

CHIEF OF NAVAL OPERATIONS  
SAFETY AND OCCUPATIONAL HEALTH BRANCH

REPORT  
TO THE  
OCCUPATIONAL SAFETY  
AND  
HEALTH ADMINISTRATION  
ON THE  
U.S. NAVY  
OCCUPATIONAL SAFETY  
AND HEALTH PROGRAM  
FOR  
FISCAL YEAR 1994

WASHINGTON, D.C. 20350-2000

Agency Annual Report  
Occupational Safety and Health Program

FISCAL YEAR 1994

|   |   |
|---|---|
| Name of Agency  | <u>Department of the Navy</u>                             |
| Name of Component   | <u>U.S. Navy</u>  |
| Address   | <u>The Pentagon</u><br><u>Washington, D.C. 20350-2000</u> |
| Number of Employees covered by this report  | <u>247,707</u> (Civilian Average)                         |
| Number of Activities covered by this report   | <u>900</u> (Approximate)                                  |
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Enclosure (1)

U.S. NAVY OCCUPATIONAL SAFETY AND HEALTH  
PROGRAM REPORT FOR FISCAL YEAR 1994

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## ATTACHMENTS

1. Major Command and Industrial Activity Performance in Meeting Occupational Injury and Illness Reduction Goals in Fiscal Year 1994
2. OPNAVINST 5100.23D, Navy Occupational Safety and Health Program Manual
3. Hazardous Material Program Automation Update
4. CNET NOTICE 5100 of 2 August 1994, Naval Occupational Safety and Health and Environmental Training Center (NAVOSH-ENVTRACEN) FY 95 Course Schedule
5. Career Development Plan for Safety and Occupational Health Personnel, NAVEDTRA 10076
6. Ergonomics in Motion, Public Works Center, Pensacola (Videotape)
7. Ergonomics at Work, Naval Aviation Depot, Norfolk (Videotape)
8. Rationale and Design for a Mishap Cost-Reduction Model for the Navy's Occupational Safety and Health Program, Report No. 93-37
9. Costs for the Department of the Navy Civilians Due to FECA: How Much Does A Case Cost?, Report No. 93-6
10. Navy Occupational Safety and Health Strategic Plan (Revised Oct 94)
11. Navy Occupational Safety and Health Program Evaluation Guide for Shore Activities
12. Part II, Federal Agency Annual Report, Safety and Health Program Activity Questionnaire

U.S NAVY  
OCCUPATIONAL SAFETY AND HEALTH PROGRAM REPORT  
FOR FISCAL YEAR 1994

**BACKGROUND**

A. REPORT COVERAGE. The average number of United States civilian employees covered by this report is 247,707 for fiscal year 1994. This number includes approximately 1400 part-time employees. Approximately 900 "activities" are covered by the report which includes organizations with civilian employees and assigned a Unit Identification Code.

B. UNIQUE AGENCY CHARACTERISTICS. The U.S. Navy activities and offices located throughout the world employing U.S. civilians. All types and forms of operations, processes, work environments and occupations exist within the Navy. We are a major national industrial employer with over 46,000 civilian employees at naval shipyards, 17,500 at aviation repair activities, and 11,700 at public works/construction activities. Our blue collar/wage grade workforce exceeds 77,000.

**PROGRAM PERFORMANCE**

A. INJURY AND ILLNESS EXPERIENCE.

1. INJURY/ILLNESS DATA.

a. WORKERS' COMPENSATION INJURY/ILLNESS STATISTICS.

Figure 1 (next page) provides a summary of our injury compensation claims experience since fiscal year (FY) 1990 for both total cases filed and lost-time cases. Attachment 1 contains a more detailed analysis of the claims for FY 1994. The data for this analysis was obtained from Office of Workers' Compensation Programs (OWCP) Federal Employees Compensation Act (FECA) Reports. As shown in Figure 1, since FY 1990, our total claims experience has declined 18.7 percent although our case rate has declined only two percent. In addition, there has been an upward trend in the total case rate since FY 1992. Our performance in reducing lost time cases has been better, with a reduction of 25 percent in cases filed since FY 1990 and a rate reduction of 9.6 percent. Figure 2 contains a summary of our compensation costs and continuation of pay costs for the last five years. While our compensation costs have risen, we have been able to reduce our continuation of pay costs by almost 44 percent. Figure 3 charts claims during FY 1993 and FY 1994 by nature of injury. Figure 4 charts actual case experience and trends for each quarter since FY 1988.

**OWCP INJURY AND ILLNESS CASES**

| Category                    | FY 90  | FY 91  | FY 92  | FY 93  | FY 94  |
|-----------------------------|--------|--------|--------|--------|--------|
| Total Injury/Illness Cases* | 19613  | 18375  | 17663  | 16980  | 15948  |
| Fatalities**                | 5      | 5      | 4      | 1      | 4      |
| Lost Time Cases             | 11929  | 10778  | 9950   | 9741   | 8955   |
| Number of Employees***      | 298998 | 290622 | 282751 | 266512 | 247707 |

**OWCP RATES OF INJURIES AND ILLNESSES PER 100 EMPLOYEES**

| Category                 | FY 90 | FY 91 | FY 92 | FY 93 | FY 94 |
|--------------------------|-------|-------|-------|-------|-------|
| OWCP Total Case Rate     | 6.31  | 6.08  | 6.00  | 6.13  | 6.19  |
| OWCP Lost Time Case Rate | 3.84  | 3.56  | 3.38  | 3.51  | 3.47  |

SOURCE OF DATA: \* OWCP FECA TABLE #2 DATA (Cases filed during FY)

                  \*\* NAVAL SAFETY CENTER OCCUPATIONAL INJURY DATA BASE

                  \*\*\* NAVY CIVILIAN PERSONNEL DATA SYSTEM (NCPDS)

FIGURE 1

**WORKERS' COMPENSATION CHARGEBACK DATA**

| Category                       | CBY 90    | CBY 91    | CBY 92    | CBY 93    | CBY 94    |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|
| a. Cases with Chargeback Costs | 42891     | 41842     | 41150     | 40820     | 38387     |
| b. Total Cost (\$K)            | \$201,114 | \$207,944 | \$222,549 | \$232,294 | \$243,164 |
| c. Cost Per Case               | \$4,689   | \$4,970   | \$5,408   | \$5,691   | \$6,334   |

**CONTINUATION OF PAY (COP)**

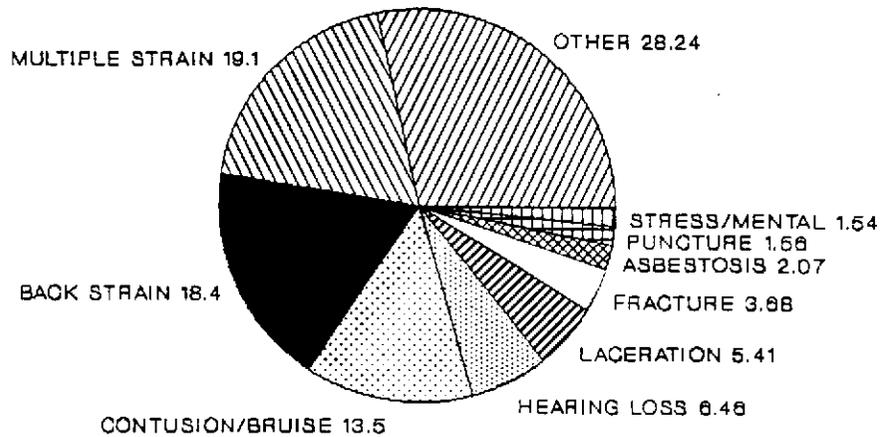
| Category                    | FY 90   | FY 91   | FY 92   | FY 93   | FY 94   |
|-----------------------------|---------|---------|---------|---------|---------|
| a. COP Cases                | 11488   | 9822    | 8583    | 8423    | 10866   |
| b. COP Cost (\$)            | 9513456 | 8426645 | 7658968 | 6668430 | 5336816 |
| c. COP Days Off (work days) | 113442  | 102789  | 90233   | 66895   | 51558   |
| d. Avg. COP Days Off        | 9.87    | 10.46   | 10.51   | 7.94    | 4.74    |

SOURCE OF DATA: \* OWCP CHARGEBACK TAPES

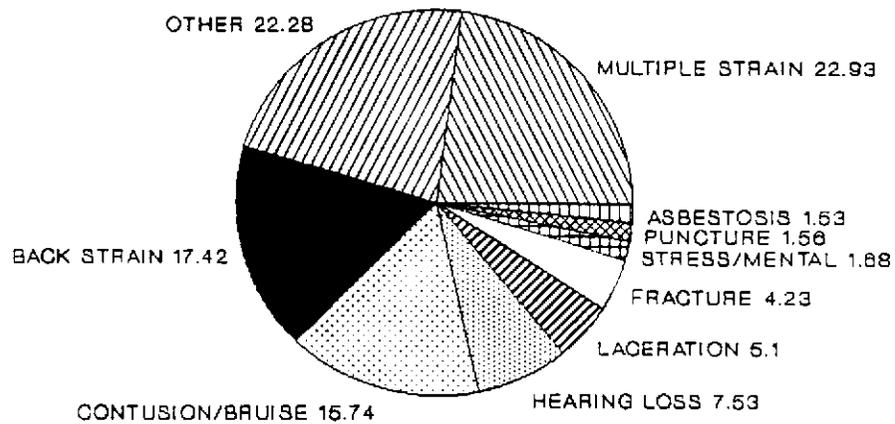
                  \*\* DEFENSE FINANCE AND ACCOUNTING CENTER DATA

FIGURE 2

# NATURE OF INJURY FISCAL YEAR 1993 (By %)



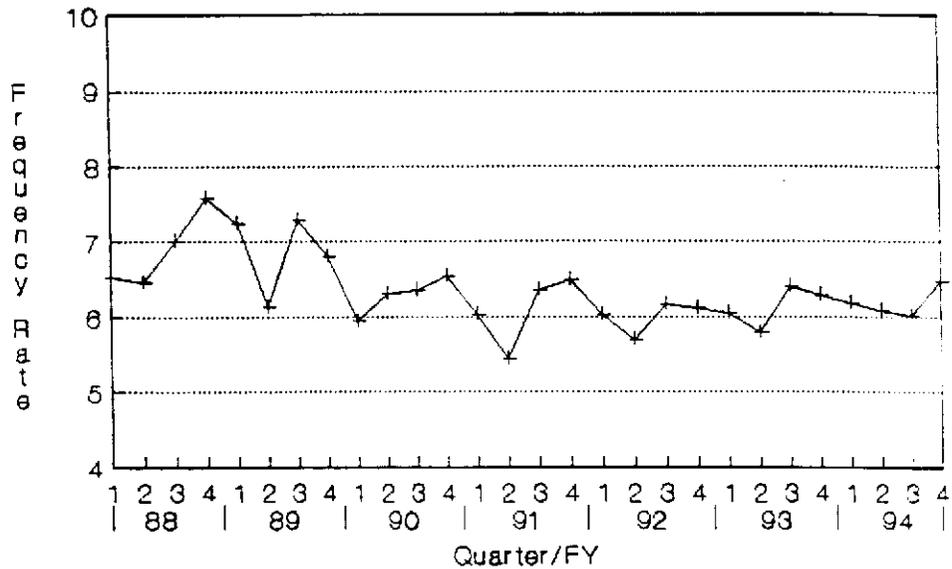
# NATURE OF INJURY FISCAL YEAR 1994 (By %)



Source: FECA Table #2 Data

FIGURE 3

## NAVY CIVILIAN INJURY CASE RATE CHART



Source: OWCP FECA Table #2 Data

## NAVY CIVILIAN INJURY CASE RATE TREND CHART

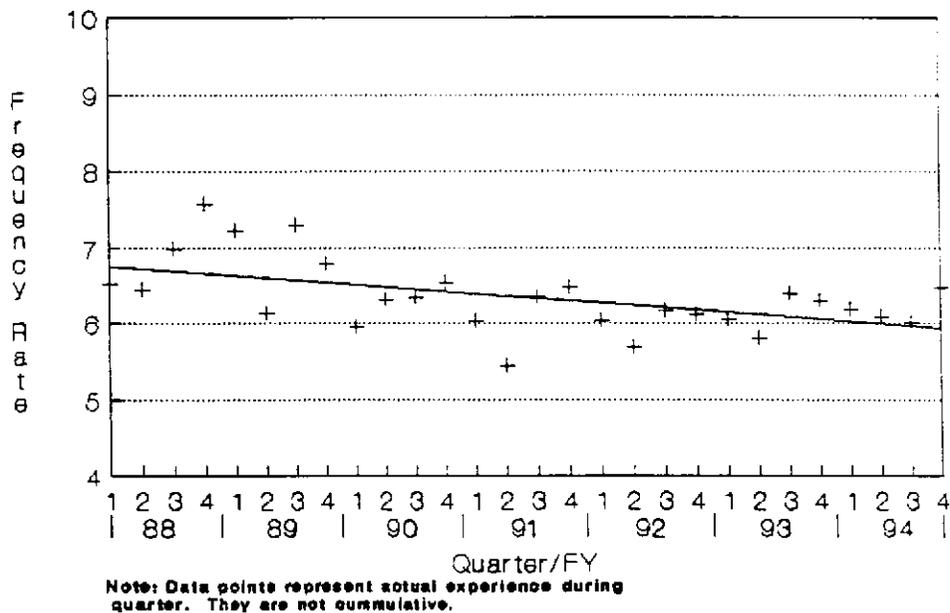


FIGURE 4

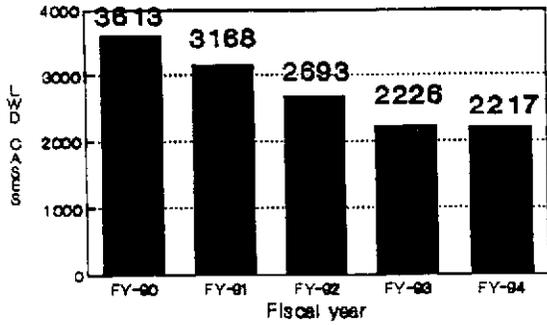
b. MISHAP STATISTICS. Figure 5 on the next page contains case and trend data for occupational lost workday mishaps and occupational fatalities. This information is based on reports submitted by activities to the Naval Safety Center, and varies significantly from FECA reports since it is based only on valid occupational injuries/illnesses that occurred during the fiscal year and resulted in five or more lost workdays (rather than all cases filed during the year). For reporting and analysis purposes, we use the term lost workday case vice lost time case. A lost workday case is a case where more than 8 hours of work time is lost after the day of injury. We require mishap reports to be submitted to the Naval Safety Center for all cases involving five or more lost workdays. Our fatality database also contains only valid occupational U.S. Naval civilian fatalities that actually occurred during the fiscal year. The information that follows also comes from our Naval Safety Center mishap database.

## 2. ANALYSIS OF OCCUPATIONAL MISHAP REPORTS FOR FY 1994.

a. Although the number of Navy civilian lost workday cases has decreased significantly since FY 1989, our case rate rose in FY 1994 above the level of FY 1993. This performance is consistent with our experience with FECA claims. After long term and substantial declines in cases and case rates since FY 1984, in FY 1994 we experienced increases in some mishap measurement factors. This change may be attributable to the impact of downsizing and base closure. As revealed in Attachment 1, substantial increases in claims have occurred at some industrial activities facing closure. Approximately 48 percent of our lost workday cases reported in FY 1994 occurred at our naval shipyards, naval aviation depots, and public works center. This represents an increase from FY 1993 in the ratio of cases at these activities in comparison to the rest of the U.S. Navy (the FY 1993 percentage of cases was 40). These activities employ slightly over 30 percent of the Navy civilian workforce.

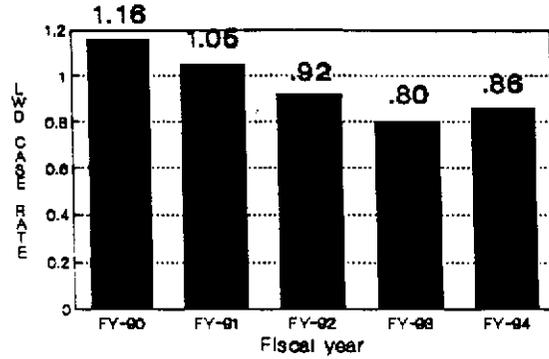
b. As shown in Figure 5, the Navy experienced four occupational fatalities in FY 1994. Additionally, there were two civilian fatalities as a result of motor vehicle accidents. One occupational fatality involved a high voltage electrician who died from burns as a result of an electrical explosion during installation of circuit breakers; a material handler died from internal injuries resulting from being struck by a tow tractor and pinned against a door; a rigger died from a blow on the head when a crane hook block hoist rope parted and fell on him; and a police officer assisting local police in an area of concurrent jurisdiction died when struck by an intoxicated passing motorist. The motor vehicle fatalities involved a civilian driving a government motor vehicle off base which left the road and struck a tree; and a civilian on travel who died when he fell asleep while driving a rental car and the car went off the road and overturned.

### LOST WORKDAY CASES 5 OR MORE LOST WORK DAYS



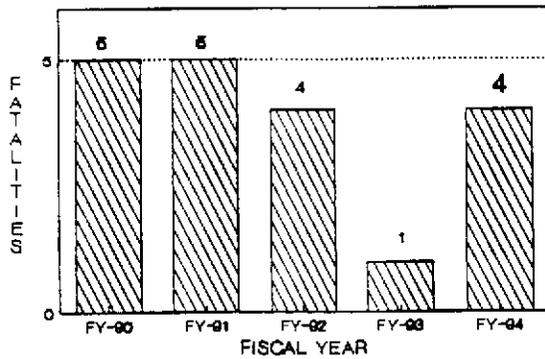
\*FY-04 DATA NOT COMPLETE

### LOST WORKDAY CASE RATES- Per 200,000 Hours Worked



\*CASES WITH FIVE OR MORE LOST WORK DAYS

### FATALITIES



Source: Naval Safety Center Mishap Data

### FATALITY RATES (PER 200,000 HOURS WORKED)

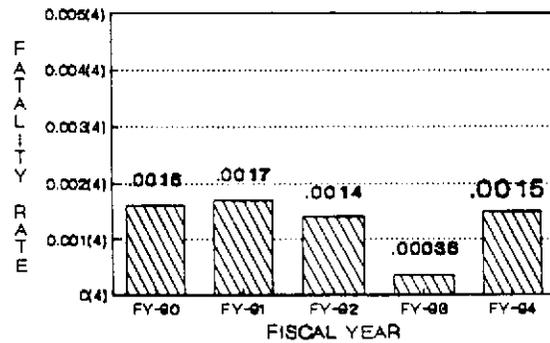


FIGURE 5

c. Figures 6 through 8 provide charts based on the analysis of data of our serious lost workday mishaps. There are no significant trends or changes from past years. The majority of lost work day mishaps continue to result in strains and sprains (50.3 percent), overexertion continues to be the most frequent source of injury (32.6 percent), and backs continue to be the most frequent body part injured (32.2 percent). As in past years, the most frequent type of work being performed when injury occurs is industrial, accounting for approximately 25.6 of lost workday cases. 24.4 percent of the lost workday cases occurred while walking or stepping.

## FY-94 LOST WORK DAY CASES (5 or more days lost)

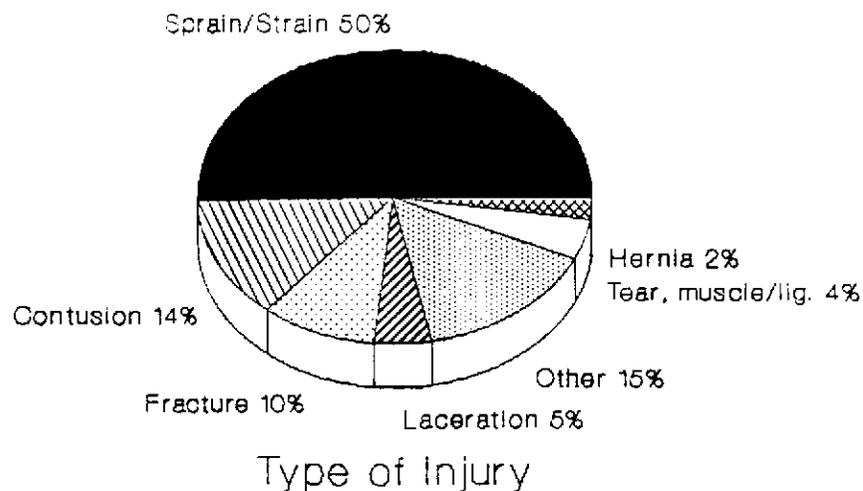


FIGURE 6

# FY-94 LOST WORK DAY CASES (5 OR MORE DAYS LOST)

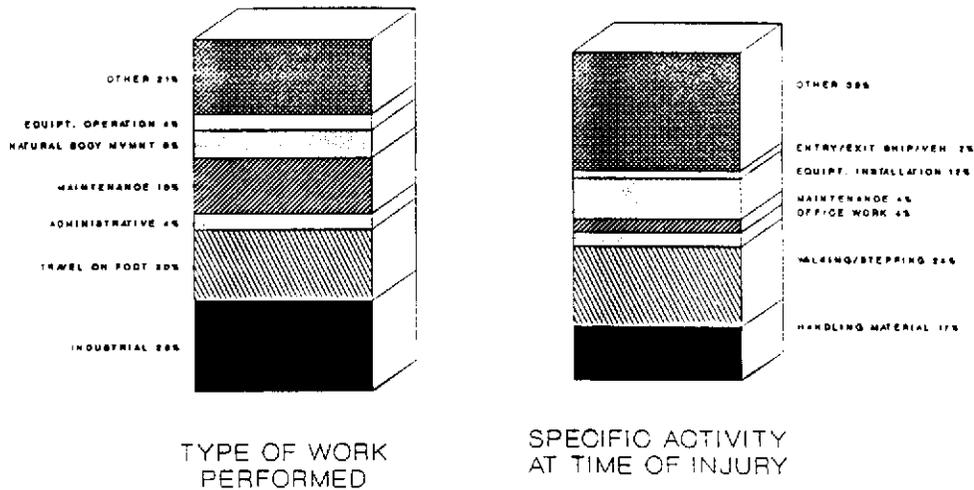
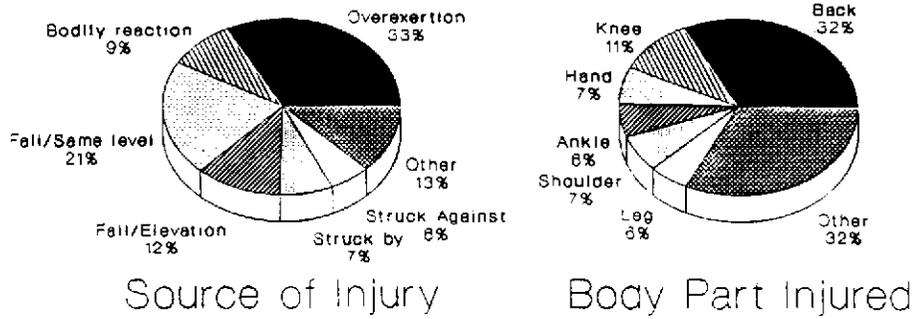
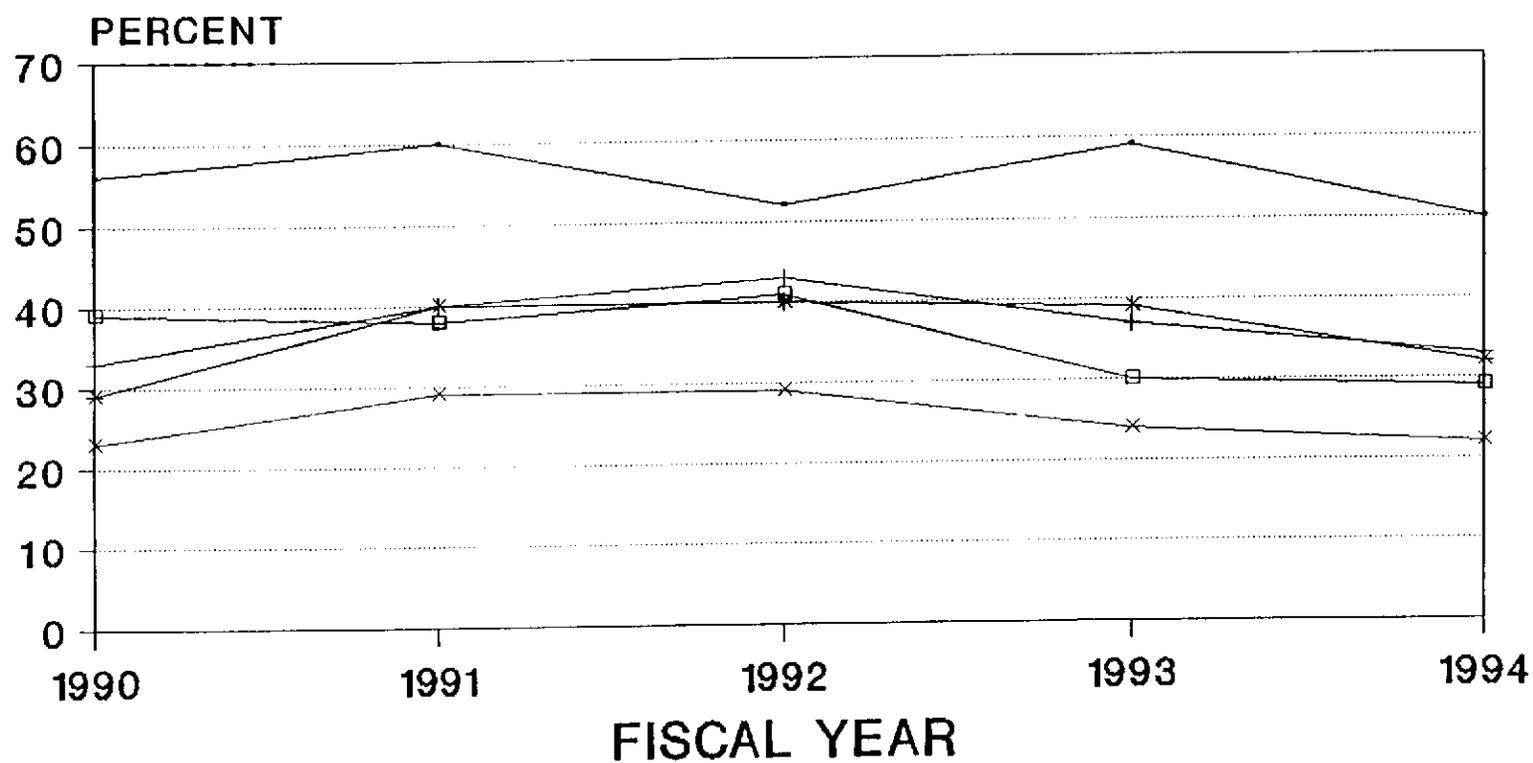


FIGURE 7

# SELECTED INJURY/ILLNESS TRENDS

## FY 1990 THROUGH FY 1994



—●— Strain/Sprain      —+— Overexertion      —\*— Back Injury  
 —□— Mat. Handlg Work      —x— Lifting/Moving Matl.

9  
 FIGURE 8

B. SIGNIFICANT OSH ACCOMPLISHMENTS AND INITIATIVES. Our programs and initiatives have been directed to reducing our claims and mishap experience and improving the overall working environment for our employees. Our interest is in both reducing costs and improving employee well-being. We have used detailed analyses of our mishap, claims and inspection experience to target program initiatives. The following discussion outlines major programs and initiatives last year.

1. WORKPLACE HAZARDS.

a. MISHAP REDUCTION INITIATIVES. We continued to incorporate quality management concepts into our efforts to attain overall OSH program improvement. In addition to our initiatives under the NAVOSH Strategic Plan as discussed later in this report, our principle reduction initiative with commands and activities is to get them to develop program improvement plans tied to mishap reduction. Our concept, as explained in past years, is called OSHPIP (Occupational Safety and Health Program Improvement Plans). Under the concept, each command identifies its program deficiencies and mishap trends, and develops strategies and actions to improve the programs and processes. Previous reports have explained this program in more detail and our report last year provided an example of a command OSHPIP. Figure 9 on the next page summarizes OSHPIP. In FY 1994, we completed our fifth year of this program. Through OSH quality management boards and process action teams, our industrial commands have made significant achievements in hazard control. The following summarizes many of our initiatives aimed at reducing mishap/claims experience and associated costs:

- Our initiative to automate OWCP FECA injury data at the Naval Safety Center was completed. We now generate reports by major command of all FECA claims filed during a fiscal quarter, with levels of employment and frequency rates for total and lost time cases. In addition, the reports provide a nature of injury summary by command, and summary performance charts for major commands and industrial activities. These reports are forwarded to the commands for review, validation and analysis. We will begin efforts to enhance this program in FY 1995.

- In addition, we continue to develop and provide quarterly performance reports tied to overall reduction goals with performance charts and guidance for goal attainment. Attachment 1 is an example of the data analysis we provide commands each quarter in monitoring their performance in reducing cases. In FY 1989, we established baseline claims rates for commands using the total claims rate, and we have monitored performance since that year.

- Continuing our improvement efforts in mishap investigation as discussed last year, we have provided improved training, revised reporting forms to identify cumulative trauma disorders, and established a mishap review board to periodically review significant occupational mishaps.

# OSHPIP: THE CNO APPROACH

## OPNAVINST 5100.23D, CHAPTER 5

OCCUPATIONAL SAFETY AND HEALTH PROGRAM IMPROVEMENT PLAN (OSHPIP) IS THE CNO APPROACH TO MISHAP REDUCTION USING TOTAL QUALITY MANAGEMENT/LEADERSHIP CONCEPTS, OSHPIP:

- FOCUSES ON ACTIONS BY HEADQUARTERS COMMANDS AND FIELD ACTIVITIES TO IMPROVE PROGRAMS.
- ACTIONS MUST BE TIED TO OVERALL NAVY STRATEGIES AND GOALS FOR REDUCING MISHAPS
- PLANS MUST OUTLINE ACTIONS THAT WILL IMPROVE PROCESSES
- STATISTICAL PROCESS CONTROL (SPC) EMPHASIZED
- CNO MONITORS IMPLEMENTATION OF PLANS

## OSHPIP PROCESS

- OBJECTIVE IS TO IMPROVE THE PROGRAM/PROCESS.
- ACTIVITY EVALUATES/ANALYZES ITS OWN ENVIRONMENT (MISHAPS, HAZARDS, RISKS, PROCESSES)
  - IDENTIFIES/DETERMINES AREAS OF IMPROVEMENT (OBJECTIVES)
  - DEVELOPS STRATEGIES FOR IMPROVEMENT
  - DEFINES SPECIFIC ACTIONS TO ACHIEVE IMPROVEMENT AND METHODS OF PERFORMANCE MEASUREMENT
- TARGET DATES FOR COMPLETION (LONG AND SHORT TERM)
- ONGOING REVIEW (CONTINUOUS IMPROVEMENT)

OSHPIP REQUIRES:

- GOOD DATA - MISHAPS/INSPECTIONS/ETC.
- GOOD ANALYSIS OF DATA
- ACHIEVABLE STRATEGIES
- MEANINGFUL ACTIONS TIED TO PROGRAM IMPROVEMENT
- REALISTIC MEASUREMENT CRITERIA
- COMMAND SUPPORT/WORKER/EXPERT INVOLVEMENT

FIGURE 9

• We continued to provide sophisticated analytical training for mishap investigators. This training covers the investigation process and various analysis techniques including Management Oversight and Risk Tree Analysis (MORT). In addition, we continued distributing standard analytical software for data analysis, specifically for statistical process control (SPC), and training in SPC from a safety standpoint.

b. MISHAP INVESTIGATION AND REPORTING. We completed our second year under our totally revised occupational mishap investigation, recording and reporting program as described in Chapter 14 of Attachment 2. Our new program provides a new investigative report which emphasizes quality investigation and identification of causal factors. We have greatly enhanced our initiative of team investigation of our most serious mishaps and have been providing our safety professionals specialized training in investigation techniques. Two types of training are now provided: a basic mishap investigation course for safety specialists and supervisors/managers; and the advanced course mentioned above for team investigations of fatalities and other significant mishaps. Various handouts and publications on mishap investigation and reporting were developed and distributed.

c. INSTRUCTIONS. NAVY OCCUPATIONAL SAFETY AND HEALTH (NAVOSH) PROGRAM MANUAL, OPNAVINST 5100.23D. We completed and issued a revised NAVOSH Manual during the year. A copy is provided in Attachment 2. New NAVOSH standards were developed on bloodborne pathogens, reproductive hazards and indoor air quality. In addition, significant changes were made to our standards on training, hazardous materials and confined space entry. Specific actions relative to these program elements are discussed elsewhere in this report.

d. HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M)

• We continued implementation of our Hazardous Material Control and Management (HMC&M) Program during the year. The HMC&M program is designed to establish life cycle control of hazardous material in compliance with OSHA Hazard Communication and EPA environmental regulations. Our intent is to limit the number and quantities of hazardous material used, reduce levels of hazard, and thus significantly reduce hazardous waste generation and costs.

• The HMC&M section of the NAVOSH Manual, Chapter 7, was substantially revised to add a sample Hazard Communication Plan, add detailed training outlines and requirements, include guidance of the Department of Defense Hazardous Material Information System, more clearly define responsibilities, and to specify training courses. Our training courses in hazardous material control both ashore and afloat were also revised and enhanced by the Navy OSH and Environmental Training Center (NAVOSHENVTRACEN).

● Improvement and expansion efforts were made for the Hazardous Material Inventory Control Systems (HICS). This automated system is designed for management control of hazardous material at the activity level. HICS has been approved for Navywide application.

● A significant new initiative which is being applied Navywide is the Consolidated Hazardous Material Reutilization and Inventory Management Program (CRIMP). As part of our HMC&M and pollution prevention programs, hazardous material reuse stores are being established on a regional basis throughout the U. S. Navy. The establishment of these stores will facilitate minimization of storage at activities, result in a significant reduction in disposal of certain types of material, and as a result, cause a significant reduction in material waste. Attachment 3 provides more details on the program.

● One other hazardous material safety automation effort to be noted is the Technical Screening Expert System (TSES). TSES is a program designed to assure hazardous material information is available and incorporated into technical specification processes. TSES is also outlined in Attachment 3.

e. CRANE SAFETY. Due to both our mishap experience in recent years and reported hazards, a major review of our crane safety program was initiated during the year. The Naval Inspector General (NAVINGEN) was requested to conduct an extensive and detailed inspection/evaluation of the crane safety program. Inspection teams were sent worldwide to review activity and command programs and identify areas for improvement. The report of this review should be released early in FY 1995. The report will be used to initiate action Navywide to improve this program.

## 2. SAFETY AWARENESS AND HAZARD RECOGNITION.

a. THE NAVOSH TRAINING PROGRAM. Substantial revisions were made to NAVOSH training requirements in OPNAVINST 5100.23D, Attachment 2. Our approach is to define specific courses that must be taken to meet various training requirements in 29 CFR 1960, as well as NAVOSH standards. Following the Zero-based training review and other reorganization actions reported last year, core training curricula for OSH professionals was defined, and courses were revised. The NAVOSH manual now clearly states what courses or subject matter must be taken in order to perform various OSH functions. The following is a summary of additional training accomplishments and initiatives in FY 1994:

(1) A greatly revised and expanded training program for OSH professionals and personnel involved in various aspects of the OSH program was developed as identified in Attachment 4. New courses provided include Introduction to NAVOSH Ashore, Safety Training Methods, Laser System Safety Officer, Aviation Safety Petty Officer. In addition to adding new courses to meet

training needs, a tuition reimbursement program was developed to better facilitate personnel taking needed courses when insufficient demand exists to support Navy development or presentation of classes. We also issued our Career Development Plan for Safety and Occupational Health Personnel, Attachment 5. This plan was developed to define the skills, abilities and knowledge (SKA's) needed to perform in the OSH profession; identify training subject matter to meet these SKA's; identify sources for such training; provide guidance for individual development plan preparation; and provide clearly structured plans for the training of OSH personnel.

(2) We continue to oversee the training process through the NAVOSH Training Steering Committee which acts as the quality management board (QMB) for safety and occupational health training. It is established through the Naval Training Plan (NTP) as a means of providing broad command input in the training process. The Steering Committee is supported by four working groups (acting as process actions teams (PATs)) representing the four communities in the Navy (air, ships, submarines and shore). Through these groups, requirements are identified, defined and incorporated into the NTP for development and implementation. Numerous changes were made to the NTP action plan during the year based on reviews and recommendations made by the working groups. The steering committee was also made the QMB for the NAVOSH Strategic Plan strategy for training, which is discussed later in this report. In addition to the NAVOSH Strategic Plan, the Naval OSH and Environmental Training Center developed its own internal plan as reported last year.

(3) In our efforts to improve the coordination and quality of training, the U.S. Navy continued to chair the Department of Defense Subcommittee on Safety, Occupational Health and Fire Protection Training. The subcommittee developed a catalog of all standard OSH courses in DOD, identified core professional development needs and requirements for OSH personnel within DOD, developed a coordinated list of specific training needs from the OSHA Training Institute; and began initiatives to better coordinate training development and delivery between services.

(4) Prerequisites and quota control mechanisms were developed for all NAVOSH training courses to better assure training is directed to the proper individuals and better manage our resources.

(5) We continued our emphasis on significantly improving training, especially afloat, with continued course review, and development of standard videotapes for distribution to both fleet and shore commands. In addition, a project was initiated to revise and convert computer assisted instruction courses in OSH for future distribution to field activities.

(6) We developed a standard format for conducting annual training needs assessments to determine professional development needs for our safety and occupational health professionals. In addition, a study was commenced to determine OSH training needs at the activity level.

(7) Finally, we conducted our most successful NAVOSH Conference with approximately 250 personnel in attendance. The conference included lectures on injury compensation management, mishap and compensation cost estimation and reduction, base closure safety, the NAVOSH Strategic Plan, how to create a total safety culture, leadership, hazardous material management, and hazard correction. In addition, special seminars were provided for statistical process control and respiratory protection program management.

b. ERGONOMICS. Our initial ergonomics standard was issued in 1989 and was revised in 1994. In implementation of these program requirements, many actions have been taken by commands and especially our industrial activities to develop comprehensive ergonomics programs. These efforts have been very successful through using TQM concepts and worker involvement. In fact, our most successful programs have been driven by a cooperative effort between management and workers which encourages workers to identify and develop ergonomic solutions to workplace stressors. Attachments 6 and 7 are videotapes developed at two of our industrial activities on ergonomics and will explain the approach of worker/management cooperation in ergonomics program development. We have begun a process to develop a broad based implementation plan that will expand the concepts in these videotapes throughout the U.S. Navy. Our emphasis will be on expanding training of managers, ergonomics coordinators, and worker ergonomics teams.

3. PROGRAM EFFECTIVENESS. In addition to our programs and initiatives on inspections and the NAVOSH Strategic Plan as discussed elsewhere in this report, we continued our major effort to develop a mishap cost-reduction model for the NAVOSH program. Attachments 8 and 9 provide copies of reports on this project. We are developing a model for long term mishap/case cost projection as well as model for activity performance analysis and comparison. We believe this effort has application throughout the Federal government and will provide very useful tools for OSH program analysis. As you will note in Attachment 9, through work with private actuarial organizations, we have developed a compensation cost projection model which can be used to estimate the true costs of an injury (compensation claim) and project the long term costs for the government. This model can also be used to focus case management and mishap prevention efforts to those cases that have the greatest potential cost (and savings) to the government. We will continue the development of these models for use throughout the U.S. Navy and, hopefully, for evaluation by the Department of Labor.

4. SAFETY AND HEALTH PROBLEMS. BASE CLOSURE AND DOWNSIZING. The impact of downsizing and base closure on occupational safety and health programs and occupational mishap claims continues to be a major concern. The maintenance of professional OSH staffs and strong mishap prevention programs is a significant problem at bases being closed, and we are seeing increases in claims at many bases facing closure. Due to our concern about the maintenance of strong occupational safety and health programs during a period of downsizing, we issued clear guidance to our commands in 1992 and 1993. Copies of this guidance was provided in previous reports. At our NAVOSH conference this year, we dedicated one afternoon to the discussion of base closure issues, and distributed a safety and health program guide for use at bases being closed. Our NAVOSH Quality Council has established a team to review this issue and with a task to develop an expanded Navywide guide for use in managing the OSH program at bases facing closure. The Council is also reviewing the concept of establishing regional OSH support offices for bases being closed.

5. ENHANCEMENTS. We are using and stressing total quality management (TQM) concepts in our management of the NAVOSH program. This is our primary overall method to increase employee participation and involvement in the program. As part of this process, changes were made in the NAVOSH Manual addressing the use of TQM processes as discussed in our report last year. In addition, as discussed later in this report, we have established a NAVOSH Quality Council, a NAVOSH Strategic Plan, and a variety of Quality Management Boards and Process Actions Teams. TQM concepts have been especially valuable to involvement in ergonomics as discussed in Section B. 2. above. In addition, we continue to pursue behavior based worker safety projects which are based on employees leadership and involvement. As discussed elsewhere in this report, we issued a revised NAVOSH manual and took numerous actions to improve OSH training.

6. RESOURCES.

a. WORKPLACE HAZARD ABATEMENT. THE NAVOSH DEFICIENCY ABATEMENT PROGRAM. An integral part of our mishap prevention program is the correction of workplace hazards identified during inspections, investigations, evaluation, oversight inspections, and as a result of employee hazard reports. Our program to correct hazards and improve the workplace is explained in the NAVOSH Program Manual (OPNAVINST 5100.23D, Chapter 12). The Naval Facilities Engineering Command (NAVFAC) has lead responsibility for administering our centrally funded and managed program to abate major deficiencies.

● In order to improve and redirect this program, responsibilities for program administration were shifted and a full-time program management position was created and filled in FY 1994. This position was established as a project manager and

point of contact for coordination of all hazard abatement efforts between major commands, facilities engineering field divisions and activities. Subsequently, a program workshop was conducted during the year with command managers and engineering field division staff to educate all cognizant personnel on the hazard abatement process, and gain their support and assistance in identifying projects and process improvements for the future.

- A major and complete review of all projects in the program was conducted during the year. As part of this review, the priorities for funding were reassessed, and unfunded requirements were reexamined. This review, named a baseline assessment memorandum (BAM) resulted in a revalidation of projects in the program, establishment of new priorities for project execution, and identification of and programming action for unfunded requirements. The BAM is being revised for future budget action.

- Expenditures in FY 1994 under the centrally funded NAVOSH Deficiency Abatement Program were \$10.6 million for approximately 95 projects, including individual facilities projects, and several program improvement studies or projects. From 1979 to 1994, over \$275 million has been expended under our centrally managed program to correct serious workplace deficiencies, and over 1470 major facility projects have been completed. Projects funded include asbestos removal, industrial ventilation improvements, noise abatement, electrical safety hazard removal, and hazardous material control and storage. To qualify for central funding, the cost of a project must exceed \$15,000.

- Outyear target projections for the NAVOSH Deficiency Abatement Program are as follows:

|       |                |
|-------|----------------|
| FY 95 | \$ 9.6 million |
| FY 96 | \$10.3 million |
| FY 97 | \$10.4 million |
| FY 98 | \$10.6 million |
| FY 99 | \$10.8 million |

Program focus in FY 1995 will be to continue to improve service to shore activities in executing local deficiency abatement projects; to streamline the process for acquiring and distributing funds; and to refine the overall process to insure the most hazardous deficiencies are corrected first. In addition, during the year, we will conduct a second program workshop for command managers, and continue to offer our course to train local asbestos program coordinators in asbestos management practices.

b. RESEARCH AND DEVELOPMENT. Our main OSH project in this area remains the mishap cost reduction model mentioned previously in this report. However, various activities have conducted a variety of research studies on ergonomics, facility design, and hazardous material.

c. DATA SYSTEMS. A major strategy in the NAVOSH Strategic Plan concerns communications and information systems. We are commencing a multi-year study to determine our needs, identify systems, and provide a comprehensive and coordinated NAVOSH information system. In addition, we continue to sponsor the Navy Occupational Health Information Management System (NOHIMS) at Naval Shipyards. This system will be maintained until a DOD-wide system is developed under the DOD Corporate Information Management (CIM) program. A CIM committee for occupational health was formed in 1992 and tri-service meetings have been on-going. We have been actively participating in this committee and its efforts to develop a model automated occupational health system. In addition, we have actively participated in the tri-service CIM effort to complete an automated hearing evaluation and audiometric test reporting system.

d. STAFFING. Our only significant staffing related action in 1994 relates to our ongoing effort to develop revised occupational health staffing standards. Revised staffing standards for industrial hygienists, technicians, laboratories, physicians and occupational health nurses were finalized and incorporated into the NAVOSH Manual, Chapter 3 (see Attachment 2). Concern exists about maintaining appropriate staffing levels at activities undergoing base closure or significant downsizing, and, as discussed in Section B.4. above, this issue is under review by the NAVOSH Quality Council. One approach under review is to establish regional offices to provide professional OSH support to activities facing closure, as well as action to assure staffing and other OSH issues are included in base closure plans.

e. TRAINING. As a result of last years efforts to clearly identify training needs and funding requirements, a total of \$1.7 million was provided under the NAVOSH program for the Naval Safety School (renamed the Naval OSH and Environmental Training Center) in FY 1994. Continuing action is underway through the POM budgeting process to obtain additional funding to cover all known NAVOSH training needs ashore and afloat.

## PROGRAM PLANNING

A. GOALS AND OBJECTIVES. THE NAVOSH STRATEGIC PLAN. During 1993 we undertook a major initiative to develop a strategic plan for the NAVOSH program. A copy was forwarded last year as Attachment 8 to our report. As part of the strategic planning process, the NAVOSH Quality Council was established with membership representing safety and occupational health professionals throughout the U.S. Navy. The Council developed the NAVOSH Strategic Plan which contains our long term mission, vision and guiding principles for NAVOSH.

1. The plan encompasses four major strategies on communications and information systems, process review and measurement, planning and engineering, and training and education. For each strategy, specific goals and objectives have been developed and a timetable for goal accomplishment is established.

2. For each strategy, a quality management board (QMB) has been established with supporting process action teams, where appropriate, to facilitate development and implementation of the strategies and goals.

3. The NAVOSH Strategic Plan provides our program goals and objectives for the next five years. During FY 1994, the QMB's and NAVOSH Quality Council met regularly working on implementation of strategic plan goals and objectives. As a result, a revised strategic plan was issued. Attachment 10 provides a copy of the revised plan with status of objectives.

4. In the area of occupational health, and as part of our strategic planning process, the Bureau of Medicine and Surgery OSHPIP established a series of process action teams for occupational health program improvement. Some of the actions underway under the OSHPIP include improving the inspection and evaluation process, improving medical case management, establishing a process for regulatory review and impact assessment, improving the budget and budget execution process, and improving and standardizing the afloat industrial hygiene survey process.

B. CORRECTIVE ACTION PRIORITIES. Our primary method for identifying and accomplishing mishap prevention program priorities is through OSHPIP as discussed earlier in this report. We use risk assessment codes (RAC) to determine priorities for workplace hazard correction. RAC is described in Chapter 12 of the NAVOSH Manual, Attachment 2. As stated above, overall priorities for the NAVOSH program are addressed by the strategic plan and through the NAVOSH Quality Council.

C. SIGNIFICANT INITIATIVES. Figure 10 and the next page summarizes what we consider to be our significant initiatives for 1995. These initiatives are discussed throughout this report. In addition, we have several initiatives relative to occupational health to be noted:

- We issued a new instruction on the management of infectious waste. This instruction provides standards for waste management at medical and dental facilities, and is designed to ensure wastes are properly handled on-site and in transport and disposal.
- A reproductive hazard review board was convened with the mission of updating our reproductive hazards technical manual, providing an annual list of known reproductive hazards, maintaining a file of known stressors not included on the list, reviewing training aids on the subject, and reviewing legal and regulatory issues.
- We established a Navy lead based paint working group, coordinated efforts with the Environmental Protection Agency on lead based paint rule making, and worked with an interagency task force on lead based paint in housing. Our efforts have been designed to ensure effective protection of our personnel through risk assessment and management.

# CNO PRIORITY NAVOSH ACTIONS

- ✓ STRATEGIC PLAN IMPLEMENTATION
- ✓ UPDATED NAVOSH TRAINING PLAN
- ✓ MISHAP INVESTIGATION/REPORTING PROGRAM IMPROVEMENT
- ✓ HMC&M IMPLEMENTATION
- ✓ SPECIAL EMPHASIS AREAS

## SPECIAL EMPHASIS AREAS

- ✓ ERGONOMICS
- ✓ PERFORMANCE/COST MEASUREMENT
- ✓ JOB HAZARD ANALYSIS/SAFETY APPRAISAL
- ✓ OCCUPATIONAL HEALTH PROGRAM IMPROVEMENT
- ✓ CRANE SAFETY
- ✓ HAZARD ABATEMENT
- ✓ CONFINED SPACE SAFETY

FIGURE 10

## PROGRAM EVALUATION

A. **THE NAVY INSPECTION PROGRAM.** Our three tiered inspection process has been designed not only to ensure compliance with Federal and Navy standards and policies, but also to assess the overall effectiveness of programs and implementation.

- At the first tier, activities are required to maintain local inspection programs that include the inspection of all workplaces at least annually by qualified professionals; the risk assessment of all workplaces to determine if greater frequency of inspection is required; job hazard analyses for hazardous operations; and as warranted by the level of risk, more frequent inspection based on documented schedules. All hazards identified during inspections must be properly recorded and reported, and entered into abatement programs for correction. Activities must also conduct internal reviews of program effectiveness.

- The second tier is at the command level where commands are required to conduct periodic (at least once every three years) OSH program management evaluations of their subordinate activities. These evaluations are structured to review program management and its effectiveness.

- The third tier and our primary monitoring device to measure program effectiveness is the NAVOSH Oversight Inspection Program. This program continues to be the core of our compliance efforts and is managed under the auspices of our Inspector General. Since its inception in 1979, over 1400 oversight inspections have been conducted. Figure 11 below provides summary information charts on this program.

### NAVINGEN OSH OVERSIGHT INSPECTIONS

|      | Satisfactory | Marginal | Unsatisfactory |
|------|--------------|----------|----------------|
| FY83 | 56 (64.3%)   | 13       | 18             |
| FY84 | 70 (76.9%)   | 10       | 11             |
| FY85 | 80 (80.8%)   | 9        | 10             |
| FY86 | 82 (81.2%)   | 15       | 4              |
| FY87 | 87 (82.9%)   | 13       | 5              |
| FY88 | 88 (87.2%)   | 7        | 6              |
| FY89 | 94 (94.0%)   | 1        | 5              |
| FY90 | 93 (96.9%)   |          | 3              |
| FY91 | 93 (91.2%)   |          | 9              |
| FY92 | 98 (85.1%)   |          | 5              |
| FY93 | 99 (97.0%)   |          | 3              |
| FY94 | 96 (97.0%)   |          | 3              |

\* Marginal ratings stopped after FY89

OSH OVERSIGHT INSPECTION RESULTS  
FISCAL YEARS 88 TO 94

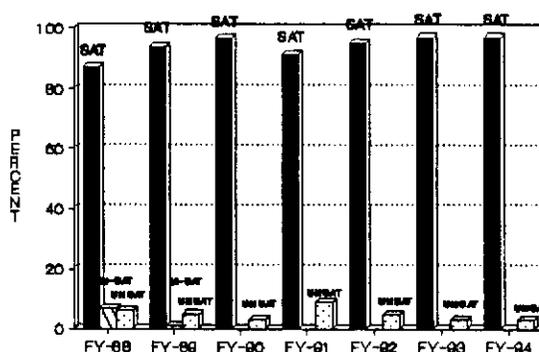


FIGURE 11

1. During FY 1994, 99 oversight inspections were conducted at our shore activities. These inspections were "unannounced" (less than 30 days notice) and conducted by teams of professional safety and industrial hygiene personnel. We have issued detailed evaluation guides for inspections which outline each program requirement. Attachment 11 provides the latest version of our evaluation guide. On each oversight inspection, 25 administrative program elements are reviewed for compliance, and oversight walkthrough reviews of worksites are made to evaluate program implementation and compliance with standards at the work unit level. In addition, there are 16 supplemental program elements that are reviewed where applicable.

2. Since FY 1989, we have used a quantitative scoring system to rate the compliance status of the NAVOSH program at each activity inspected. Administrative and workplace compliance are weighed equally in scoring, and an overall score of 75 or higher is required for a satisfactory rating. We have now completed five years of inspections under the quantified scoring system and feel we have good baseline data to measure future inspection trends. As shown in Figure 12 below, the mean score for FY 1994 was 88 percent which is consistent with the mean scores since 1989. Our satisfactory rating level for FY 1994 was 97 percent.

## NAVINGEN OVERSIGHT INSPECTIONS FISCAL YEAR 1990 TO 1994

|                   | <u>1990</u> | <u>1991</u>  | <u>1992</u>  | <u>1993</u>  | <u>1994</u> |
|-------------------|-------------|--------------|--------------|--------------|-------------|
| INSPECTIONS       | 85          | 87           | 90           | 88           | 92          |
| REINSPECTIONS     | 1           | 5            | 8            | 7            | 3           |
| FOLLOWUPS         | 10          | 10           | 5            | 7            | 4           |
| TOTAL INSPECTIONS | -----<br>96 | -----<br>102 | -----<br>103 | -----<br>102 | -----<br>99 |
| MEAN SCORE        | 88.0        | 87.0         | 88.0         | 89.0         | 88.0        |

FIGURE 12

3. We feel our oversight inspection program is without peer and serves as a driving force in our efforts to provide safe and healthful workplaces for all Navy personnel. We continually try to improve and enhance this program. Formal reports are issued by the Inspector General for each inspection, and submitted to the Secretary of the Navy. Attention and concern is high at all levels of command for this program.

4. As you can see in Figures 11 and 12, compliance and performance has remained relatively consistent since FY 1990. A summary of the findings of these inspections reveals workplace deficiencies in rank order were electrical safety, hazardous material control and management, machine guarding, walking/working surfaces, and respiratory protection. The most frequently observed program deficiencies were training, hazardous material control and management, command support, hazard abatement, and mishap investigation. Figure 13 below charts information on deficiencies observed during inspections.

5. Our inspection special emphasis areas for FY 1995 are hazard abatement management, ergonomic program development, mishap analysis, weight handling equipment safety, and confined space program management.

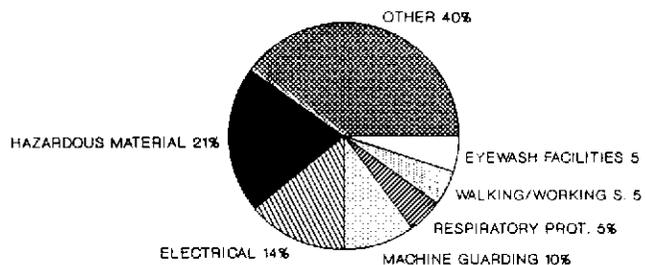
**MOST FREQUENT PROGRAM DEFICIENCIES  
FY-90 THROUGH FY-94**

| DEFICIENCY        | FY90 | FY91 | FY92 | FY93 | FY94 |
|-------------------|------|------|------|------|------|
| OSH TRAINING      | 50%  | 50%  | 55%  | 59%  | 63%  |
| HMC&M             | 44%  | 43%  | 55%  | 48%  | 59%  |
| ABATEMENT         | 31%  | 47%  | 46%  | 46%  | 44%  |
| • COMMAND SUPPORT |      |      |      | 41%  | 46%  |
| MISHAP INVEST.    | 38%  | 52%  | 53%  | 23%  | 39%  |
| IH SURVEYS        | 33%  | 41%  | 33%  | 31%  | 38%  |

NOTE: PERCENTAGES EQUATE TO THE NUMBER OF INSPECTIONS WHERE DEFICIENCIES WERE NOTED

• INITIATED IN FY93

**MAJOR WORKPLACE DEFICIENCIES  
FY 1994**



**FIGURE 13**

6. We completed the fourth year of our process of program management review at the major command headquarters. The purpose of these reviews is to evaluate the level of OSH management support provided to subordinate activities and recommend actions for program improvement. Using total quality management and leadership concepts, our intent is to not only assist in improving the level of regulatory compliance, but also to increase the quality of programs and mishap reduction efforts. Five major commands received reviews during the year with two evaluated highly satisfactory, one evaluated satisfactory, and two marginal or less than satisfactory.

B. SAFETY AND HEALTH PROGRAM ACTIVITY QUESTIONNAIRE. Attachment 12 contains our responses to the requested activity questionnaire. The information used to complete the questionnaire was obtained from our oversight inspection unit based on their observations from the 99 inspections they conducted during the year. In addition, information was obtained from OSH management evaluations of commands conducted during the last three years. Our responses to the questionnaire are only estimates. There is no reporting requirement to obtain this information, and for an organization of our size, to establish such reporting systems would be costly. In the current environment of downsizing and government reinvention, we cannot support creating extensive new reporting requirements. We believe the questionnaire is more appropriate for use at a single activity, and as such should be used by OSHA during their targeted inspections or evaluations.

## GOVERNMENT-WIDE-INITIATIVES

### SAFETY BELT USE PROGRAM

The Navy's policy on safety belt use is contained in OPNAVINST 5100.12F. The Navy requirements include:

1. All persons operating or riding in a government motor vehicle are required to wear a safety belt at all times.

2. All Navy military personnel are also required to wear safety belts in their personal vehicles or while riding in any private motor vehicle both on and off Navy property.

3. Navy federal civilian employees are required to wear safety belts in private vehicles off a Navy property while in a duty status. Everyone is required to wear safety belts while on a Navy property (civilian guest, contractors, dependents, etc.). Violation of the Navy's safety belt use regulation is punishable under the Uniform Code of Military Justice for Military personnel, and is the basis for administrative disciplinary action for civilian employees.

4. Actual observations of safety belt use are periodically conducted at many Navy activities. However, there is no requirement for the results of these surveys to be centrally reported. During visits to activities by Naval Safety Center staff, seat belt surveys are conducted. These surveys are made during weekdays and include all vehicles at a particular location at the activity. Observed usage rates range from 89 to 91 percent.

5. Occupant protection programs and activities conducted in FY 1994 include the following:

a. Eight messages were released on all aspects of traffic safety including alcohol countermeasures, occupant protection, risk assessment and risk management. Those commands achieving 70%+, 80%+ and 90%+ safety belt use were given special recognition through a "Safety Belt Honor Roll Award" message.

b. 29 motor vehicle safety instructor courses were conducted and 292 instructors trained. Eight traffic safety surveys were conducted and one command inspection.

c. 208 planning kits were distributed in observance of Drunk and Drugged Driving awareness month.

d. Risk assessment and risk management education was incorporated into post-boot camp training and into Navy traffic safety courses.

6. A summary of injuries and seat belt usage data for on-duty motor vehicle accidents during FY 1994 is presented in Figure 14 on the next page.

U.S. NAVY SAFETY BELT USE  
FY-94 ON THE JOB MOTOR VEHICLE ACCIDENT'S GMV/PMV

Navy Civil Service

| Belts Worn                | Not Worn               | Unknown                |
|---------------------------|------------------------|------------------------|
| Cost <u>\$1,239,844</u> * | Cost <u>\$27,520</u> * | Cost <u>\$42,732</u> * |
| Deaths <u>2</u>           | Deaths <u>0</u>        | Deaths <u>0</u>        |
| Injuries <u>20</u> **     | Injuries <u>3</u> **   | Injuries <u>1</u> **   |
| LWD <u>272</u>            | LWD <u>83</u>          | LWD <u>9</u>           |
| No Injury <u>31</u>       | No Injury <u>1</u>     | No Injury <u>11</u>    |

Navy Military

| Belts Worn                | Not Worn                | Unknown                |
|---------------------------|-------------------------|------------------------|
| Cost <u>\$1,155,682</u> * | Cost <u>\$177,280</u> * | Cost <u>\$56,589</u> * |
| Deaths <u>0</u>           | Deaths <u>0</u>         | Deaths <u>0</u>        |
| Injuries <u>13</u> **     | Injuries <u>4</u> **    | Injuries <u>0</u> **   |
| LWD <u>180</u>            | LWD <u>255</u>          | LWD <u>0</u>           |
| No Injury <u>189</u>      | No Injury <u>5</u>      | No Injury <u>11</u>    |

\* Cost includes injury/death cost plus any reportable property damage. Additionally:

(1) Event cost is counted only once in the "belts worn" category, if two or more people were in the vehicle and one wore a belt and the other(s) did not.

(2) Event cost is counted only one in the "not worn" category if two or more people were in the vehicle and one did not wear a belt and other belt use as unknown.

(3) Event cost is counted only one in the "unknown" category if two or more people were in the vehicle and belt use is unknown.

(4) Event cost is counted only once in Navy Military "not worn" category when an on-duty Navy person and an on duty civil service person are involved in the same mishap.

\*\*The information above includes only those mishaps with property damage in excess of \$2000 and/or injuries with five or more lost work days as reported to the Naval Safety Center.

FIGURE 14

## COMMENTS, REQUESTS AND RECOMMENDATIONS

### COMMENTS ON FEDERAL AGENCY PROGRAM IMPROVEMENTS

We have the same basic recommendations for Federal Agency Programs as in past years and continue to consider these improvements important:

1. We believe the targeted inspection program should be improved in order to provide a consistent and well coordinated program throughout the United States, and focus on assisting activities in program improvement rather than simply providing routine compliance inspections of worksites. The development of a reasonable level of consistency in inspection procedures between OSHA regions is essential, as is improved coordination on compliance citations. The evaluation guide developed by OSHA for 29 CFR 1960 compliance review can be a good tool for use on all targeted inspections, and can result in greater consistency of inspections between regions. We continue to encounter the scheduling of many targeted inspections near the end of the fiscal year, long delays in receipt of some reports, and citations that are sometimes of questionable validity or inconsistent with private industry application. We receive more inspections at activities not targeted than those on the targeting list.

2. Increased support and resources at the OSHA Training Institute remains essential in order to provide adequate assistance to Federal Agencies and meet requirements for Federal Agency training assistance. The creation of a distinct section at the OSHA Training Institute for Federal Agency support is again (for the fourth year) recommended. Our support from the training institute continues to decline. OSHA needs to meet its responsibilities to support Federal agencies in training. During the last year we made a concerted effort to work with OSHA and the OSHA Training Institute to improve training support but were largely unsuccessful. Our efforts last year clearly support the need for a Federal agency section or department at the Institute.

3. As recommended in past years, if OSHA is to continue to use Office of Workers' Compensation claims data to monitor Federal Agency mishap experience, then the data base needs to be significantly revamped. A review should be made in coordination with agencies to update the data base and coding to reflect current organizations and data requirements. The OWCP data base coding and organization remains out-of-date. The need to revamp the system is addressed in the recommendations of Attachment 8.

4. We believe the format of this annual report needs to be revamped to reduce redundancy. The sections on program performance and program planning contain many duplications and, because of this, it is unclear what data should be provided in the sections. For example, significant initiatives regarding workplace hazards and awareness are also likely to be significant initiatives in program planning; program effectiveness initiatives can be similar to program evaluation actions; and both can relate to or be part of goals or resource issues.

5. In addition, we do not concur with the activity questionnaire requirement or its inclusion in this report. The questionnaire can be useful at the activity level, but at the agency level, it is not meaningful. At best, even if extensive reporting requirements were established, the data provided would still be estimated, with some responses very speculative.

MAJOR COMMAND AND INDUSTRIAL ACTIVITY CIVILIAN  
OCCUPATIONAL INJURY AND ILLNESS CASE EXPERIENCE  
DURING FISCAL YEAR 1994

This enclosure provides injury and illness case numbers and rates for major commands, shipyards, aviation depots, and public works centers for fiscal year (FY) 1994.

The case rate data is summarized from the Office of Workers' Compensation Programs (OWCP) Federal Employees Compensation Act (FECA) Table #2 Reports. Case rates are calculated from full time U.S. civilian (permanent and temporary) workforce populations using the following equation:

$$\text{Case rate} = \frac{\text{Cases} \times 200,000 \text{ hours worked}^*}{\text{End Strength} \times 520 \text{ hours} \times (\text{n}) \text{ Quarter}}$$

\* 200,000 work hours = 100 employees x 50 weeks x 40 hours/week

NOTE: Case rate and trend charts in TAC C are based on actual case experience during each quarter and average employment during the quarter. The data in the Total Case Rate tables and charts, TABs A and B, is based on accumulative case experience for the fiscal year and average employment levels for the fiscal year to date.

TAB A. Major Command TCRs for FY 1994 with comparison charts.

TAB B. Major Industrial Activity TCRs for FY 1994 with comparison charts.

TAB C. Navy Case Rate and Trend Charts for FY 1994.

MAJOR COMMAND TOTAL CASE RATES (TCR) FOR  
FISCAL YEAR 1994

| MAJOR<br>COMMAND | FY-88<br>TCR<br>BASELINE | FY-94*<br>TOTAL<br>CASES w/o<br>FIRST AID | AVERAGE<br>FY-94<br>END<br>STRENGTH** | FY-94<br>TCR | %DECREASE<br>/INCREASE<br>FROM TCR<br>BASELINE*** |
|------------------|--------------------------|---|---------------------------------------|--------------|---|
| SPAWAR ****      | 2.63                     | 92  | 6537                                  | 1.35         | -48.66  |
| NCTC****         | 2.90                     | 82  | 4032                                  | 2.05         | -28.62  |
| NAVSUP****       | 4.59                     | 544                                       | 15167                                 | 3.44         | -25.05  |
| NAVFAC           | 6.64                     | 1167                                      | 20611                                 | 5.44         | -18.07  |
| CNET             | 3.84                     | 259                                       | 7896                                  | 3.15         | -17.96  |
| CINCLANT         | 6.70                     | 582                                       | 10076                                 | 5.55         | -17.16  |
| NAVSEA           | 10.26                    | 8279                                      | 90230                                 | 8.82         | -14.03  |
| NAVAIR           | 5.73                     | 2256                                      | 41362                                 | 5.24         | -8.55   |
| ONI              | 3.24                     | 41  | 1241                                  | 3.17         | -2.16   |
| ONR              | 2.27                     | 103                                       | 4253                                  | 2.32         | 2.20  |
| CINCPAC          | 5.40                     | 640                                       | 10981                                 | 5.60         | 3.70  |
| NAVRES           | 5.50                     | 157                                       | 2349                                  | 6.42         | 16.72   |
| SECGRU           | 3.34                     | 28  | 682                                   | 3.94         | 17.96   |
| MSC              | 5.73                     | 379                                       | 4898                                  | 7.44         | 29.84   |
| BUMED            | 3.06                     | 513                                       | 11904                                 | 4.14         | 35.29   |
| OCEAN            | 2.25                     | 56  | 1430                                  | 3.76         | 67.11   |
| SPO              | 1.74                     | 36  | 1185                                  | 2.92         | 67.81   |
| BUPERS           | 1.88                     | 110                                       | 2329                                  | 4.54         | 141.48  |
| EUR              | 0.94                     | 22  | 692                                   | 3.05         | 224.46  |
| OTHER            | NA                       | 597                                       | NA                                    | NA           | NA  |
| USN              | 6.75                     | 15948                                     | 247707                                | 6.19         | -8.29   |

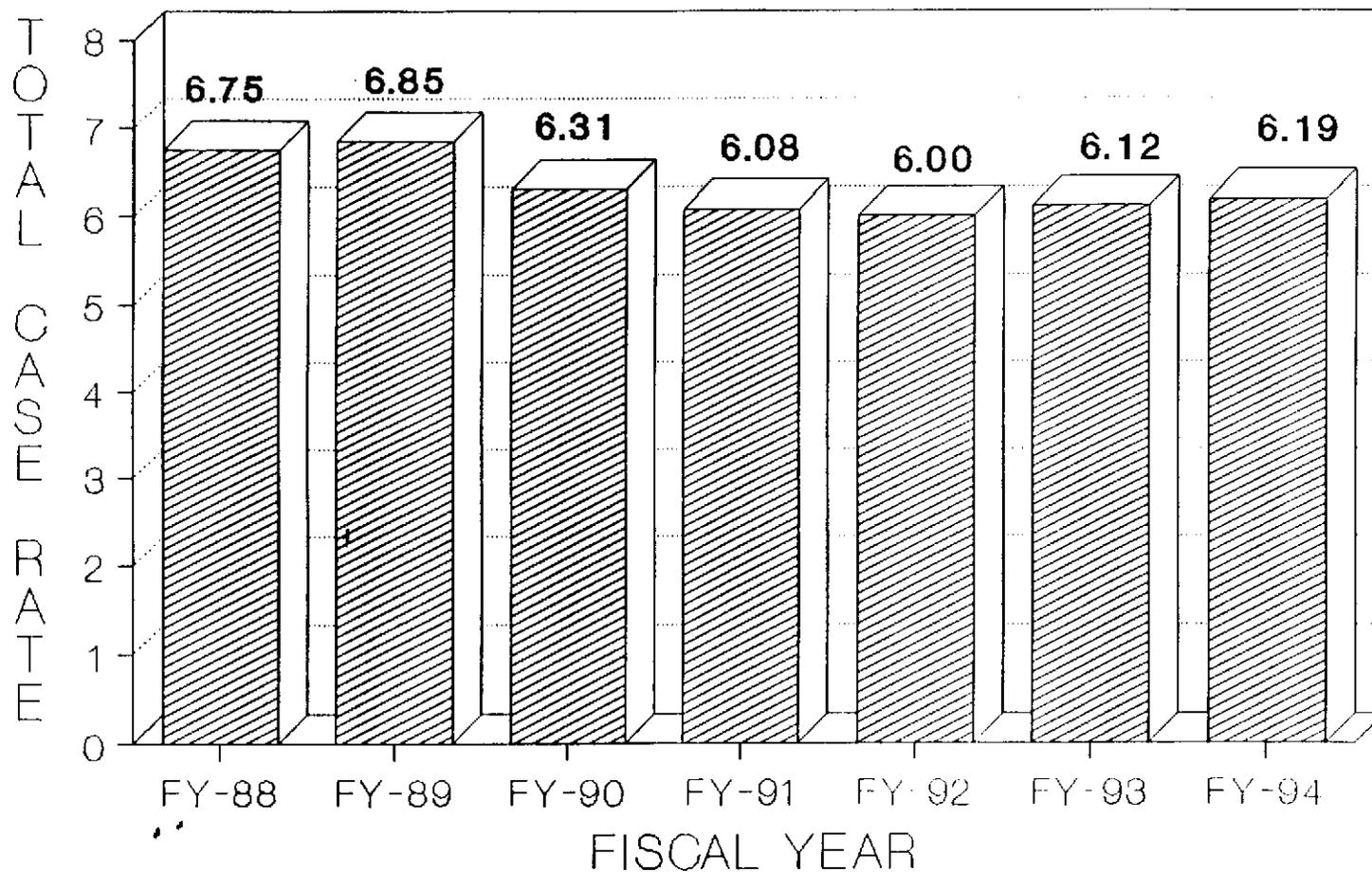
\* SOURCE: OWCP/FECA TABLE #2 REPORTS

\*\* SOURCE: NCPDS 1532 REPORTS

\*\*\* COMMANDS ARE RANKED FROM BEST PERFORMANCE (DECREASE FROM BASELINE) TO POOREST PERFORMANCE (INCREASE FROM BASELINE).

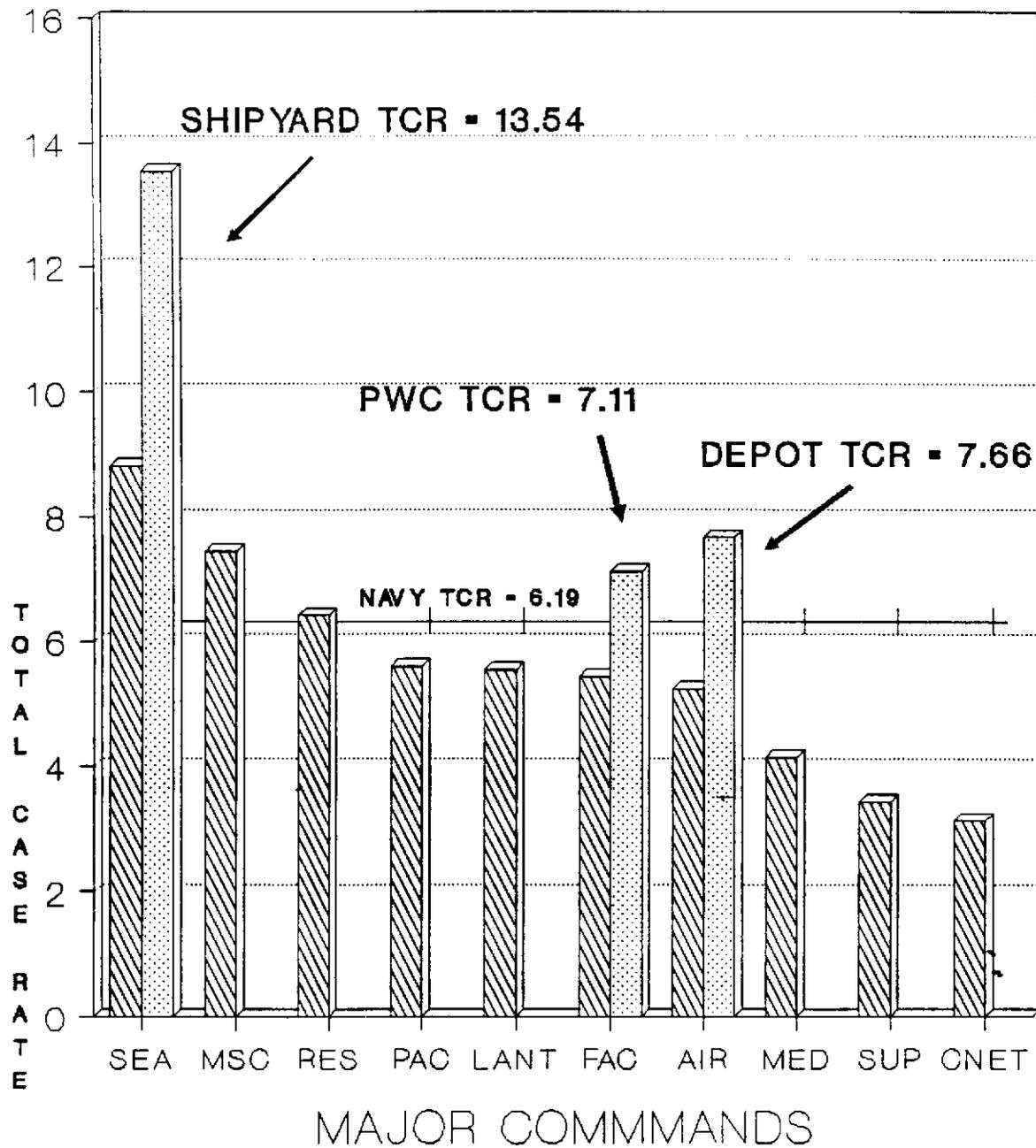
\*\*\*\* DATA REFLECTS AND IS AFFECTED BY ORGANIZATIONAL CHANGES.

# NAVY TOTAL CASE RATES (CASES PER 200,000 HOURS WORKED)



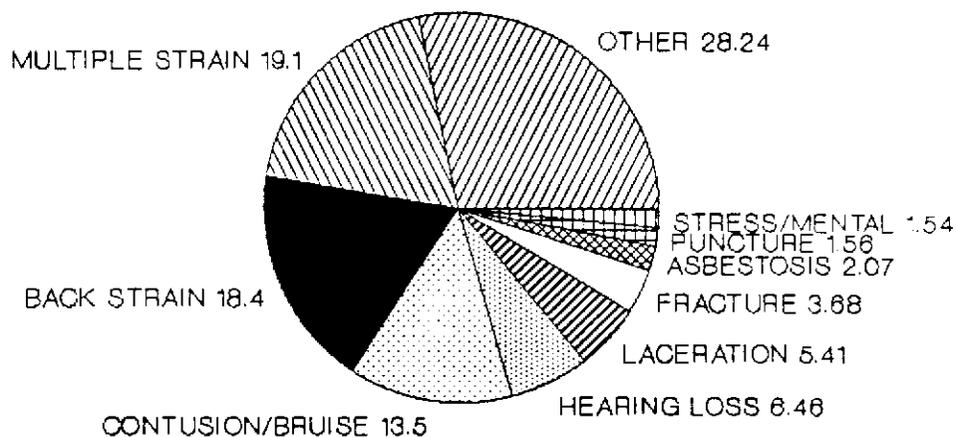
# "TOP TEN" MAJOR COMMANDS

## TOTAL CASE RATES FOR FY-94

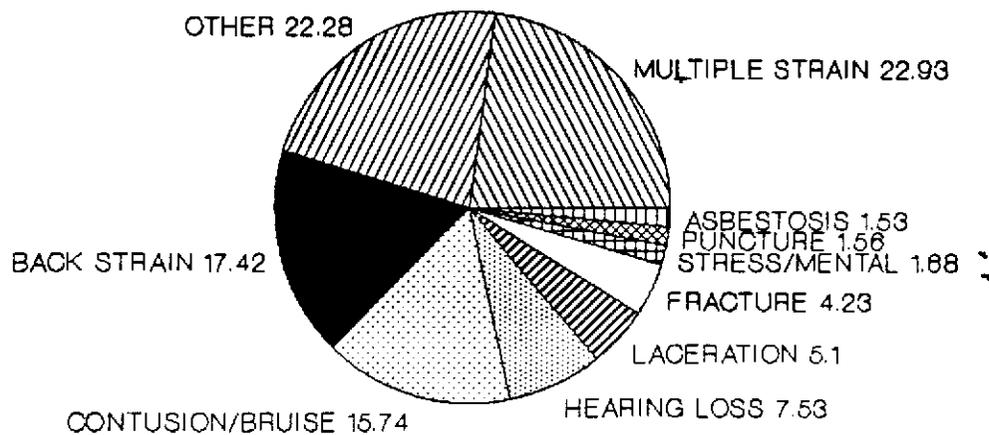


Source: OWCP FECA Table #2 Reports

## NATURE OF INJURY FISCAL YEAR 1993



## NATURE OF INJURY FISCAL YEAR 1994



Source: FECA Table #2 Data

MAJOR INDUSTRIAL ACTIVITY TOTAL CASE RATES (TCR) FOR  
FISCAL YEAR 1994

| MAJOR INDUSTRIAL ACTIVITY | FY-88<br>TCR<br>BASELINE | FY-94*<br>TOTAL<br>CASES w/o<br>FIRST AID | AVERAGE<br>FY-94<br>END**<br>STRENGTH | FY-94<br>TCR | % DECREASE<br>/INCREASE<br>FROM TCR<br>BASELINE*** |
|---------------------------|--------------------------|---|---------------------------------------|--------------|--|
| <u>NADEPs</u>             |                          |   |                                       |              |  |
| JACKSONVILLE              | 8.70                     | 195                                       | 2855                                  | 6.56         | -24.59   |
| NORTH ISLAND              | 13.23                    | 408                                       | 3472                                  | 11.31        | -14.51   |
| ALAMEDA                   | 9.06                     | 208                                       | 2526                                  | 7.92         | -12.58   |
| CHERRY POINT              | 7.33                     | 221                                       | 3033                                  | 7.00         | -4.50  |
| NORFOLK                   | 4.56                     | 197                                       | 3395                                  | 5.58         | 22.36  |
| PENSACOLA                 | 4.19                     | 175                                       | 2334                                  | 7.21         | 72.07  |
| NADEP TOTAL               | 8.02                     | 1404                                      | 17615                                 | 7.66         | -4.48  |
| <u>SHIPYARDs</u>          |                          |   |                                       |              |  |
| PEARL HARBOR              | 16.70                    | 398                                       | 4507                                  | 8.49         | -49.16   |
| PORTSMOUTH                | 11.62                    | 394                                       | 4950                                  | 7.65         | -34.16   |
| LONG BEACH                | 18.37                    | 463                                       | 3636                                  | 12.24        | -33.36   |
| NORFOLK                   | 10.28                    | 729                                       | 8337                                  | 8.41         | -18.19   |
| MARE ISLAND               | 16.24                    | 732                                       | 4984                                  | 14.13        | -12.99   |
| PHILADELPHIA              | 16.64                    | 844                                       | 5053                                  | 16.07        | -3.42  |
| PUGET SOUND               | 17.21                    | 2116                                      | 10002                                 | 20.37        | 18.36  |
| CHARLESTON                | 5.88                     | 813                                       | 4616                                  | 16.95        | 188.26   |
| SHIPYARD TOTAL            | 13.87                    | 6489                                      | 46085                                 | 13.54        | -2.37  |
| <u>PWCs</u>               |                          |   |                                       |              |  |
| NORFOLK                   | 15.26                    | 218                                       | 3161                                  | 6.63         | -56.55   |
| PEARL HARBOR              | 10.49                    | 118                                       | 1445                                  | 7.85         | -25.16   |
| SAN FRANCISCO             | 9.93                     | 133                                       | 1675                                  | 7.46         | -23.16   |
| SAN DIEGO                 | 7.82                     | 229                                       | 2522                                  | 8.73         | 11.63  |
| GUAM                      | 0.39                     | 9   | 1531                                  | .56          | 43.58  |
| PENSACOLA                 | 8.50                     | 109                                       | 808                                   | 12.97        | 52.58  |
| GREAT LAKES               | 5.23                     | 56  | 614                                   | 8.77         | 67.68  |
| YOKOSUKA                  | 0.00                     | 0   | 40                                    | 0.00         | NA   |
| PWC TOTAL                 | 8.67                     | 872                                       | 11776                                 | 7.11         | -17.99   |

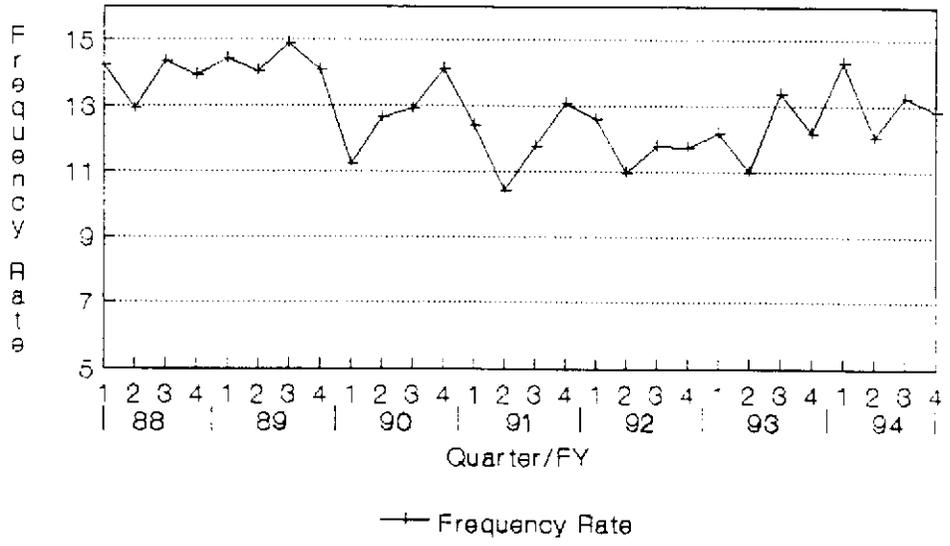
\* SOURCE: OWCP/FECA TABLE #2 REPORTS

\*\* SOURCE: NCPDS 1532 REPORTS

\*\*\* INDUSTRIAL ACTIVITIES ARE RANKED FROM BEST PERFORMANCE,  
(DECREASE FROM BASELINE) TO POOREST PERFORMANCE (INCREASE  
FROM BASELINE).

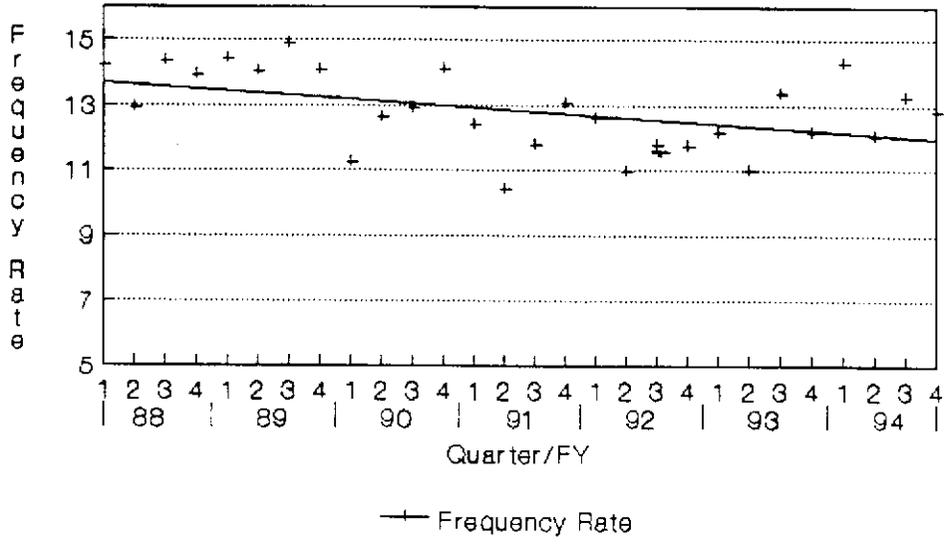
TAB B

## SHIPYARD CIVILIAN INJURY CASE RATE CHART

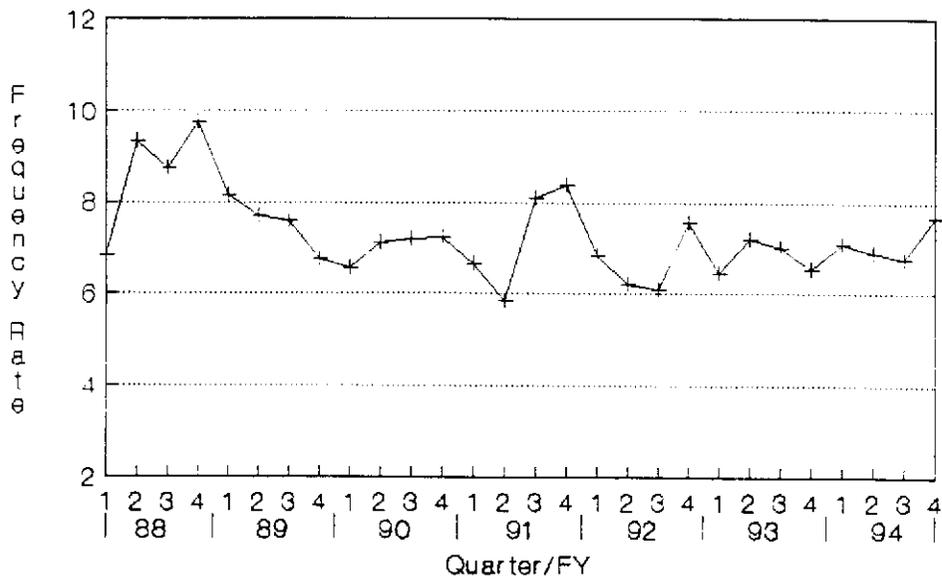


Source: OWCP FECA Table #2 Data

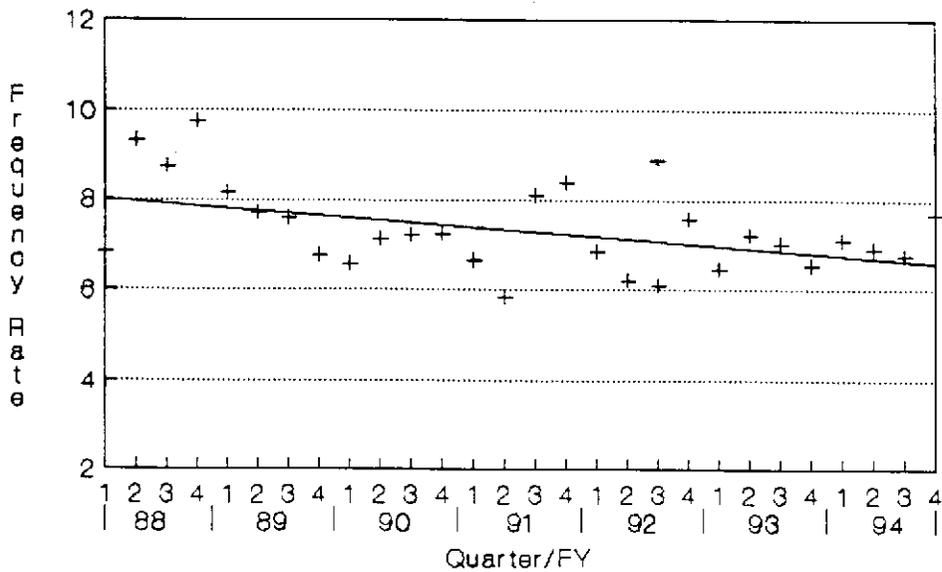
## SHIPYARD CIVILIAN INJURY CASE RATE TREND CHART



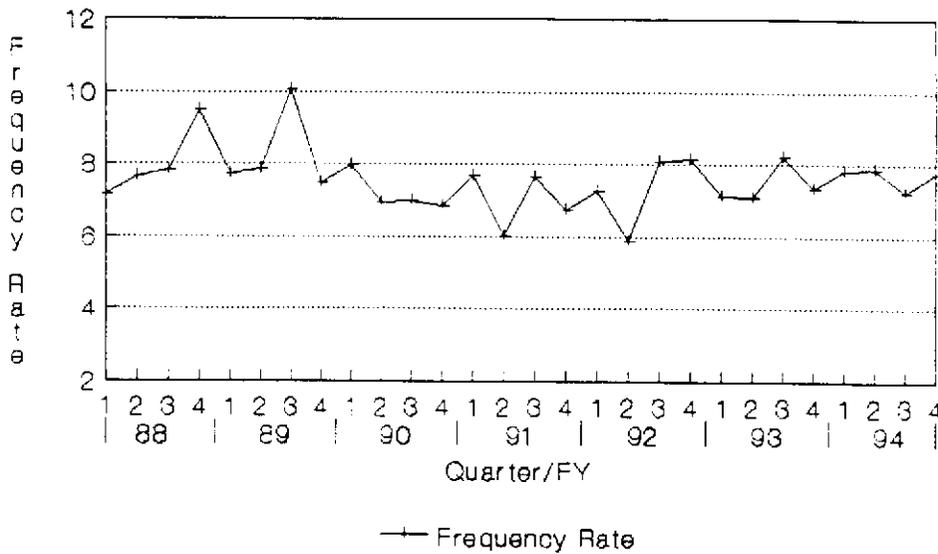
## PWC CIVILIAN INJURY CASE RATE CHART



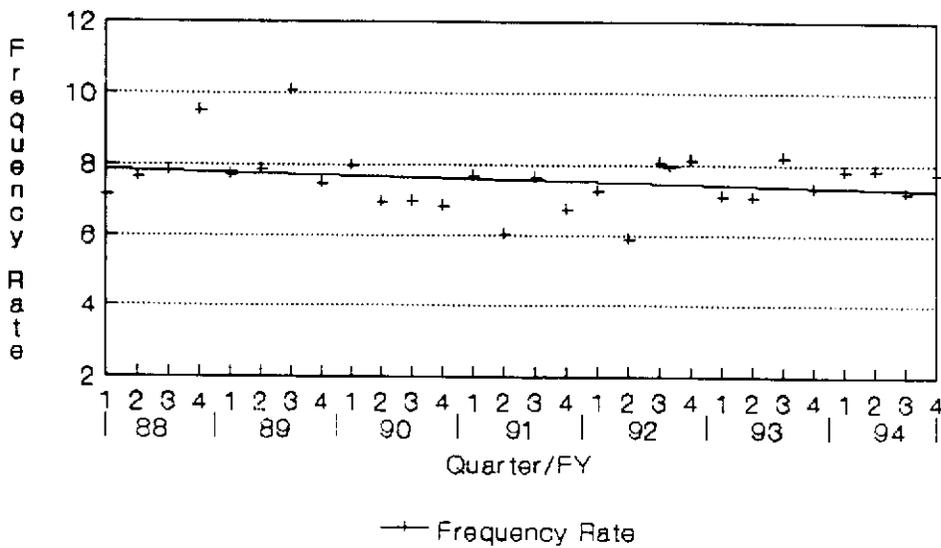
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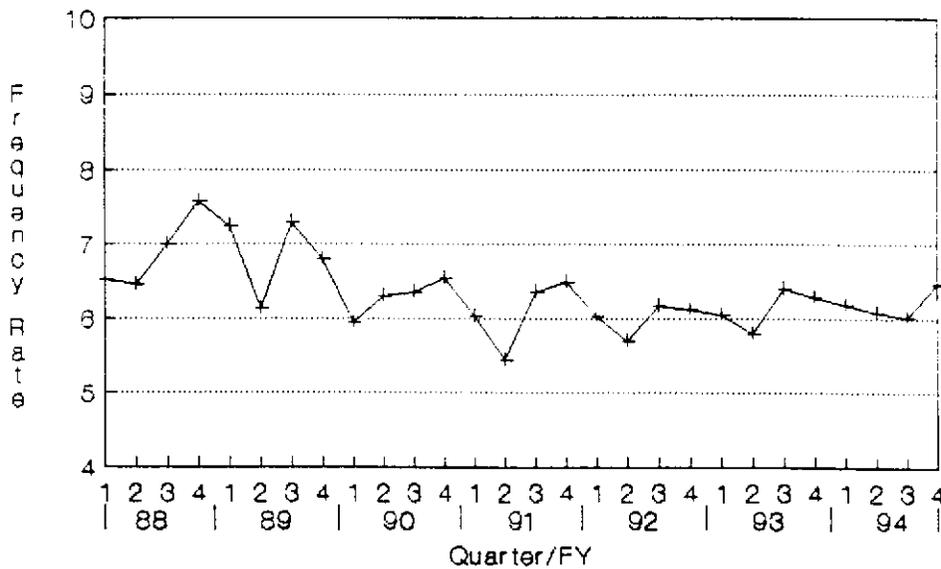
## AVIATION DEPOT CIVILIAN INJURY CASE RATE CHART



## AVIATION DEPOT CIVILIAN INJURY CASE RATE TREND CHART

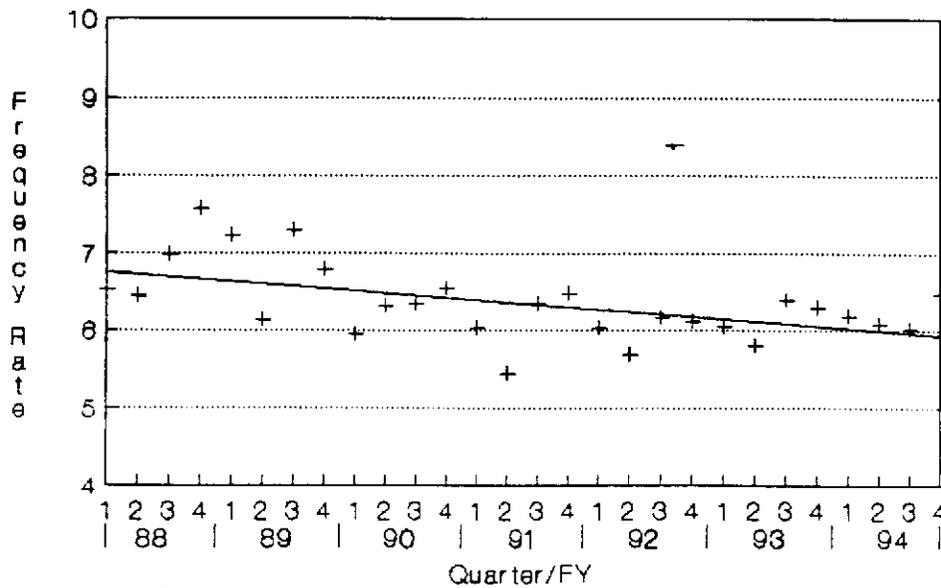


## NAVY CIVILIAN INJURY CASE RATE CHART



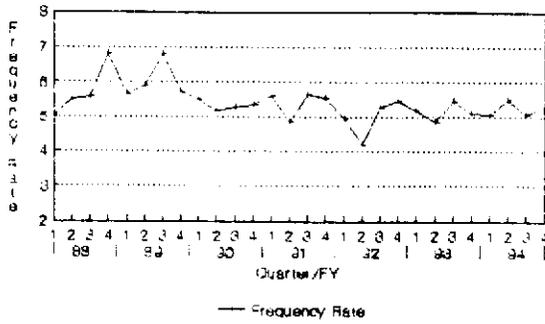
Source: OWCP FECA Table #2 Data

## NAVY CIVILIAN INJURY CASE RATE TREND CHART

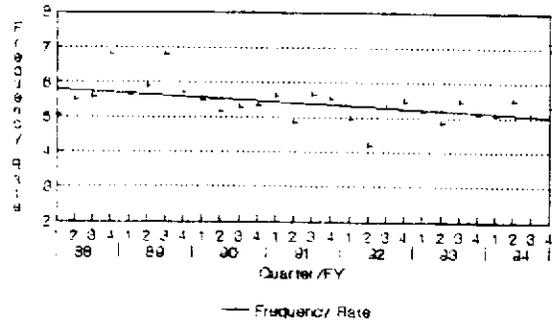


Note: Data points represent actual experience during quarter. They are not cumulative.

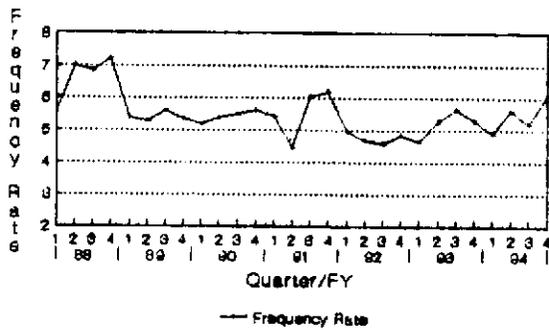
**NAVAIR CIVILIAN INJURY CASE RATE CHART**



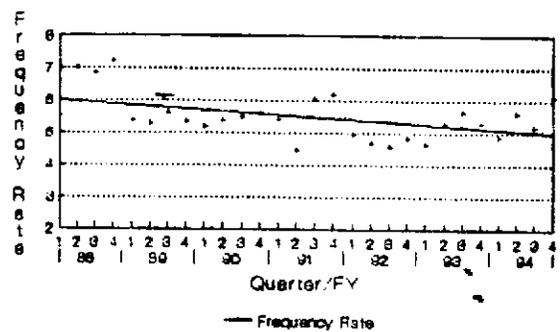
**NAVAIR CIVILIAN INJURY CASE RATE TREND CHART**



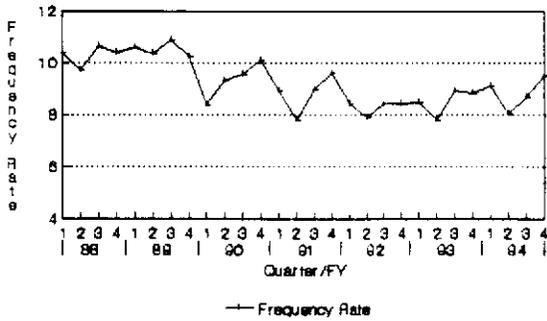
**NAVFAC CIVILIAN INJURY CASE RATE CHART**



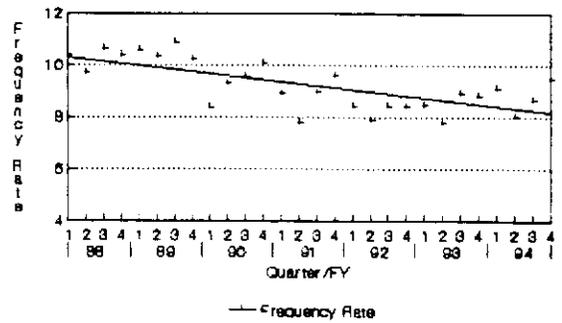
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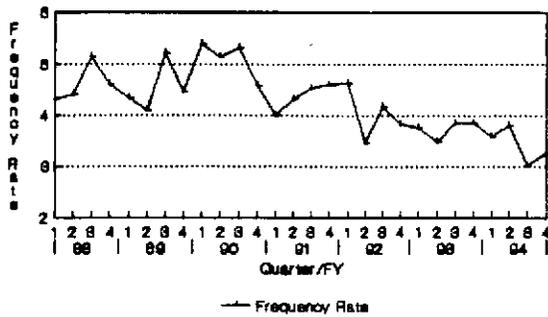
**NAVSEA CIVILIAN INJURY CASE RATE CHART**



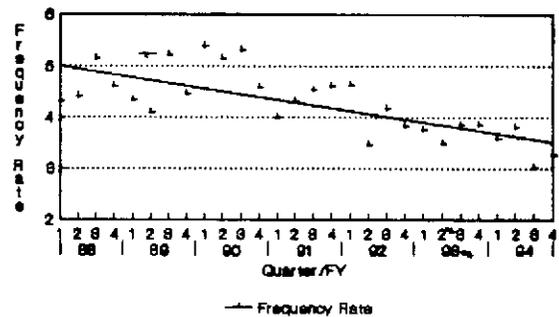
**NAVSEA CIVILIAN INJURY CASE RATE TREND CHART**



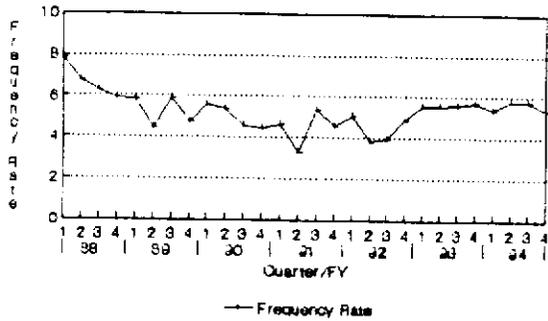
**NAVSUP CIVILIAN INJURY CASE RATE CHART**



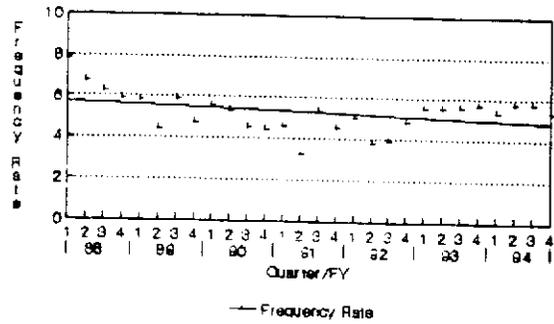
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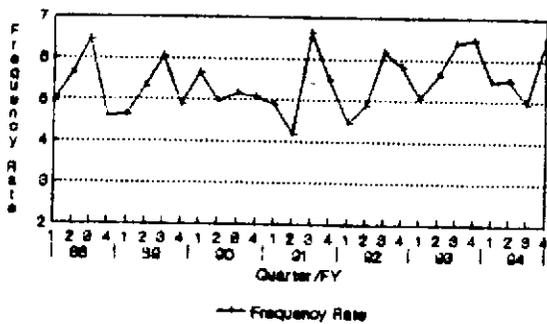
**LANTFLT CIVILIAN INJURY CASE RATE CHART**



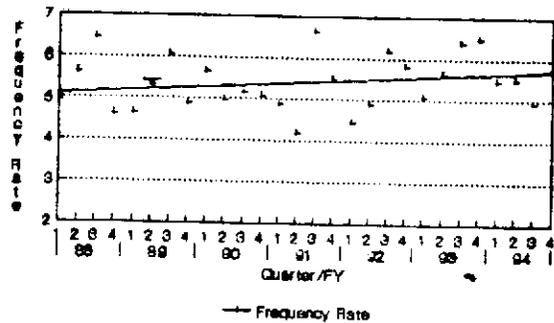
**LANTFLT CIVILIAN INJURY CASE RATE TREND CHART**



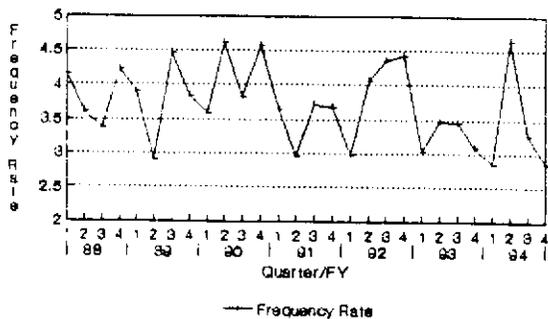
**CINCPACFLT CIVILIAN INJURY CASE RATE CHART**



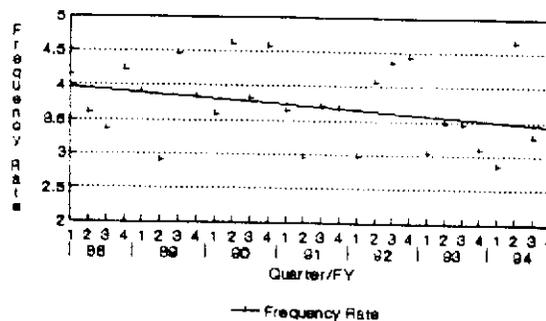
**PACFLT CIVILIAN INJURY CASE RATE TREND CHART**



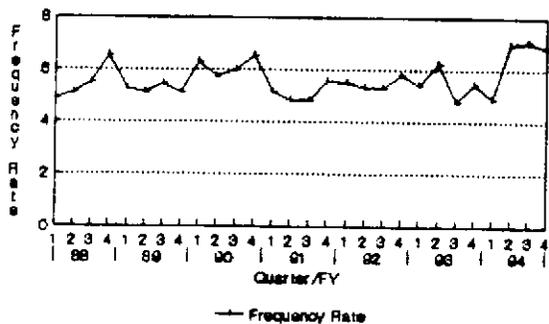
**CNET CIVILIAN INJURY CASE RATE CHART**



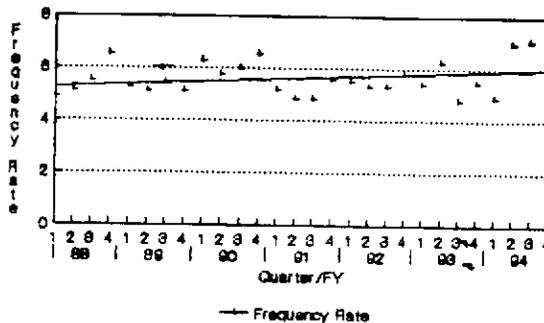
**CNET CIVILIAN INJURY CASE RATE TREND CHART**



**NAVRES CIVILIAN INJURY CASE RATE CHART**

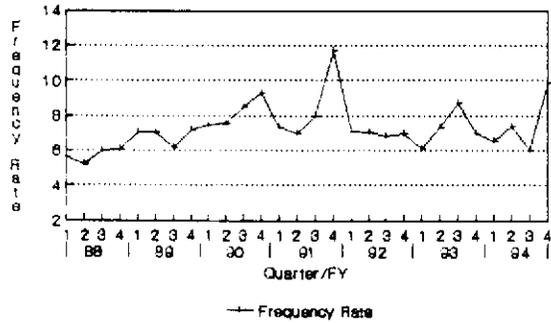


**NAVRES CIVILIAN INJURY CASE RATE TREND CHART**

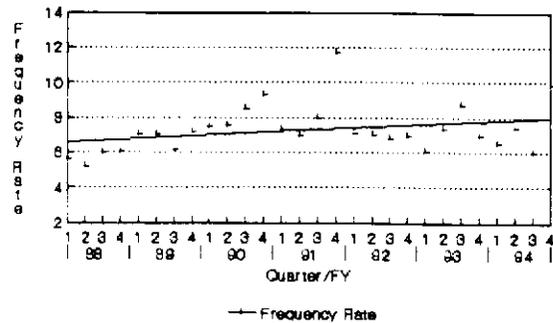


Source: FECA Table #2 Data

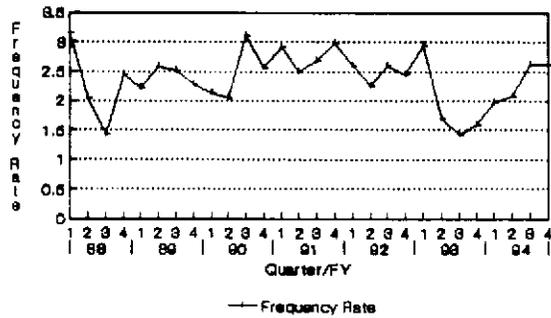
**MSC CIVILIAN INJURY CASE RATE CHART**



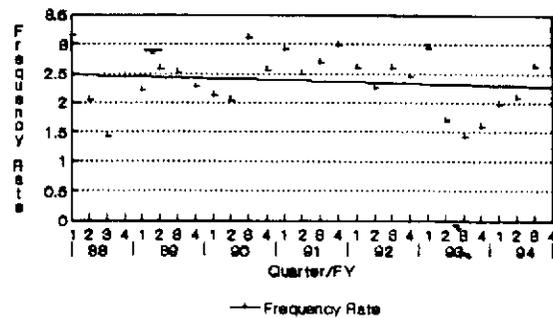
**MSC CIVILIAN INJURY CASE RATE TREND CHART**



**ONR CIVILIAN INJURY CASE RATE CHART**

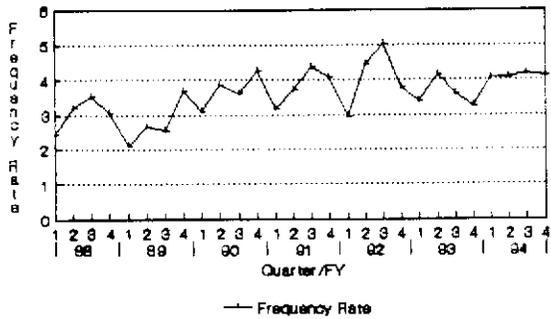


**ONR CIVILIAN INJURY CASE RATE TREND CHART**

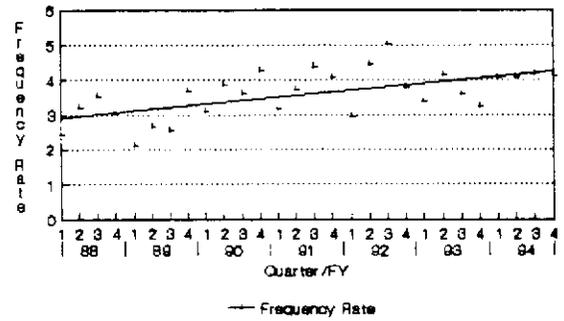


Source: FECA Table #2 Data

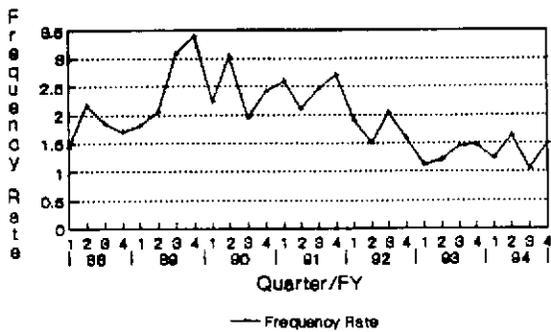
**BUMED CIVILIAN INJURY CASE RATE CHART**



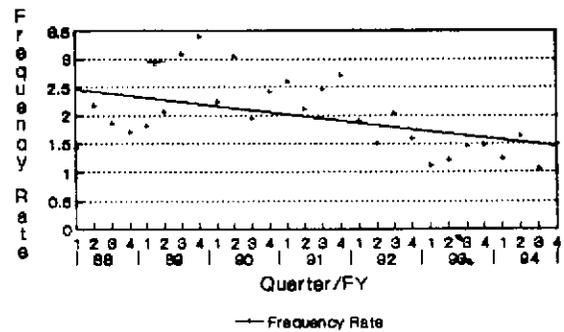
**BUMED CIVILIAN INJURY CASE RATE TREND CHART**



**SPAWAR CIVILIAN INJURY CASE RATE CHART**



**SPAWAR CIVILIAN INJURY CASE RATE TREND CHART**





*HAZARDOUS MATERIAL  
PROGRAM AUTOMATION  
UPDATE  
(CHRIMP/TSES/HMC&M)*

PRESENTED TO  
ANNUAL NAVY OCCUPATIONAL  
SAFETY & HEALTH  
CONFERENCE

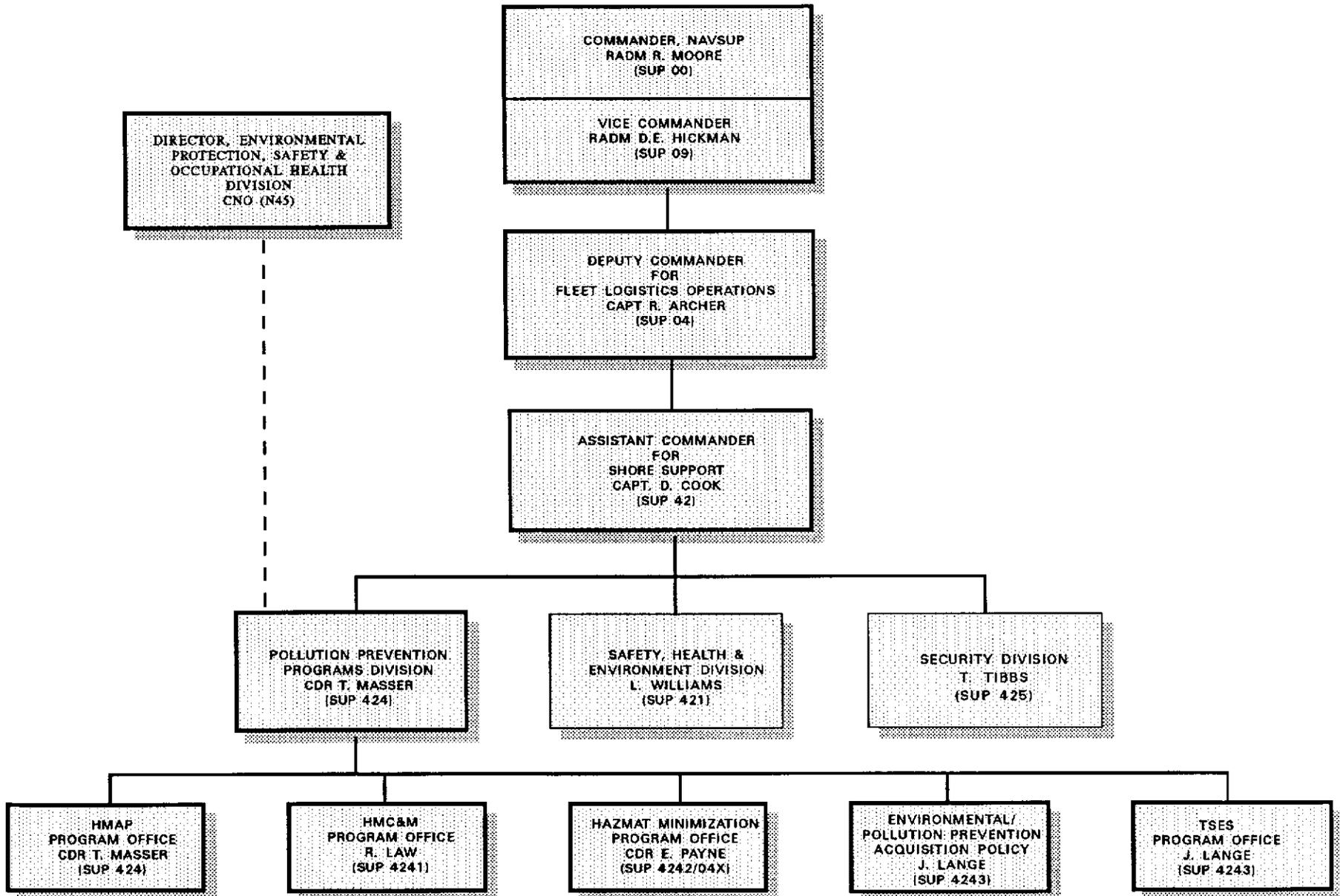
Hanalei Hotel  
San Diego, California  
28 October 1994

CDR Tom Masser, SC, USN  
Director, Pollution Prevention Programs Division  
Naval Supply Systems Command

# OVERVIEW

- ✓ ORGANIZATION
- ✓ SCOPE OF PROGRAM
- ✓ HAZARDOUS MATERIAL PROCESS ANALYSIS
- ✓ WHAT IS CHRIMP?
- ✓ THE HICS PROGRAM
- ✓ TSES
- ✓ THE HMC&M SYSTEM
- ✓ RHMMS SYSTEM INTEGRATION
- ✓ THE BOTTOM LINE
- ✓ SUMMARY

# POLLUTION PREVENTION PROGRAMS DIVISION (P3) ORGANIZATION



# SCOPE OF PROGRAM

## ■ POLLUTION PREVENTION IS NOT:

X JUST ENVIRONMENTAL

X JUST SAFETY

X JUST ENGINEERING

X JUST SUPPLY

X JUST TRANSPORTATION

X JUST OPERATIONS

## ■ POLLUTION PREVENTION IS:

✓ EVERYONES JOB

✓ EVERYONES RESPONSIBILITY

✓ EVERYONES SUCCESS

➔ TEAM WORK IS CRITICAL. YOU CAN'T DO IT ALONE!!!

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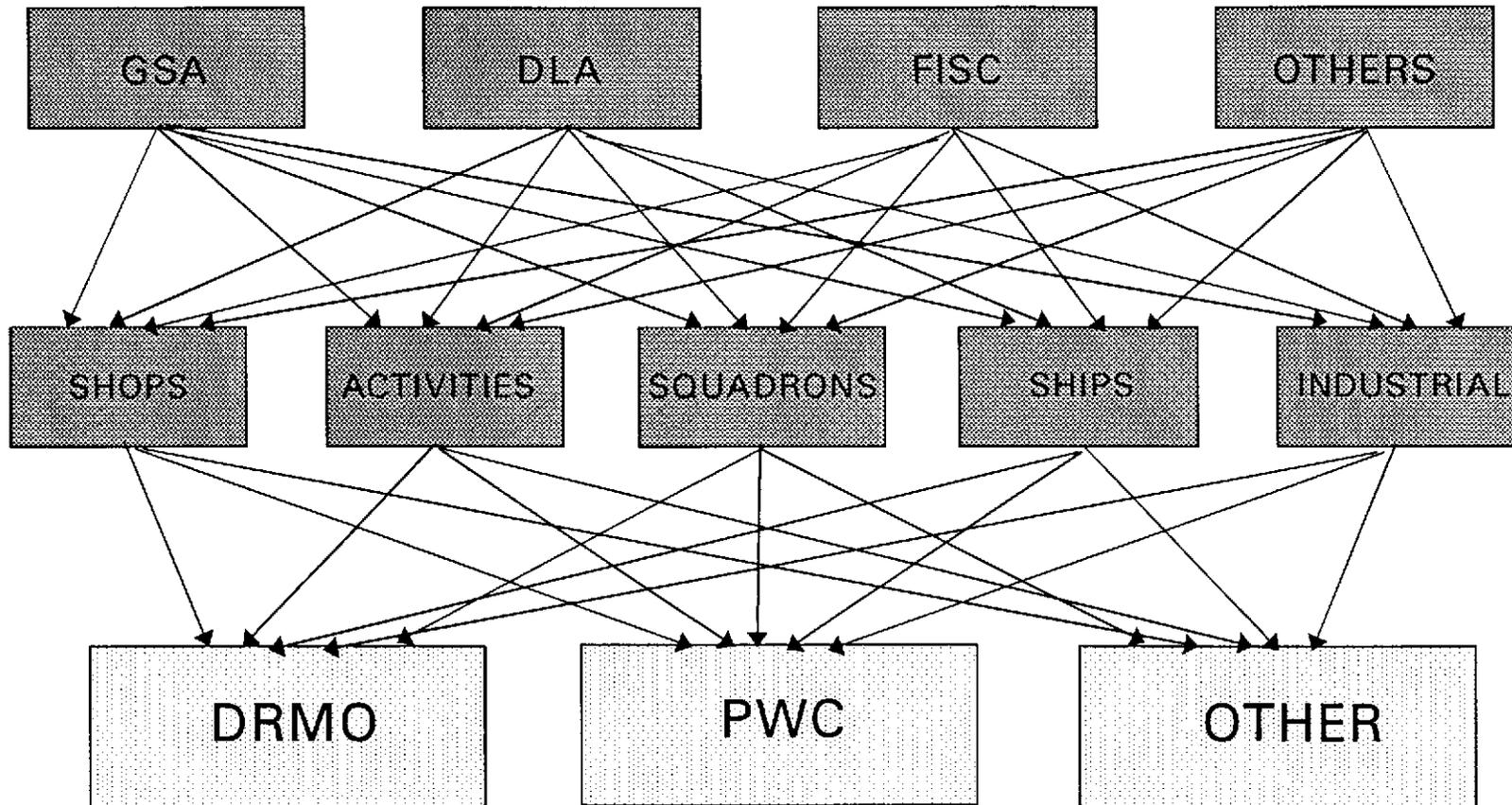
# HAZARDOUS MATERIAL PROCESS ANALYSIS

- ANALYZE HAZMAT FLOW PROCESS
- ANALYZE MANAGEMENT PRACTICES THAT CONTRIBUTE TO WASTE GENERATION
- INITIATE PROGRAM AND PROCESS CHANGES TO REDUCE WASTE STREAM

# PRE-CHRIMP PROCESS

AKA ... THE CHAOS PROCESS

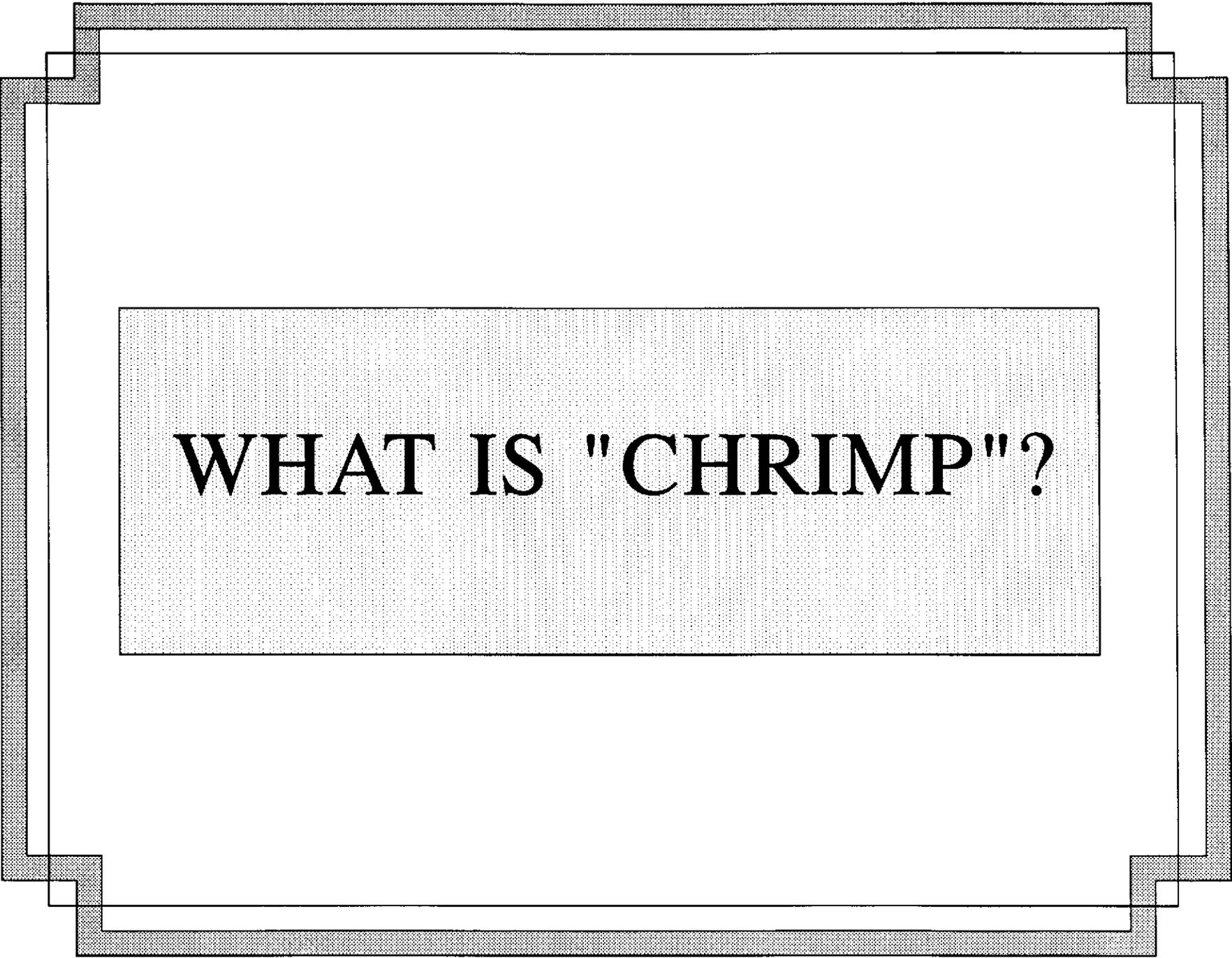
## SOURCES



## DESTINATIONS

# DISADVANTAGES

- DECENTRALIZED CONTROLS FOR HAZMAT
- SHOPS DETERMINE STOCKING LEVEL, UNITS OF ISSUE
- DECENTRALIZED CONTROLS FOR WASTE DISPOSAL
- DIFFICULT TO PREVENT UNAUTHORIZED USE
- EXCESSIVE HAZMAT STOCKS LEAD TO SHELF LIFE EXPIRATION
- STOCKING "DRUMS" WHEN "PINTS" WERE NEEDED
- EXCESSIVE TRAINING AND OVERSIGHT



**WHAT IS "CHRIMP"?**

# CHRIMP

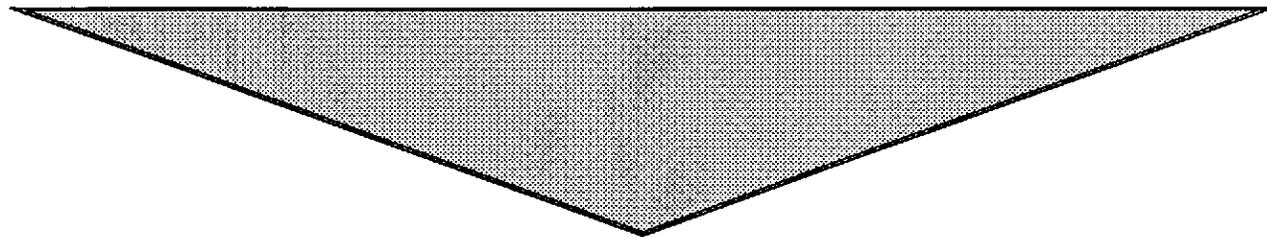
➔ **CONSOLIDATED  
HAZARDOUS MATERIAL  
REUTILIZATION &  
INVENTORY  
MANAGEMENT  
PROGRAM**

# CHRIMP IS THE "PROCESS"

*X CHRIMP IS NOT THE SOFTWARE PROGRAM!*

■ CHRIMP IS NOT HICS

■ CHRIMP IS NOT HMC&M

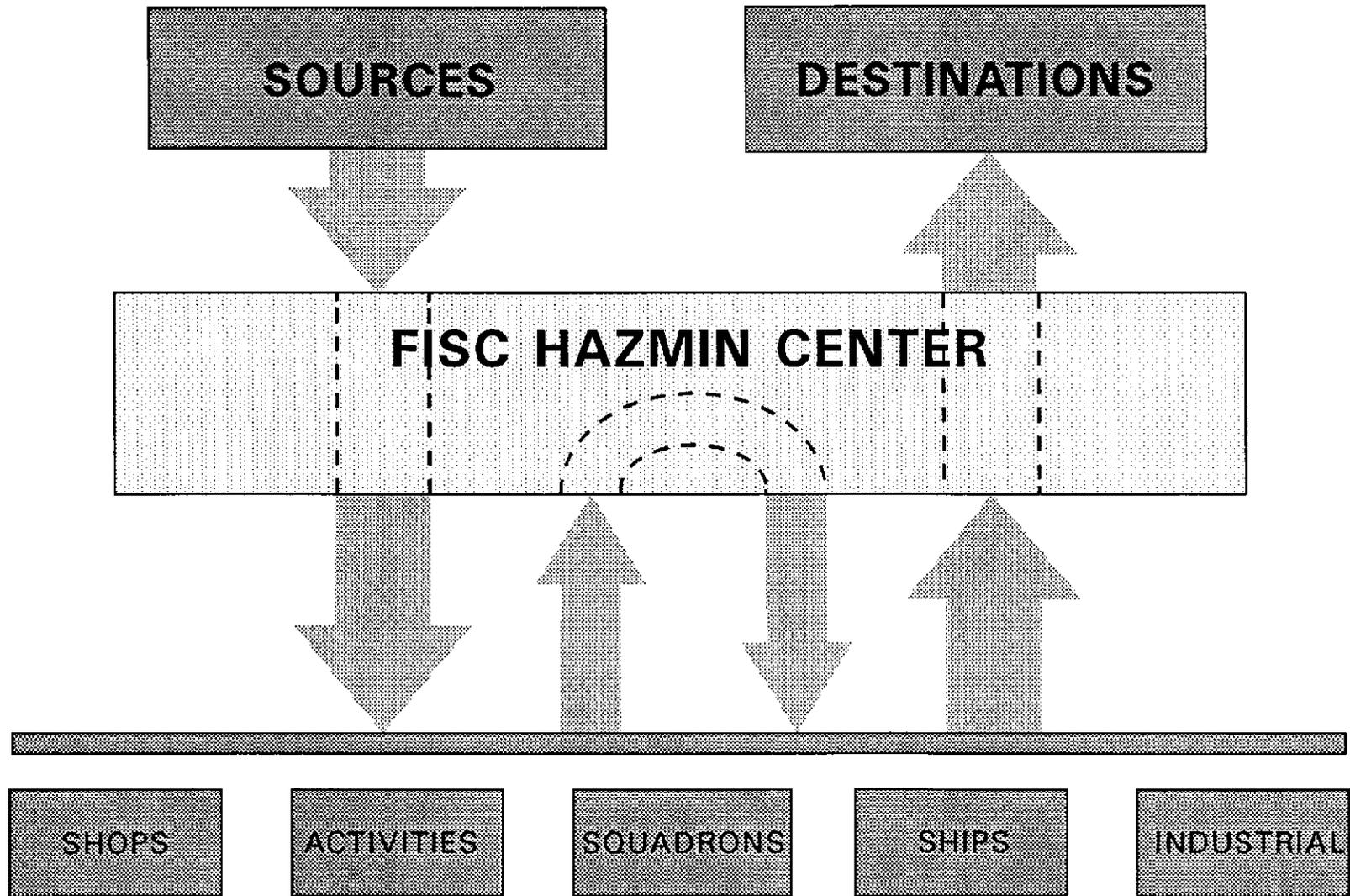


THE ADP PROGRAMS SUPPORT  
THE CHRIMP PROCESS....

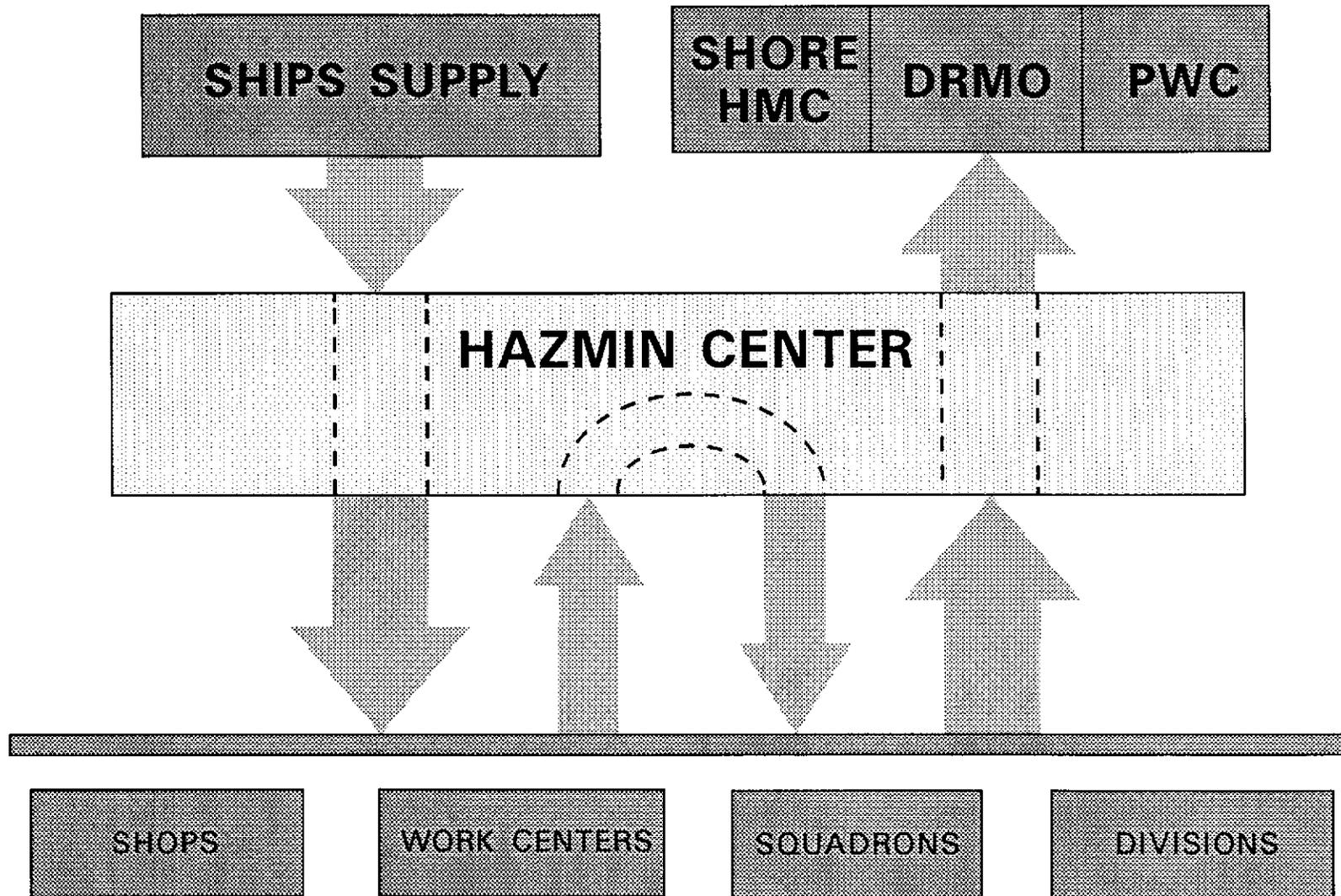
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# CHRIMP PROCESS



# CHRIMP AFLOAT PROCESS



# ADVANTAGES

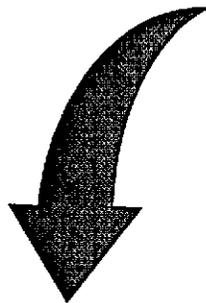
- CENTRALIZED CONTROL
- FULL OWNERSHIP OF CRADLE TO GRAVE HAZMAT
- DISPENSING OPERATION (BREAK BULK)
- CUSTOMER - DRIVEN OPERATION
- USER - FRIENDLY, MINIMIZED PAPER PROCESS
- ENHANCES SAFETY AWARENESS
- IMPROVED RECORD KEEPING AND REPORTING
- CONTROLLED AUTHORIZED USE LIST
- BARCODING / LABELING / TRACKING
- IMPROVED TRAINING

# HORIZON



**IMPLEMENTATION OF  
"CHRIMP" CONCEPT**

WITH SUPPORT FROM  
ADP SYSTEMS



***UTILIZING HICS  
AND  
HMC&M PROGRAM***

# THE HICS PROGRAM

## ■ HAZARDOUS INVENTORY CONTROL SYSTEM

### ➤ VERSION 3.4 RELEASED JAN 94 WITH CHRIMP MANUAL

- ✓ PC BASED
- ✓ IMPROVED MATERIAL MANAGEMENT SYSTEM
- ✓ PROVIDES VISIBILITY OF END USE MATERIAL
- ✓ CONTAINER TRACKING WITH BAR CODE
- ✓ ISSUES MATERIAL IN LESS THAN STANDARD ISSUE/UNIT PACK
- ✓ PROCESS OPERATION CODE
- ✓ COMPLEMENTS REUTILIZATION PROCESS
- ✓ PROVIDES CANNED MGMT REPORTS w/LTD CUSTOM REPORTING
- ✓ INVENTORIES TO NSN

### ➤ VERSION 4.0 RELEASE TBD

- ✓ PASSWORD DRIVEN (SUPERVISOR, VIEWER, USER)
- ✓ LAN CAPABLE
- ✓ AUL INCORPORATED INTO DATA BASE
- ✓ ALLOWS MULTI-LOCATION
- ✓ CAS AND CAGE ADDED
- ✓ REPORTS ALLOW USER TO TAYLOR (BANDIT)
- ✓ HAZTEC SYSTEM (HAZMAT TRACKING & PACKAGING COMPLIANCE)
- ✓ CHEMTRACK (CAS NUMBERS AND % OF BLENDS)
- ✓ PRINT 1348-1

# TSES

(TECHNICAL SCREENING EXPERT SYSTEM)

## SMART BUSINESS PRACTICES...

- AUTOMATED/STANDARD TECHNICAL PROCESS
- FOLD IN MULTITUDE OF REGULATIONS/CONTROLS

✓ HAZARDOUS     ✓ OZONE DEPLETING  
✓ MEDICAL        ✓ SUBSTANCE  
✓ DON'T BUY      ✓ PRIME

- LINK EXISTING DATA BASES

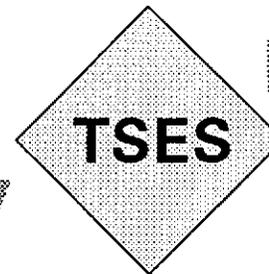
- UP AT FISCs

- IMPLEMENTING SHIPS & SHORE ACTIVITIES...  
2 YEAR TIMELINE

- WHAT'S NEXT...

✓ AUTOMATE FRONT AND BACK DOORS

REQUEST FOR MATERIAL



ISSUE REJECT PROCEDURE

### DATA BASES

- LOCAL
- LOCAL AUL
- SHML/AUL
- ODS
- AMAL/ADAL
- PRIME
- NON-STD
- DON'T BUY
- FED 313
- H2-1

### OTHER SOURCES

- FEDLOG
- HAYSTAK
- HICS REUSE

FUTURE

- EDI

- GREEN LIST

*SIMPLIFIES SAILOR'S/  
TECH'S JOB*

# **THE HMC&M SYSTEM**

**(HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM)**

## ***WHAT IS IT?***

- FULL CAPABILITIES TO SUPPORT JOINT SERVICE REQUIREMENTS DESCRIBED IN DEFENSE ENVIRONMENTAL SECURITY CORPORATE INFORMATION MANAGEMENT (DESCIM) HAZARDOUS SUBSTANCE MANAGEMENT SYSTEM (HSMS):

- HAZARDOUS MATERIAL MANAGEMENT
- HAZARDOUS WASTE MANAGEMENT
- POLLUTION PREVENTION
- ENVIRONMENTAL REPORTING
- **HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM**

# **THE HMC&M SYSTEM**

**(HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM)**

## ***WHERE DID IT COME FROM?***

- CNO DESIGNATED NCTAMSLANT TO INTEGRATE SELECTED SYSTEMS AND PROTOTYPE INTEGRATED SYSTEM AS AN INVESTMENT PROJECT USING FY 1992 POLLUTION PREVENTION FUNDS MANAGEMENT SYSTEM (HSMS):
- FIRST TEST IN SEPT 93
- BETA TESTING/PROTOTYPING AT 3 NAVY SITES
- 1994 INSTALLATION FOR FULL PROTOTYPING AT ALL SHIPYARDS
- PROBABLE NEAR TERM INSTALLATION AT:
  - PACIFIC ARMY COMMAND
  - BEALE AIR FORCE BASE
  - NAVY AVIATION DEPOTS
  - 9 OTHER DoD BETA TEST SITES

# **THE HMC&M SYSTEM**

**(HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM)**

## ***WHAT ARE ITS MAJOR FEATURES?***

- SOFTWARE DEVELOPED AND OWNED BY NAVY
- WILL RUN ON 386/486 HARDWARE IN STANDALONE OR NETWORK ENVIRONMENT
- MAINTAINS DATA FOR LOCAL MATERIAL SAFETY DATA SHEETS
- INTERFACES WITH HMIS CD-ROM DATABASE
- MAINTAINS MATERIAL CHEMICAL CONSTITUENT INFORMATION
- MAINTAINS CHEMICAL HAZARD INFORMATION
- MAINTAINS ACTIVITY AUTHORIZED USE LIST FOR HM
- MAINTAINS INFORMATION ON ALL PROCESSES THAT USE HM OF GENERATE HW

# **THE HMC&M SYSTEM**

## **(HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM)**

### ***MAJOR FEATURES (CONTINUED)***

- **AUTHORIZES THE USE OF HM BASED ON PROCESSES**
- **TRACKS HM USAGE AND HW GENERATED FOR ALL PROCESSES**
- **TRACKS CHEMICAL RELEASE INFORMATION FOR ALL PROCESSES**
- **TRACKS HM ORDERED, RECEIVED, STORED, ISSUED, USED, AND RECYCLED AS WELL AS HW DISPOSED OF**
- **TRACKS CHEMICALS THROUGH THEIR LIFE CYCLE AT THE FACILITY BASED ON MATERIAL TRANSACTIONS MADE IN THE SYSTEM**
- **MAINTAINS AN ON-LINE HM AND CHEMICAL INVENTORY**
- **TRACKS HW FROM PROCESS GENERATION THROUGH RECYCLE, TREATMENT, OR OFF-SITE DISPOSAL**

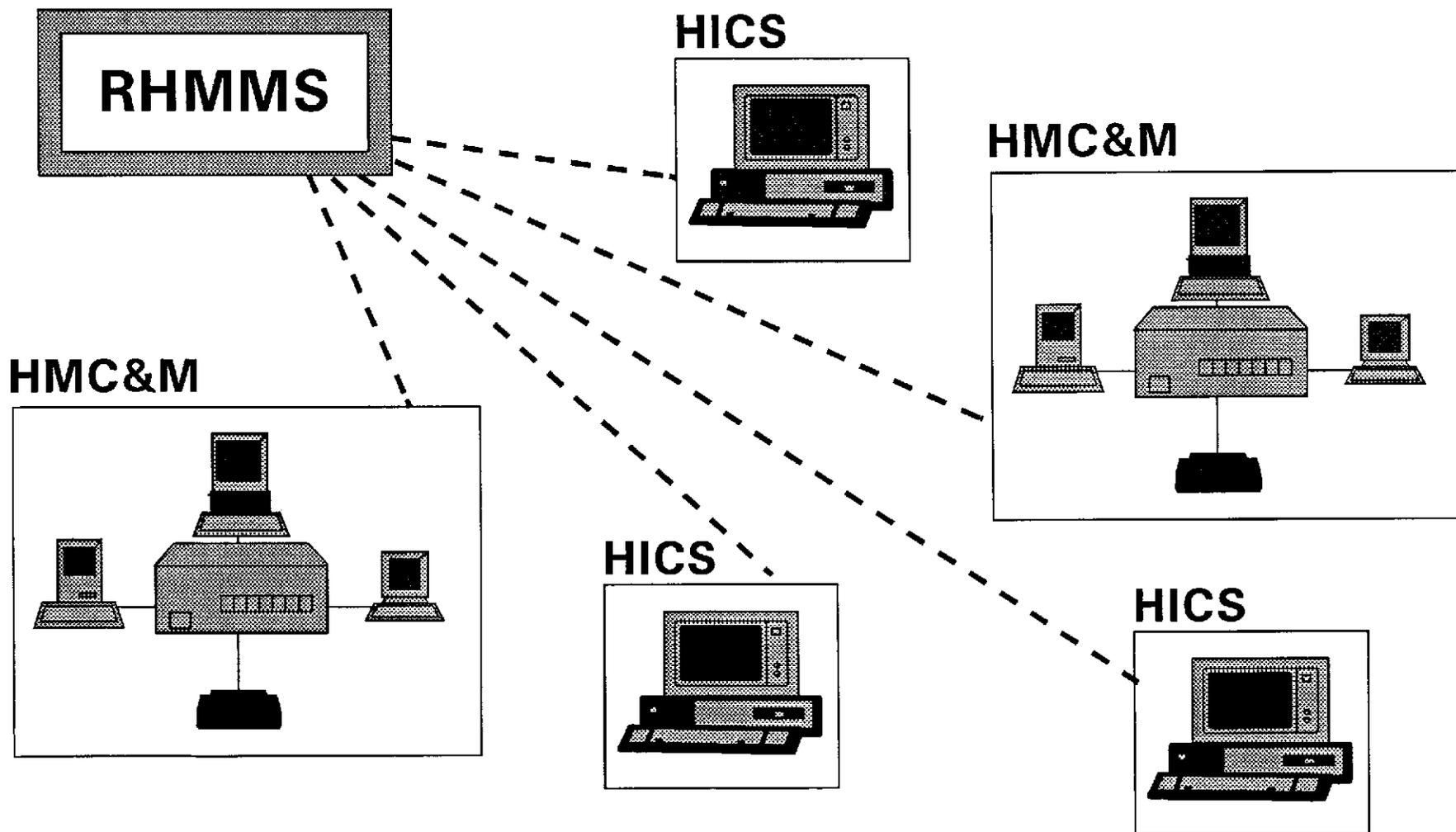
**THE HMC&M SYSTEM**  
**(HMC&M ENVIRONMENTAL COMPLIANCE SYSTEM)**

***MAJOR FEATURES (CONTINUED)***

- PRINTS HW MANIFESTS AND DD 1384s
- FULLY SUPPORTS EPCRA REQUIREMENTS

# RHMMS SYSTEM INTEGRATION

➤ RHMMS = REGIONAL HAZARDOUS MATERIAL MANAGEMENT SYSTEM



# BOTTOM LINE

## ■ ***EPCRA IS HERE!!!***

➡ YOU MUST MAINTAIN AND REPORT HAZMAT CHEMICAL SUBSTANCE INVENTORIES AND PROCESS RELEASE INFORMATION ABOVE THRESHOLDS TO BE IN COMPLIANCE WITH E.O. 12856

➡ IF YOU DON'T IMPLEMENT CHRIMP HOW ARE YOU GOING TO COMPLY WITH EPCRA???

# SUMMARY

- CHRIMP - THE IMPROVED PROCESS FOR MANAGEMENT FOR HAZMAT IS MANDATED... THREE YEAR IMPLEMENTATION GOAL!!!
- IMPLEMENTATION OF HICS AND HMC&M WILL SUPPORT THE CHRIMP PROCESS
- TSES SUPPORTS TECHNICAL SCREENING PROCESS
- RHMMS WILL SUPPLEMENT CHRIMP TO PROVIDE REGIONAL ASSET VISIBILITY TO HICS/HMC&M INVENTORIES
- ALL ADP SYSTEMS REQUIRE COMMITMENT OF RESOURCES TO IMPLEMENT
- CENTRALIZED CONTROL AND TRACKING OF HAZMAT IS NECESSARY TO SUPPORT EPCRA REQUIREMENTS

✓ *POLLUTION PREVENTION -  
IT'S THE RIGHT THING TO DO, AND . . .*



***IT'S THE LAW !!!***



DEPARTMENT OF THE NAVY  
CHIEF OF NAVAL EDUCATION AND TRAINING  
NAVAL AIR STATION  
PENSACOLA, FLORIDA 32508-5108

Canc Frp: Jul 95

CNETNOTE 5100  
T242

2 AUG 1994

CNET NOTICE 5100

Subj: NAVAL OCCUPATIONAL SAFETY AND HEALTH AND ENVIRONMENTAL  
TRAINING CENTER (NAVOSHENVTRACEN) FY 95 COURSE SCHEDULE

Ref: (a) OPNAVINST 5100.19C  
(b) OPNAVINST 5100.23C  
(c) OPNAVINST 5090.1A  
(d) NAVEDTRA 10076

Encl: (1) NAVOSHENVTRACEN FY 95 General Course Information  
(2) NAVOSHENVTRACEN FY 95 Courses  
(3) Other Navy Sources of Occupational Safety and Health,  
and Environmental Protection Training  
(4) NAVOSH Tuition/Registration Fee Advancement Pilot  
Program

1. Purpose. To promulgate the NAVOSHENVTRACEN FY 95 Course Schedule and provide additional information on occupational safety and health, and environmental protection training and professional development, in support of references (a) through (d). Reference (d) is the Navy Career Development Program for Safety and Occupational Health Personnel, currently in printing awaiting distribution.

2. Discussion

a. Enclosures (1) and (2) provide the FY 95 NAVOSHENVTRACEN course offerings, along with general course information such as eligibility and quota request procedures for the courses contained in the enclosures. Enclosure (3) lists other NAVOSH and environmental protection courses available from a variety of Navy activities, including points of contact for quotas. Enclosure (4) outlines a pilot program under which Navy OSH personnel may apply for a tuition/registration fee advance for relevant professional development training from non-Navy sources.

b. Any necessary revisions to the information in enclosures (1) through (4) will be disseminated by message using the NAVOSHENVTRACEN Collective Address Designator (CAD) "All Safety and Environmental Training." The NAVOSHENVTRACEN course schedule will also be available in the Catalog of Navy Training Courses (CANTRAC), NAVEDTRA 10500.

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3. Action

a. Commands are encouraged to take full advantage of all applicable training in enclosures (2) through (4) to ensure compliance with occupational safety and health, and environmental protection training requirements of references (a) through (c). Specific attention should be paid to prerequisites and course descriptions to ensure applicability for potential students.

b. As described in enclosure (4), non-Navy professional development courses are available to Navy OSH personnel on a tuition or registration fee payment advancement basis, in support of references (b) and (d). This training should be used to supplement Navy-provided core OSH courses to ensure individual professional development needs are met. Tuition or registration fees will not be paid for more than two courses per fiscal year per student. This pilot program is being initiated as a means of supporting professional development training for OSH professionals when/where it is not possible to provide Navy sponsored classes due to lack of sufficient demand at a single location, and as a method of controlling travel/per diem costs by supporting localized non-government training.

c. Individuals desiring training described in enclosure (4) should contact directly the indicated points of contact for further information on these courses.

4. Cancellation Contingency. This notice will remain in effect until cancelled by another with the same subject.

  
T. L. MCCLELLAND  
Executive Assistant

Distribution (CNETINST 5218.1F, Case A):  
Lists I through VIII, X, XII  
SNDL FT111 (NAVOSHENVTRACEN) (1,000 copies)

Copy to:

SNDL A3 (CNO (N45, N8, N86, N87, N88))  
21A (Fleet Commanders in Chief) (100 copies)  
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24G (Submarine Force Commanders) (50 copies)  
FKA1C (COMNAVFACENGCOM) (100 copies)  
FH1 (BUMED) (100 copies)

NAVAL OCCUPATIONAL SAFETY AND HEALTH, AND  
ENVIRONMENTAL TRAINING CENTER

FY 95 GENERAL COURSE INFORMATION

The information below applies only to courses listed in enclosure (2).

1. ELIGIBILITY AND COST. Department of the Navy personnel who meet course prerequisites are eligible to attend courses listed in enclosure (2). Interested personnel from other Department of Defense (DoD) activities or federal agencies, who meet prerequisites, may attend on a space-available basis. There are no tuition charges for government employees. Attendance by contractors or foreign nationals may require reimbursement and will be handled on a case-by-case basis.

2. OBTAINING A QUOTA

a. Time restrictions. There are no restrictions on how far in advance courses may be requested. Due to high demand, it is recommended that quotas be requested as far in advance as practical. Student names must be provided. "No name" quotas will not be accepted since they frequently result in "no shows."

NOTE: In order to be admitted to Confined Space Safety (A-493-0030) or Laser System Safety Officer (Category I)(A-493-0038), the nominee must take and pass a prerequisite screening examination. This requires initial submission of the quota request not later than 90 days prior to the course convening date to allow ample time for mailing and completion/grading of the examination. Quotas will be confirmed only if and when students have passed the pre-test.

b. Prerequisites

(1) Check prerequisites carefully and make sure that your written request clearly supports your qualifications to take the desired course.

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(2) The prerequisites for shore NAVOSH courses have been established in support of OPNAVINST 5100.23C and in conjunction with CNO (N454) and the Shore NAVOSH Training Working Group to ensure maximum availability of required training for OSH professionals. If, based upon a particular prerequisite, approval in writing by an Echelon II headquarters command OSH Manager is required, these civilian (DD Form 1556) and military (letter or message) quota requests must be forwarded for endorsement VIA the applicable Echelon II activity and code listed below. If approved, the quota request will then be sent to NAVOSHENVTRACEN (Code 103) for processing. If disapproved by the Echelon II OSH Manager, the quota request will be returned to the requesting command. Any quota request not meeting the prerequisites which is sent directly to NAVOSHENVTRACEN without the required approval, will be returned to the sender.

ECHELON II OSH MANAGERS

| <u>NAME</u>      | <u>CODE</u> | <u>COMM PHONE</u> | <u>DSN</u> | <u>FAX</u>   |
|------------------|-------------|-------------------|------------|--------------|
| BUMED            |             |                   |            |              |
| Robert Coulton   | MED-2422    | 202-653-0243      | 294-0243   | -1895        |
| CHNAVPERS        |             |                   |            |              |
| Safety Officer   | PERS 01     | 703-614-1100      | 224-1100   | -7708        |
| CINCLANTFLT      |             |                   |            |              |
| Moe Bridgman     | N4433A      | 804-444-1944      | 564-1944   | -6835        |
| Sara Johnson     | N4433B      | 804-444-3567      | 564-3567   | -6835        |
| Fred Whiting     | N4433C      | 804-444-4086      | 564-4086   | -6835        |
| CINCPACFLT       |             |                   |            |              |
| John Yasui       | N466        | 808-471-0758      | 471-0758   | -3927        |
| CINCUSNAVEUR     |             |                   |            |              |
| Andrew Rahaman   | N74         | 01144715144238    |            | -4585        |
| CMC              |             |                   |            |              |
| Russell Stephens | SDO         | 703-614-2423      | 224-1077   | 703-695-3231 |
| CNET             |             |                   |            |              |
| Robert Jordan    | 00X         | 904-452-8785      | 922-8785   | -3869        |
| CNO (FSA)        |             |                   |            |              |
| Beatrice Wanzer  | 09BF        | 202-685-1526      | 325-1526   | -1541        |
| COMNAVAIRSYSCOM  |             |                   |            |              |
| Freya Arroyo     | AIR09F2     | 703-604-3219      | 664-3219   | -3125        |

| <u>NAME</u>                         | <u>CODE</u> | <u>COMM PHONE</u> | <u>DSN</u> | <u>FAX</u> |
|-------------------------------------|-------------|-------------------|------------|------------|
| COMNAVCOMTELCOM<br>Thomas Minnick   | NIG3        | 202-282-0810      | 292-0810   | -2685      |
| COMNAVFACENGCOM<br>Mary Wingard     | 40K3        | 804-444-5193      | 564-5193   | 445-9454   |
| COMNAVOCEANCOM<br>H. J. Crochet     | N513A       | 601-688-5394      | 485-5394   | -5376      |
| COMNAVRESFOR<br>Karl Spence         | 005         | 504-948-5403      | 363-5403   | -1466      |
| COMNAVSEASYS<br>Tom Grossman        | SEA07I&E    | 703-602-4266      | 332-4266   | -4032      |
| Bernie Stapor                       |             | 703-602-4275      | 332-4275   | -4032      |
| Charles Anderson                    |             | 703-602-4268      | 332-4268   | -4032      |
| COMNAVSECGRU<br>Thomas Eisiminger   | G43SOH      | 202-282-0765      | 292-0765   | -0891      |
| COMNAVSPACECOM<br>William Krajci    | 00X         | 703-663-7716      | 249-7716   | -8464      |
| COMNAVSPECWARCOM<br>Safety Officer  | N41         | 619-437-0880      | 577-0880   | -3943      |
| COMNAVSUPSYSCOM<br>Lucinda Williams | 453         | 804-444-1096      | 564-1096   | -1820      |
| COMSC<br>Joe Ruprecht               | NOOM        | 202-433-5958      | 288-5958   | -6704      |
| COMSPAWARSYSCOM<br>Anthony Sliwa    | 00F         | 703-602-7235      | 332-7235   | -7578      |
| DIRSSP<br>Richard Crawford          | 2016        | 703-607-0136      | 325-0136   | -2175      |
| ONI<br>Michael Smith                | ONI4C       | 301-669-5550      | 294-5550   | -4629      |
| ONR<br>David Nagle                  | 91A         | 703-696-4135      | 226-4135   | -5383      |

c. Preparing the request. ALL REQUESTS MUST BE IN WRITING.

(1) Navy and DoD Civilians. Civilians should request quotas for any NAVOSHENVTRACEN courses listed in enclosure (2) by submitting a typed DD Form 1556 (Request, Authorization, Agreement, Certification of Training and Reimbursement) to their local Human Resource Offices (HROs). A copy may be faxed in advance to the NAVOSHENVTRACEN at DSN 565-8901/COMM (804) 445-8901, with the original to follow. Be sure the following information is included on the form:

Block 3 - A legible social security number

Block 7 - A convenient phone number (including DSN) for additional information or notification of schedule changes, etc.

Block 8 - The nominee's functional position title relating to safety/environmental responsibilities

Block 13 - The primary UIC of the nominee's activity

Block 18 - A thorough statement explaining why the course is required and how it is related to the person's job assignment. Justification for waivers from prerequisites should also be included here. The quota request will be evaluated based largely upon this information and the person's job series classification.

Block 19 - a. NAVOSHENVTRACEN

b. Commanding Officer  
Naval Occupational Safety and Health,  
and Environmental Training Center  
9080 Breezy Point Crescent  
Norfolk, VA 23511-3998

(2) Navy and DoD Military Personnel. Military personnel must request quotas by sending an official letter to the above address, or message to NAVOSHENVTRACEN NORFOLK VA//103//. An advance copy of the letter may be faxed to DSN 565-8901/COMM (804) 445-8901, with the original to follow. The letter or message should include the student's first name, middle initial, last name, SSN, rate/rank/branch of service, and position title; the activity's UIC, complete mailing address and phone number (DSN/COMM); and the course identification number (CIN), title and location requested.

NOTE: USMC personnel wishing to attend Ground Safety for Marines (A-493-0047) should contact Mr. Russell Stephens, HDQTRS CMC, at DSN 224-1077 or (703) 614-2423, to obtain a quota.

d. Alternate dates. If there is an acceptable alternate date/location, indicate it on the quota request. If the first choice is full, a quota will be granted for the alternate selection, if space is available.

e. HMC&M Technician Course (A-322-2600). All quotas for this NEC-granting course are controlled by BUPERS. Priority is given to personnel ordered to this course en route to their permanent duty station. Other available quotas for shore or afloat E-5 to E-9 enlisted personnel may be requested by message to BUPERS WASHINGTON DC//405F//, or by calling SKC Hester at DSN 227-2484 or FAX DSN 224-6433.

3. QUOTA CONFIRMATION. Quota confirmation or denial postcards will be mailed by NAVOSHENVTRACEN within 10 days of receipt of the quota request.

a. A "Granted" postcard will indicate a granted quota and give a quota confirmation number which must appear on the student's orders. Multiple names from one command may appear on each postcard.

b. A "Denied" postcard will indicate the reason the quota was not available or not granted. Multiple names from one command may appear on each postcard.

c. Postcards are mailed using the Standard Navy Distribution List (SNDL) address; therefore, a valid UIC must be on the quota request to locate the mailing address.

4. REMINDER MESSAGES. A reminder message will be sent 30 days prior to the start of the course listing all confirmed attendees to date, and identifying exact classroom locations, reporting times, and uniform information. Quota requests will continue to be accepted after the 30-day messages go out, up to the day the class starts, if seats are still available. Confirmation of these last-minute quotas is made over the phone or by fax.

5. CANCELLATIONS/SUBSTITUTIONS. The NAVOSHENVTRACEN must be notified as soon as possible if a command cannot use an already confirmed quota or wishes to substitute a nominee. Activities failing to cancel unused quotas, resulting in "no shows," will be notified accordingly in writing. Notification of cancellations or substitutions may be done by phone, fax, or message.

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Substitutions must also meet the criteria for the prerequisites of the course, especially if Echelon II approval was required for that course.

6. **WAIVERS.** Waivers may be requested by the command for exceptions to prerequisites. For example, if an E-4 is filling a position which requires a course normally limited to E-5 or above, the command may request, in writing, for the NAVOSHENVTRACEN to waive the rating level.

7. **"FAIR SHARE" OF QUOTAS.** To ensure the maximum number of commands have access to NAVOSH and environmental courses, there is a "fair share" limit of three quotas per course per command. Exceptions can only be made through a written request for waiver or if the course has space available within 30 days of a convening.

8. **UNIFORM POLICY.** Military personnel attending courses listed in enclosure (2) are expected to be in the uniform of the day for the particular location. Civilian personnel will dress appropriately. Any requirements for coveralls or working uniforms to wear on field trips will be noted in the 30-day confirmation messages.

9. **LATE ARRIVALS.** All classes begin at 0730 and end at 1600. Persons are encouraged to arrive on time the first day of a course. Students expecting to arrive after 0830 should notify the NAVOSHENVTRACEN of their plans so that their seats may be held open for them. Unless prior arrangements have been made, any person arriving after 0830 cannot be guaranteed a seat in the convening, even though the quota had been confirmed. If there are standbys or walk-ins, these persons will be offered the unfilled seats at 0830.

10. **DUTY WHILE UNDER INSTRUCTION.** It is recommended that students reporting for training be exempt from standing duty at their parent commands.

11. **CATALOG OF NAVY TRAINING COURSES (CANTRAC), NAVEDTRA 10500.** Courses listed in enclosure (2) of this schedule are also included in CANTRAC. CANTRAC provides a centralized source of information on all courses under the purview of the Chief of Naval Education and Training (CNET) and other Navy training commands. Volume II of CANTRAC, published in CD-ROM format each April and October, contains course descriptions (course identification numbers (CINs), locations, lengths, prerequisites, personnel reporting procedures, and quota control authority), along with convening schedules. CANTRAC is distributed Navy wide

and should be available at all commands. Check with your training officer or Educational Services Officer (ESO) for further information on the location of CANTRAC at your command.

12. NAVOSHENVTRACEN LOCATION. The NAVOSHENVTRACEN is located in the center wing behind the Norfolk Naval Air Station BOQ, Ely Hall, Building SP-17, which is directly across the street from the Breezy Point Officer's Club on Fifth Avenue. After entering the Naval Air Station's Gate 4, take the first left turn at the signal light, then the first right turn onto Breezy Point Crescent. From the Naval Air Station's Gate 3, follow Bellinger Boulevard east, past the air field and hangers, to Fifth Avenue. Turn right onto Fifth Avenue at the signal light, then the first right onto Breezy Point Crescent. Parking is available behind the BOQ and next to the NAVOSHENVTRACEN building.

13. WORLD-WIDE COURSE LOCATIONS. NAVOSHENVTRACEN provides courses at over a dozen locations world wide and arranges classroom facilities with a variety of DoD activities. Some of these arrangements cannot be made until 45-60 days before the class convenes. Course location, base, building, and classroom numbers will be provided in the 30-day reminder messages.

14. NAVOSHENVTRACEN PHONE NUMBERS FOR ADDITIONAL INFORMATION. The voice mail system may be accessed by calling DSN 565-8778 or (804) 445-8778, and then dialing the extension number, as follows:

|  |                  |
|--|------------------|
| Commanding Officer                     | Ext. 313         |
| Executive Officer                      | Ext. 347         |
| Admin/Switchboard                      | Ext. 300         |
| Quota Control                          | Ext. 324/325/326 |
| Training Department                    |                  |
| Occupational Health Training Division  | Ext. 337         |
| Safety Training Division               | Ext. 320         |
| Envir. Prot./Haz Mat Training Division | Ext. 316         |

Since the NAVOSHENVTRACEN serves students world-wide, we cannot take or accept quota requests or reservations over the phone. Training Department personnel can answer questions on prerequisites and course content. Quota Control can provide information on the availability of remaining quotas. If anyone has any specific difficulties or suggestions concerning NAVOSHENVTRACEN courses, they are encouraged to call the Commanding Officer directly.

NAVAL OCCUPATIONAL SAFETY AND HEALTH, AND  
ENVIRONMENTAL TRAINING CENTER

FY 95 COURSES

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The following courses are offered by the NAVOSHENVTRACEN in Norfolk, VA and at various exported locations throughout the world. Prospective students are advised to pay particular attention to course descriptions and prerequisites to ensure courses are applicable to their needs. Course lengths are given in instructional days. Courses are listed by the course identification number (CIN) in alpha-numeric order.

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| <u>CIN</u> | <u>COURSE TITLE</u>   |
|------------|---|
| A-4A-0051  | NAVOSH Program Seminar  |
| A-4J-0021  | Afloat Environmental Protection Coordinator                     |
| A-8B-0008  | Afloat Hazardous Material Coordinator                           |
| A-322-0010 | Afloat Hazardous Material for the Supervisor                    |
| A-322-2600 | Hazardous Material Control and Management (HMC&M)<br>Technician |
| A-493-0021 | Construction Safety Standards                                   |
| A-493-0024 | Ergonomics  |
| A-493-0030 | Confined Space Safety   |
| A-493-0031 | Introduction to Hazardous Materials (Ashore)                    |
| A-493-0033 | Electrical Standards  |
| A-493-0035 | Introduction to Industrial Hygiene for Safety<br>Professionals  |
| A-493-0038 | Laser System Safety Officer (Category I)                        |
| A-493-0043 | Safety Appraisal  |
| A-493-0047 | Ground Safety for Marines                                       |
| A-493-0048 | Basic Mishap Investigation and Recordkeeping<br>(Ashore)        |
| A-493-0050 | Introduction to Navy Occupational Safety and<br>Health (Ashore) |
| A-493-0061 | General Industry Safety Standards                               |
| A-493-0062 | Safety Certification Review                                     |
| A-493-0063 | Safety Training Methods   |
| A-493-0065 | Aviation Safety Petty Officer                                   |
| A-493-0066 | Advanced Mishap Investigation                                   |
| A-493-0067 | Laser System Safety Officer (Category II)                       |
| A-493-2099 | Safety Programs Afloat  |
| A-760-2166 | Shipboard Asbestos Emergency Response                           |
| S-493-0001 | Machinery and Machine Guarding Standards                        |
| S-493-0002 | Cranes and Materials Handling for General Industry              |
| S-493-0003 | Respiratory Protection  |
| S-493-0006 | Workplace Back Injuries   |
| S-493-0009 | Fire Protection and Life Safety                                 |

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TITLE: Navy Occupational Safety and Health Program Seminar

CIN: A-4A-0051 COURSE LENGTH: 1 day  
CDP: 438E CLASS SIZE: 30

DESCRIPTION: The purpose of this course is to provide full-time/collateral-duty OSH personnel with an update of and commanding officers/managers with an overview of NAVOSH policies, programs and initiatives. In addition, information and techniques for managing a successful program are provided. The course content includes an overview from the CNO perspective; NAVOSH oversight inspections; medical surveillance and workplace monitoring; reduction of injury claims; hazard abatement; hazardous material management; and an overview of a successful activity program.

PREREQUISITES: None

This course is offered in conjunction with the one-day Executive Seminar (A-4A-0054) conducted by the Naval School, Civil Engineer Corps Officers. It is scheduled for the day following the Executive Seminar and in the same location. Quotas for the NAVOSH Program Seminar are controlled by the NAVOSHENVTRACEN.

DATES:

16 Nov 94  
11 Jan 95  
22 Mar 95  
26 Apr 95  
14 Jun 95  
19 Jul 95

LOCATIONS:

San Diego, CA  
Pearl Harbor  
Jacksonville, FL  
Norfolk  
Mediterranean Area  
Bangor/Silverdale WA area

TITLE: Afloat Environmental Protection Coordinator

CIN: A-4J-0021 COURSE LENGTH: 3 days  
CDP: 430U CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide assigned collateral-duty shipboard Environmental Protection Coordinators with training to establish and operate a ship's environmental protection program. Course content includes environmental protection procedures; program duties/responsibilities; recordkeeping/reporting; liability, violations, and site access; overseas environmental compliance; spill response and contingency plans; hazardous material disposal/offload; recycling/reutilization; solid waste management; air/noise pollution; medical/infectious waste management; marine sanitation/sewage; oil/oily waste management; and shipboard discharges at sea.

PREREQUISITES: Senior enlisted and officer personnel assigned as Afloat Environmental Protection Coordinators on board ships and submarines.

| DATES:       | LOCATIONS:       |
|--------------|------------------|
| 24-26 Oct 94 | Norfolk, VA      |
| 7 - 9 Nov 94 | San Diego, CA    |
| 12-14 Dec 94 | Norfolk, VA      |
| 6 - 8 Feb 95 | Oakland, CA      |
| 8 -10 Mar 95 | Norfolk, VA      |
| 19-21 Apr 95 | Everett, WA      |
| 19-21 Jun 95 | San Diego, CA    |
| 23-25 Aug 95 | Pearl Harbor, HI |
| 18-20 Sep 95 | Mayport, FL      |

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TITLE: Afloat Hazardous Material Coordinator

CIN: A-8B-0008 COURSE LENGTH: 2 days  
CDP: 438F CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide Afloat Hazardous Material Coordinators with the training to manage a ship's hazardous material program. The course content includes procurement; handling, storage and disposal of hazardous materials; and inspection of storage locations. Students learn to interpret material safety data sheets (MSDSs) and how to provide hazard-specific training.

PREREQUISITES: Senior personnel designated as Afloat Hazardous Material Coordinators.

Dates and locations will be announced by  
separate message pending resolution of funding.

TITLE: Afloat Hazardous Material for the Supervisor  
CIN: A-322-0010 COURSE LENGTH: 2 days  
CDP: 430V CLASS SIZE: 30

DESCRIPTION: The purpose of this course is to provide shipboard workcenter supervisors with the training to manage a hazardous material program within their workcenters. The course content includes procurement, handling, storage, and disposal of hazardous materials, as well as inspection of storage locations. Supervisors learn to interpret material safety data sheets (MSDSs) and how to provide hazard-specific training to their subordinates. Elements of the Consolidated Hazardous Materials, Reutilization and Inventory Management Program (CHRIMP) will be included to prepare the supervisor for shipboard HAZMAT issue/reissue centers being instituted by the fleet.

PREREQUISITES: E-4 and above, any rating, functioning as a shipboard workcenter supervisor.

Dates and locations will be announced by  
separate message pending resolution of funding.

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TITLE: Hazardous Material Control and Management (HMC&M)  
Technician

CIN: A-322-2600 COURSE LENGTH: 5 days  
CDP: 438D (Norfolk) CLASS SIZE: 30  
477C (San Diego)

DESCRIPTION: The purpose of this course is to provide shipboard HMC&M technicians with the training to safely handle, use, store and dispose of HM/HW. The course content includes information on procurement, handling, storage, and disposal of HM, as well as inspection of storage locations. Students learn to interpret material safety data sheets (MSDSs) and how to provide hazard-specific training to their subordinates. Elements of the Consolidated Hazardous Materials, Reutilization and Inventory Management Program (CHRIMP) will be included to prepare the technician for HAZMAT issue/reissue centers being instituted by the fleet. This course confers SNEC 9595.

PREREQUISITES: E-5 through E-9, any rating; surface ship, submarine, and shore military personnel eligible for SNEC 9595.

Dates and locations will be announced by  
separate message pending resolution of funding.

TITLE: Construction Safety Standards

CIN: A-493-0021 COURSE LENGTH: 10 days  
CDP: 224L CLASS SIZE: 40

DESCRIPTION: The purpose of the course is to provide military full-time and additional duty safety personnel, ROICCs, construction inspectors, and other military/civilian personnel assigned responsibility for conducting or supervising OSH efforts at Navy construction sites, with the training to identify and interpret OSHA and NAVOSH standards, apply those standards to a construction site, and ensure the site is free from hazards to ensure the safety of personnel. The course content includes NAVOSH program introduction; OSHA construction standards; walking and working surfaces; electrical safety; fire protection and prevention; welding and cutting; materials handling and storage; tools (hand and powered); excavations; signs, signals and barricades; concrete and masonry construction; construction specific operations; occupational health and environmental controls; personal protective equipment; and hazard recognition, evaluation and control. This course confers SNEC 6021.

PREREQUISITES: E-5 and above in construction ratings, ROICCs, and construction inspectors. All civilian and military personnel must have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:       |
|-----------------|------------------|
| 27 Mar-7 Apr 95 | Gulfport, MS     |
| 15-26 May 95    | Port Hueneme, CA |
| 10-21 Jul 95    | Gulfport, MS     |

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TITLE: Ergonomics

CIN: A-493-0024 COURSE LENGTH: 5 days  
CDP: 286R CLASS SIZE: 30

DESCRIPTION: The purpose of this course is to provide safety specialists, managers, and industrial hygienists who are required to perform ergonomics program management/administrative functions with the training to independently develop and implement back injury prevention and cumulative trauma disorder (CTD) prevention programs. The course content includes back injury prevention; CTDs; workplace design; tool and equipment selection and design; displays and controls; and environmental stressors.

PREREQUISITES: Must be in GS-018, -019, -690, or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:        |
|-----------------|-------------------|
| 17-21 Oct 94    | Norfolk, VA       |
| 31 Oct-4 Nov 94 | Ramstein, Germany |
| 5 - 9 Dec 94    | San Diego, CA     |
| 27 Feb-3 Mar 95 | Charleston, SC    |
| 17-21 Apr 95    | Pearl Harbor, HI  |
| 19-23 Jun 95    | Norfolk, VA       |
| 7 -11 Aug 95    | Everett, WA       |

TITLE: Confined Space Safety

CIN: A-493-0030 COURSE LENGTH: 8 days  
CDP: 286X CLASS SIZE: 25

DESCRIPTION: The purpose of the course is to provide Gas Free Engineers (GFEs)/Assistants (AGFEs) and Confined Space Program Managers (CSPMs)/Assistants (ACSPMs) with the training to establish and oversee a shore maritime and non-maritime Gas Free Engineering/Confined Space Entry Program and apply the standards outlined in NAVSEA S6470-AA-SAF-010 and OPNAVINST 5100.23C. The course content includes the reasons for gas testing; toxicology and health hazards; chemistry for gas free engineers; ventilation requirements and calculations; procedures, responsibilities and program requirements; hot work, space cleaning, inerting and pressing up procedures; selection and use of gas detection instruments; and personal protective equipment.

PREREQUISITES: Must be designated in writing as the shore activity GFE/AGFE or CSPM/ACSPM. Prospective students must take and pass a screening examination in order to be admitted to the course. This requires submission of quota requests at least 90 days before the convening date to allow time for completion and grading of the exam.

DATES:

LOCATIONS:

|              |                  |
|--------------|------------------|
| 18-27 Oct 94 | Norfolk, VA      |
| 21-30 Mar 95 | San Diego, CA    |
| 11-20 Apr 95 | Jacksonville, FL |
| 6 -15 Jun 95 | Groton, CT       |
| 15-24 Aug 95 | Pearl Harbor, HI |

CNETNOTE 5100  
02 AUG 94

TITLE: Introduction to Hazardous Materials (Ashore)

CIN: A-493-0031 COURSE LENGTH: 5 days  
CDP: 286Y CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to introduce civilian and military personnel assigned to full-time/collateral OSH safety duties with the training to identify hazardous materials and hazardous materials control requirements and methods ashore. The course content includes definitions and types of hazardous materials; chemistry of hazardous materials; human toxicology; hazard communication (HAZCOM) program; identification, labelling, marking, storage and transportation of hazardous materials; and HAZWOPER (29 CFR 1910.120).

PREREQUISITES: Must be in GS-018, -019, -690, or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:         |
|-----------------|--------------------|
| 17-21 Oct 94    | Guam               |
| 14-18 Nov 94    | San Diego, CA      |
| 5-9 Dec 94      | Norfolk, VA        |
| 9 -13 Jan 95    | Pearl Harbor, HI   |
| 13-17 Feb 95    | Jacksonville, FL   |
| 3 - 7 Apr 95    | Norfolk, VA        |
| 26-30 Jun 95    | San Diego, CA      |
| 7 -11 Aug 95    | Patuxant River, MD |
| 28 Aug-1 Sep 95 | San Diego, CA      |
| 18-22 Sep 95    | Bangor, WA         |

TITLE: Electrical Standards

CIN: A-493-0033 COURSE LENGTH: 4 days  
CDP: 287A CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide full-time OSH personnel and designated collateral duty OSH managers/safety officers at shore activities with the training to identify and interpret electrical safety standards and apply those standards to ensure hazard-free workplaces.

PREREQUISITES: Must be in GS-018, -019, or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:       | LOCATIONS:         |
|--------------|--------------------|
| 4 - 7 Oct 94 | Norfolk, VA        |
| 1 - 4 Nov 94 | Charleston, SC     |
| 10-13 Jan 95 | San Diego, CA      |
| 4 - 7 Apr 95 | Whidbey Island, WA |
| 25-28 Jul 95 | Pearl Harbor, HI   |

CNETNOTE 5100  
02 AUG 94

TITLE: Introduction to Industrial Hygiene for Safety  
Professionals

CIN: A-493-0035 COURSE LENGTH: 4 days  
CDP: 287C CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to introduce full-time safety and occupational health personnel and environmental protection and emergency response personnel to the field of industrial hygiene and the identification of potential health hazards in the workplace. The course content includes an overview of the field of industrial hygiene; exposure standards; sampling strategies; sampling and analysis of particulates, gases and vapors; calibration of sampling pumps and direct reading instruments for gases and vapors; respiratory protection program and equipment; toxicology; noise monitoring; heat/cold stress evaluation; and asbestos sampling and analysis.

PREREQUISITES: Must be in GS-018, -019, or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:       | LOCATIONS:       |
|--------------|------------------|
| 1-4 Nov 94   | Norfolk, VA      |
| 15-18 Nov 94 | Jacksonville, FL |
| 10-13 Jan 95 | Pearl Harbor, HI |

TITLE: Laser System Safety Officer (Category I)

CIN: A-493-0038 COURSE LENGTH: 6 days  
CDP: 287F CLASS SIZE: 25

DESCRIPTION: The purpose of this course is to provide personnel assigned as full-time/collateral-duty Category I Laser Systems Safety Officers (LSSOs) with the training to identify and apply the specific requirements for control of laser radiation hazards in the ashore and afloat environments. The course content includes the physics of laser safety; laser hazard analysis; biological effects of optical radiation; laser eye and skin protection; standards utilization; laser system and range certification; and Navy Laser Hazards Prevention Program management. The course does not include information on other non-ionizing or ionizing radiation safety.

PREREQUISITES: Must be designated in writing as a Category I Laser System Safety Officer. Prospective students must take and pass a screening exam in order to be admitted to the course. This requires submission of quota requests at least 90 days before the convening date to allow time for completion and grading of the exam. Students will be required to bring a scientific calculator to the course and be able to use it to solve complex algebraic and trigonometric equations.

| DATES:       | LOCATIONS:    |
|--------------|---------------|
| 6 -13 Dec 94 | Norfolk, VA   |
| 12-19 Sep 95 | San Diego, CA |

CNETNOTE 5100  
02 AUG 94

TITLE: Safety Appraisal

CIN: A-493-0043 COURSE LENGTH: 4 days  
CDP: 287M CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide full-time shore OSH personnel and activity designated collateral-duty OSH managers/safety officers with the training required to perform safety appraisals of command workplaces and processes. Emphasis is placed on pre-appraisal planning (including site preparation); data collection/analysis; formulation of conclusions and recommendations for improvement; and outbriefing and report writing. The course content includes planning/preparation of appraisal; objective observations; interfacing with appraisee; analytical tools; and report preparation.

PREREQUISITES: Must be in GS-018, -019, -690 or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

DATES:

LOCATIONS:

|              |                 |
|--------------|-----------------|
| 24-27 Jan 95 | San Diego, CA   |
| 14-17 Mar 95 | Pearl Harbor HI |
| 13-16 Jun 95 | Norfolk, VA     |
| 11-14 Jul 95 | Indian Head, MD |

TITLE: Ground Safety for Marines

CIN: A-493-0047 COURSE LENGTH: 10 days  
CDP: 287R CLASS SIZE: 40

DESCRIPTION: The purpose of the course is to provide USMC personnel assigned to full-time/collateral safety duties at ashore units/staffs with training to utilize fundamental safety and occupational health concepts/techniques in the Marine Corps Accident Prevention, Safety and Occupational Health Programs. The course content includes hazard control fundamentals; Marine Corps OSH Standards (29 CFR 1910); personal protective equipment; hazardous materials; hazardous waste and environmental laws; industrial hygiene; recreation and off-duty safety; safety training; mishap investigation and reporting procedures; and motor vehicle and traffic safety programs.

PREREQUISITES: USMC E-4 and above with 3 years service, or 0-2/0-3 serving in ground safety billets.

| DATES:          | LOCATIONS:         |
|-----------------|--------------------|
| 28 Nov-9 Dec 94 | Camp Pendleton, CA |
| 23 Jan-3 Feb 95 | Camp Lejeune, NC   |
| 13-24 Mar 95    | Camp Pendleton, CA |
| 19-30 Jun 95    | Camp Lejeune, NC   |
| 7 -18 Aug 95    | Okinawa, JA        |

NOTE: USMC personnel wishing to attend Ground Safety for Marines (A-493-0047) should contact Mr. Russell Stephens, HDQTRS CMC, at DSN 224-1077 or (703) 614-2423, to obtain a quota.

CNETNOTE 5100  
02 AUG 94

TITLE: Basic Mishap Investigation and Recordkeeping (Ashore)

CIN: A-493-0048 COURSE LENGTH: 4 days  
CDP: 287S CLASS SIZE: 30

DESCRIPTION: The purpose of this course is to provide full-time shore OSH personnel and designated activity collateral-duty OSH managers/safety officers with the training to conduct and participate in the investigation of mishaps and record and report the results of those investigations using analytical techniques and data management systems. The course content includes change analysis; administrative considerations; energy-barrier-target analysis; interviewing witnesses; human errors; events/causal factors analysis; integrating and reporting information; and recording and reporting mishaps.

PREREQUISITES: Civilians must be in GS-018, -019, -690 or -803 classification series. Military or collateral-duty personnel must be designated in writing as OSH managers/safety officers. Collateral-duty personnel must have completed A-493-0050 (Introduction to NAVOSH (Ashore)). Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:         |
|-----------------|--------------------|
| 1 - 4 Nov 94    | Groton, CT         |
| 6 - 9 Dec 94    | Norfolk, VA        |
| 10-13 Jan 95    | San Diego, CA      |
| 31 Jan-3 Feb 95 | Indian Head, MD    |
| 7 -10 Mar 95    | Pearl Harbor, HI   |
| 11-14 Apr 95    | Jacksonville, FL   |
| 9 -12 May 95    | Oakland, CA        |
| 18-21 Jul 95    | Norfolk, VA        |
| 15-18 Aug 95    | San Diego, CA      |
| 19-22 Sep 95    | Whidbey Island, WA |

TITLE: Introduction to Navy Occupational Safety and Health  
(Ashore)

CIN: A-493-0050 COURSE LENGTH: 5 days  
CDP: 287T CLASS SIZE: 30

DESCRIPTION: This course provides shore primary and collateral-duty military and civilian safety personnel with training to independently implement, maintain and manage a comprehensive safety program ashore. The course content includes terms, principles, concepts and requirements for mishap prevention; safety, fire, environment, and occupational health programs in the Navy; fundamentals of mishap causation, hazard recognition, evaluation and control; specific safety programs such as mishap investigation and reporting, occupational safety and health standards, hazard abatement, respiratory protection, hearing conservation, sight conservation, ergonomics, energy control and confined space entry.

PREREQUISITES: Collateral-duty personnel must be designated in writing as the activity OSH manager/safety officer. All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:       |
|-----------------|------------------|
| 17-21 Oct 94    | Jacksonville, FL |
| 14-18 Nov 94    | San Diego, CA    |
| 12-16 Dec 94    | Norfolk, VA      |
| 23-27 Jan 95    | Rota, SP         |
| 13-17 Feb 95    | Bremerton, WA    |
| 6 -10 Mar 95    | Newport, RI      |
| 27-31 Mar 95    | Norfolk, VA      |
| 8 -12 May 95    | San Diego, CA    |
| 10-14 Jul 95    | Pearl Harbor, HI |
| 17-21 Jul 95    | Yokosuka, JA     |
| 31 Jul-4 Aug 95 | Norfolk, VA      |
| 11-15 Sep 95    | Norfolk, VA      |

CNETNOTE 5100  
02 AUG 94

TITLE: General Industry Safety Standards

CIN: A-493-0061 COURSE LENGTH: 5 days  
CDP: 288E CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide full-time OSH personnel and designated collateral-duty OSH managers/safety officers, fire protection specialists and others assigned responsibility for conducting/supervising OSH inspection efforts at shore activities, with the training to identify and interpret OSHA standards and apply those standards to their work environment. The course content includes standards orientation; walking/working surfaces; electrical standards; fire protection; storage and materials handling; machine guarding and portable tools; welding and cutting; hazardous materials; general environmental control; toxic and hazardous substances; personal protective equipment; and hazard communication.

PREREQUISITES: Must be in GS-018, -019, -690 or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:       |
|-----------------|------------------|
| 14-18 Nov 94    | Philadelphia, PA |
| 30 Jan-3 Feb 95 | Rota, SP         |
| 13-17 Mar 95    | Jacksonville, FL |
| 8 -12 May 95    | Norfolk, VA      |
| 12-16 Jun 95    | San Diego, CA    |
| 31 Jul-4 Aug 95 | Washington, DC   |
| 21-25 Aug 95    | Everett, WA      |

TITLE: Safety Certification Review

CIN: A-493-0062 COURSE LENGTH: 5 days  
CDP: 379R CLASS SIZE: 25

DESCRIPTION: The purpose of the course is to provide full-time OSH professionals with a review of basic sciences and safety standards in preparation for their taking the Certified Safety Professional (CSP) Fundamentals Exam. The course content includes a review of the basic sciences (math, chemistry, physics, mechanics, statistics, and electricity) and safety (standards, fire protection, industrial hygiene, system safety, hazardous materials, ethics, and law). The review is based on the BCSP and AIA review manuals for the CSP Fundamentals Exam.

PREREQUISITES: Must be in GS-018, -690, or -803 classification series or military equivalent positions. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). Must be eligible to qualify for CSP examination. All civilian and military personnel must also have at least 12 months from course date remaining in job assignment. The assumption of this course is that all attendees possess the basic science/safety standards knowledge required to take the CSP Fundamentals Exam and only need to review the material in an intensive session. Students must bring a scientific calculator to class.

| DATES:       | LOCATIONS:       |
|--------------|------------------|
| 3 - 7 Oct 94 | Jacksonville, FL |
| 15-19 May 95 | San Diego, CA    |

CNETNOTE 5100  
02 AUG 94

TITLE: Safety Training Methods

CIN: A-493-0063 COURSE LENGTH: 5 days  
CDP: 379S CLASS SIZE: 25

DESCRIPTION: The purpose of the course is to provide full-time and collateral-duty OSH personnel assigned responsibilities for safety training at shore activities with the training to independently develop, administer and evaluate safety training efforts at their commands. The course content includes safety training program policies; safety training requirements; the safety training target audience, training methodologies and instructional techniques; development and presentation of lesson plans; and evaluation of training.

PREREQUISITES: Must be in GS-018, -019, -690 or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment. Some formal instructor training is desirable.

| DATES:       | LOCATIONS:    |
|--------------|---------------|
| 24-28 Oct 94 | Bangor, WA    |
| 20-24 Mar 95 | Kings Bay, GA |
| 15-19 May 95 | Norfolk, VA   |
| 7 -11 Aug 95 | San Diego, CA |

TITLE: Aviation Safety Petty Officer

CIN: A-493-0065 COURSE LENGTH: 8 days  
CDP: 399A CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide aviation safety petty officers with the training to assist in the operation and management of the aviation activity's occupational safety and health program and its aviation safety program ashore and afloat, including investigation of on- and off-duty mishaps and completion of required reports. The course content includes safety and health procedures, policies and instructions; deficiency abatement program; mishap investigation and reporting, safety and health training; hazardous material control and management; maintenance of safety records; hazard detection, elimination, reporting and monitoring; management of an activity's safety committee; and hangars, flight-line and deck safety. The course confers PNEC 8301.

PREREQUISITES: E-6 through E-9 in one of the following ratings: AB, ABE, ABF, ABH, AD, AE, AF, AM, AME, AMH, AMS, AO, AS, AT, AW, AV, AZ or PR

Dates and locations will be announced by separate message pending resolution of funding.

CNETNOTE 5100  
02 AUG 94

TITLE: Advanced Mishap Investigation

CIN: A-493-0066 COURSE LENGTH: 5 days  
CDP: 430W CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to provide full-time OSH professionals/safety officers and others at shore activities responsible for performing Class A and B mishap investigations, with the training to conduct accident/incident investigation and write investigation reports, and to determine the root causes of mishaps and formulate effective measures to prevent recurrence using a management oversight and risk tree (MORT) systems approach. The course content includes model programs for root cause analysis; failure recognition and analysis; events and causal factors analysis; investigative interviewing techniques; human errors; change analysis and identification models; hazard-barrier-target analysis; analytic trees; management and risk assessment systems analysis; information integration for investigative reports; root cause corrective action evaluation; and briefing techniques for mishap investigation results.

PREREQUISITES: All quota requests must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months remaining in job assignment.

| DATES:       | LOCATIONS:       |
|--------------|------------------|
| 14-18 Nov 94 | Pensacola, FL    |
| 6 -10 Feb 95 | Norfolk, VA      |
| 15-19 May 95 | Pearl Harbor, HI |
| 21-25 Aug 95 | San Diego, CA    |

TITLE: Laser System Safety Officer (Category II)

CIN: A-493-0067 COURSE LENGTH: 2 days  
CDP: 451Z CLASS SIZE: 30

DESCRIPTION: The purpose of this course is to provide civilian and military personnel assigned as Category II Laser Systems Safety Officers (LSSOs) with the training necessary to develop and manage a local Laser Safety Program at naval commands ashore and afloat. Course content includes an overview of basic laser physics, theory and mechanics; laser terms and definitions; laser classifications; supervision of laser operations and maintenance; laser range inspections; optical radiation and the laser radiation medical surveillance program; an overview of the laser hazard control program; and how to manage a local laser safety program.

PREREQUISITES: Must be designated in writing as a Category II Laser System Safety Officer. Graduates of A-493-0038 (LSSO (Cat I)) may attend if approved in writing by cognizant Echelon II command. All civilian and military personnel must have at least 12 months remaining in job assignment.

| DATES:       | LOCATIONS:         |
|--------------|--------------------|
| 4 - 5 Oct 94 | Camp Pendleton, CA |
| 15-16 Nov 94 | Camp Lejeune, NC   |
| 4 - 5 Jan 95 | Norfolk, VA        |
| 24-25 Jan 95 | Camp Pendleton, CA |
| 7 - 8 Feb 95 | Camp Lejeune, NC   |
| 21-22 Mar 95 | Guam               |
| 11-12 Apr 95 | Norfolk, VA        |
| 2 - 3 May 95 | Camp Pendleton, CA |
| 6 - 7 Jun 95 | Camp Lejeune, NC   |
| 6 - 7 Sep 95 | Camp Lejeune, NC   |

CNETNOTE 5100  
02 AUG 94

TITLE: Safety Programs Afloat

CIN: A-493-2099 COURSE LENGTH: 5 days  
CDP: 438G CLASS SIZE: 30

DESCRIPTION: The purpose of the course is to train selected enlisted personnel assigned primary/collateral duty safety-related duties afloat. The course content includes shipboard safety organization; safety supervisor/petty officer duties and responsibilities; governing instructions and publications; shipboard programs on hazardous materials; NAVOSH programs; mishap investigation and reporting; safety training and recordkeeping; hazard abatement plans and deficiency logs; and safety standdown and zone inspections. Course covers the fundamentals of the Safety Programs Afloat PQS, NAVEDTRA 43460-4A, Watchstation 301 - Divisional Safety Petty Officer, required for the Enlisted Surface Warfare Specialist (ESWS) qualification.

PREREQUISITES: E-5 through E-9 assigned safety duties afloat

Dates and locations will be announced by separate message pending resolution of funding.

TITLE: Shipboard Asbestos Emergency Response

CIN: A-760-2166 COURSE LENGTH: 1 day  
CDP: 438J CLASS SIZE: 21

DESCRIPTION: The purpose of the course is to provide members of a ship's three-person asbestos response team with training on emergency underway procedures. The course content includes discussion of health hazards and the Navy's asbestos control program, in addition to an instructor demonstration and laboratory session in personal protective equipment (PPE) use and an insulation removal/repair mock-up. The course deals only with limited, at-sea asbestos removal, repair, and clean up allowed when 3 nautical miles or more from U.S. shores.

PREREQUISITES: Assignment to a ship's three-person asbestos response team and in the ship's Asbestos Medical Surveillance Program (AMSP). Applicable to ships commissioned before 1976 or meeting the exceptions listed in NSTM 635.

Dates and locations will be announced by  
separate message pending resolution of funding.

CNETNOTE 5100  
02 AUG 94

TITLE: Machinery and Machine Guarding Standards

CIN: S-493-0001 COURSE LENGTH: 4 days  
CDP: 944T CLASS SIZE: 30

DESCRIPTION: The course familiarizes the student with various types of common machinery and related safety standards. Guidance is provided on hazards associated with various kinds of machinery and control of hazardous energy sources (lockout/tagout). The course presents an approach to machine inspection that enables participants to recognize hazards such as those created by points of operation, rotating parts, and flying chips, and provides options to achieve abatement. The course also includes an introduction to robotics.

PREREQUISITES: Must be in GS-018, -019, or -803 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:       |
|-----------------|------------------|
| 28 Nov-1 Dec 94 | Norfolk, VA      |
| 7 -10 Feb 95    | San Diego, CA    |
| 2 - 5 May 95    | Pearl Harbor, HI |
| 8 -11 Aug 95    | Pensacola, FL    |

TITLE: Cranes and Materials Handling for General Industry

CIN: S-493-0002 COURSE LENGTH: 4 days  
CDP: 944U CLASS SIZE: 30

DESCRIPTION: The course introduces the student to various types of overhead cranes, hoists, and powered industrial trucks used in general industry. Students are provided with basic information on overhead/gantry cranes, outdoor storage bridge crane operations, wire rope, slings, and crane inspection/maintenance procedures. Operation/maintenance of powered industrial trucks and appropriate OSHA and ANSI standards and related requirements are also discussed.

PREREQUISITES: Must be in GS-018, -019, or -803 classification series, or CEC officers. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:       | LOCATIONS:    |
|--------------|---------------|
| 17-20 Jan 95 | San Diego, CA |
| 6 - 9 Jun 95 | Norfolk, VA   |

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TITLE: Respiratory Protection

CIN: S-493-0003 COURSE LENGTH: 4 days  
CDP: 944V CLASS SIZE: 30

DESCRIPTION: The course covers the requirements for the establishment, maintenance, and monitoring of a respirator program. Topics include terminology, OSHA and ANSI standards, NIOSH certifications, and medical surveillance recommendations.

PREREQUISITES: Must be designated in writing as the (or to be the) activity respiratory protection program manager (RPPM) or alternate RPPM. All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:          | LOCATIONS:         |
|-----------------|--------------------|
| 15-18 Nov 94    | Newport, RI        |
| 14-17 Feb 95    | Millington, TN     |
| 25-28 Apr 95    | Whidbey Island, WA |
| 29 Aug-1 Sep 95 | Pensacola, FL      |

CNETNOTE 5100  
02 AUG 94

TITLE: Workplace Back Injuries

CIN: S-493-0006 COURSE LENGTH: 3 days  
CDP: 944Y CLASS SIZE: 30

DESCRIPTION: The course covers application of biomechanical, physiological, and job design principles, and their relationship to workplace back injuries. Also discussed are the incidence/costs of back injuries and the relative merits of injury prevention strategies including worker training, conditioning, and the use of job redesign.

PREREQUISITES: Must be in GS-018, -019, -690 or -803 classification series, or officer designator 2300. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:       | LOCATIONS:    |
|--------------|---------------|
| 8-10 Nov 94  | Norfolk, VA   |
| 13-15 Jun 95 | San Diego, CA |

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TITLE: Fire Protection and Life Safety

CIN: S-493-0009 COURSE LENGTH: 4 days  
CDP: 945G CLASS SIZE: 30

DESCRIPTION: The course introduces the student to the recognition of potential fire hazards and emergency procedures. Topics include the chemistry of fire, types/effectiveness of extinguishing agents, means of egress, detection/alarm systems, fire brigades, fire prevention plans, and the Life Safety Code (NFPA 101). 29 CFR 1910, Subparts E and L, and referenced NFPA Codes provide the basis for the course.

PREREQUISITES: Must be in GS-018, -019, -081, -803 or -804 classification series. Otherwise, quotas must be approved in writing by the cognizant command headquarters (Echelon II). All civilian and military personnel must also have at least 12 months from course date remaining in job assignment.

| DATES:       | LOCATIONS:    |
|--------------|---------------|
| 1 - 4 Nov 94 | Norfolk, VA   |
| 4 - 7 Apr 95 | San Diego, CA |

02 AUG 94

OTHER NAVY SOURCES OF SAFETY, OCCUPATIONAL HEALTH,  
AND ENVIRONMENTAL PROTECTION TRAINING

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In addition to the courses provided or sponsored by NAVOSHENVTRACEN, safety, occupational health, and environmental training is also conducted by the activities listed below. Telephone numbers are provided for further information on specific course offerings at various locations. Consult the CANTRAC for convening dates, locations, and course descriptions, or call the point of contact for their course schedule and more information.

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| <u>Course(s)</u>  | <u>Activities/Phone Numbers</u>  |
|---|--|
| Submarine Safety Officer<br>(F-4J-0020)   | Submarine Training Facility<br>(SUBTRAFAC), Norfolk, VA<br>COMM (804) 445-8783<br>DSN 565-8783     |
| Afloat Safety Officer<br>(A-4J-0020)  | Surface Warfare Officer<br>School (SWOSCOLCOM), Newport, RI<br>COMM (841) 841-4963<br>DSN 948-4963 |
| Quota Control:  | Mr. King, BUPERS 413C<br>COMM (703) 614-8324<br>DSN 224-8324                                       |
| NOTE: This course is imbedded in the SWOS Department Head course, Shipboard Readiness Training. |  |
| Aviation Safety Officers<br>(S-00-3301)   | Naval Post Graduate School<br>(NAVPGSCOL) Monterey, CA<br>COMM (408) 646-2581<br>DSN 878-2581      |
| Aviation Safety Command<br>(S-00-3302)  | Quota Control: COMNAVAIRLANT N45<br>COMM (804) 444-7478<br>DSN 5564-7478                           |
| Aviation Safety Management<br>(S-00-3326)   |  |
| Aviation Safety Reserve Officers<br>(S-00-3327)   |  |
| Enclosure (3)   |  |

CNETNOTE 5100  
02 AUG 94

Various courses in industrial ventilation, Deficiency Abatement Program/Management Information System (DAP/MIS), and hazardous waste operations

Naval Facilities Engineering Service Center (NFESC)  
Code ESC-43, Port Hueneme, CA  
DSN 551-2639/5270  
COMM (805) 982-2639/5270  
(formerly NEESA)

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Various courses in shore environmental protection

Naval School, Civil Engineering Corps Officers (CECOS)  
Port Hueneme, CA  
DSN 551-5655  
COMM (805) 982-5655

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Various NAVOSH, environmental health, and respiratory protection courses. Quotas are controlled by each Navy Environmental and Preventive Medicine Unit (NEPMU) and Navy Disease Vector Ecology and Control Center (DVECC). Courses are provided by the Navy Environmental Health Center (NEHC) upon request only. Call the point of contact provided for information.

Navy Environmental Health Center (NEHC), Code NEHC-04D, Norfolk, VA  
DSN 564-7575  
COMM (804) 444-7575

Navy Environmental and Preventive Medicine Unit No. 2 (NEPMU 2), Norfolk, VA (all classes below are located in Norfolk, VA)

DSN 564-7671  
COMM (804) 444-7671

Navy Environmental and Preventive Medicine Unit No. 5 (NEPMU 5), San Diego, CA (all classes below are located in San Diego)

DSN 526-7086  
COMM (619) 556-7086  
FAX (619) 556-7071  
DSN 526-7071

Navy Environmental and Preventive Medicine Unit No.6 (NEPMU 6),  
Pearl Harbor, HI (all classes below in Pearl Harbor, HI unless  
otherwise noted; all dates tentative)

DSN 430-9505  
COMM (808) 471-9505  
FAX (808) 474-9361 DSN 474-9361  
Email: nepmu6@hq.pacom.mil

Navy Environmental and Preventive Medicine Unit No. 7 (NEPMU 7),  
Naples, IT

DSN 625-4468  
COMM (039) 81-724-4468

Most courses provided upon request.  
See CANTRAC for schedule and course listing.

Navy Disease Vector Ecology and Control Center, Alameda, CA

DSN 993-2806  
COMM (510) 263-2806  
FAX (510) 263-2799  
DSN 993-2799

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NAVOSH TUITION/REGISTRATION FEE ADVANCEMENT PILOT PROGRAM

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This pilot program is designed to provide optimum variety and availability of professional development courses for Navy OSH personnel in an efficient and cost-effective manner. Under this program, the Naval Occupational Safety and Health, and Environmental Training Center (NAVOSHENVTRACEN) will advance tuition or registration fees for selected courses.

This pilot program is being initiated as a means of supporting professional development training for OSH professionals when/where it is not possible to provide Navy sponsored classes due to lack of sufficient demand at a single location, and as a method of controlling travel/per diem costs by supporting localized non-government training.

The courses selected for FY 95 are designed to meet a variety of professional development training needs identified in major claimant inputs to the NAVOSHENVTRACEN. They also support the formal training subject-matter list in the Career Development Program for Safety and Occupational Health Personnel (NAVEDTRA 10076).

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- GENERAL INFORMATION -

1. Target audience. The course/topic areas selected for tuition advancement are aimed at practicing OSH professionals, both military and civilian. Specific prerequisites for each topic area are indicated below.

2. What is funded

a. The NAVOSHENVTRACEN will advance registration/tuition fees only to qualified applicants desiring courses in any of the topic areas from the National Institute for Occupational Safety and Health (NIOSH), NIOSH-sponsored Education Resource Centers (ERCs) or the National Safety Council (NSC). (NOTE: These courses/topics and sources are the only ones for which tuition and fees will be advanced in this manner, at this time.)

b. Tuition and registration fee advancement will be on a first-come, first-served basis until FY 95 funds designated for this pilot program are exhausted.

Encl (4)

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c. Travel and per diem are the responsibility of the commands. The NAVOSHENVTRACEN will not reimburse commands for these items. Training providers generally furnish information regarding travel and lodging. Consult NIOSH, the ERCs, or NSC points of contact for this information.

### 3. Application procedures

a. Individuals are responsible for contacting the training provider directly for information on course offerings, locations, dates, exact costs, and registration procedures.

b. PRIOR TO REGISTERING, commands shall request, by formal command correspondence, a line of accounting and funding from the NAVOSHENVTRACEN for the anticipated tuition/fees. Requests shall be forwarded, via the cognizant Echelon II command headquarters OSH Office (see enclosure (1)), to:

Commanding Officer  
Naval Occupational Safety and Health, and  
Environmental Training Center (Code 2023)  
9080 Breezy Point Crescent  
Norfolk, VA 23511-3998

c. The request shall include the name of applicant; job title, classification series/grade or officer specialty; course title; tuition/registration fee; dates of course; name and address of training provider; name of participant's command; and a command point of contact and DSN phone number.

d. The NAVOSHENVTRACEN will provide a letter with accounting data to cover the registration/tuition fees, along with a feedback report form and other instructions.

4. Cancellation/refund policy. Generally, training providers will make a full refund if a course quota is cancelled PRIOR TO two weeks before the course begins. If the quota is cancelled within the training provider's nonrefundable period or participants are no-shows for any reason, commands are responsible for reimbursing the NAVOSHENVTRACEN for the forfeited tuition/registration fee. Consult the individual training provider to verify their cancellation procedures.

5. Upon course completion. The individual shall forward to the NAVOSHENVTRACEN a copy of the graduation certificate (or other completion verification). The feedback report form, originally provided with the accounting data, must also be returned to NAVOSHENVTRACEN. The feedback report requests students' opinions of the course, applicability to their job, quality of

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instruction, and other comments to help evaluate training effectiveness.

6. Accreditation. Usually these types of professional development courses meet the criteria for award of certification maintenance points and/or continuing education units (CEUs) required by various professional groups and licensing agencies. Individual course descriptions published by these training providers should be consulted to verify award of these points.

- PROFESSIONAL DEVELOPMENT COURSES/TOPIC AREAS -

The courses/topics listed below were selected to support headquarters major claimant requirements and the Career Development Program for Safety and Occupational Health Personnel (NAVEDTRA 10076). Exact course titles, numbers, and lengths may vary among providers. All topics are available from NIOSH and/or a NIOSH ERC. These sources should be investigated first. If a course is not available from one of these sources in your vicinity or at the desired time, you should contact the NSC or OSHATI for a course covering the same topic. Points of contact are provided at the end of this enclosure. Registration/tuition fee advancement may be requested only for the topic areas below as long as the course is taken at NIOSH, a NIOSH ERC, or the NSC.

NOTE: OSHATI courses are not part of this tuition advancement pilot program as they do not charge tuition to federal employees. The course numbers are included below for information purposes only as alternative sources of training.

SAFETY AND HEALTH IN THE HEALTH CARE SETTING

LENGTH: 3 days

SOURCE: NIOSH, NIOSH ERCs, and National Safety Council

PREREQUISITES: Must be in GS-018, -019, -690, -640, or -803 classification series assigned at/in support of a medical or dental facility.

INDOOR AIR QUALITY

LENGTH: 3 days

SOURCE: NIOSH ERCs and OSHATI #233

PREREQUISITES: Must be in GS-018, -019, -690, -640, or -803 classification series, or an Industrial Hygiene Officer.

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APPLIED INDUSTRIAL HYGIENE

LENGTH: 5 days

SOURCE: NIOSH and NIOSH ERCs

PREREQUISITES: Must be in GS-0690 or -640 classification series, or an Industrial Hygiene Officer.

FUNDAMENTALS OF INDUSTRIAL HYGIENE

LENGTH: 5 days

SOURCE: NIOSH, NIOSH ERCs, National Safety Council

PREREQUISITES: Must be in GS-018, -019, -690, -640, or -803 classification series, or an Industrial Hygiene Officer.

INDUSTRIAL HYGIENE REVIEW

LENGTH: 5 days

SOURCE: NIOSH and some NIOSH ERCs

PREREQUISITES: Must be in GS-690 classification series or an Industrial Hygiene Officer eligible to sit for the American Board of Industrial Hygiene Core or Comprehensive examinations.

OCCUPATIONAL MEDICINE FOR PHYSICIANS

LENGTH: 2 days

SOURCE: NIOSH and some NIOSH ERCs

PREREQUISITES: Must be a physician practicing Occupational Medicine.

OCCUPATIONAL HEALTH NURSING

LENGTH: 3 days

SOURCE: NIOSH and National Safety Council

PREREQUISITES: Must be a nurse working in the Occupational Health field.

STATISTICAL ANALYSIS/MATH FOR SAFETY PROFESSIONALS

LENGTH: 3 days

SOURCE: NIOSH ERCs, and National Safety Council

PREREQUISITES: Must be in GS-018, -019, -690, -640, or -803 classification series, or an Industrial Hygiene Officer.

OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT/MANAGEMENT TECHNIQUES

LENGTH: 4 days

SOURCE: NIOSH, NIOSH ERCs, National Safety Council, and OSHATI #244

PREREQUISITES: Must be in GS-018, -690, or -803 classification series, or an Industrial Hygiene Officer.

OCCUPATIONAL SAFETY AND HEALTH LAW/LEGAL CONCERNS

LENGTH: 4 days

SOURCE: NIOSH and NIOSH ERCs

PREREQUISITES: Must be in GS-018, -690, or -803 classification series, or an Industrial Hygiene Officer.

NONIONIZING RADIATION

LENGTH: 3 days

SOURCE: NIOSH and NIOSH ERCs

PREREQUISITES: Must be in GS-018, -019, -690, -640, or -803 classification series, or an Industrial Hygiene Officer.

TOXICOLOGY

LENGTH: 3 days

SOURCE: NIOSH, NIOSH ERCs, and OSHATI #223

PREREQUISITES: Must be in GS-018, -690, or -803 classification series, or an Industrial Hygiene Officer.

- SOURCES OF PROFESSIONAL DEVELOPMENT TRAINING -

Students should contact the following training providers directly for information on course dates and locations, and registration procedures.

NIOSH AND NIOSH-SPONSORED ERCS

The professional development topics listed are covered in various courses provided by NIOSH. NIOSH courses are presented at the NIOSH facilities in Cincinnati, OH, and most are also available at the NIOSH ERCS associated with universities nationwide. All NIOSH courses involve a course fee, which includes tuition, all course materials, and a certificate, upon completion. Advance registration is required for NIOSH courses. A registration form will be mailed to you if you contact your local or nearest ERC or contact the NIOSH Training Registrar, Ms. Marsha Striley, at (513) 533-8225, FAX (513) 533-8560, or write to:

NIOSH/Training Registrar  
Division of Training and Manpower Development  
Robert A. Taft Laboratories M.S. C-11  
4676 Columbia Parkway  
Cincinnati, OH 45226-1998

The NIOSH ERCS listed below also offer courses covering most of the professional development topics. It is recommended that you contact your nearest ERC for its course offerings and dates to minimize expenditure of travel funds. If the ERC does not offer the desired course, contact the main NIOSH office in Cincinnati.

|                     |                |   |
|---------------------|----------------|---|
| NIOSH               | (513) 533-8225 | NIOSH Division of Training and Manpower Development<br>Cincinnati |
| Alabama             | (205) 934-7032 | University of Alabama at Birmingham; Auburn University            |
| Northern California | (415) 642-1681 | University of California at Berkeley; Davis and San Francisco     |

|                     |                |   |
|---------------------|----------------|---|
| Southern California | (213) 740-4038 | University of Southern California; University of California, Los Angeles; University of California, Irvine                                |
| Illinois            | (312) 996-3602 | University of Illinois at Chicago   |
| Maryland            | (301) 955-3602 | Johns Hopkins University  |
| Massachusetts       | (617) 432-3325 | Harvard University  |
| Michigan            | (313) 763-2243 | University of Michigan  |
| Minnesota           | (612) 626-0900 | University of Minnesota; St. Paul-Ramsey Medical Center   |
| New York/New Jersey | (212) 241-4804 | Mt. Sinai School of Medicine; New York University; Hunter College; Robert Wood Johnson Medical School; New Jersey Institute of Technology |
| North Carolina      | (919) 962-2101 | University of North Carolina; North Carolina State University; Duke University  |
| Ohio                | (513) 558-5701 | University of Cincinnati  |
| Texas               | (713) 792-4638 | University of Texas; Texas A&M University   |
| Utah                | (801) 581-8719 | University of Utah  |
| Washington          | (206) 685-3221 | University of Washington  |

- OTHER TRAINING SOURCES -

If the desired topic is not available at a NIOSH site, the following providers should be contacted for their offerings:

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NATIONAL SAFETY COUNCIL (NSC)

The NSC charges federal employees a lower "member tuition" rate. Persons may take a course at any regional site and should initially contact that site for specific course information. However, to ensure that the lower tuition rate is charged, all DD Form 1556s must be forwarded directly to the NSC headquarters for processing. On the 1556, be sure to include the desired course title/number, regional site location, and dates.

National Safety Council  
Safety Training Institute  
1121 Spring Lake Drive  
Itasca, IL 60143-3201  
1-800-621-7615, FAX (708) 285-1315

NSC TRAINING INSTITUTE REGIONAL OFFICES

National Safety Council  
Safety Training Institute  
Central Region Office  
1121 Spring Lake Drive  
Itasca, IL 60143-3201  
1-800-621-7646, FAX (708) 285-1315

Serving - Arkansas, Illinois, Indiana, Iowa, Kansas,  
Kentucky, Louisiana, Michigan, Minnesota,  
Missouri, Nebraska, North Dakota, Ohio, Oklahoma,  
South Dakota, Texas, Wisconsin

National Safety Council  
Safety Training Institute  
Southeastern Region Office  
3300 NE Expressway, Suite 7A  
Atlanta, GA 30341-3941  
1-800-441-5103, FAX (404) 457-6189

Serving - Alabama, Florida, Georgia, Mississippi, North  
Carolina, Puerto Rico, South Carolina, Tennessee

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National Safety Council  
Safety Training Institute  
Western Region Office  
303 Twin Dolphin Drive, Suite 520  
Redwood City, CA 94065-1409

1-800-544-1030, FAX (415) 508-8831

Serving - Alaska, Arizona, California, Colorado, Hawaii,  
Idaho, Montana, Nevada, New Mexico, Oregon, Utah,  
Washington, Wyoming

National Safety Council  
Safety Training Institute  
Northeastern Region Office  
251 Salina Meadow Parkway, Suite 270  
Syracuse, NY 13212-4501

1-800-432-5251, FAX (315) 453-7932

Serving - Connecticut, Delaware, Maine, Maryland,  
Massachusetts, New Hampshire, New Jersey,  
New York, Pennsylvania, Rhode Island, Vermont,  
Virginia, Washington, DC, West Virginia

OSHATI

OSHATI in Des Plaines, IL, do not charge federal employees  
tuition for courses. Only the OSHATI Education Centers (EC)  
require tuition, and none of the topics listed above is available  
at an OSHATI EC. For information, dates, and locations on OSHATI  
courses, contact:

Office of the Registrar  
OSHA Training Institute  
1555 Times Drive  
Des Plaines, IL 60018

(708) 297-4913

# **CAREER DEVELOPMENT PROGRAM FOR SAFETY AND OCCUPATIONAL HEALTH PERSONNEL**

**NAVEDTRA 10076**



**Published by  
NAVAL EDUCATION AND TRAINING  
PROGRAM MANAGEMENT SUPPORT ACTIVITY**

**Prepared by  
NAVOSH TRAINING GROUP STEERING COMMITTEE  
APRIL 1994**

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## FOREWORD

This publication provides guidance on career development for personnel employed in the safety and occupational health profession. It has been developed for the Shore Navy Occupational Safety and Health (NAVOSH) Training Working Group under the direction of the NAVOSH Training Group Steering Committee.

The publication contains information on what is considered to be developmental requirements for personnel to be fully qualified as safety professionals in the Navy and recommended methods for those personnel to attain qualifying experience.

The publication is structured to provide a method for program development and maintenance (Chapter 1), specific development plans to attain journeymen level qualifications (Chapter 2), a management development program (Chapter 3), an industrial hygiene development program (Chapter 4), guidelines for development plans (Chapter 5), and appendices providing sources for developmental training and guidance for recruitment.

Recommendations for change or improvement to this manual may be submitted to the Chairman, Functional Advisory Panel of the Shore NAVOSH Training Working Group, c/o Chief of Naval Operations (N454), Washington, DC 20350-2000.

## CHAPTER 1

### PROGRAM DEVELOPMENT AND MAINTENANCE

#### 1. Coverage

The safety and occupational health career development program is designed to cover civilian employees of the Department of Navy in the following classification series; Safety Specialist, GS-018; Safety Manager, GS-018; Safety Engineer, GS-803; and, Industrial Hygienist, GS-690. The guidelines in this publication may also be applied in identifying developmental needs for military personnel in equivalent positions assigned to command designated safety billets. Military equivalents include NOCBs 0862, 2740, 8656, and 8995 from LT to CDR; NECs include 9571, SW-6021 and 8301, from E-4 to E-9.

#### 2. Program Organization

The program is organized under the auspices of the NAVOSH Training Group Steering Committee in accordance with the requirements in Chapter 6 of OPNAVINST 5100.23C. Following that instruction, a Shore NAVOSH Training Working Group has been established to review, develop and recommend training requirements and actions necessary to facilitate compliance with regulations.

As a subunit of the Shore NAVOSH Training Working Group, the Functional Advisory Panel for Safety and Occupational Health Professional Development (hereafter referred to as the Functional Advisory Panel) is created.

#### 3. Membership

The membership of the Functional Advisory Panel shall be representative of major Naval commands included in the overall NAVOSH Training Group. Members should be selected by the respective command based on their experience and background, and their ability to actively contribute and participate in career developmental actions of the Functional Advisory Panel. Commands represented are:

- a. Chief of Naval Operations (N45)
- b. Naval Safety Center (Code 41)
- c. Bureau of Medicine and Surgery
- d. U.S. Atlantic Fleet
- e. U.S. Pacific Fleet
- f. Systems Commands
- g. Naval Education and Training

#### 4. Meetings

The Functional Advisory Panel will meet at minimum semiannually on call of the chairman. The chairman will be selected by the membership. Minutes will be maintained and submitted with recommendations to the Shore NAVOSH Training Working Group. Meetings will normally be scheduled to occur prior to Shore NAVOSH Training Working Group meetings in order for that Group to evaluate recommendations.

#### 5. Functions

The purpose of the Functional Advisory Panel is to prepare and maintain the overall Safety and Occupational Health Career Development Program. Besides responsibility for this publication, members will collect data on new training requirements and developmental needs, prepare individual development plans for interns, and collect data on training and educational sources for professional development.

#### 6. Implementation Process

Recommendations on program actions, additions and changes to this publication, and resource requirements will be submitted by the Functional Advisory Panel to the Shore NAVOSH Training Working Group. Upon approval by that Group, these items/recommendations will be forwarded to the NAVOSH Training Group Steering Committee. If adopted by the committee, actions will be included in the NAVOSH Navy Training Plan (NTP) and action organizations identified. Resource requirements for this program will be provided through the NTP.

#### 7. Actions

The career developmental guidelines in this publication should be used to develop and implement Individual Development Plans. Individual commands may adopt the publication or sections thereof as mandatory requirements as deemed appropriate.

## CHAPTER 2

### CAREER DEVELOPMENT PLAN FOR JOURNEYMEN

1. Introduction. The career development plan (CDP) provided in this chapter identifies assignments, orientations and formal training considered necessary to achieve the skills, knowledge, and abilities (SKA's) deemed important for personnel in safety and occupational health positions. This chapter outlines actions for entry level personnel considered necessary in their development to the journeyman level. Completion of these CDP guidelines will provide personnel the necessary background to become fully qualified professionals in the following civil service classifications: Safety Engineer, GS-803; and Safety Specialist, GS-018. CDP's for additional classification series can be added to this manual as developed by the Functional Advisory Panel and approved by the NAVOSH Training Group Steering Committee.

2. Safety Program Scope. Safety programs provide technical assistance to headquarters, station, unit, or activity commands in matters relating to the prevention of mishaps and the administration of mishap prevention programs at Navy facilities, or involving Navy material or operations. These programs cover not only government property and personnel, but also public and contractor personnel at government facilities or using government property.

3. Functions Performed by Safety Personnel. Safety professionals are expected to perform the following functional tasks in varying degrees of magnitude depending on the nature, size and scope of their organization:

a. Participate in overall activity/unit management including committees, councils, budgeting, employee relations, injury compensation, training, and providing other functional assistance.

b. Manage or assist in the overall management of the activity safety and occupational health program. Review and interpret national, federal, defense and Navy safety standards, manuals, reports and other formal written communications, and develop of local guidance. Act as technical advisor and coordinator on safety and occupational health issues. Recommend safety protective equipment and material.

c. Administer specialized safety sub-programs such as motor vehicle and transportation safety, explosives safety, radiation safety, hazardous materials control, confined space entry, laser safety, athletic and recreational safety, public safety, fire prevention, and systems safety.

d. Coordinate safety education, training and motivational programs including developing or providing training and training materials.

e. Evaluate safety program effectiveness and the achievement of safety objectives. Identify deficiencies, recommend corrective measures and develop implementation plans.

f. Perform safety analyses of data to identify trends and hazard reduction requirements and actions.

g. Conduct inspections of facilities, equipment, material and operations to identify hazards and prepare inspection reports which recommend corrective measures. Develop and maintain abatement programs for identified hazards. Evaluate levels of risk for determining hazard correction priorities.

h. Investigate mishaps and hazardous incidents to determine causation factors and/or improper work/behavioral practices. Prepare investigative reports.

i. Develop or evaluate hazard controls and recommend hazard control measures for unsafe conditions, operations or practices.

j. Perform safety research to identify hazard control measures, potential failure modes and methods to improve program effectiveness.

k. Review plans, designs and specifications for operations and facilities to identify proper hazard controls. Coordinate control measures and programs with contractors.

4. Skills, Knowledge and Abilities (SKA's) Required to Perform Safety Functional Tasks. Table 2-1 describes the SKA's considered necessary to perform the functions discussed in section 3 above.

#### 5. Description of Safety Positions.

a. SAFETY ENGINEERS. Navy civilian safety engineers are responsible for the engineering design, selection and/or evaluation of hazard controls, or safety standards, and for conducting safety engineering reviews of Navy environments and materials. Safety engineers provide technical guidance for the safety manager and other organizational engineering or technical divisions. Safety engineers perform the tasks identified above, focusing on the engineering aspects of those tasks. The entry level for safety engineers is normally on the GS-5 or 7 level, in the 803 classification series. The journeyman level is GS-11 or 12 depending on the nature, size and risks at the employing activity.

b. SAFETY SPECIALISTS. Navy civilian safety specialists are responsible for the major elements of a command safety program. Safety specialists provide technical guidance to supervise personnel and advise the safety manager on the status of their assigned areas of responsibility. Safety specialists are

normally assigned to specific operations or geographic areas and/or to specific sub-specialists, such as explosives safety, radiation safety, accident data analysis, safety training, etc. Safety specialists perform the tasks identified above, focusing on the non-engineering aspects of those tasks. The entry level for safety specialist is normally GS-05 in the 018 series and GS-0018-11 level is considered the journeyman level.

6. Development Plan for Journeymen. This plan is designed to provide an effective procedure for developing qualified journeyman safety personnel. Safety engineers at the GS-5/7 entry level will typically have the complimentary technical and general education background required. Safety specialists at the entry level (GS-5) may or may not have adequate complimentary technical and general education backgrounds. Most entry level safety personnel (both engineers and specialists) will not have an adequate safety education or field experience background, nor are they generally familiar with Navy environments. The following CDP provides for integrated training and experience in all aspects of industrial safety and occupational health as found in Navy environments. Development periods as described are approximately 36 months in length. The CDP plan for safety engineers is based on the assumption that the engineer holds a baccalaureate degree in engineering, or a closely related science. The CDP plan for journeyman safety specialists assumes the individual has a general liberal art baccalaureate degree. Variations to the plans should be defined in specific Individual Development Plans (IDP) to accommodate command and individual requirements.

a. Field Activity Safety Program Assignments. On the job training for entry level personnel must be oriented to providing exposure in all SKA's. Table 2-2 lists subject matter and recommended assignments for supervised "on-the-job" training and is based on gaining experience in a diversified safety program. Safety specialist trainees should be required to actively participate in all safety program functional areas during their development period. The goal of on the job assignments is to develop basic abilities and provide sufficient experience to perform effectively and independently at the journeyman level.

b. Activity Functional Rotational Assignments. Trainees should receive orientations in each major function element of an activity. Table 2-3 lists recommended assignments. These assignments are designed to familiarize the trainee with organization and functional requirements. The goal of the orientations is to provide exposure and experience with all elements of activity operations and Navy safety program administration in order to meet overall SKA requirements and perform professionally at the journeyman level.

TABLE 2-1

|   |  |  |
|---|--|--|
| <p><b>FUNCTION 1: Navy organization, management systems, and environments.</b></p>  |  |  |
| <p>a. <u>Knowledge</u> of management and organization principles and of the various functions in Navy environments.</p>   | <p>b. <u>Ability</u> to work independently, initiate and monitor actions, and to integrate direction and guidance from multiple sources.</p> | <p>c. <u>Skill</u> to communicate effectively to management, technical, supervisory and other employees.</p>       |
| <p><b>FUNCTION 2: Overall safety management.</b></p>  |  |  |
| <p>a. <u>Knowledge</u> of the principles, practices and policies of safety management.</p>  | <p>b. <u>Ability</u> to adapt safety management practices to organizational needs and methods.</p>   | <p>c. <u>Skill</u> to interpret, develop, prepare or evaluate safety instructions, publications, reports, etc.</p> |
| <p><b>FUNCTION 3: Administer safety sub-programs.</b></p>   |  |  |
| <p>a. <u>Knowledge</u> of the various safety sub-programs such as occupational health, fire prevention, explosives safety, motor vehicle safety, radiation safety, etc.</p> | <p>b. <u>Ability</u> to manage and administer programs.</p>  | <p>c. <u>Skill</u> in management including providing leadership and direction.</p>                                 |
| <p><b>FUNCTION 4: Provide for safety education, training and motivational programs.</b></p>   |  |  |
| <p>a. <u>Knowledge</u> of education, training and motivational techniques.</p>  | <p>b. <u>Ability</u> to develop or evaluate safety education, training or motivational material and programs.</p>                            | <p>c. <u>Skill</u> to conduct safety education and training and prepare training material for presentations.</p>   |
| <p><b>FUNCTION 5: Evaluate safety program effectiveness.</b></p>  |  |  |
| <p>a. <u>Knowledge</u> of safety program evaluation techniques.</p>   | <p>b. <u>Ability</u> to objectively evaluate program effectiveness and to recommend improvement.</p>   | <p>c. <u>Skill</u> at gathering and reviewing data essential for Evaluation.</p>                                   |

TABLE 2-1 (cont.)  
SKILLS, KNOWLEDGE AND ABILITIES (SKA's)

|   |   |  |
|---|---|--|
| <b>FUNCTION 6: Perform safety analyses</b>  |   |  |
| <b>a. <u>Knowledge</u> of safety analysis methods, hazard control techniques, and safety science.</b>                           | <b>b. <u>Ability</u> to perform safety analyses of data, facilities, equipment, material and operations.</b>                    | <b>c. <u>Skill</u> in conducting analyses, interpreting data, and developing conclusions.</b>              |
| <b>FUNCTION 7: Perform safety inspections.</b>  |   |  |
| <b>a. <u>Knowledge</u> of safety standards and requirements and workplace environments, operations, material and equipment.</b> | <b>b. <u>Ability</u> to recognize violations of standards and potential risk factors, and to determine corrective measures.</b> | <b>c. <u>Skill</u> to conduct inspections and prepare written reports.</b>                                 |
| <b>FUNCTION 8: Investigate accidents and prepare reports.</b>   |   |  |
| <b>a. <u>Knowledge</u> of accident causation factors.</b>   | <b>b. <u>Ability</u> to conduct investigations, recognize causal factors and determine preventive measures.</b>                 | <b>c. <u>Skill</u> in investigating and preparing reports.</b>   |
| <b>FUNCTION 9: Develop and evaluate hazard controls.</b>  |   |  |
| <b>a. <u>Knowledge</u> of hazard control principles, methods, and practices.</b>  | <b>b. <u>Ability</u> to evaluate safety risk factors.</b>   | <b>c. <u>Skill</u> to select or evaluate specific hazard controls.</b>                                     |
| <b>FUNCTION 10: Conduct safety research.</b>  |   |  |
| <b>a. <u>Knowledge</u> of research principles and techniques.</b>   | <b>b. <u>Ability</u> to organize, administer and evaluate research projects.</b>  | <b>c. <u>Skill</u> to conduct literature, laboratory and field research.</b>                               |
| <b>FUNCTION 11: Review plans and designs.</b>   |   |  |
| <b>a. <u>Knowledge</u> of safety standards and hazard control principles.</b>   | <b>b. <u>Ability</u> to review plans, designs, and contracts to evaluate safety features.</b>                                   | <b>c. <u>Skill</u> in performing reviews and evaluations and in making hazard control recommendations.</b> |

**TABLE 2-2  
FIELD ACTIVITY SAFETY PROGRAM ASSIGNMENTS**

| SUBJECT MATTER                     | LENGTH (in weeks) |            | SKA'S ACQUIRED |
|------------------------------------|-------------------|------------|----------------|
|                                    | Engineer          | Specialist |                |
| SAFETY MANAGEMENT                  | 10                | 10         | 1abc; 2abc     |
| SAFETY TRAINING                    | 6                 | 9          | 4bc            |
| SAFETY PROGRAM EVALUATION          | 5                 | 5          | 5bc            |
| HAZARD ANALYSIS                    | 6                 | 4          | 6bc            |
| SAFETY INSPECTIONS                 | 18                | 26         | 7bc            |
| MISHAP INVESTIGATION AND REPORTING | 8                 | 12         | 8bc            |
| HAZARD CONTROL                     | 20                | 5          | 9bc            |
| SAFETY SUB-PROGRAMS ADMINISTRATION | 15                | 15         | 3bc            |
| HAZARDOUS MATERIAL                 | 3                 | 5          | 3abc           |
| OCCUPATIONAL HEALTH                | 3                 | 5          | 3abc           |
| SAFETY RESEARCH                    | 6                 | 4          | 10bc           |

**TABLE 2-3. ACTIVITY FUNCTIONAL ROTATIONAL ASSIGNMENTS**

| SUBJECT MATTER                          | LENGTH (in weeks) |            | SKA'S ACQUIRED              |
|---|-------------------|------------|-----------------------------|
|   | Engineer          | Specialist |                             |
| OSH OFFICE AND ACTIVITY ORIENTATION     | 1                 | 1          | 1abc;<br>2abc               |
| PW/CONSTRUCTION/ MAINTENANCE            | 4                 | 2          | 1abc; 6abc;<br>7abc; 11abc; |
| PURCHASING, CONTRACTING, SUPPLY, BUDGET | 2                 | 2          | 1abc; 3abc;<br>7abc         |
| PERSONNEL/TRAINING                      | 2                 | 2          | 1abc; 4abc                  |
| MEDICAL/INDUSTRIAL HYGIENE              | 1                 | 3          | 3abc; 7abc;<br>8abc         |
| SECURITY, FIRE                          | 1                 | 1          | 1abc; 3abc                  |
| PLANNING/ENGINEERING                    | 5                 | 2          | 6abc; 9abc;<br>11abc        |
| OPERATIONS/PRODUCTION,                  | 2                 | 5          | 7abc; 9abc                  |
| RTD&E/QA                                | 2                 | 2          | 9abc; 10abc                 |

**TABLE 2-4**  
**FORMAL TRAINING SUBJECT MATTER LIST**

| SUBJECT MATTER                               | LENGTH (in weeks) |            | SKA's ACQUIRED         |
|--|-------------------|------------|------------------------|
|  | Engineer          | Specialist |                        |
| STATISTICS                                   | 1                 | 1          | 5a, 6a, 9a             |
| HAZARD CONTROL AND PREVENTION                | 2                 | 2          | 2a, 5a, 7a, 9a         |
| SAFETY LAW                                   | 1                 | 1          | 2a, 7a                 |
| OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE   | 2                 | 2          | 2a, 3a, 4a, 5a, 7a, 9a |
| HAZARDOUS MATERIALS                          | 1                 | 1          | 3a, 5a, 7a             |
| SYSTEM SAFETY                                | 2                 | 1          | 2a, 3a, 6a             |
| OSHA STANDARDS                               | 2                 | 3          | 3a, 5a, 6a, 7a, 8a, 9a |
| EXPLOSIVES SAFETY                            | 2*                | 2*         | 3a, 6a, 7a             |
| CONFINED SPACE ENTRY                         | 1                 | 1          | 3a, 6a, 7a             |
| SAFETY MANAGEMENT                            | 2                 | 2          | 2a, 3a, 5a             |
| MANAGEMENT                                   | 1                 | 1          | 1a                     |
| ELECTRICAL AND ELECTRONICS SAFETY            | 2                 | 1          | 3a, 6a, 7a             |
| VENTILATION DESIGN                           | 1                 | 1          | 3a, 7a, 9a, 11a        |
| FIRE PREVENTION                              | 2                 | 1*         | 3a, 6a                 |
| INSTRUCTOR TRAINING                          | 1                 | 1          | 4a                     |
| MISHAP INVESTIGATION                         | 1                 | 2          | 3a, 6a, 8a             |
| RADIATION SAFETY (IONIZING AND NON-IONIZING) | 1*                | 2*         | 3a, 6a, 7a             |
| TRAFFIC SAFETY                               | -                 | 1          | 3a, 8a                 |
| SAFETY ENGINEERING/FACILITY DESIGN           | 1                 | -          | 3a, 6a, 9a, 11a        |
| ERGONOMICS                                   | 1                 | 1          | 3a, 7a, 9a             |

\* Optional depending on assignments and the organization

c. Formal Classroom Training. Table 2-4 lists formal training subject matter considered necessary for a fully qualified journeymen. In addition, journeymen may need other specialized training in order to perform assigned tasks. Subject matter listed in the Table may be completed through a variety of methods including college courses, correspondence courses, workshops and conferences. Appendix A provides a matrix of available subject matter training resources. Information regarding non-commercial courses should be obtained from CANTRAC or the Catalog of Occupational Safety and Health Training Courses (NAVEDTRA 10075-C). The assigned Supervisor is responsible for ascertaining sources of approved training (federal and commercial) to meet training needs. Requirements may have been accomplished through previous experience or academic training. To complete the plan, individual self development is required and must be encouraged. The goal of the formal classroom training is to provide the trainee with technical knowledge in all primary elements of the safety profession in the Naval environment.

CHAPTER 3  
MANAGEMENT DEVELOPMENT

(RESERVED)

**CHAPTER 4**

**INDUSTRIAL HYGIENE DEVELOPMENTAL PROGRAM**

**(To Be Developed by Bureau of Medicine and Surgery)**

## CHAPTER 5

### INDIVIDUAL DEVELOPMENT PLANS

1. Purpose. An IDP is required for each trainee to integrate the individuals qualifications with developmental plan requirements and guidelines (see Chapter 2). The plan should define specific assignments, orientation and training for the first or current year, with draft developmental outlines for the next two years. The purpose of the long term plan is to assure planning and programming in accordance with the career development program and to facilitate individual completion of program requirements.

2. Preparation. Appendix B provides a sample IDP. The IDP will be drafted by the supervisor and will be processed in accordance with local procedures.

a. The plan will define length of time for each learning objective. Based on the individuals education and experience, the plan will emphasize areas in which the intern has the least experience or knowledge.

b. Once approved, the supervisor is responsible for assuring its execution. The plan will be revised each year.

3. Classroom Training. The supervisor will schedule and target classroom training to meet developmental plan guides using Appendix A, other available training schedules, and local college, university or training school schedules. The employees past training and experience, as well as availability and cost should be utilized in planning.

4. Funding. Funding will come out of local budgets. It will be up to the supervisor to initiate appropriate funding planning and programming.

**APPENDIX A  
TRAINING RESOURCE LIST**

|  | NAVAL SAFETY SCHOOL | OSHA TI | OTHER GOVT (see below) | LOCAL COLLEGE | GENERAL UNIT |
|--|---------------------|---------|------------------------|---------------|--------------|
| HAZARD CONTROL & PREVENTION                | X                   |         |                        | X             | X            |
| STATISTICS                                 |                     |         |                        | X             | X            |
| SAFETY LAW                                 | X                   |         | 2                      | X             | X            |
| OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE | X                   | X       | 1,2,3                  | X             | X            |
| HAZARDOUS MATERIALS                        | X                   | X       | 3                      | X             | X            |
| SYSTEMS SAFETY                             | X                   |         | 1                      |               | X            |
| OSHA STANDARDS                             | X                   | X       | 1                      |               |              |
| EXPLOSIVES SAFETY                          |                     |         | 1,4                    |               | X            |
| CONFINED SPACE ENTRY                       | X                   | X       |                        | X             | X            |
| SAFETY MANAGEMENT                          | X                   | X       | 1,3                    | X             | X            |
| MANAGEMENT                                 |                     |         | 6                      | X             | X            |
| ELECTRICAL/ELECTRONICS                     | X                   | X       | 1,5                    | X             | X            |
| VENTILATION DESIGN                         | 7                   | X       | 1,3,7,8                | X             |              |
| FIRE PREVENTION                            |                     | X       | 1                      | X             | X            |
| INSTRUCTOR TRAINING                        | X                   | X       | 6                      | X             | X            |
| MISHAP INVESTIGATION                       | X                   | X       | 1,9                    | X             | X            |
| RADIATION (IONIZING AND NON-IONIZING)      | X                   | X       | 1,3,10                 | X             | X            |
| TRAFFIC SAFETY                             |                     |         | 1,9                    |               | X            |
| SAFETY ENGINEERING/FACILITY DESIGN         |                     |         | 1                      | X             | X            |
| ERGONOMICS                                 | X                   | X       | 3                      | X             | X            |

1. Army Material Command/Army Corps of Engineers
2. Environmental Protection Agency
3. NIOSH/NIOSH Education Resource Centers
4. Army Defense Ammunition Center and School
5. Naval Facilities Engineering Command Public Works Support Center
6. Office of Personnel Management
7. Naval Facilities Engineering Support Center
8. Navy Environmental Health Center
9. Transportation Safety Institute
10. Naval Sea Systems Command Detachment

Note: For specific non-commercial course information refer to CANTRAC or the Catalog of OSH Training Courses (NAVEDTRA 10075-C). For information on approved commercial courses, contact the Headquarters Functional Advisor.

**APPENDIX B**

**SAMPLE INDIVIDUAL DEVELOPMENT PLAN**

**INDIVIDUAL DEVELOPMENT PLAN**

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| <p><b>1. Employee (Name and Sec. No.)</b><br/>BOE, John R.      000-00-0000</p>  |  | <p><b>2. Current Position and Grade</b><br/>Safety and Occupational Health Manager<br/>05-0018-00</p>   |  | <p><b>3. Organization</b><br/>Chief of Naval Education and Training<br/>Training Performance Evaluation Board</p>  |  |
| <p><b>4. CAREER GOALS (Include Positions and Grades)</b></p>   |  |   |  |  |  |
| <p><b>5. Short Run</b><br/>Improve performance in present position.</p>  |  |   |  |  |  |
| <p><b>6. Long Run</b><br/>Assume greater NAVOSH duties and responsibilities.</p>   |  | <p><b>10. Other Activities</b></p>  |  |  |  |
| <p><b>7. Developmental Objectives</b></p> <p>a. Increase knowledge of hazardous materials.</p> <p>b. Increase knowledge of electrical safety/machine guarding standards.</p> <p>c. Increase knowledge of employees safety programs.</p> <p>d. Maintain proficiency in training safety procedures and firefighting certification program.</p> |  | <p><b>8. Developmental Assignments</b></p> <p>a. Serve as member of training safety and firefighting review team. FY-94/95</p> <p>b. Observe explosive safety inspection at field activity. FY-94</p> <p>c. Provide advice/assistance relative to revision of:<br/>SMARVEST 1500.75<br/>CARETREST 1500.20C</p> <p>d. Conduct explosive safety inspection at field activity. FY-95</p> |  | <p><b>9. Formal Trainings</b></p> <p>a. Hazardous Materials (A-493-0021) 2/94</p> <p>b. Basic Explosives Safety (S-000-0025) FY-94</p> <p>c. Machinery/Machine Guarding (S-493-0001) FY-95</p> <p>d. Electrical Safety (MEO) (Local) FY-95</p> |  |
| <p><b>11. Developmental experiences needed for:</b></p> <p>a. (X) Overall career (individual) development</p> <p>b. (X) More effective performance in present position</p>   |  | <p><b>13. Remarks</b></p> <p>This IDP is a two-year plan covering FY-94/95</p>  |  |  |  |
| <p><b>12. ( ) No further career development desired/needed at present time</b></p>   |  | <p><b>14. Employee Signature</b></p>  |  |  |  |
| <p><b>14. Employee Signature</b></p>   |  | <p><b>15. Date</b></p>  |  | <p><b>16. Supervisor Signature</b></p>   |  |
| <p><b>17. Date</b></p>   |  | <p><b>17. Date</b></p>  |  |  |  |

***RATIONALE AND DESIGN FOR A MISHAP COST-REDUCTION  
MODEL FOR THE NAVY'S OCCUPATIONAL  
SAFETY AND HEALTH PROGRAM***

***S. L. Shepherd***

***E. J. Doyle, Jr.***

***W. M. Pugh***

***Report No. 93-37***

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BETHESDA, MARYLAND**



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## EXECUTIVE SUMMARY

### *Problem*

Costs to the U.S. Department of the Navy for occupational mishaps suffered by its civilian employees have risen steadily for more than a decade, reaching one-quarter of a billion dollars in 1993. The rate of increase exceeds that expected from inflation alone; however the role played by other factors is unclear. Ample data are available to help identify the reasons for these rising costs. They reside, however, in multiple databases that are incompatible, were designed primarily for administrative purposes, and are maintained by separate organizational entities. Moreover, before they can be used to assess, for instance, the effectiveness of Navywide safety programs, well-recognized difficulties in making comparisons between vastly different types of facilities must be addressed.

### *Objective*

The purpose of this report is to propose a means for using available data sources to identify factors influencing the Department's workers' compensation costs. Particular emphasis is placed on the development of methods for identifying those factors which present opportunities for the reduction or control of costs.

### *Approach*

A design is proposed for a Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program. The proposed Model will be derived from an integrated database built from data obtained from the U.S. Department of Labor's Office of Workers' Compensation Programs (OWCP), the Navy Civilian Personnel Data System, and the Navy Inspector General Oversight Inspection Unit. These sources provide,

respectively, information on the cost and occurrence of individual occupational mishaps at Department of the Navy facilities, on worker demographics, and on facility safety inspections. Analyses will be based on mishaps at the Department's 150 largest facilities.

### ***Results***

Naval Health Research Center has obtained the necessary data and begun preparing them for integration into the proposed database. As of 30 June 1991, the 150 facilities to be included in the analyses employed 242,040 civilian workers. These individuals comprise 80 percent of the Department's entire civilian work force as of that date. In the subsequent year (1 July 1991 to 30 June 1992) this "at-risk population" experienced approximately 8,500 mishaps meeting criteria for the definition of an analyzable case (e.g., mishaps resulting in time lost from work). Actuarial projections of the total costs expected to accrue as a result of all mishaps experienced by all Department of the Navy civilian employees during this time period exceed \$357 million. Of this amount, approximately 75 percent is likely to be accounted for by mishaps planned for inclusion in the analyses used to build the Model.

### ***Conclusions***

While requiring considerable initial effort to manipulate, the available data nonetheless appear remarkably free from keystroke errors and other common problems associated with administrative databases. We conclude that development of the Mishap Cost-Reduction and Quality Assessment Model is feasible using these data and that creation of the Model should proceed as proposed. We conclude further that the Model has great potential for helping both to improve the Navy's Occupational Safety and Health Program, and to reduce and control its costs for occupational injuries and illnesses.

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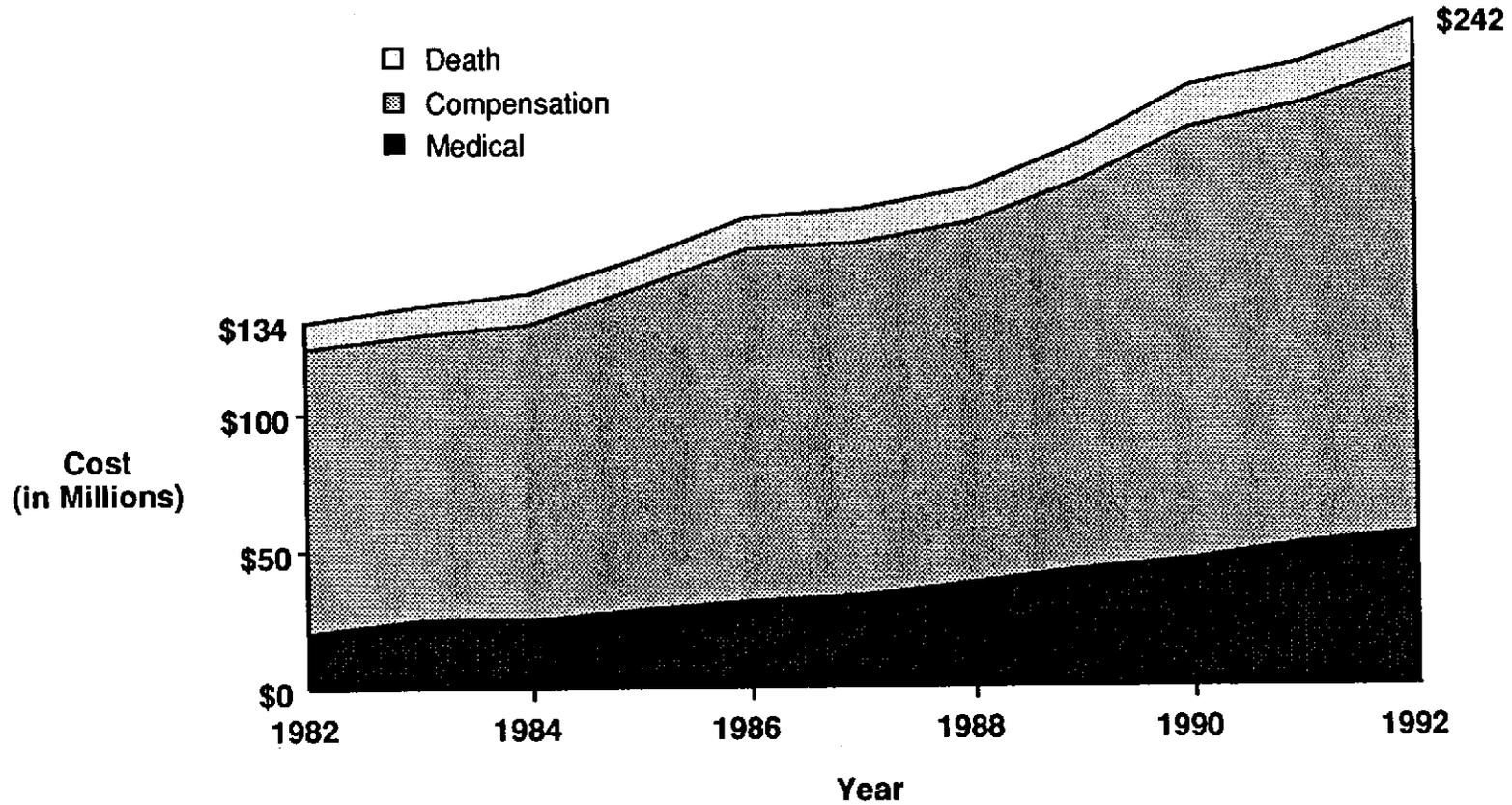
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## BACKGROUND

Costs to the U.S. Department of the Navy for occupationally related injuries and illnesses suffered by its civilian workers have increased steadily for at least the last decade, rising from \$133 million in 1982 to \$242 million in 1992 (Figure 1). Large as they are, these numbers include only "direct" costs (principally the costs of medical care and compensation for lost wages) and do not include such "indirect" costs as lost productivity, replacement employee training, administrative overhead, and the provision of in-house medical care, all of which increase substantially the true total cost of occupational injuries and illnesses.<sup>1,2</sup>

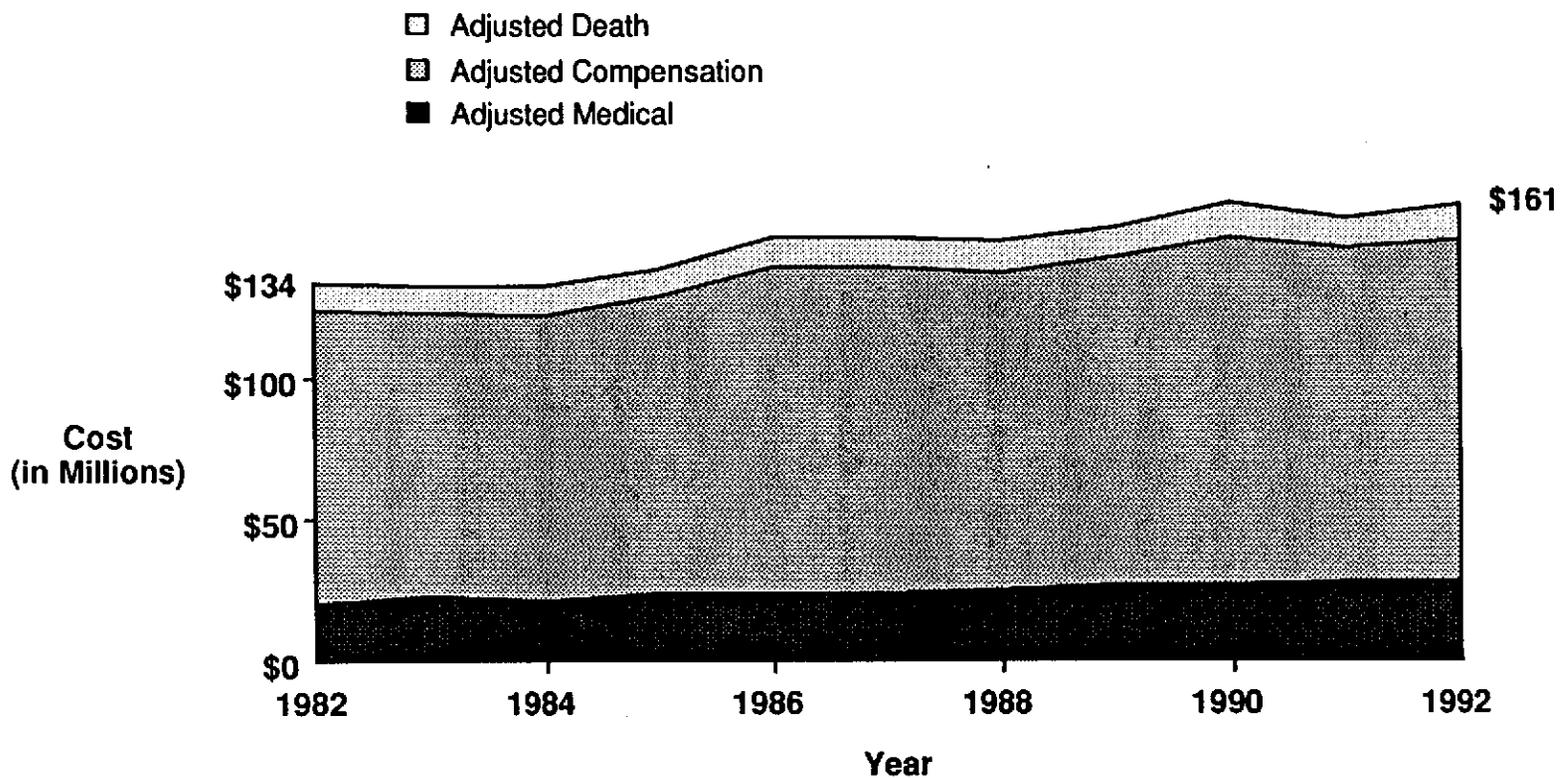
This steady increase in costs, which persists even after adjustment for inflation (Figure 2), constitutes reason enough for the development of better means both to understand the forces driving these upward costs and to identify effective programs to reduce or contain them. Other imperatives apply as well, however. Citing the need to control increasing costs, President Reagan in 1983 set a governmentwide goal of reducing injuries to federal civilian workers by 3 percent per year for five consecutive years.<sup>3</sup> Results for the Navy were less than desired and subsequently the Chief of Naval Operations specified a follow-up goal of reducing the Navy's total injury and illness case rate by 2 percent per year for the five years ending in fiscal year 1993.<sup>4</sup> Beginning in fiscal year 1994, individual facilities will be required to establish their own reduction goals consistent with local needs, constraints, and capabilities.<sup>5 10505, 6</sup> (The Marine Corps' rate- and cost-reduction activities during this period have been conducted without the establishment of formal goals). Despite their differences, all of these efforts require or will require varying degrees of analysis if assessment of their effectiveness is to be maximally informative.



**Figure 1: Chargeback costs in nominal dollars, Department of the Navy, chargeback years (1 July - 30 June) 1982-92**

Source: Director's Office, Division of Federal Employees' Compensation, Office of Workers' Compensation Programs, Employment Standards Administration, U.S. Department of Labor.

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**Figure 2: Chargeback costs in 1982 constant dollars, Department of the Navy, chargeback years (1 July - 30 June) 1982-92**

Sources: Director's Office, Division of Federal Employees' Compensation, Office of Workers' Compensation Programs, Employment Standards Administration, U.S. Department of Labor.

Death and compensation benefits adjusted by annual federal COLA from FECA form CA-841, Office of Workers' Compensation Program, Employee Standards Administration, U.S. Department of Labor.

Medical benefits adjusted by annual medical care price index, Consumer Price Index Detailed Report, June 1992, and unpublished data, U.S. Bureau of Labor Statistics.

### *The Federal Employees' Compensation Act*

Any employer's expenditures for occupationally related health mishaps\* are the result of two interacting elements: the rate of injuries and illnesses occurring in its work force, and the individual costs of those injuries and illnesses. Cost control efforts should address both. Of the two, however, mishap rates have the greatest influence on total cost. As noted by William Hager, president of the National Council on Compensation Insurance, a nonprofit research and rate-making organization for commercial providers of workers' compensation insurance, "The most effective way to control costs is to prevent injuries from arising in the first place."<sup>7</sup> This is likely to be particularly true for the Department of the Navy because its potential to influence injury and illness rates is substantially greater than its potential to influence the costs of personnel mishaps once they have occurred.

Provisions for the care and compensation of federal civilian employees harmed at the workplace are contained in the Federal Employees' Compensation Act of 1916, as amended (5 U.S.C. 8101 *et seq.*). This act grew out of a Progressive Era consensus that industrial accidents were going to be an inevitable corollary of the Industrial Revolution and that rather than forcing injured workers to seek recompense from employers through the litigious finding of fault, the burden of injured workers should be borne by society nonadversarially. It has been described as "one of the most significant social policy statutes predating the Great Depression."<sup>8 p.3</sup> Implementing regulations are contained in the Code of Federal Regulations, Title 20, Chapter 1: *Office of Workers' Compensation Programs, Department of*

---

\* A "mishap" is defined in OPNAVINST 5100.23C ¶1402e as "any unplanned or unexpected event causing personnel injury, occupational illness, death, material loss or damage, or an explosion of any kind whether damage occurs or not." In the current document, "mishap" has been used broadly to refer to any event leading an employee to file a claim for benefits under the Federal Employees' Compensation Act, or as a collective term referring to all work-related injuries and illnesses.

*Labor (Parts 1-199)*, with further guidance provided in the *Federal Personnel Manual*, Chapter 810: *Injury Compensation*.

Authority to administer the Federal Employee's Compensation Act is vested in the Office of Workers' Compensation Programs (OWCP) of the U.S. Department of Labor. OWCP, which administers other federally mandated workers' compensation programs as well (e.g., the Black Lung Benefits Act), is composed of several divisions, among which the Division of Federal Employees' Compensation has responsibility for handling claims originating under the Federal Employees' Compensation Act. The Division, in turn, is comprised of a Branch of Special Claims and 12 district offices, each with jurisdiction for claims arising in its specified geographic area (Figure 3). Claims examiners at the district offices oversee and adjudicate individual claims.

Under the Federal Employees' Compensation Act, the rights, roles, and obligations of injured workers, employing federal agencies (such as the Department of the Navy), and OWCP are precisely delineated. Injured workers have the right to receive compensation for lost wages and to full payment of medical expenses if certain criteria are met (e.g., the claimant is an eligible employee of the federal government and the injury or illness was work-related). The rates of compensation are fixed: For the first 45 days following an injury, payment is at full salary, is subject to taxation, and is paid via the employing agency's payroll as if the worker were still on the job. Thereafter, payment is made by OWCP at two-thirds or three-quarters of an employee's salary (depending on the presence or absence of dependents) and is tax-free. In some cases (called "scheduled awards") compensation will be made for the loss of a body part or its use, and again, the amount of compensation is fixed (although payments may be prorated if the loss is judged to be less

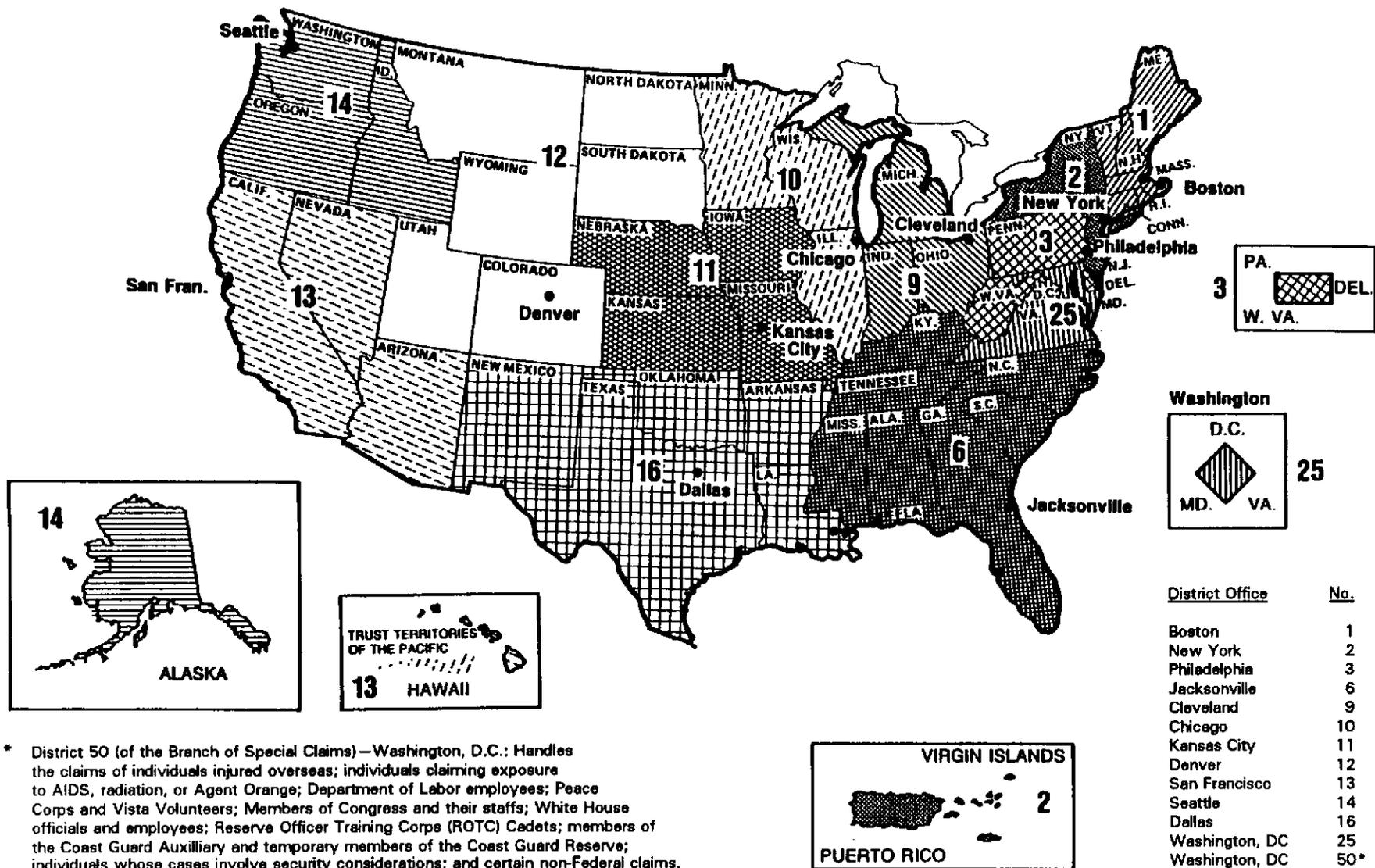


Figure 3: District office territorial jurisdiction under the Federal Employees' Compensation Act

Source: Federal Personnel Manual, Chapter 810: Injury Compensation

than 100 percent). Injured federal workers also have the right to choose their own health-care providers and to appeal decisions made by OWCP. In return, they are precluded from obtaining benefits or redress beyond what is provided by the act, they are obligated to submit to OWCP-requested medical evaluations, to return to work as soon as they are able, and to accept assignments or reemployment offers for which they have been deemed medically fit.

Employing agencies may offer medical care at their own facilities, but they cannot insist that these facilities be used. Agencies may challenge, or "controvert," an employee's initial claim to compensation if they believe the claim fails to meet the necessary criteria. And agencies may (and are encouraged to) make offers of "light duty assignment" to injured workers when they have sufficiently recovered. Agencies cannot, however, contest an injured employee's rate of compensation. Nor can they request a hearing before OWCP; in a hearing requested by an employee they are proscribed from questioning the claimant or making any argument (20 CFR 10.135). Indeed, because the Federal Employees' Compensation Act is meant to be nonadversarial, employing agencies are expressly forbidden from "actively participating in the claims adjudication process" (20 CFR 10.140).

OWCP, on the other hand, may review any case at any time. It may require claimants to submit to medical evaluations as frequently as it desires and from health-care providers of its own choosing. And in all cases, OWCP is the final arbiter of entitlement; agencies are entitled to an explanation of OWCP's actions, but must accept its decisions (*Federal Personnel Manual* 810, Subchapter 4-3).

*Paperwork and the timeliness of claims processing*

Because all affected parties are required to communicate in writing, the filing of an injury or illness claim under the Federal Employees' Compensation Act triggers a complex cascade of paperwork. The key events in this cascade are depicted in Figures 4 and 5, which illustrate the paperwork flow generated by filings for injuries and illnesses, respectively. As one OWCP regional director noted in 1991, the way in which claims are handled, along with the roles of the various participants and the principles for fact-finding and decision-making, is much the same today as it was in 1916.<sup>8</sup> Indeed, the procedure manual for OWCP's claims examiners contains instructions for placing incoming claims materials on a "spindle by punching a hole as near as possible to the center of the document. Material should be aligned at the upper corners. Centered documents are less likely to become ragged at the edges. . . ."<sup>9</sup> Chap. 2-400 ¶2a

Only a portion of the information generated in this course of events is computerized, and not surprisingly, considerable time can be required to process claims. A "time-lag analysis" conducted by OWCP on claims filed during the period 1 October 1991 to 31 December 1991 revealed that government-wide, 28 percent of the claims filed (32 percent for the Department of the Navy) took more than 45 days from the date of injury to arrive at OWCP.<sup>10</sup> Following receipt, added time still is required for OWCP to adjudicate a claim (that is, accept or deny it for coverage).<sup>11</sup> But regardless of its source, slow claims processing is important in the context of cost control efforts because of its association with increased claims costs.<sup>12, 13</sup>

**Figure 4: Paperwork flow for selected forms used in reporting injuries to the Office of Workers' Compensation Programs (OWCP)**

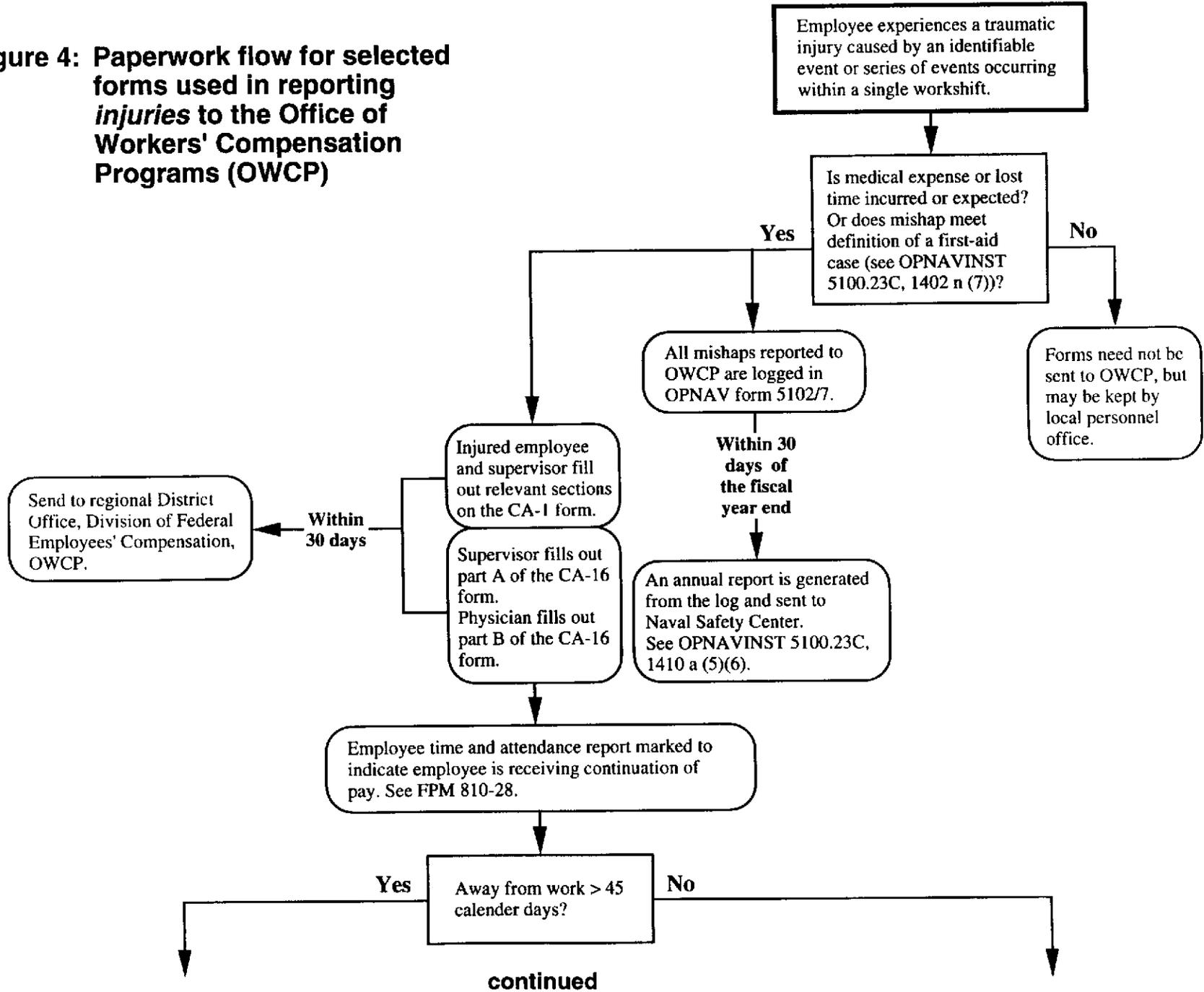
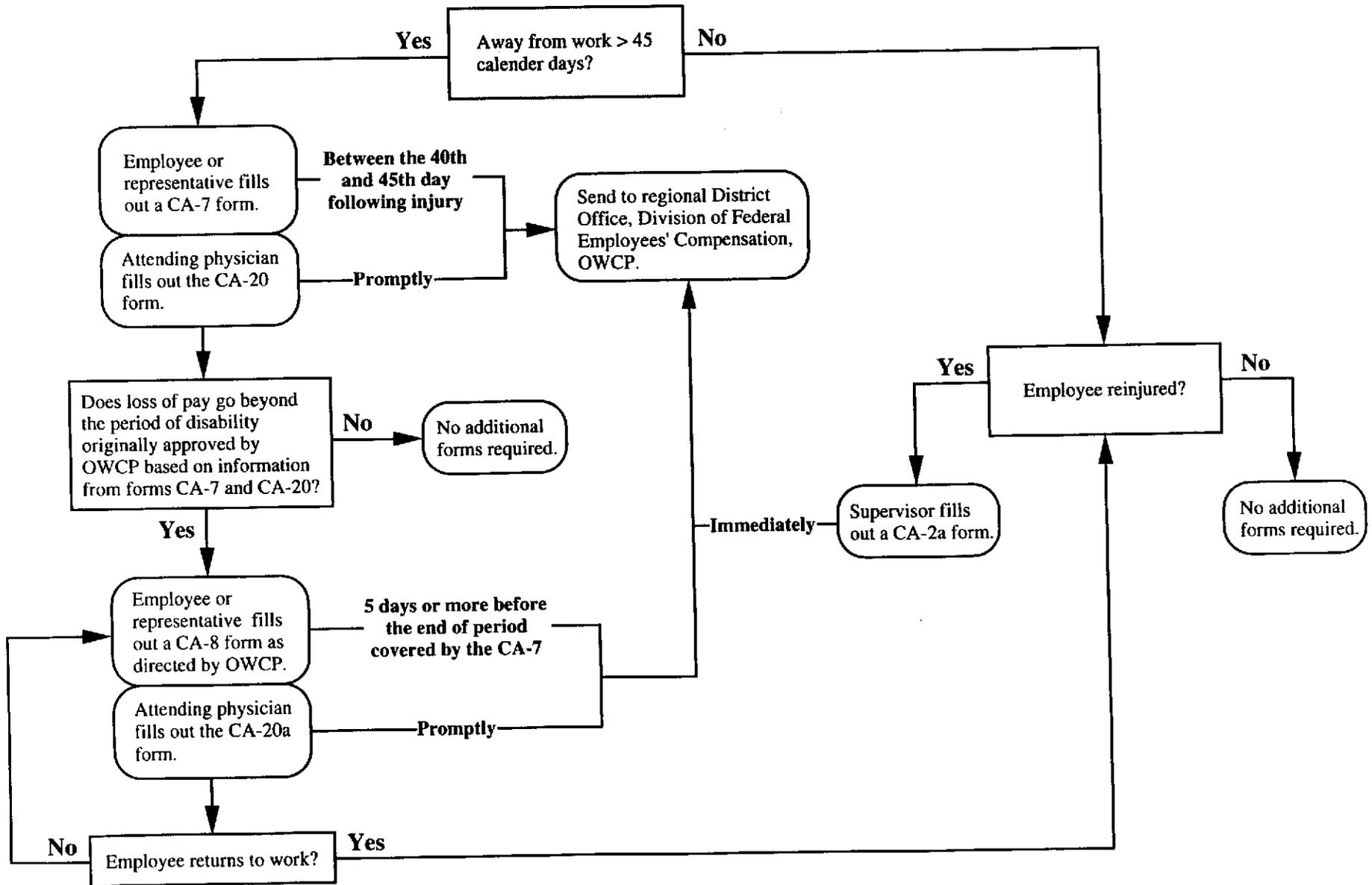
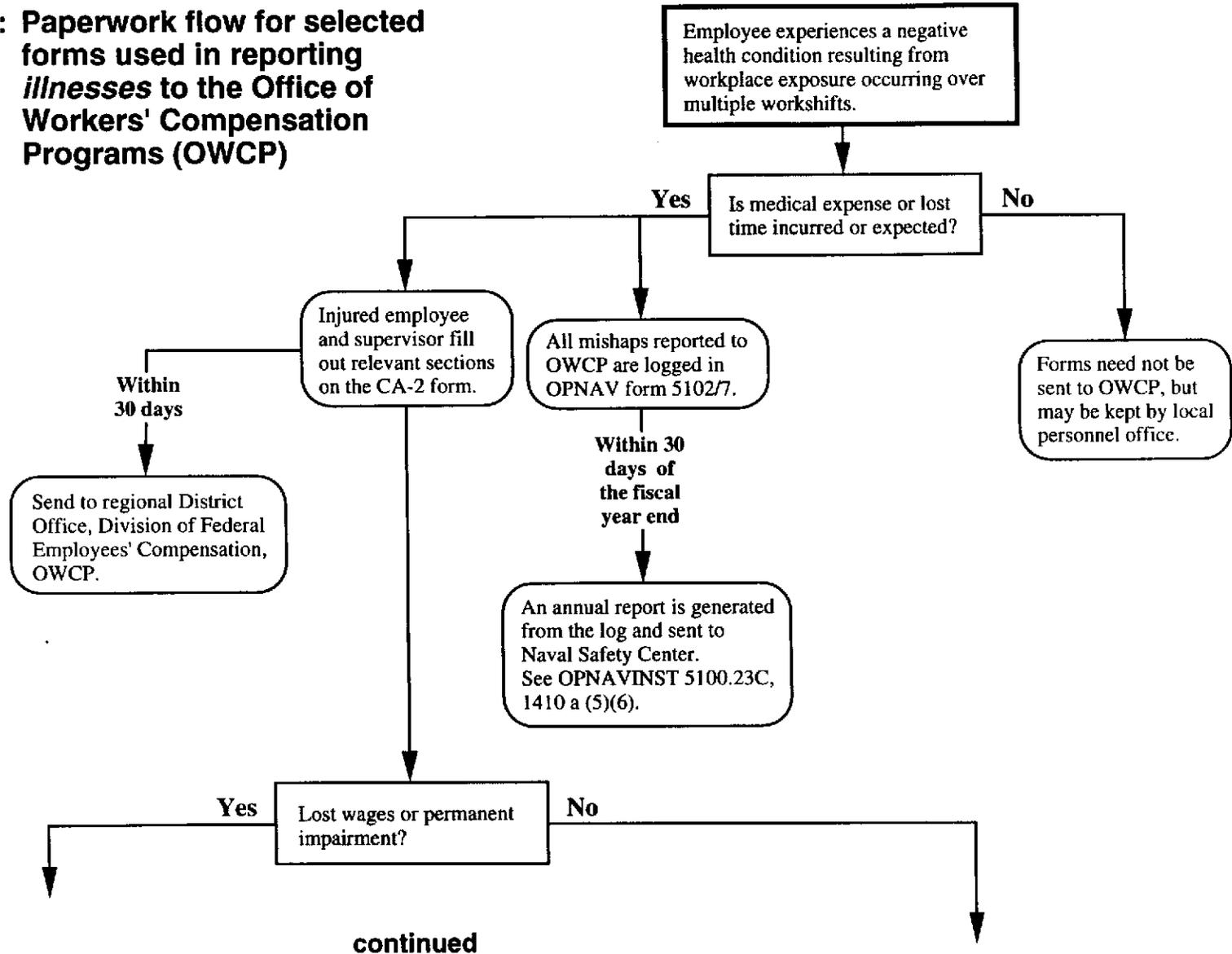


Figure 4: continued

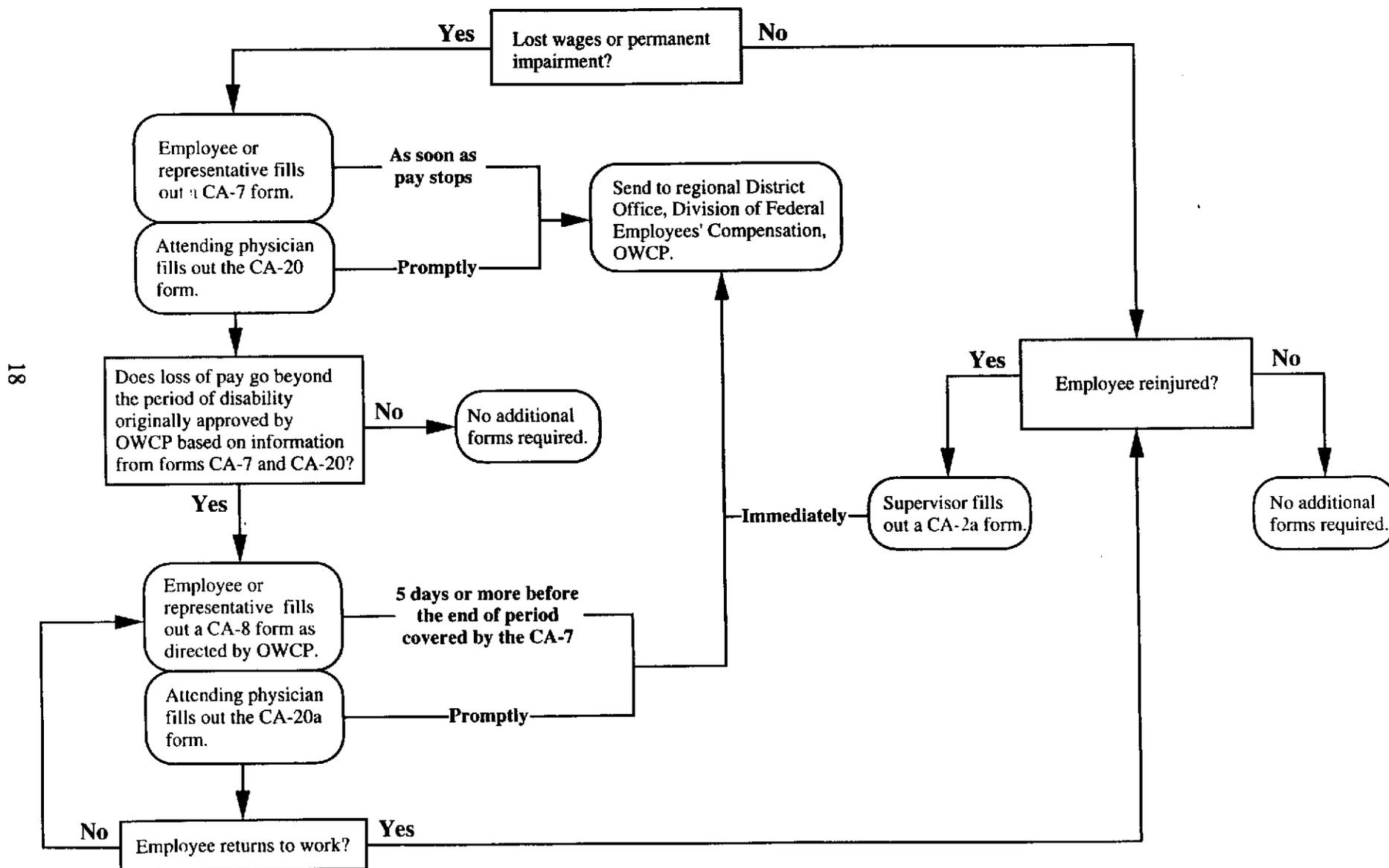


**Figure 5: Paperwork flow for selected forms used in reporting illnesses to the Office of Workers' Compensation Programs (OWCP)**



continued

Figure 5: continued



*Chargebacks and the financing of injury and illness claims*

The Federal Employees' Compensation Act is financed via the Employees' Compensation Fund. This fund is maintained through chargebacks made by OWCP to the employing federal agencies on whose behalf OWCP has made payments during 12-month periods running from July through June. After OWCP calculates the amount to be charged back to each agency, the agencies include the amount in their budget requests for the next fiscal year; the funds are then deposited in the Employees' Compensation Fund within 30 days after they become available.<sup>14</sup>

The chargeback financing mechanism was first instituted in 1960. Its purpose was to provide federal agencies with an incentive to improve their occupational health and safety performance by making them directly responsible for the costs of work-related injuries and diseases suffered by their workers.<sup>8</sup> In essence, it produced a governmental version of the experience-rating system used by private insurers in which employers with poor safety records and high workers' compensation costs are charged more than employers with good records and low costs.<sup>15</sup>

To further promote accountability, the *Federal Personnel Manual* states that agencies should pay special attention to chargeback billings and "arrange to charge costs to the lowest organizational level practicable in order to make managers more aware of costs" (*FPM* Chapter 810, Subchapter 9-1f.). Accordingly, the Department of Defense Comptroller instituted a policy effective fiscal year 1990 of charging workers' compensation costs (which previously had been centrally paid by each service) back to the individual activity for whom an injured or ill employee had worked. This policy was subsequently reemphasized by the Chief of Naval Operations in a formal instruction noting that the intention of the policy was

"to increase the awareness of local commanders of injury compensation costs incurred at their activities, as well as the impact that their actions can have in reducing future costs."<sup>16</sup>

The instruction also reaffirmed the Navy's commitment "to provide a safe work environment."<sup>16</sup>

### ***The Navy Occupational Safety and Health Program***

As the preceding discussion makes clear, most of the factors affecting the costs of injuries and illnesses once they have occurred are beyond the control of the Department of the Navy and of individual activities. Payment rates are fixed, selection of health-care providers is in the hands of employees, decision-making powers are held by OWCP exclusively, and the Department has no rights of appeal. However, one cost driver does fall almost completely within the Department's realm of influence: safety.

The Navy's Occupational Safety and Health Program for its civilian work force is detailed in the *Navy Occupational Safety and Health Program Manual*.<sup>5</sup> The *Manual* states policy ("to provide a safe and healthful workplace for all personnel"<sup>5 10104</sup>), assigns responsibilities, prescribes resource allocation and organizational structures, establishes reporting and recordkeeping criteria, and specifies explicit prevention and monitoring programs for a variety of known occupational hazards (e.g., noise and lead exposure). The second edition of the *Manual* was revised substantially seven times in 10 years; the third edition was released in late 1992<sup>5</sup> and represents a sustained effort on the part of the Navy to continually improve its Occupational Safety and Health Program. The Marine Corps' corresponding document is *Marine Corps Order 5100.8E*.<sup>17</sup>

Identifiable expenditures for the program exceeded \$179 million in fiscal year 1992; the actual resources devoted were even greater because this total excludes many of the costs of uniformed personnel who provide health or safety services to civilian workers.<sup>6</sup> Implementation of the Navy's Occupational Safety and Health Program is assessed by means of a three-tiered inspection plan including: (1) routine workplace inspections conducted annually (or more often) under authority of activity-level commanding officers, (2) occupational safety and health management evaluations conducted at least every three years at subordinate commands under authority of Echelon 1 and 2 commanders, and (3) comprehensive oversight inspections conducted under the auspices of the Navy Inspector General. The latter are meant "to evaluate all aspects of the Navy Occupational Safety and Health Program"<sup>5 10906a</sup> and are primarily conducted at large, industrialized facilities such as shipyards and aviation depots; results from these inspections are entered into a centralized database maintained by the Navy Inspector General's Oversight Inspection Unit and are used in part to help assess the efficacy of the overall program.

### **RATIONALE FOR A MODEL**

Despite the effort and resources devoted to implementing the Navy's Occupational Safety and Health Program and to ensuring adherence to its requirements, costs for occupational mishaps to civilian employees are still increasing (Figures 1 and 2). This poses numerous questions. Is the increase due to rising costs per case? To an increasing rate of cases? Or both?

It is also unclear how well either of these factors is understood. Medical inflation, for instance, has obviously been driving up the cost per case. But has the actual increase exceeded that expected from inflation? And if so, why? As for rates, the Navy's

occupational injury and illness case rate for its civilian workers has reportedly been decreasing since at least fiscal year 1988.<sup>18</sup> This should have been associated with an accompanying reduction in costs (or at least their rate of increase)—but only if those cases from which the rates are compiled are the same as those from which the Navy's workers' compensation bills are generated. Anecdotal reports suggest, however, that minor injuries not associated with compensation costs are reported to OWCP (the source of the data from which the Navy case rates are calculated) with varying degrees of rigor by different activities. Moreover, the bulk of the costs OWCP charges back in any given year are for cases originally occurring many years previously and which were likely to have been unaffected by current trends; for instance, 30 percent of the cases and 73 percent of the costs on the Department of the Navy's 1990 chargeback bill are for mishaps that originally occurred before 1988. This means the underlying trend for the rates of injuries and illnesses actually driving workers' compensation costs is currently unknown. (This type of difficulty in analyzing and interpreting data on occupational injuries and illnesses is far from unique.<sup>19</sup> The U.S. Bureau of Labor Statistics, for instance, appears for years to have been underestimating by a factor as great as nine the rates in private industry of injury and illness-related lost workdays—the Bureau's primary measure of mishap severity—because of flawed methodology.<sup>20</sup>)

Equally uncertain are the effects of the Navy's three-tiered occupational safety and health inspections. Initial analyses by our research team suggested that higher scores on the "program" component of the Navy Inspector General Oversight Inspection Unit inspections tended to be associated with lower injury rates.<sup>21</sup> However, subsequent analyses using more sophisticated statistical techniques have called these initial findings into question.<sup>22</sup>

Other researchers have found similarly conflicting results and the issue of whether inspections affect injury rates remains a topic of vigorous debate.<sup>23</sup> Both Viscusi<sup>24</sup> and Ruser and Smith,<sup>25</sup> for instance, found inspections administered by the Occupational Safety and Health Administration (OSHA) to be unrelated to injury rates. Robertson and Keeve, on the other hand, showed that OSHA inspections were associated with injury rates if the data were disaggregated by objective and subjective injuries and if they controlled for the effect of increasing workers' compensation payment rates.<sup>26</sup> OSHA itself obtained similarly inconclusive results when asked to demonstrate the efficacy of the medical surveillance programs it had imposed on industry. After collecting data from more than 7,000 businesses, OSHA's principal analytic approach was to catalog the respondents' medical surveillance programs then relate facets of the programs to a variety of subjective impressions (e.g., perceived effects on employee relations).<sup>27, 28</sup> An attempt was made in the agency's *Draft Final Report* to relate medical surveillance programs to "hard" outcomes (i.e., illness rates). However, the relevant regression results (which showed significant associations of medical surveillance programs with reported illness rates among large manufacturing firms using the most hazardous materials<sup>27</sup>) were excluded from the published report of the study because of problems in the analysis.<sup>28</sup> Private industry appears to be having equal difficulties in the area, for the OSHA survey did find that among a subgroup of companies studied in detail, none had performed quantitative analyses of the effects of their medical surveillance programs on illness or injury rates because most "simply . . . did not know how."<sup>28 p.696</sup>

As these examples illustrate, assessing trends in an organization's costs due to occupational injuries and illnesses, along with the efficacy of its cost control and occupational

safety and health programs, is difficult at best. Without question, the effort can yield both lowered mishap rates and costs.<sup>12,19,29</sup> But meaningful results require access to appropriate databases, experience with the data sets to be used, the informed use of sophisticated analytic techniques, perseverance, and a rational framework for organizing data and guiding their analysis—that is, a model.

*Exploiting performance variation among activities*

These same requirements apply to the assessment of the various etiologic-specific program components mandated in the *Navy Occupational Safety and Health Program Manual*<sup>5</sup> (e.g., the Hearing Conservation Program). They apply if cost-effectiveness comparisons are to be made between program components ("Does an investment in hearing conservation produce greater or lesser savings than an equal investment in ergonomics?"). And they apply to the assessment of individual activities.

Also required (and indeed, exploited) are individual variations in performance. As Table 1 shows, even among Navy activities similar in nature—in this case, shipyards—there are substantial differences in mishap rates and their associated costs. Fourfold differences exist between shipyards with the highest and lowest mishap rates. Cost per employee varies even more.

This type of variation potentially offers the means of identifying "good" or "bad" performers, but only if competing explanations for the differences in question are first taken into account. Differences in outcome (e.g., mishap rates) may be due to differences in performance (e.g., Occupational Safety and Health Program effectiveness). But they may also be due to factors such as an activity's mission or the composition of its work force. A shipyard, for instance, will have a higher injury rate than an administrative facility, no

Table 1

**Incidence Rates and Costs Accrued Through Two Years for Lost-Time  
Injuries and Illnesses Newly Occurring In Navy Shipyards  
During the 12 Months Ending 30 June 1992\***

| Shipyard | Incidence rate<br>(new lost-time cases<br>per 100 full-time<br>employees**) | 95%<br>confidence<br>interval | Mean cost per case<br>(two-year accrued<br>costs***), in dollars | Cost per employee<br>(two-year accrued<br>costs***), in dollars |
|----------|---|-------------------------------|--|---|
| A        | 1.91  | 1.46—2.42                     | 4,933  | 94  |
| B        | 4.54  | 3.83—5.31                     | 1,911  | 87  |
| C        | 5.13  | 4.53—5.77                     | 2,417  | 124   |
| D        | 5.37  | 4.48—6.33                     | 2,042  | 110   |
| E        | 6.84  | 6.15—7.56                     | 2,462  | 168   |
| F        | 7.32  | 6.42—8.29                     | 7,297  | 534   |
| G        | 8.08  | 7.14—9.08                     | 2,216  | 179   |
| H        | 8.52  | 7.25—9.90                     | 5,519  | 470   |
| overall  | 5.82  | 5.61—6.04                     | 3,417  | 199   |

\* Source: OWCP annual chargeback summary tapes as provided by the Office of Civilian Personnel Management, Department of the Navy.

\*\* Excludes cases filed but not accepted by OWCP

\*\*\* Costs shown are the sum of all payments made by OWCP in the original injury year (1 July 1991 to 30 June 1992) plus those made in the single subsequent year for which data were available, i.e., through 30 June 1993.

Under the Federal Employees' Compensation Act, as in private industry, the bulk of all costs are generated by a minority of cases for which payments continue over many years. For this reason, the costs incurred on behalf of a cohort of injured workers in the first few years following their injuries represent only a small portion of the total amount that eventually will be paid. Cost and actuarial studies<sup>1, 30</sup> show that the eventual total cost for a lost-time illness or injury among Department of the Navy civilian employees is approximately nine times the amount paid out the first two years. This means the average projected total cost for the lost-time cases in Table 1 exceeds \$30,000. For the eight Navy shipyards, 3,529 such cases occurred in the year shown, which will result in an eventual cost of more than \$108 million. This total excludes an additional \$3.6 million that was paid directly to injured workers by the shipyards in the form of continuation of pay.<sup>31</sup>

matter how well run the former's occupational safety and health program or how poorly the latter's.

A further example of the importance of taking such factors into account can be seen in Figures 1 and 2, which illustrate trends in the Department of the Navy's direct costs from occupational mishaps during the period 1982 to 1992. Figure 1 shows these costs increasing 82 percent when graphed in current, or "nominal," dollars. This trend appears less worrisome when inflation is taken into account (Figure 2). However, the size of the Department's civilian work force has been decreasing during the period shown (among blue-collar workers, who experience the overwhelming proportion of occupational mishaps, there has been a 25 percent reduction in the Department's work force from 1982 to 1992), and adjusting the data additionally to show costs as if the size of the work force had remained constant would therefore reveal a steeper "real" increase than that shown in Figure 2. (This latter adjustment was not calculated because the requisite data—annual OWCP payments broken down by injury year cohorts and dating back to the year in which the first cohort receiving payment was injured—are not available.)

As this example shows, meaningful data interpretation often depends on finding suitable methods of adjustment. In particular, the need to control for key differences in groups or institutions when making comparisons using statistical models based on administrative- or claims-based data, has been described by Roos et al.<sup>32</sup> They note that testing hypotheses about the relationship between interventions (e.g., safety programs) and outcomes, distinguishing the better of two interventions, or identifying performers with especially good (or especially poor) results all depend on proper adjustments with the right covariates.

## AN OCCUPATIONAL MISHAP COST-REDUCTION MODEL FOR THE NAVY

The impetus for using administrative- and claims-based data to help better understand the Navy's escalating workers' compensation costs is contained in a 1991 *Tentative Medical Requirement*.<sup>33</sup> The *Requirement* points out that large quantities of data are routinely generated and stored in the course of implementing and monitoring the Navy's Occupational Safety and Health Program and in the course of paying compensation expenses for workers suffering occupational mishaps. The *Requirement* notes further that the existence of these data represents an opportunity for assessing aspects of the Navy's Occupational Safety and Health Program, but that before this opportunity can be realized the data must be integrated and organized.

Figure 6 presents a proposed Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program. The Model is based on theoretical assumptions and empirical findings from the relevant literature, as well as consideration of what data are currently available from centralized sources. An overview of these data sources is provided below; a detailed description of the specific variables planned for extraction from these sources and incorporation into the Model appears in the Appendix, with the variables grouped into "domains" corresponding to those shown in the Model and categorized by whether they are fixed or modifiable.

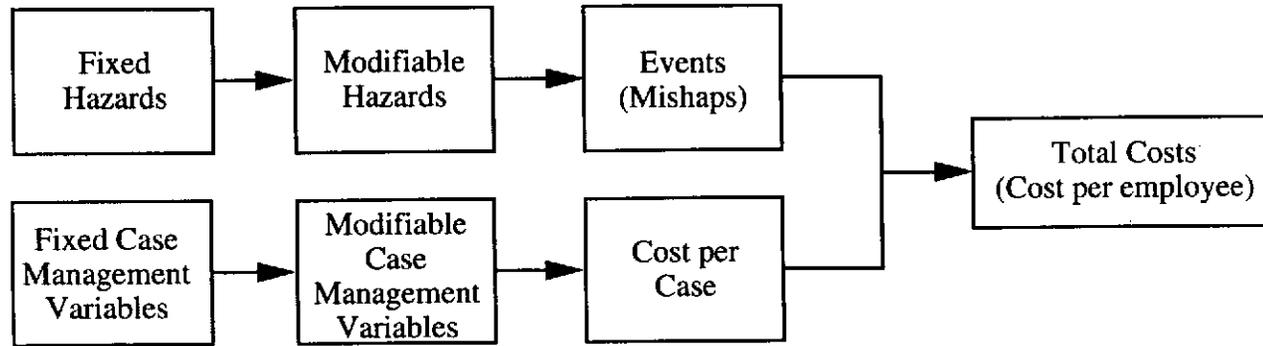
The Model in Figure 6 is presented first in overview, then in four parts. The overview (Figure 6) depicts the broad influences on workers' compensation costs proposed in the Model: combinations of risk factors lead to mishaps, combinations of case management factors lead to costs per case, and the two multiplied together (number of cases times cost per case) give overall cost, which can be standardized as cost per employee. The first part

of the Model (Figure 6a) shows the hypothesized relationship for a given facility between those variables that cannot be changed via the Navy's Occupational Safety and Health Program (e.g., the mean age of a facility's work force) and the illness and injury rates which would be "expected" given these unalterable circumstances. Figure 6b shows the hypothesized relationship between those variables which *can* be changed (e.g., safety inspection scores) and residualized injury and illness rates—that is, the difference between a facility's actual and expected rates. Various aspects of a facility's ability to manage its cases and their attendant costs are unalterable; Figure 6c shows these factors and their hypothesized influences. And finally, some aspects of case management are under facilities' control and the proposed relationship between these variables and the difference between a facility's actual and expected costs is shown in Figure 6d. Breakdown of the Model in this fashion allows for the separate analysis, if desired, of explicit safety and health outcomes (i.e., injury and illness rates), of various cost drivers, and of the combined effects of all these factors on overall total costs.

#### *Application of the Model to a hypothetical example*

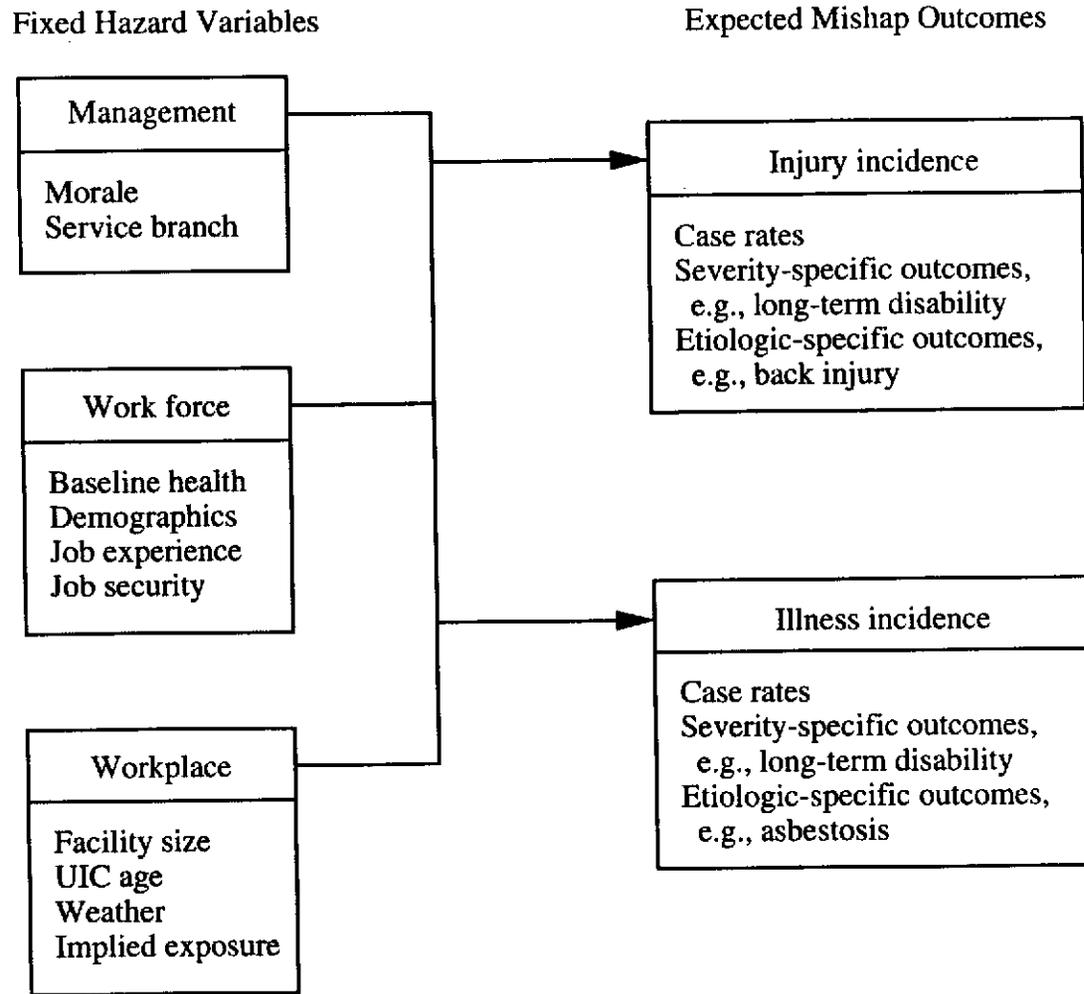
Figure 7 presents a decision-making algorithm showing how the costs of occupational injuries and illnesses at an individual facility might be analyzed through application of the Model. Such an application can be further illustrated with a hypothetical example.

A particular facility with 1,000 civilian employees, for instance, might report 100 occupational mishaps in a year, with an eventual projected cost for these cases of \$1 million, or \$1,000 per employee. In contrast, suppose the per-employee cost for occupational mishaps Navywide is \$250. Obviously, the facility's per-employee cost exceeds that of the Navy as a whole. Suppose, however, that blue-collar workers comprise 50 percent of the

*Overview*

**Figure 6: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program**

*Relationship of fixed hazard variables to expected mishap rates*



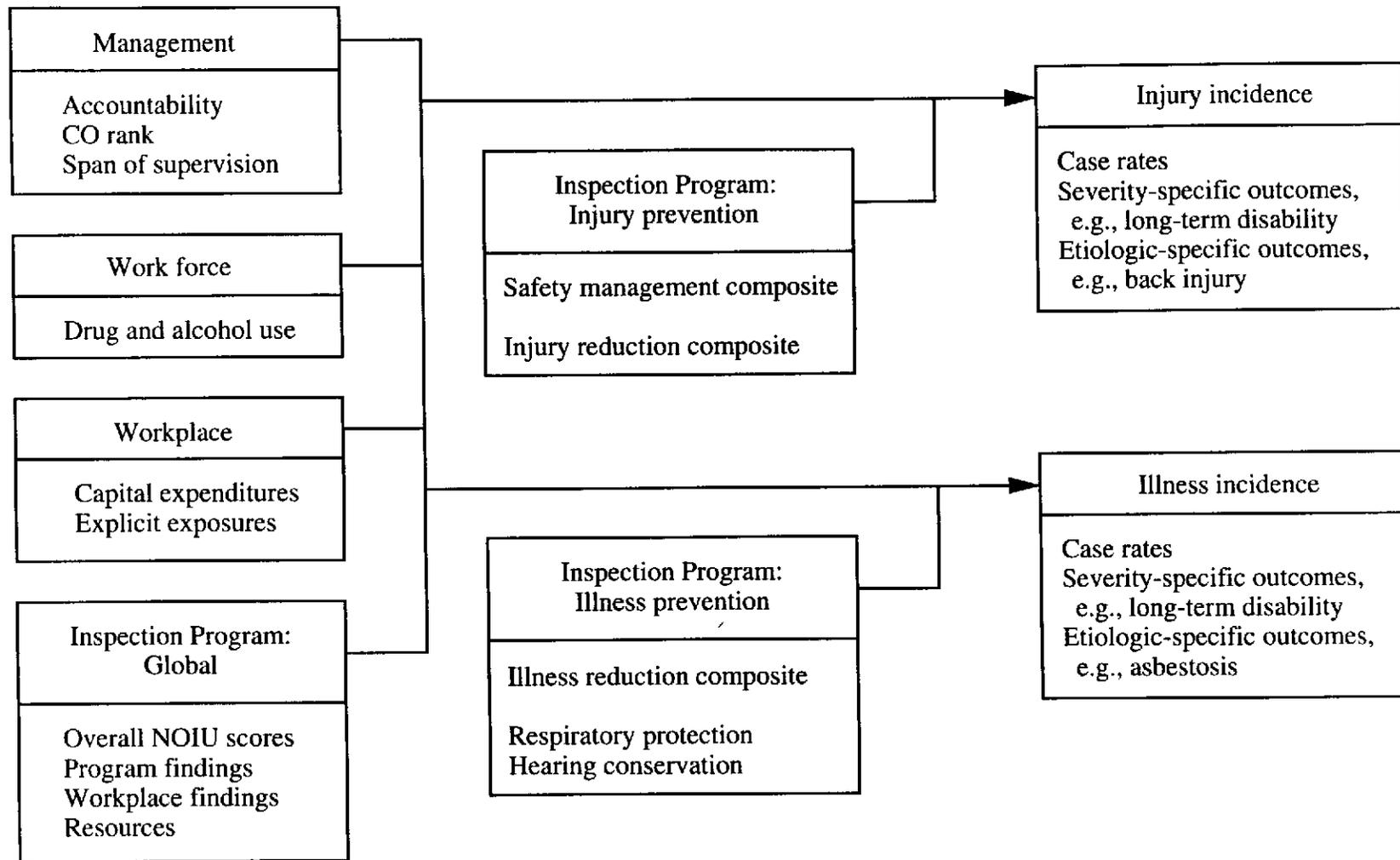
**Figure 6a: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program**

Note: Specific variable definitions are provided in the Appendix.

*Relationship of modifiable hazard variables to residualized mishap rates*

Modifiable Hazard Variables

Residualized Mishap Outcomes

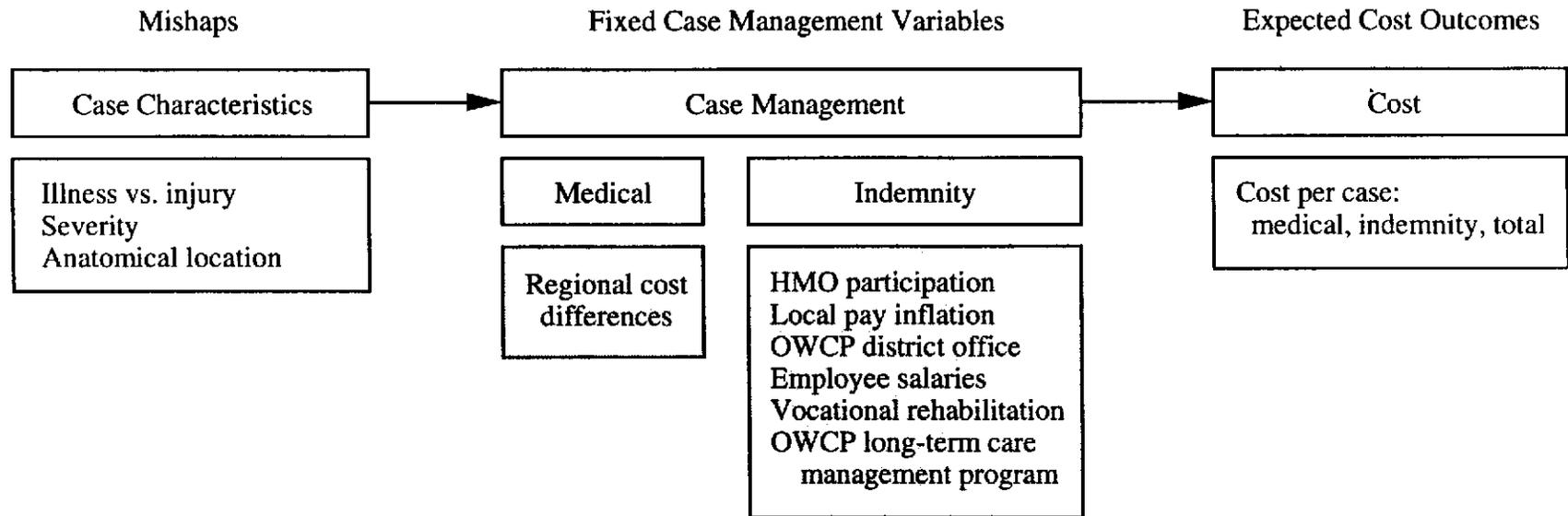


31

**Figure 6b: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program**

Note: Specific variable definitions are provided in the Appendix.

*Relationship of fixed case management variables to expected cost per case*

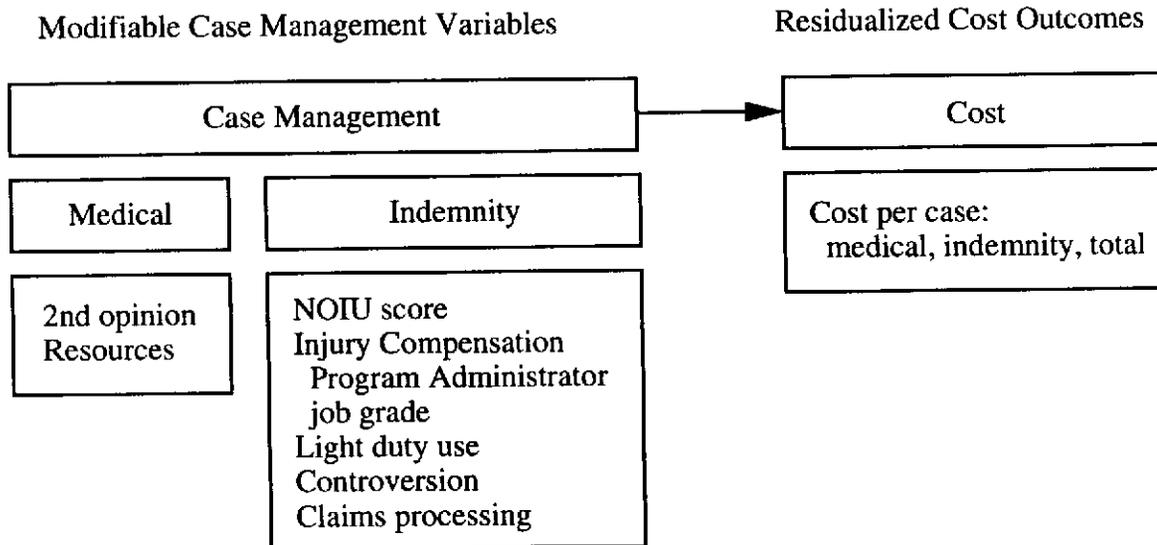


32

**Figure 6c: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program**

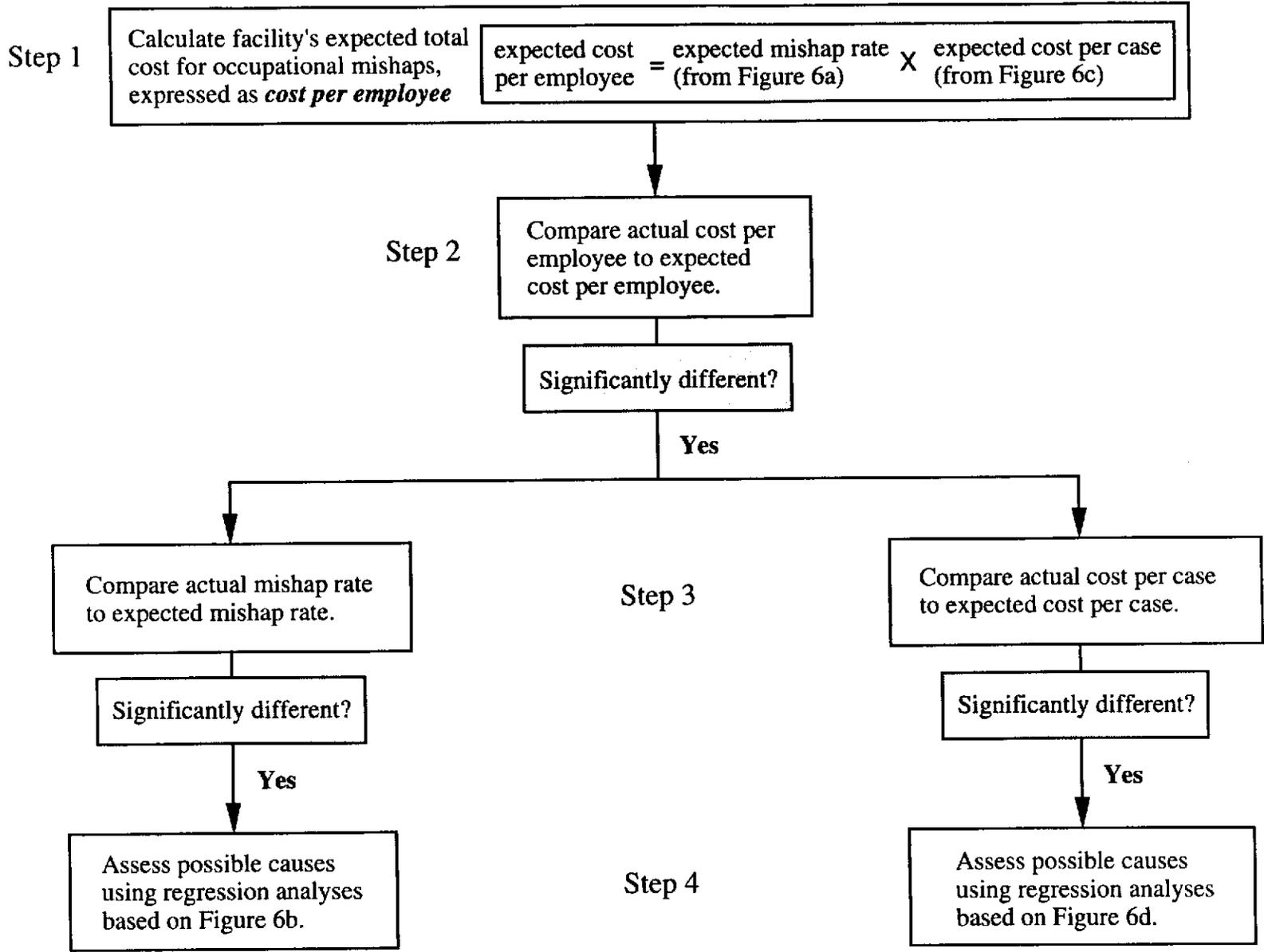
Note: Specific variable definitions are provided in the Appendix.

*Relationship of modifiable case management variables to residualized cost per case*



**Figure 6d: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program**

Note: Specific variable definitions are provided in the Appendix.



**Figure 7: Algorithm for application of the Mishap Cost-Reduction and Quality Assessment Model to the analysis of occupational mishaps at an individual facility**

facility's work force and that it is located in an expensive urban area where medical costs are 150 percent of the national average. Are the facility's costs still excessive? And if so, why?

Step 1 in the algorithm calls for using the Model to begin answering these questions by calculating, as shown in Figures 6a and 6c, the rate of mishaps and the cost per case that would be "expected" given circumstances of the facility that cannot be changed. In this case, doing so might indicate an expected mishap rate, given the high percentage of blue-collar workers, of 7 per 100 (as opposed to the observed 10 per 100) and an expected cost per case, given the area's high cost of medical services, of \$10,500. Together, these expected figures yield an expected cost per employee for the facility of \$735 (70 expected cases times an expected \$10,500 cost per case / 10,000 employees). In Step 2, a one-sample t-test would be used to determine if the difference between the facility's expected \$735 cost per employee and its actual \$1,000 cost per employee was statistically significant.

Step 3 assumes this difference is significant and that it is important to know why. (Higher-than-expected rates? Higher-than-expected costs per case? Or both?) Each of these questions can be addressed statistically (using a one-sample test for proportions for the rate difference and a one-sample t-test for the difference in cost per case). In this hypothetical example, this facility's cost per case is actually *less* than would be expected given the prevailing high cost of medical services in its locale. Its mishap rate, however, is significantly greater than expected, even given the facility's large proportion of blue-collar workers. Step 4 calls for examining the possible reasons for this excess through the use of regression analyses based on Figure 6b of the Model; for instance, this facility might be found to have an inadequate safety program.

## DATA SOURCES AND STUDY SAMPLE

Inevitably, data collected for claims or other administrative purposes have various quirks and shortcomings when used for research purposes. These have been commented on by previous researchers<sup>19, 34</sup>—some of whom have found themselves completely thwarted in their attempts to make use of such data<sup>35</sup>—and can include such problems as erratic case classification, incomplete records, coding errors, and limitations or idiosyncracies in one data set that preclude or limit the use of another.

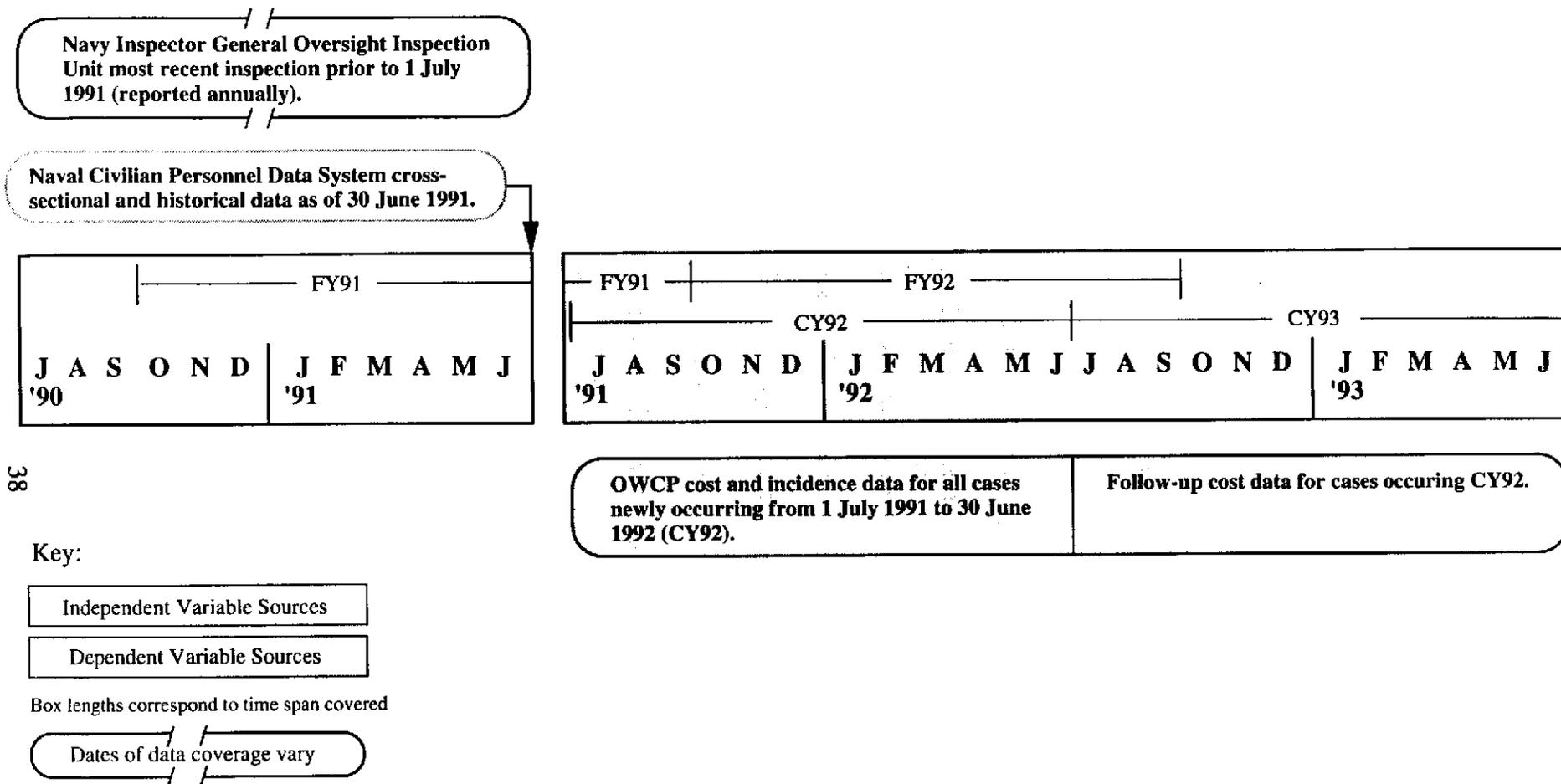
Our research team has performed an overview of the potential Navy data sources available for use in the Mishap Cost-Reduction Model and our initial findings have been consistent with the experiences of these early workers. For instance, the only source of case-level cost and mishap data is OWCP, to which events are reported for the payment of compensation claims. The data from OWCP, whose chargeback year runs from 1 July to 30 June, include a code identifying an injured worker's employing activity; using this code and denominator data from the Department of the Navy's Office of Civilian Personnel Management, it is possible to calculate event rates for individual activities. To establish the reliability of these data, it would be useful to correlate them with rate data independently collected by the Naval Safety Center.<sup>5</sup> However, the case reporting criteria used by the two organizations are not always consistent, the Safety Center does not collect individual-level data, and the time frame for its data collection corresponds to that of the federal fiscal year (1 October to 30 September). This means it is not possible to correlate data from these two sources and that given the necessity of using the first, the second is of limited value. Similar problems became apparent with other data sources containing otherwise potentially useful information.

Figure 8 shows the data sources planned for use in the Model and the time periods from which data will be extracted. To help strengthen the causal plausibility of the Model's results, independent (i.e., predictor) variables are being extracted from data entries no later than 30 June 1991; dependent (outcome) variables are being extracted from data entries occurring on or after 1 July 1991. Additional comments on the planned data sources are provided below.

*Office of Civilian Personnel Management: Study sample*

The Policy Analysis and Information Branch, Office of Civilian Personnel Management, Department of the Navy, publishes routine reports on various demographic aspects of the Department's civilian work force. Data from the Office's report of 30 June 1991 were used to identify the 150 Department of the Navy facilities having the largest U.S. citizen civilian work forces as of that date.<sup>36</sup> These 150 facilities, identified by Unit Identification Codes, are listed in Table 2. The Model relies on variables (listed in the Appendix) generated from data describing these facilities.

To minimize the effect of potential cultural differences, four facilities in Guam and Puerto Rico that would have qualified based on size were excluded from the sample. Although comprising less than 10 percent of the Department's 1,544 facilities employing civilian workers on 30 June 1991, the 150 facilities selected nonetheless employed 80 percent of all civilians working for the Department at that time. Most of the Department's workers' compensation costs are generated by its large industrial facilities (e.g., shipyards and aviation rework and repair depots), and all of these facilities are included in the sample. Also shown in Table 2 is the percentage of each facility's work force comprised of blue-collar workers, which previous work has shown is related to injury and illness rates.<sup>22</sup>



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**Figure 8: Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program: Planned dates of data coverage**

Table 2

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

| Unit Identification Code<br>and facility description | Location         | Pop.  | Percent blue-<br>collar |
|--|------------------|-------|-------------------------|
| 00251 PUGET SOUND NAVSHIPYD                          | Bremerton, WA    | 11470 | 64.21                   |
| 00181 NORFOLK NAVSHIPYD                              | Portsmouth, VA   | 11369 | 69.74                   |
| 00191 NAVSHIPYD                                      | Charleston, SC   | 7501  | 66.00                   |
| 00102 NAVSHIPYD                                      | Portsmouth, NH   | 7054  | 60.80                   |
| 00221 NAVSHIPYD                                      | Mare Island, CA  | 7032  | 61.02                   |
| 00151 NAVSHIPYD                                      | Philadelphia, PA | 6925  | 74.11                   |
| 00311 NAVSHIPYD                                      | Pearl Harbor, HI | 5332  | 67.99                   |
| 60530 NAVWPNSCEN                                     | China Lake, CA   | 5239  | 6.68                    |
| 60921 NAVSWC   | Dahlgren, MD     | 5156  | 9.41                    |
| 65887 NAVAVNDEPOT                                    | Norfolk, VA      | 4385  | 63.15                   |
| 65888 NAVAVNDEPOT                                    | North Island, CA | 4375  | 56.27                   |
| 63126 COMPACMISTESTCEN                               | Point Mugu, CA   | 4272  | 12.59                   |
| 00164 NAVWPNSUPPCEN                                  | Crane, IN        | 4031  | 16.08                   |
| 60258 NAVSHIPYD                                      | Long Beach, CA   | 3965  | 73.90                   |
| 65885 NAVAVNDEPOT NAS                                | Alameda, CA      | 3930  | 63.72                   |
| 65889 NAVAVNDEPOT                                    | Pensacola, FL    | 3775  | 66.38                   |
| 00163 NAVAVIONICCEN                                  | Indianapolis, IN | 3539  | 25.49                   |
| 00253 NAVUSEAWARENGSTA                               | Keyport, WA      | 3532  | 40.97                   |
| 66604 NUSC   | Newport, RI      | 3434  | 5.07                    |

| Unit Identification Code<br>and facility description | Location         | Pop.  | Percent blue-<br>collar |
|--|------------------|-------|-------------------------|
| 00251 PUGET SOUND NAVSHIPYD                          | Bremerton, WA    | 11470 | 64.21                   |
| 00181 NORFOLK NAVSHIPYD                              | Portsmouth, VA   | 11369 | 69.74                   |
| 00191 NAVSHIPYD                                      | Charleston, SC   | 7501  | 66.00                   |
| 00102 NAVSHIPYD                                      | Portsmouth, NH   | 7054  | 60.80                   |
| 00221 NAVSHIPYD                                      | Mare Island, CA  | 7032  | 61.02                   |
| 00151 NAVSHIPYD                                      | Philadelphia, PA | 6925  | 74.11                   |
| 00311 NAVSHIPYD                                      | Pearl Harbor, HI | 5332  | 67.99                   |
| 60530 NAVWPNSCEN                                     | China Lake, CA   | 5239  | 6.68                    |
| 60921 NAVSWC   | Dahlgren, MD     | 5156  | 9.41                    |
| 65887 NAVAVNDEPOT                                    | Norfolk, VA      | 4385  | 63.15                   |

Table 2, continued:

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

| Unit Identification Code<br>and facility description | Location           | Pop. | Percent blue-<br>collar |
|--|--------------------|------|-------------------------|
| 00167 DTNSRDC  | Bethesda, MD       | 2688 | 12.17                   |
| 00189 NSC  | Norfolk, VA        | 2672 | 52.69                   |
| 62269 NAVAIRDEVGEN                                   | Warminster, PA     | 2614 | 6.92                    |
| 67004 MCLB   | Albany, GA         | 2572 | 39.58                   |
| 00197 NAVORDSTA                                      | Louisville, KY     | 2528 | 53.44                   |
| 62383 MSC PAC AREA                                   | Oakland, CA        | 2405 | 84.78                   |
| 63394 NAVSHIPWPNSYSENGSTA                            | Port Hueneme, CA   | 2377 | 0.97                    |
| 00383 ASO  | Philadelphia, PA   | 2332 | 8.10                    |
| 68335 NAVAIRENGCEN                                   | Lakehurst, NJ      | 2298 | 18.36                   |
| 63387 PWC  | San Diego, CA      | 2290 | 60.04                   |
| 00187 PWC  | Norfolk, VA        | 2143 | 69.81                   |
| 67001 MCB  | Camp Lejeune, NC   | 2133 | 40.74                   |
| 42191 NAVAIR-OPER SUPP FLD                           | Washington, DC     | 1906 | 0                       |
| 62204 MCLB   | Barstow, CA        | 1786 | 65.12                   |
| 65540 NAVSSES  | Philadelphia, PA   | 1730 | 12.31                   |
| 00109 WPNSTA   | Yorktown, VA       | 1623 | 45.84                   |
| 00161 USNA   | Annapolis, MD      | 1502 | 38.35                   |
| 00146 MCAS   | Cherry Point, NC   | 1412 | 43.34                   |
| 60701 WPNSTA   | Seal Beach, CA     | 1346 | 35.74                   |
| 00367 FLEMATSUPPO                                    | Mechanicsburg, PA  | 1345 | 0                       |
| 62583 CBC  | Port Hueneme, CA   | 1316 | 26.98                   |
| 68378 PWC  | San Francisco, CA  | 1307 | 64.65                   |
| 62755 PWC  | Pearl Harbor, HI   | 1294 | 56.96                   |
| 00681 MCB  | Camp Pendleton, CA | 1288 | 50.93                   |
| 61331 NAVCOASTSYSCEN                                 | Panama city, FL    | 1284 | 10.12                   |
| 60036 WPNSTA   | Concord, CA        | 1270 | 51.26                   |
| 00259 NAVHOSP  | San Diego, CA      | 1262 | 18.30                   |

Table 2, continued:

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

| Unit Identification Code<br>and facility description | Location              | Pop. | Percent blue-<br>collar |
|--|-----------------------|------|-------------------------|
| 00183 NAVHOSP  | Portsmouth, VA        | 1215 | 8.40                    |
| 61339 NAVTRASYSSEN                                   | Orlando, FL           | 1195 | 1.00                    |
| 68381 NAVSEA PMO                                     | Washington, DC        | 1191 | 0                       |
| 00244 NSC  | San Diego, CA         | 1172 | 42.49                   |
| 00264 MCCDC  | Quantico, VA          | 1172 | 40.02                   |
| 68438 TRIREFFAC BANGFOR                              | Bremerton, WA         | 1139 | 65.94                   |
| 00168 NAVMEDCOM NATCAPREG                            | Bethesda, MD          | 1120 | 20.45                   |
| 64267 NAVWARFARE ASSMT CTR                           | Corona, CA            | 1084 | 1.01                    |
| 62474 WESTNAVFACENCOM                                | San Bruno, CA         | 1064 | 0.38                    |
| 00193 WPNSTA   | Charleston, SC        | 1050 | 48.10                   |
| 00612 NSC  | Charleston, SC        | 976  | 27.56                   |
| 44466 TRIREFFAC                                      | Kings Bay, GA         | 971  | 62.31                   |
| 62980 COMNAVMIIPERSCOM                               | Washington, DC        | 960  | 1.35                    |
| 00027 MANAGEMENT HDQTRS MC                           | Washington, DC        | 958  | 0.10                    |
| 68322 NAVEDTRAPRODEVSEN                              | Pensacola, FL         | 954  | 2.62                    |
| 62306 NACOCEANO                                      | Stennis Space Ctr, MS | 946  | 0.42                    |
| 62271 NAVPGSCOL                                      | Monterey, CA          | 854  | 12.30                   |
| 00228 NSC  | Oakland, CA           | 853  | 12.66                   |
| 42200 NAVELEX PO                                     | Arlington, VA         | 822  | 0                       |
| 64281 NAVSEA NORFOLK DET                             | Norfolk, VA           | 818  | 0                       |
| 62467 SOUTHNAVFACENCOM                               | Charleston, SC        | 817  | 0.12                    |
| 62470 LANTNAVFACENCOM                                | Norfolk, VA           | 796  | 0                       |
| 60478 WPNSTA   | Earle Colts Neck, NJ  | 756  | 43.92                   |
| 62472 NAVFACENCOMNORDIV                              | Philadelphia, PA      | 750  | 0.27                    |
| 00246 NAS NO ISLE                                    | San Diego, CA         | 735  | 25.17                   |
| 60050 MCAS EL TORO                                   | Santa Anna, CA        | 727  | 41.40                   |
| 62376 NAVAIRPROPCEN                                  | Trenton, NJ           | 716  | 39.80                   |

Table 2, continued:

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

| Unit Identification Code<br>and facility description | Location             | Pop. | Percent blue-<br>collar |
|--|----------------------|------|-------------------------|
| 00171 COMNAVDIST                                     | Washington, DC       | 701  | 37.23                   |
| 00619 NAVHOSP  | Oakland, CA          | 701  | 17.83                   |
| 00406 NSC PUGET SOUND                                | Bremerton, WA        | 672  | 24.85                   |
| 65114 PWC  | Pensacola, FL        | 664  | 70.18                   |
| 68166 NISC   | Suitland, MD         | 628  | 1.43                    |
| 63042 NAS  | Lemoore, CA          | 604  | 36.59                   |
| 65584 NAVELEXSYSENGCEN                               | San Diego, CA        | 601  | 6.66                    |
| 00216 NAS  | Corpus Christi, TX   | 596  | 37.75                   |
| 65912 NAVSEACENLANT                                  | Portsmouth, VA       | 596  | 0.84                    |
| 00129 SUB BASE                                       | New London, CT       | 593  | 40.98                   |
| 62661 NETC   | Newport, RI          | 593  | 41.48                   |
| 65913 NAVSEACENPAC                                   | San Diego, CA        | 593  | 1.01                    |
| 62849 NAESU  | Philadelphia, PA     | 590  | 0                       |
| 65113 PWC  | Great Lakes, IL      | 580  | 70.69                   |
| 62813 NAVSTA   | Pearl Harbor, HI     | 561  | 7.66                    |
| 00604 NSC  | Pearl Harbor, HI     | 561  | 36.90                   |
| 00207 NAS  | Jacksonville, FL     | 557  | 15.08                   |
| 62678 SUPSHIP C/R USN                                | Portsmouth, VA       | 540  | 28.70                   |
| 63285 NAVINVESTSERCMD                                | Washington, DC       | 534  | 0                       |
| 62791 SUPSHIP C/R                                    | San Diego, CA        | 532  | 28.01                   |
| 67399 MCAGCC   | Twentynine Palms, CA | 511  | 33.07                   |
| 62477 CHESNAVFACENGCOM                               | Washington, DC       | 509  | 0                       |
| 60259 NAS MIRAMAR                                    | San Diego, CA        | 509  | 42.44                   |
| 00232 NAVHOSP  | Jacksonville, FL     | 503  | 14.71                   |
| 63408 NAVMTO   | Norfolk, VA          | 489  | 24.74                   |
| 62793 SUPSHIP C/R                                    | Newport News, VA     | 488  | 0.61                    |
| 68711 SWNAVFACENGCOM                                 | San Diego, CA        | 488  | 0                       |

Table 2, continued:

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

| Unit Identification Code<br>and facility description | Location           | Pop. | Percent blue-<br>collar |
|--|--------------------|------|-------------------------|
| 00014 OCNR   | Washington, DC     | 485  | 0.21                    |
| 60191 NAS OCEANA                                     | Virginia Beach, VA | 482  | 34.23                   |
| 68462 NORDA  | Bay St. Louis, MS  | 473  | 0                       |
| 68836 NSC  | Jacksonville, FL   | 468  | 16.45                   |
| 00025 COMNAVFACENGCOMHQ                              | Washington, DC     | 464  | 0.22                    |
| 61414 NAVPHIBASE                                     | Little Creek, VA   | 464  | 44.18                   |
| 00204 NAS  | Pensacola, FL      | 458  | 13.32                   |
| 62604 CBC  | Gulfport, MS       | 457  | 46.61                   |
| 61463 NAVBASE  | Norfolk, VA        | 456  | 0                       |
| 00620 NAS  | Whidbey Island, WA | 451  | 9.98                    |
| 00019 COMNAVAIRSYSYSCOM                              | Arlington, VA      | 438  | 0.46                    |
| 00024 NAVSEA HG                                      | Washington, DC     | 433  | 2.31                    |
| 67439 MARCORSUPACT                                   | Kansas City, MO    | 431  | 1.62                    |
| 62789 SUPSHIP C/R                                    | Groton, CT         | 422  | 1.42                    |
| 62795 SUPSHIP C/R                                    | Pascagoula, MS     | 418  | 8.37                    |
| 65580 NAVELEXSYSENGCEN                               | Portsmouth, VA     | 417  | 0.24                    |
| 00213 NAS  | Key West, FL       | 417  | 38.85                   |
| 00030 DIRSSPO  | Washington, DC     | 409  | 0                       |
| 68346 NAVAIR PMO                                     | Washington, DC     | 404  | 0                       |
| 68094 NRMC   | Camp Pendleton, CA | 399  | 23.06                   |
| 65928 NTC  | Orlando, FL        | 399  | 35.59                   |
| 65538 NAVSEALOGSUPENGACT                             | Mechanicsburg, PA  | 399  | 0                       |
| 60200 NAS  | Cecil field, FL    | 396  | 11.11                   |
| 68084 NAVHOSP  | Charleston, SC     | 393  | 5.60                    |
| 60957 FAADCPAC                                       | San Diego, CA      | 388  | 0                       |
| 68305 NAVCIVENGLAB CBC                               | Port Hueneme, CA   | 386  | 6.22                    |
| 47039 OFC NAVOPER                                    | Arlington, VA      | 377  | 0                       |

Table 2, continued:

**Department of the Navy Facilities Employing Civilians: Largest 150 Facilities  
as of 30 June 1991, in Descending Order by Work Force Size**

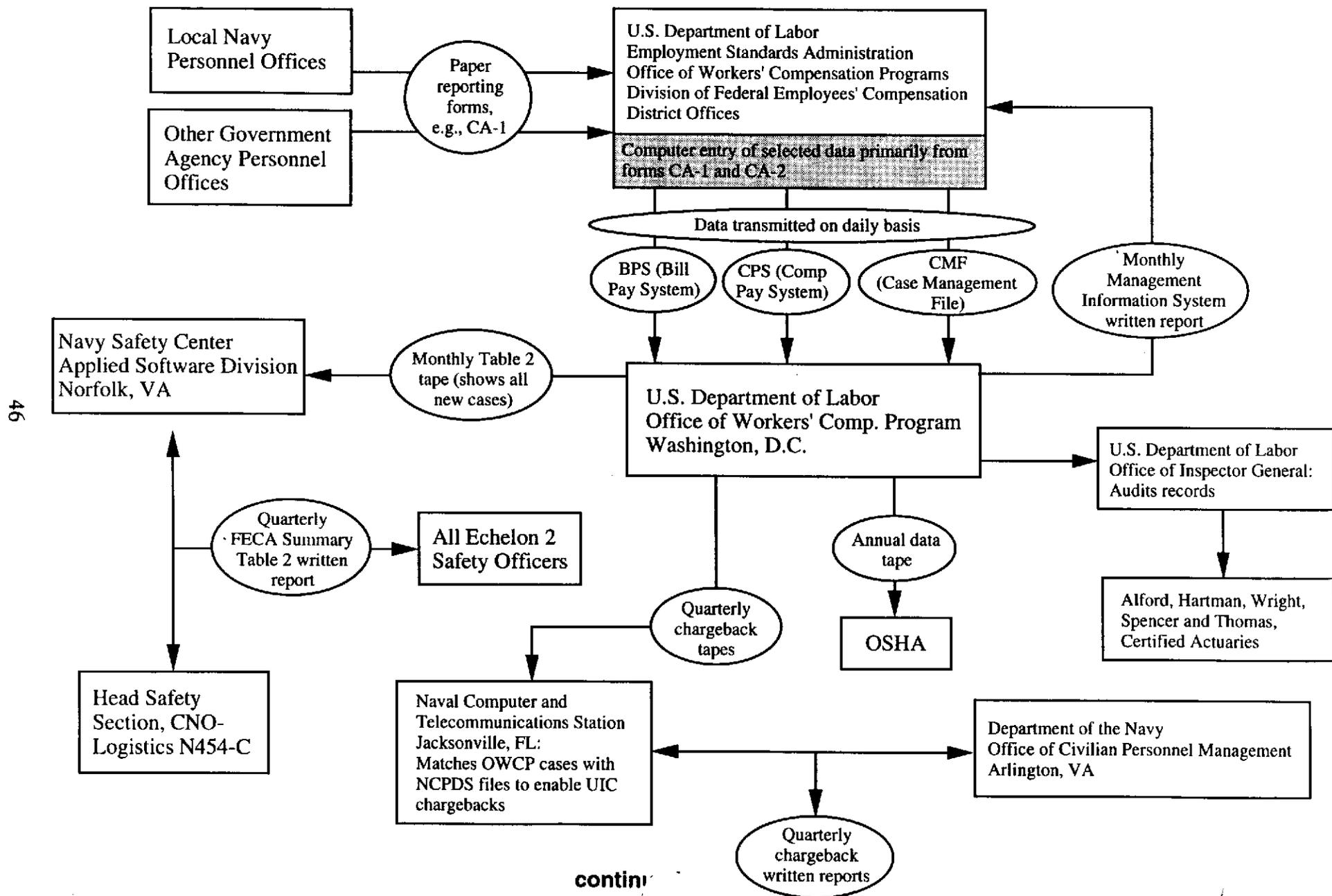
| Unit Identification Code<br>and facility description | Location          | Pop.    | Percent blue-<br>collar |
|--|-------------------|---------|-------------------------|
| 63028 POMFLANT                                       | Charleston, SC    | 376     | 53.19                   |
| 62742 PACNAVFACENGCOM                                | Pearl Harbor, HI  | 375     | 0                       |
| 68860 NAVSUPCEN                                      | Pensacola, FL     | 370     | 34.86                   |
| 60951 FAADCLANT                                      | Norfolk, VA       | 366     | 0                       |
| 00236 NAS  | Alameda, CA       | 363     | 29.20                   |
| 00318 MCAS   | Kanehoe Bay, HI   | 358     | 54.19                   |
| 65236 NAVELEXSYSENGCEN                               | Charleston, SC    | 357     | 0                       |
| 00296 NAS  | Moffett Field, CA | 357     | 35.85                   |
| 65980 NAVELEXSYSENGACT                               | St. Inigoes, MD   | 354     | 1.69                    |
| 68093 NAVHOSP  | Camp Lejeune, NC  | 350     | 18.57                   |
| 62767 NAVAIRTECHSERFAC                               | Philadelphia, PA  | 347     | 0.29                    |
| 67854 MCRDAC   | Washington, DC    | 342     | 3.22                    |
| 42237 SUB BASE                                       | Kings Bay, GA     | 340     | 10.29                   |
| 68057 NARDAC   | Norfolk, VA       | 338     | 0.59                    |
| <b>TOTAL</b>   |                   | 242,040 | 37.95                   |

*Office of Workers' Compensation Programs: Outcome variables*

A vast stream of paper flows to OWCP (Figures 4 and 5). So that OWCP can comply with various statutory reporting requirements—in particular that it notify federal agencies as to the individual employees for whom expenses have been incurred and for which the agencies will be charged (*Federal Personnel Manual*, Chapter 810, Subchapter 9-2c)—some of this information is transferred to computer and is therefore available for analysis. These data include date of injury (or first reporting of illness), cause and nature of the injury or illness, and medical and compensation expenses—all of which are key outcome variables in the Model. Social security numbers are used to keep track of the individual data records. Of particular value is a code indicating whether the injury or illness resulted in time lost from work. Because these cases *must* be reported to OWCP, and because they are, in practice, virtually synonymous with lost workday cases, this code provides a means for selecting uniformly reported and classified cases across facilities as well as for generating case rates directly comparable to those calculated by independent sources such as the National Council on Compensation Insurance<sup>37</sup> and the Bureau of Labor Statistics.<sup>38</sup>

Figure 9 shows the route data take as they are collected and distributed by OWCP. In brief, paper forms originating from personnel offices throughout the federal government are sent to one of the 12 OWCP district offices. There, selected data elements are entered into computers and transmitted daily to a centralized data processing center, which in turn, sorts and separates case records by federal agency. Upon receipt of these taped data for its employees, the Department of the Navy then matches the OWCP files with individual personnel files from the Naval Civilian Personnel Data System to verify the employing activity for injured workers, thereby enabling chargebacks to the correct activity as per

Figure 9: Flow of Navy-related OWCP data

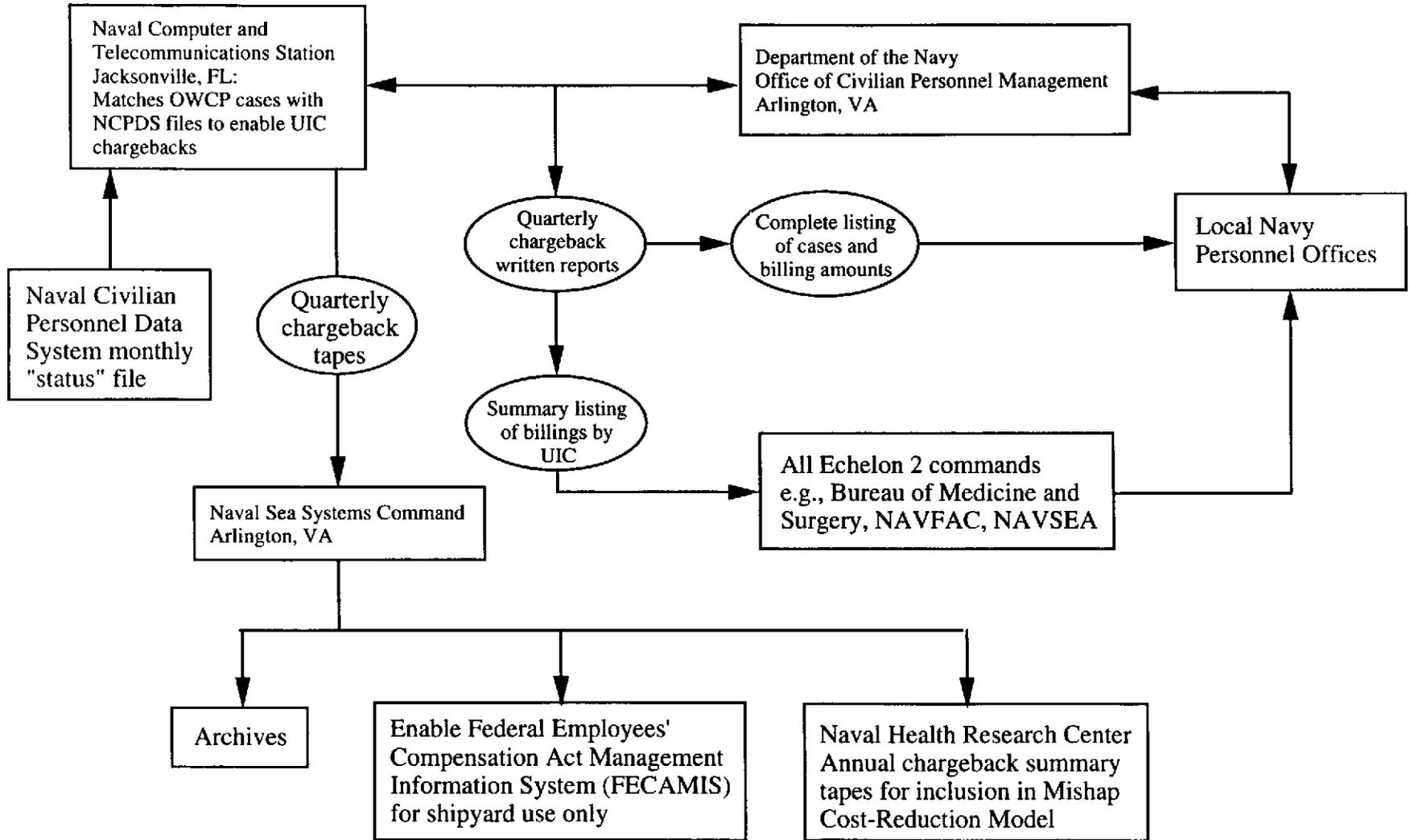


46

contin

Figure 9: continued

47



instruction.<sup>16</sup> Once processed in this manner, various paper reports and taped copies of the data are distributed as shown in Figure 9.

For every claim filed, the taped data available from OWCP includes 74 data fields arrayed as a single record approximately 428 characters in length. Because some of these fields are no longer used or have other idiosyncracies, and because no comprehensive data dictionary is available from OWCP, Naval Health Research Center has prepared a detailed and thorough codebook describing OWCP's taped data.<sup>39</sup> Use of this codebook will allow precise selection of cases according to well-understood criteria.

As mentioned, OWCP creates a data record for every claim it receives. Not all claims received, however, meet the criteria for a compensable occupational injury or illness (*Federal Personnel Manual* 810, Subchapter 3); some are filed for injuries incurred away from work and some for incidents that do not result in injury. Claims not accepted by OWCP are identifiable in the database and will be excluded from use in the Model.

As shown in Figure 8, the Model will be based on data from cases newly occurring between 1 July 1991 and 30 June 1992 (OWCP's 1992 chargeback year). Experience with previous OWCP data sets<sup>1</sup> suggests that only 80 percent of the total number of claims eventually to be reported to OWCP for occurrences during this period, will have been reported in time to appear on OWCP's year-end tape for the 1992 chargeback year. Within another year, however, the identified portion of the cohort will have risen to 98 percent (the remainder will be reported in subsequent years). Accordingly, OWCP's 1993 year-end tape will be reviewed for cases newly occurring between 1 July 1991 and 30 June 1992 but not previously reported, and these cases will be included among those eligible for inclusion in the Model.

Of the approximately 19,500 injuries and illnesses occurring between 1 July 1991 and 30 June 1992 and reported to OWCP through the end of its 1993 chargeback year, roughly 8,500 are expected to meet the added criteria of: (1) adjudicated as accepted by OWCP, (2) involving some amount of lost time, and (3) occurring at one of the 150 facilities listed in Table 2. Data for the Model's outcome variables will be derived from these cases.

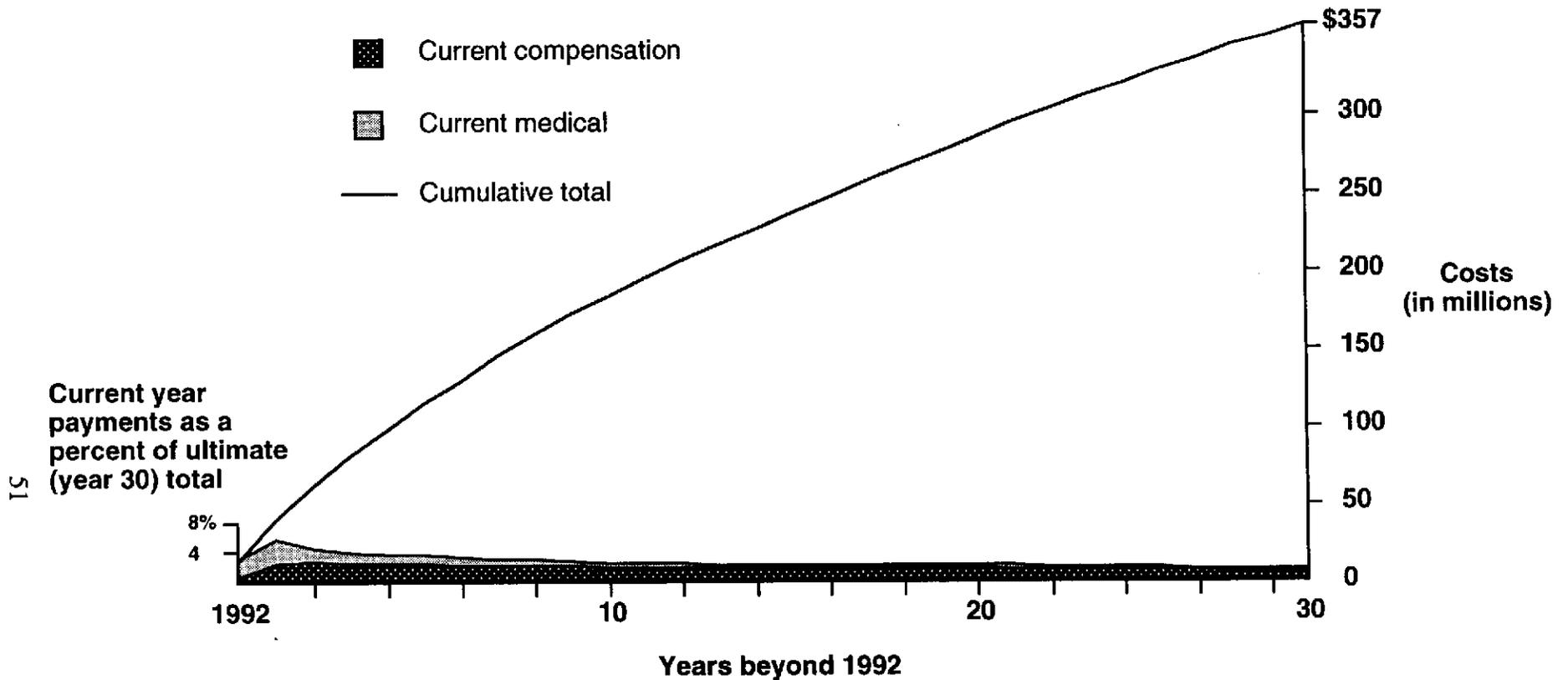
The outcome variables will be of two types, as shown in Figure 6. The first consists of standard epidemiologic measures of injury and illness incidence,<sup>29, 38</sup> e.g., overall lost-time case rate (expressed as events per 100 full-time employees), severity-specific case rates (counting, for instance, only cases involving 45 days or more of disability), or rates of mishaps due to specific etiologies (back injury or hearing loss, for example). After statistical adjustment as dictated by the Model, statistically significant differences in these variables will identify facilities that are performing better or worse than expected with respect to a given predictor variable of concern (e.g., safety inspection score).

The second type of outcome variable consists of cost variables, primarily cost per case and cost per employee. The latter is a particularly useful comparative measure because it is affected not only by mishap severity and case management (more severe and less well-managed cases both drive up costs), but also by incidence; two facilities can have the same mean cost per case but one with a higher mishap rate will also have a higher cost per employee. As with incidence, both cost per case and cost per employee can be examined with respect to specific outcomes of interest (e.g., mean cost per back injury).

Regardless of the measure used, the ultimate cost attributable to the mishaps occurring in any given year takes years to become apparent. This latency occurs partly for the same reason that it takes time for the true incidence to become known: mishaps that are reported

late are also late in generating costs. But primarily it occurs because workers' compensation costs follow what is known in the insurance industry as a "long tail" pattern of development<sup>40</sup>: a single case can generate payments for years and leave its ultimate cost unknown for decades. During the 1992 chargeback year, for instance, OWCP paid over \$1 million for 62 mishaps that originally occurred prior to July 1961. Conversely, of the \$242 million paid out in the 1992 chargeback year, only \$14.5 million (or 6 percent) was for cases newly occurring that year.

While the full cost of these new 1992 cases will not be known for many years, actuarial methods have been developed that enable predictions of future costs based on past payment histories.<sup>40, 41, 42</sup> Figure 10 uses results from actuarial analyses of payments dating back to 1961 and made by OWCP on behalf of the Department of the Navy to show how the initial expenses for the cases newly occurring in 1992 are expected to grow over time, reaching \$357 million in cumulative expenses after 30 years.<sup>30</sup> As shown in Figure 8, the Model will incorporate cost data for these new 1992 cases as they have accrued through the end of the 1993 chargeback year (by which time \$42 million in payments had been made). While this plan represents a necessary compromise between the competing goals of data recency, completeness, and compatibility, it is also apparent that this approach means the Model will be based on less than 15 percent of the total expected costs attributable to these mishaps. Accordingly, methods will be explored whereby actuarial projections can be used to estimate the ultimate costs of the individual mishaps providing data for use in the Model; the suitability of using such projections on individual cases, as well as on within-facility collections of cases, will also be explored. Alternatively, actuarial projections might best be used *after* the Model has been applied; once a particular facility, for instance, has



**Figure 10: Actuarial projections of eventual Department of the Navy costs for occupational mishaps occurring during chargeback year 1992 (1 July 1991 - 30 June 1992)**

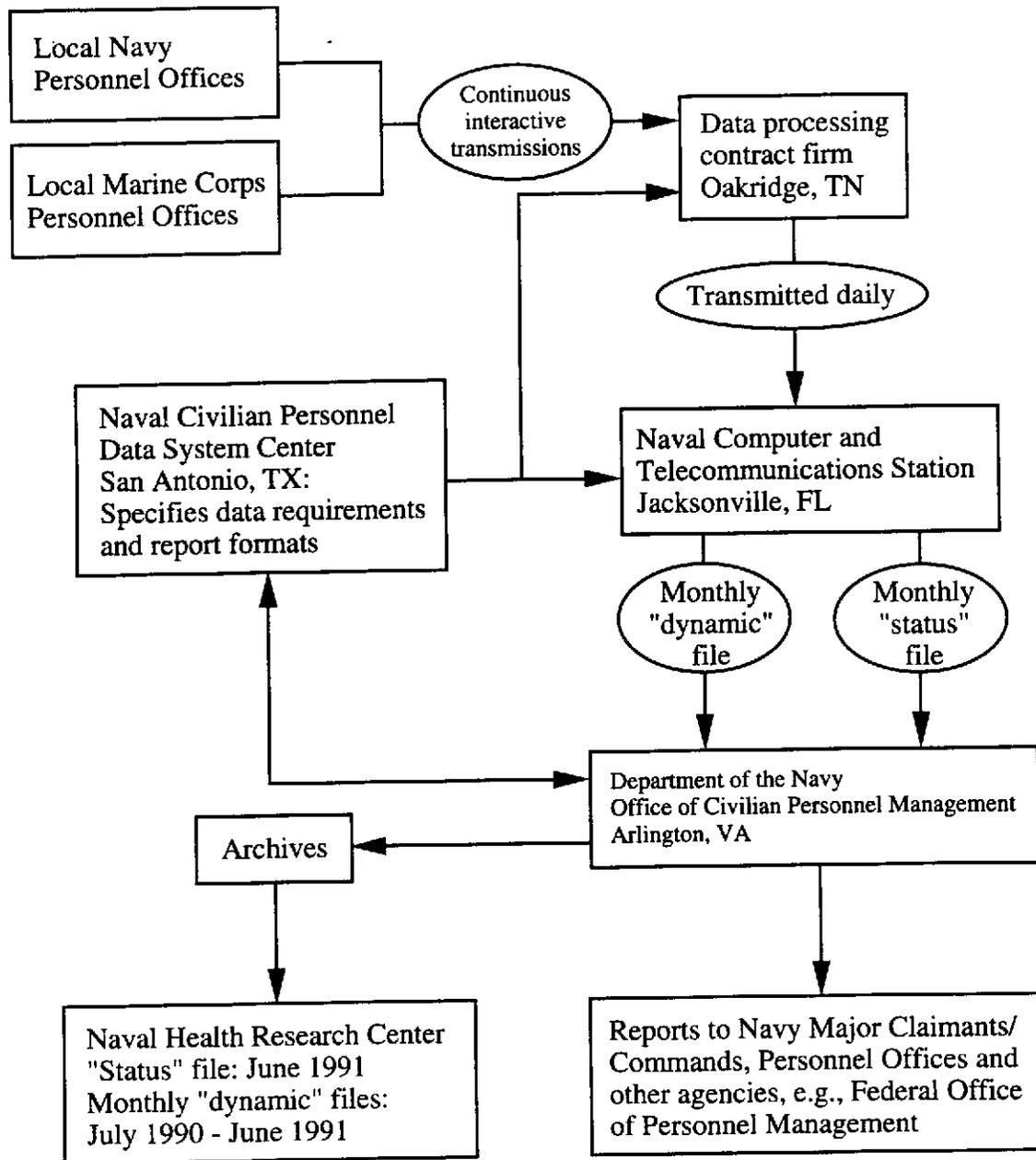
Source: Actuarial model created by Towers Perrin, St. Louis, MO, using data from the Office of Workers' Compensation Programs, Employment Standards Administration, U.S. Department of Labor, as supplied by Naval Health Research Center (reference 30); incorporates first-year medical payments of \$11.3 million, first-year compensation payments of \$3.1 million, second-year medical payments of \$16 million, and second-year compensation payments of \$11.4 million.

been found to have significantly higher than expected costs, the ultimate value of this discrepancy could then be calculated using actuarial techniques.

*Naval Civilian Personnel Data System: Control variables and denominator counts*

The Model calls for a number of control (i.e., "fixed") variables to permit adjustments between facilities with different work force demographics. Data for this purpose are available from the Naval Civilian Personnel Data System, which collects 1,500 characters of coded information on every civilian employed by the Department of the Navy. As with OWCP, not all of this information is captured at a central location, the data take a circuitous route (Figure 11) during which they are sometimes "massaged" and manipulated, and not everything entered is permanently stored. Nonetheless, substantial amounts of data are retained. These are contained on a monthly "status" file depicting the current status of all Department employees with respect to some 200 data fields, and on a "dynamic" file prepared monthly and containing data on all employees for whom some change in status has occurred in the prior month (e.g., a promotion or change of duty station). Both files are arrayed as a single record per individual and all records contain social security numbers, thereby permitting linkage with each other as well as with records from OWCP.

Again as with OWCP, no comprehensive data dictionary is available for the Naval Civilian Personnel Data System. Naval Health Research Center has therefore reviewed the data fields and prepared a thorough codebook describing the subset of variables planned for initial inclusion in the Model.<sup>43</sup> This subset includes approximately 30 data fields containing information such as age, ethnicity, gender, occupation, and educational achievement (details are provided in the Appendix).



**Figure 11: Flow of data through the Naval Civilian Personnel Data System**

Data will be extracted from taped files provided by the Navy Office of Civilian Personnel Management, which controls the Naval Civilian Personnel Data System. These tapes will include the "status" file for 30 June 1991 and the 12 "dynamic" files for the 12-month period ending June 1991. These latter files will provide information such as the percentage of a facility's work force receiving promotions during the prior year; the two sets of files together will permit a comprehensive description of the work force as it existed on 30 June 1991 at each of the 150 facilities in the sample.

*Navy Inspector General Oversight Inspection Unit: Predictor variables*

One of the Model's central purposes is to permit meaningful assessments of various Navy occupational safety and health programs as they are applied across facilities. Among these is the inspection program conducted by the Navy Inspector General Oversight Inspection Unit. These inspections are carried out following a prescribed protocol,<sup>44</sup> and with scheduling priority accorded to those facilities "determined to have the most severe safety and health problems."<sup>5 10906b</sup> Individual items are assessed and scored, collapsed into subcomponents (e.g., Hearing Conservation Program compliance), then collapsed again into two broad assessment categories: "program" and "workplace." The program score rates organizational compliance with requirements such as the existence of specified committees and published policies, whereas the workplace score evaluates more traditional workplace safety criteria.

By 30 June 1991, 85 of the 150 facilities in the sample had been inspected at least once. (Several had been inspected more than once, and in these cases the most recent scores will be used). Another five had been inspected prior to 30 September 1991. Because the oversight inspections are generally scheduled and announced well in advance, and because

organizations tend to prepare for such events ahead of time,<sup>45</sup> it is likely that inspections occurring during these three months remain indicative of conditions as they existed at these facilities as of 30 June 1991; accordingly, these later inspections will be used as well, yielding a total of 90 facilities for which scores are available for incorporation in the Model. These scores have been entered into a database, of which copies have been provided to the Naval Health Research Center. Variables planned for use in the Model are described in the Appendix.

### PLAN OF ANALYSIS AND MODEL BUILDING

After extraction from the described sources, data will be integrated into a single database, with individual-level data linked by social security number and facility-level data linked by Department of the Navy Unit Identification Code number. Analysis will then proceed in stages. Throughout, candidate predictor variables showing no significant association with the dependent variable under analysis will be dropped from further consideration, with the goal of producing the leanest, most parsimonious model possible.<sup>46</sup>

The strategy for determining facility-level "expected mishap rates," as indicated in Figure 6a, will be similar to that used by Robertson and Keeve.<sup>26</sup> The first step will be to ascertain mishap rates by occupational category using combined data from all 150 facilities in the sample. (Among the 240,000 civilian employees at these 150 facilities there are approximately 620 uniquely coded occupations.<sup>43</sup> To achieve statistical stability, occupations represented by only a small number of subjects will be consolidated into broader established groupings, for instance Department of the Navy Occupational Levels.<sup>43</sup>) These rates will then be applied to each individual within an occupational category to determine his or her expected number of mishaps based solely on the general hazard level of that individual's

occupation.<sup>26</sup> The difference between an individual's actual and expected number of mishaps will then be regressed onto the available demographic variables, yielding a fitted equation that will be used to calculate for each individual the number of mishaps that would be predicted after controlling for his or her occupation and given his or her age and other similar factors. The results from these two steps will then be combined to produce, for each individual in the sample, an expected number of mishaps given the person's job, age, gender, etc. Within each facility, these individual-level expected numbers will be summed to generate an expected number of mishaps given the occupations and demography of a facility's entire work force. The difference between this number and the facility's actual mishap rate will be regressed onto the remaining facility-level variables shown in Figure 6a (e.g., weather exposure) to produce a fitted equation that will be used to predict a facility's rate of mishaps over and above that attributable to the occupational and demographic characteristics of its work force. Finally, the quantities from these last two steps will be summed to produce, for each facility in the sample, an expected number of mishaps given its mission, location, work force composition, and other factors that cannot be changed via the Navy's Occupational Safety and Health Program.

At this stage, each facility's actual rate of mishaps will be compared statistically to its expected rate of mishaps (using the normal approximation to the binomial distribution). Facilities having rates significantly higher (or lower) than expected will be identified. Regression of the difference between facilities' actual and expected rates onto the variables in Figure 6b will in turn suggest the degree to which factors that are "modifiable" and under a facility's control (e.g., safety program performance) influence or are responsible for mishap rates above or below that which is expected.

The cost analyses depicted in Figures 6c and 6d will be handled in a similar fashion. Using individual-level data from all subjects in the sample, case costs will be regressed onto those mishap characteristics which best define its likely costs (e.g., the severity of the mishap),<sup>1</sup> plus those variables hypothesized as influencing costs but outside a facility's control (e.g., regional variation in the price of medical services). The resulting fitted equation will permit calculation of predicted (or "expected") individual case costs. The difference between actual costs and these expected costs will then be used as the dependent variable in a second regression designed to determine the influence on excess costs of those variables amenable to change (Figure 6d). For each facility, a mean difference between individual actual and expected costs will be calculated; means significantly higher than zero will indicate facilities whose costs per case are excessively high for reasons attributable to case management practices at the facility itself.

### APPLICATIONS

As proposed, the Mishap Cost-Reduction and Quality Assessment Model offers myriad applications. Fundamentally, it offers the opportunity to identify sources of the Department of the Navy's rising costs for occupational injuries and illnesses and to thereby permit the concentration of resources in those areas offering the best opportunities for the reduction or control of these costs. Broadly speaking, these potential opportunity areas have been conceptualized a priori as involving some aspect either of the rate of occupational mishaps or of their individual costs.

Rates will be analyzable at a variety of levels and for different purposes. The Model will facilitate evaluation of the overall effectiveness of the Navy Occupational Safety and Health Program by making it possible to determine whether more vigorous program

implementation is associated with lower mishap rates Navywide. Model-guided analysis of rates associated with specific etiologies (e.g., back strain) will also make it possible to assess individual program components (e.g., the Ergonomics Program) and identify those that may be less effective than desired as currently implemented.

More narrowly, the Model will enable assessment of individual facilities. It will permit, for instance, the identification of facilities whose mishap rates are excessively high because of shortcomings in their safety programs. In addition, the Model will encourage and facilitate the exploration of "What if?" scenarios. For instance, what if facility A had a work force with the demographic composition of facility B? What would its mishap rate look like? Or, what if a facility increased the amount of safety training provided to its workers? Would its mishap rate decrease?

Similar questions will be amenable to analysis with respect to cost. For instance, what if the policy were changed so that Injury Compensation Program Administrators were required at facilities with annual compensation costs in excess of \$500,000 rather than the current \$1 million?<sup>16</sup> Would the savings justify the expense?

Finally, the database underlying the Model has applications beyond those directly related to derivation of the Model. For instance, it could be used to generate Navywide mishap rates by occupation, which offers the potential for identifying high-risk occupations and perhaps the subsequent development of occupation-specific safety programs. Similarly, the database offers the potential for the development of algorithms enabling Injury Compensation Program Administrators and others to identify at the earliest possible moment those mishaps with the potential for generating the greatest costs (e.g., lost-time traumatic

injuries of the back among workers over age 45), thereby increasing the prospects of effective early intervention.

## CONCLUSIONS AND RECOMMENDATIONS

We conclude that development of the Mishap Cost-Reduction and Quality Assessment Model is feasible using the available data. We conclude further that the Model has great potential for helping both to improve the Navy's Occupational Safety and Health Program, and to reduce and control its costs for occupational injuries and illnesses. Our principal recommendation, therefore, is that development of the Model proceed as proposed. Implementing this recommendation will establish the Navy as a leader among federal agencies working to address a problem identified recently in a report to the President by the Secretary of Labor, namely that within federal occupational safety and health programs there is "little basic research into causal factors of mishaps or hazard recognition, evaluation and control methods."<sup>47</sup>

The following secondary recommendations are based on our initial work with a wide variety of information sources with a potential bearing on the development of a maximally informative Model for understanding contributors to the occurrence and cost of occupational mishaps within the Navy:

- Estimating the total future costs attributable to a current occupational mishap is the only way to develop an accurate perception of the true cost of newly occurring injuries and illnesses—and the value of their prevention—and the Department of the Navy's (and OWCP's) capability to estimate these costs needs to be strengthened considerably. This capability should be developed in concert with professional actuaries experienced in the field of workers' compensation.<sup>30</sup> Ultimately, the ability should be developed to project costs at

both the facility level and at the individual case level (using such attributes as the anatomical location and severity of injury).

- The current Navy policy of charging workers' compensation costs back to individual facilities for the purpose of increasing local commanders' awareness of the costs of unsafe working conditions is philosophically sound.<sup>16</sup> Because, however, 95 percent of the costs charged back in any given year are attributable to mishaps that occurred in prior years, the effect of a facility's current safety efforts on its current bill is almost negligible.

Accordingly, we recommend that accounting procedures be explored whereby facilities, rather than being charged for expenses deriving from liabilities incurred years ago, could instead be charged each year for the full projected costs of the mishaps occurring in that year. Such an approach would be consistent with the requirement that private insurers set aside each year sufficient reserves to meet the full liability created by that year's new cases.<sup>40</sup>

- The database from which the Model is to be derived should be maintained and enhanced as new data become available. This applies not only to data from those sources discussed in this document and currently planned for inclusion in the database, but to potential new data sources as well. Candidates for such future incorporation include, but are not limited to:

- Standardized industrial hygiene and exposure data from the Consolidated Industrial Hygiene Laboratories<sup>48</sup>
- Naval Facilities Engineering Command's listing of projects receiving centrally managed hazard abatement funds<sup>5 11206</sup>
- Navy Occupational Safety and Health Program annual per-facility cost data reported to the Chief of Naval Operations (N-45)<sup>5 11303</sup>

- Facility-level annual safety training data, as reported to the Naval Civilian Personnel Data System Center
- Occupational health service provider performance indicator data from the Bureau of Medicine and Surgery<sup>49</sup>

- A critical variable used by the Bureau of Labor Statistics<sup>38</sup> and others in injury epidemiology<sup>20</sup> for measuring mishap severity is workdays lost due to individual injuries or illnesses. OWCP, however, does not record this information, nor is it available from other Navy sources. The U.S. Air Force has developed a procedure for routinely merging data from OWCP and local Air Force personnel offices with its centralized headquarters civilian personnel file to provide readily this and other useful cost-control information (e.g., continuation of pay and light duty start- and stop-date data). We recommend that the Department of the Navy consider instituting a similar procedure.

- In addition to the just-mentioned capability of the Air Force, other federal agencies have developed systems for rapidly reviewing, analyzing, and managing their occupational mishap rates and costs. Preeminent among these is the U.S. Postal Service, which over many years has developed and refined a computerized National Accident Reporting System and a computerized Workers' Compensation Information System. The first of these systems produces timely, comprehensive reports on newly occurring injury statistics, allowing quick identification of potentially hazardous situations. The second alerts local Postal Service compensation specialists to the appearance of a new claim *within 10 days* of its filing with OWCP. Given that their Navy counterparts may not receive this same information for months (Figure 9, page 46) and that the savings to be gained from reacting quickly to new

case filings are potentially huge,<sup>12, 13</sup> we recommend that the Department of the Navy evaluate these systems and consider their adoption.

- Finally, the Safety and Occupational Health Branch, Chief of Naval Operations, has repeatedly recommended that the OWCP database be thoroughly revamped.<sup>50</sup> We agree completely with this recommendation. The database, upon which billions of dollars in chargebacks are based, is archaic and difficult to use. No codebook is available from OWCP. The starting and stopping point for OWCP's "year" is at odds with the fiscal year used by rest of the federal government, necessitating constant manipulations of the data if comparisons to other available information are to be made. The financial accounting uses for which the database is designed are short- rather than long-term. And the medical and epidemiological coding schemes used in the database are unconventional, rudimentary, and inconsistent. Improving the quality of this information should substantially strengthen efforts by the Department of the Navy (and other federal agencies) to control the costs of occupational mishaps and to improve worker health and safety.

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## **APPENDIX**

### **VARIABLES PLANNED FOR CONSIDERATION IN THE MISHAP COST-REDUCTION MODEL**

**Variables Planned for Consideration in the Mishap Cost-Reduction Model**  
(variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>  | <i>Domain</i> | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|---------------|---|----------------------------------|---------------|---|
| 1. accountability:<br>civilian managers  | management    | OSH Performance Procedures<br>percentage score from NOIU<br>inspection                        | y                                | NOIU          | this score (from Section 4 in the<br>Evaluation Guide) is comprised of<br>two "yes" or "no" items; better<br>measures may be available  |
| 2. accountability:<br>commanding<br>officer's remaining<br>length of stay at<br>time of NOIU<br>inspection | management    | months remaining in UIC<br>commanding officer's tour of<br>duty at time of NOIU<br>inspection | y                                | †             | COs have often moved to new<br>duty stations before the possible<br>effects of poor scores become<br>apparent   |
| 70 3. accountability:<br>military performance<br>evaluations   | management    | †   | y                                | †             | OPNAVINST 5100.23C states that<br>military performance evaluations<br>should recognize OSH activities;<br>where is this information<br>recorded? Whose evaluations<br>should be considered? |
| 4. rank of<br>commanding officer   | management    | numerical rank as of 30 June<br>1991  | y                                | †             |   |
| 5. rank/grade of<br>safety director  | management    | numerical rank/grade as of 30<br>June 1991  | y                                | †             |   |

† Specific measure or data source remains to be identified.

Acronyms:      DIN:      Data Identification Number                      NOIU:      Navy Inspector General Oversight Inspection Unit  
                   NAVFAC:      Naval Facilities Engineering Command                      OSH:      Occupational Safety and Health  
                   NAVOSH:      Navy Occupational Safety and Health                      OWCP:      Office of Workers' Compensation Programs  
                   NCPDS:      Naval Civilian Personnel Data System                      UIC:      Unit Identification Code; here, often synonymous with facility

**Variables Planned for Consideration in the Mishap Cost-Reduction Model**  
(variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>                                  | <i>Domain</i> | <i>Proposed Measure</i>  | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>   |
|--|---------------|--|----------------------------------|---------------|--|
| 6. ratio of rank to age of commanding officer    | management    | ratio of numerical rank to age in years as of 30 June 1991                   | y                                | †             | assumes better officers are sooner to rise in rank and that better overall management is associated with reduced injury risk       |
| 7. ratio of rank/grade to age of safety director | management    | ratio of numerical rank to age in years, as of 30 June 1991                  | y                                | †             | assumes better managers are sooner to rise in rank/grade and that better overall management is associated with reduced injury risk |
| 8. span of supervision                           | management    | ratio of workers to supervisors  | y                                | NCPDS         | may be prescribed in our sample and hence lack statistical variability   |
| 9. supervisory performance ratings               | management    | mean performance rating (ordinal variable coded 1 to 5) for supervisors only | n                                | NCPDS         | higher ratings should reflect better morale and therefore may be associated with lower injury rates                                |
| 10. service branch                               | management    | dichotomous measure: Navy vs. Marine Corps Command                           | n                                | UIC listing   |  |

† Specific measure or data source remains to be identified.

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(variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>              | <i>Domain</i> | <i>Proposed Measure</i>  | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>   |
|------------------------------|---------------|--|----------------------------------|---------------|--|
| morale: awards               | management    | percent of UIC's work force receiving a performance-based cash award or bonus during preceding year      | n                                | NCPDS         | see the NCPDS HM DIN series for range of award codes; HM1 or HM5A may contain an indication of <i>safety awards</i> given, which <i>might be of value as a variable in its own right</i> |
| morale: disciplinary actions | management    | percent of UIC's work force subject to disciplinary action during preceding year                         | n                                | NCPDS         | see the NCPDS Q5 DIN series for range of codes   |
| morale: promotions           | management    | percent of UIC's work force receiving promotions during preceding year                                   | n                                | NCPDS         | conceivably, there would be higher morale in a UIC with more employees receiving promotions; higher morale should be associated with lower injury and illness rates                      |
| morale: performance ratings  | management    | ordinal variable coded 1 to 5; UIC work force's mean, median, mode, or some recoded percentage breakdown | n                                | NCPDS         | higher ratings should reflect better morale and therefore may be associated with lower injury rates  |

Specific measure or data source remains to be identified.

|   |   |
|---|---|
| <p>acronyms:</p> <p>DIN: Data Identification Number</p> <p>NAVFAC: Naval Facilities Engineering Command</p> <p>NAVOSH: Navy Occupational Safety and Health</p> <p>NCPDS: Naval Civilian Personnel Data System</p> | <p>NOIU: Navy Inspector General Oversight Inspection Unit</p> <p>OSH: Occupational Safety and Health</p> <p>OWCP: Office of Workers' Compensation Programs</p> <p>UIC: Unit Identification Code; here, often synonymous with facility</p> |
|---|---|

**Variables Planned for Consideration in the Mishap Cost-Reduction Model**  
(variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>                          | <i>Domain</i> | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|---------------|---|----------------------------------|---------------|---|
| 15. morale: turnover rate                | management    | ratio of total employees on payroll during year to average number of employment positions | †                                | NCPDS         | may require annual compilation of monthly data; may not be meaningful given hiring freeze and trend towards hiring "contractors"; Office of Personnel Management has a formal calculation for measuring turnover              |
| 16. baseline health: physical handicaps  | work force    | percent of UIC's work force with a physical handicap                                      | n                                | NCPDS         | all handicaps are self-reported   |
| 17. demographics: educational attainment | work force    | highest academic attainment levels  | n                                | NCPDS         | NCPDS uses a categorical, quasi-ordinal coding scheme for this data; "17," for instance, refers to the attainment of a master's degree, not 17 years of education, and a mean constructed from these data could be misleading |
| 18. demographics: race/ethnicity         | work force    | composition of UIC's work force using categories from NCPDS coding                        | n                                | NCPDS         | example coding is E: white non-Hispanic; can be recoded as desired  |
| 19. demographics: gender                 | work force    | gender distribution of UIC's work force   | n                                | NCPDS         |   |

† Specific measure or data source remains to be identified.

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**Variables Planned for Consideration in the Mishap Cost-Reduction Model**  
 (variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>  | <i>Domain</i> | <i>Proposed Measure</i>  | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>   |
|--|---------------|--|----------------------------------|---------------|--|
| 20. demographics:<br>mean age                                | work force    | mean age of UIC's work force,<br>in years                          | n                                | NCPDS         | computed by subtracting<br>birthdates from 30 June 1991  |
| 21. job security   | work force    | dichotomous yes or no:<br>reduction in force announced<br>for UIC? | n                                | †             | measure should identify UIC's<br>included in base-closing acts<br>passed prior to 1 July 1991  |
| 22. implied<br>exposure: specific<br>employee<br>occupations | workplace     | percent of UIC's work force<br>engaged in specific<br>occupations  | n                                | NCPDS         | possible way of rating the inherent<br>danger of a workplace; a variety<br>of NCPDS variables are available<br>for this information, e.g.,<br>occupational series codes, DONOL<br>Codes for occupational families,<br>PATCOB codes (occupations<br>classified by professional,<br>administrative, technical, etc.),<br>and wage grade vs. general<br>schedule (i.e., blue- vs. white-<br>collar) pay plan status |

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† Specific measure or data source remains to be identified.

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## Variables Planned for Consideration in the Mishap Cost-Reduction Model

(variants of most measures could be formulated for use at either the individual- or facility-level)

| Variable  | Domain    | Proposed Measure   | Modifiable<br>by NAVOSH? | Source | Notes  |
|---|-----------|--|--------------------------|--------|--|
| 23. implied exposure: Navy job category ratings | workplace | percent of UIC's work force in job hazard categories A, B, & C | n                        | †      | alternative way to rate the inherent danger of a workplace; note that the A, B, & C ratings in OPNAVINST 5100.23C ¶0303c, Appendix 3-A do not categorize facilities per se, but refer rather to numbers of workers in various job hazard categories; this variable is most likely related to injuries and not illnesses. |
| 24. implied exposure: annual wages              | workplace | UIC work force's mean annual wage                              | n                        | NCPDS  | alternative way to rate the inherent danger of a workplace; provides a potential continuous variable; <b><i>this measure also is related to indemnity costs, since a higher paid work force will receive higher compensation for the same injuries</i></b>   |
| 25. implied exposure: facility hazard value     | workplace | NOIU facility hazard value                                     | n                        | NOIU   | alternative way to rate the inherent danger of a workplace; NOIU inspectors rank facilities on their perceived inherent hazardousness; scores range from 0.5 (low hazard) to 4.5 (high hazard)   |

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† Specific measure or data source remains to be identified.

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|  |  |
|--|--|
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 (variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>          | <i>Domain</i> | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i>               | <i>Notes</i>   |
|--------------------------|---------------|---|----------------------------------|-----------------------------|--|
| 26. facility size        | workplace     | total number of employees at facility   | n                                | NCPDS                       | prior research has shown an inverse relationship between facility size and injury incidence  |
| 27. facility age         | workplace     | years elapsed from facility's commissioning                                   | n                                | †                           | NAVFAC may be possible source; this measure should assess how up-to-date or well-maintained the facilities and equipment are to which employees are exposed; alternatives include date of last major renovation or new building or mean age of all buildings |
| 28. capital expenditures | workplace     | total expenditures for capital improvements per employee over last five years | y                                | †                           | another possible measure of how up-to-date or well-maintained the facilities and equipment are to which employees are exposed; NAVFAC may be possible source   |
| 29. weather exposure     | workplace     | <i>Places Rated Almanac</i> weather index                                     | n                                | <i>Places Rated Almanac</i> | this composite variable combines humidity, and daily, seasonal, and monthly temperature variability; scores for UICs in Model range from 362 to 910  |

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† Specific measure or data source remains to be identified.

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| <i>Variable</i>  | <i>Domain</i> | <i>Proposed Measure</i>            | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>   |
|--|---------------|------------------------------------|----------------------------------|---------------|--|
| 30. explicit exposure: employee overtime or mean length of work week | workplace     | hours worked per employee per week | y                                | †             | two concepts need to be addressed, one is quantity of exposure, the other is "work intensity"; because intensity is not really measured by overtime, alternatives need to be explored (for instance, payments for supplies, standardized by number of employees) |
| 31. NOIU scores: overall NAVOSH rating                               | OSH program   | overall composite percentage score | y                                | NOIU          | could be used in conjunction with specific NOIU subcomponents  |
| 32. NOIU scores: program findings                                    | OSH program   | percentage score                   | y                                | NOIU          | could be used in conjunction with other NOIU component scores  |
| 33. NOIU scores: workplace findings                                  | OSH program   | percentage score                   | y                                | NOIU          | could be used in conjunction with other NOIU component scores  |
| 34. resources: hazard abatement expenditures                         | OSH program   | dollars per employee per year      | y                                | †             | NAVFAC and CNO-Logistics N-45 may be possible sources; note that local expenditures are reported to CNO via OPNAVINST 5100.23C Appendix 13-A, whereas centrally managed costs are reported via NAVFAC  |

† Specific measure or data source remains to be identified.

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| <i>Variable</i>                                    | <i>Domain</i> | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|---------------|---|----------------------------------|---------------|---|
| 35. resources:<br>industrial hygiene<br>staff size | OSH program   | ratio of total industrial hygiene<br>staff per employee                                   | y                                | †             | CNO-Logistics N-45 may be possible source; may be so prescribed (as per OPNAVINST 5100.23C ¶0303c) as to be invariate; consider as an alternative the safety and occupational health professional personnel line item expenditures from the OPNAVINST 5100.23C Appendix 13-A form reported annually to CNO-Logistics N-45 |
| 78 36. resources: OSH<br>staff size                | OSH program   | ratio per employee of total<br>OSH staff (doctors, safety<br>personnel, inspectors, etc.) | y                                | †             | CNO-Logistics N-45 may be possible source; may be so prescribed (as per OPNAVINST 5100.23C ¶0303c) as to be invariate; consider as an alternative the safety and occupational health professional personnel line item expenditures from the OPNAVINST 5100.23C Appendix 13-A form reported annually to CNO-Logistics N-45 |

† Specific measure or data source remains to be identified.

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| <i>Variable</i>                                    | <i>Domain</i> | <i>Proposed Measure</i> | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|---------------|-------------------------|----------------------------------|---------------|---|
| 37. NOIU scores:<br>safety-management<br>composite | OSH program   | percentage score        | y                                | NOIU          | weighted composite to be derived from the following 11 individual item scores: OSH Office Organization, OSH Performance Eval, OSH Inspection Prog, NAVOSH Deficiency Abatement, OSH Training, Employee Reports, Mishap Investigation, OSH Policy, Project Review Program, Navy Awards, Hazardous Material Control |
| 38. NOIU scores:<br>illness-reduction<br>composite | OSH program   | percentage score        | y                                | NOIU          | weighted composite to be derived from the following 5 individual item scores: industrial hygiene, medical surveillance, asbestos, hearing, respiratory protection; should only to be used in modeling illness-related outcomes  |
| 39. NOIU scores:<br>injury-reduction<br>composite  | OSH program   | percentage score        | y                                | NOIU          | weighted composite to be derived from the following 4 individual item scores: back injury prevention, gas-free engineering, sight conservation, respiratory protection; should only be used in modeling injury-related outcomes   |

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 (variants of most measures could be formulated for use at either the individual- or facility-level)

| <i>Variable</i>  | <i>Domain</i> | <i>Proposed Measure</i>  | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>   |
|--|---------------|--|----------------------------------|---------------|--|
| 40. NOIU scores:<br>respiratory<br>composite           | OSH program   | percentage score   | y                                | NOIU          | weighted composite to be derived from combination of gas-free engineering and respiratory protection program scores; should only to be used in modeling of outcomes related to diseases acquired through respiratory exposures |
| 41. NOIU scores:<br>back-injury-<br>reduction score    | OSH program   | percentage score of Back Injury Prevention and Control Program | y                                | NOIU          | should only to be used in modeling of back-injury-related outcomes   |
| 42. NOIU scores:<br>Hearing<br>Conservation<br>Program | OSH program   | percentage score of Hearing Conservation Program               | y                                | NOIU          | should only to be used in modeling of hearing-related outcomes   |

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|---|-------------------------------|--|----------------------------------|---------------|---|
| 43. claims processing time                  | case management:<br>indemnity | elapsed time in days from date of injury to OWCP adjudication date   | †                                | OWCP          | there are two major components to claims processing time: length of time from injury to claim receipt at OWCP office (which measures UIC handling time), and length of time from claim receipt to claim adjudication (which measures OWCP handling time); it may be useful to code and analyze each of these separately |
| 44. FECA Program score from NOIU inspection | case management:<br>indemnity | percentage score   | y                                | NOIU          |   |
| 45. government first care provider          | case management:<br>indemnity | percent of ill or injured workers who obtain their initial medical care from a government (as opposed to private) provider |                                  | †             |   |
| 46. HMO participation                       | case management:<br>indemnity | percent of employees in capitated payment HMO  | n                                | NCPDS         | this variable can also be included in medical costs domain  |

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|---|----------------------------|---|----------------------------------|---------------|---|
| 47. Injury Compensation Program Administrator: job grade          | case management: indemnity | grade (and step) of ICPA, if existent, as of 30 June 1991   | y                                | †             | OPNAVINST 12810.1 indicates ICPAs should be professionals appointed "at a level commensurate with cost/risk liability of the program"; facilities attaching greater importance to Federal Employees' Compensation Act (FECA) cost control will presumably recruit higher caliber personnel for this position; alternative is ratio of ICPA grade to mean GS grade in geographic region. |
| 48. intensity of UIC's cost containment/claims management efforts | case management: indemnity |   | y                                | †             | no candidate measure as yet; the frequency with which UICs access the FECA Management Information System (FECAMIS) would be an ideal candidate; however, FECAMIS is only available in shipyards   |
| 49. local pay differential  | case management: indemnity | dichotomous yes or no: is UIC affected by civil service 8% pay differential for employees in SF, NY, or LA? | n                                | NCPDS         | geographic salary adjustment based on the location of the UIC; applies to a UIC's entire white-collar work force; note that blue-collar pay rates can vary throughout the country   |

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| <i>Variable</i>                                      | <i>Domain</i>                 | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|-------------------------------|---|----------------------------------|---------------|---|
| 50. OWCP District Office                             | case management:<br>indemnity | dummy variable for OWCP District Office code handling UIC claims  | n                                | OWCP          | see Figure 3 in text for map of areas covered by each district  |
| 51. OWCP long-term case management program           | case management:<br>indemnity | dichotomous yes or no: is UIC's OWCP District Office engaged in OWCP long-term case management program? | n                                | OWCP          | this program began in 1992 in four OWCP offices; may be premature to detect an effect   |
| 52. rate of "light duty" duty assignment             | case management:<br>indemnity | percent of employees filing a CA1 or CA2 who are given "light duty" assignments                         | y                                | †             | NCPDS may be best source of these data; note that the Air Force enters and maintains this information in its computerized headquarters "CW" personnel records |
| 53. rate of claims controversy                       | case management:<br>indemnity | percent of claims controverted, by UIC  | y                                | OWCP          |   |
| 54. rate of injured (or ill) workers' return to work | case management:<br>indemnity | percent of UIC's workers filing a CA1 or CA2 who return to work   | y                                | OWCP          |   |

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| <i>Variable</i>  | <i>Domain</i>              | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i> | <i>Notes</i>  |
|--|----------------------------|---|----------------------------------|---------------|---|
| 55. vocational rehab: success rate   | case management: indemnity | percent of all eligible cases for which vocational rehabilitation is initiated and successfully results in job placement                      | y                                | OWCP          | this code needs to be read from subject's last (most recent) record in the file; note that as per <i>Federal Personnel Manual</i> Chapter 810 ¶8-5, vocational rehab is only provided to "permanently disabled employees" |
| 56. vocational rehab: mean days elapsed before initiation of rehabilitation efforts  | case management: indemnity | for all workers receiving rehabilitation, mean days elapsed from date of injury (or reported illness) to initiation of rehabilitation efforts | y                                | OWCP          | see notes from variable 55  |
| 57. vocational rehab: mean days elapsed before rehabilitated workers' return to work | case management: indemnity | for all rehabilitated workers who return to work, mean days elapsed from date of injury (or reported illness) to return to work               | y                                | OWCP          | see notes from variable 55  |
| 58. HMO participation  | case management: medical   | percent of employees in capitated payment HMO   | n                                | NCPDS         | this variable can also be included in indemnity costs domain  |

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| <i>Variable</i>                            | <i>Domain</i>            | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i>               | <i>Notes</i>   |
|--|--------------------------|---|----------------------------------|-----------------------------|--|
| 59. regional medical cost differential     | case management: medical | <i>Places Rated Almanac</i> medical care cost index   | n                                | <i>Places Rated Almanac</i> | this index measures percent variation from national norm in health-care prices by metropolitan statistical area; note that a similar measure prepared by the American Chamber of Commerce Researchers Association and included in the <i>Statistical Abstract of the United States</i> is highly correlated with the <i>Places Rated</i> index (r = .815; p < .001)    |
| 60. resources: available medical personnel | case management: medical | ratio per employee of total available medical personnel at UIC (or accessible contiguous UIC) | y                                | †                           | the measure should include all docs, nurses, technicians, etc.; need to include or consider civilian, military, and contract care providers, as well as part-time providers; the issue of multiple UICs served by a single clinic needs to be addressed; physician and nursing staff levels may be so prescribed (as per OPNAVINST 5100.23C ¶0303c) as to be invariate |

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|--|--------------------------------|---|----------------------------------|---------------|--|
| 61. resources:<br>medical facility<br>on-site                            | case<br>management:<br>medical | dichotomous yes or no:<br>presence at UIC (or accessible<br>contiguous UIC) of medical<br>facilities?               | y                                | †             |  |
| 62. resources: nurse<br>on-site  | case<br>management:<br>medical | dichotomous yes or no:<br>presence at UIC (or accessible<br>contiguous UIC) of one or<br>more full-time nurse?      | y                                | †             | need to consider availability of<br>civilian, military, and contract care<br>providers   |
| 63. resources:<br>physician on-site                                      | case<br>management:<br>medical | dichotomous yes or no:<br>presence at UIC (or accessible<br>contiguous UIC) of one or<br>more full-time physicians? | y                                | †             | need to consider availability of<br>civilian, military, and contract care<br>providers   |
| 64. resources: total<br>expenditures for<br>provision of medical<br>care | case<br>management:<br>medical | dollars per employee per year   | y                                | †             | should include salaries for all<br>medical personnel (docs, nurses,<br>technicians, etc.), equipment,<br>outside contractors, etc.; for<br>multiple UICs served by a single<br>clinic, expenses should be<br>allocated on a per-person basis to<br>each UIC served |

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| <i>Variable</i>   | <i>Domain</i> | <i>Proposed Measure</i>   | <i>Modifiable<br/>by NAVOSH?</i> | <i>Source</i>  | <i>Notes</i>  |
|---|---------------|---|----------------------------------|----------------|---|
| 65. incidence: lost-time case rate                            | outcome       | total accepted lost-time cases per 100 employees                  | na                               | OWCP and NCPDS | cases included in calculating rates must meet all case definition criteria (e.g., OWCP adjudication status equals accepted); fatalities to be included  |
| 66. incidence: case-specific or etiologic-specific case rates | outcome       | total accepted cases meeting specified criteria per 100 employees | na                               | OWCP           | these cases can be defined as desired; e.g., injury cases only (excluding illnesses), long-term disability cases (those, say, involving more than 45 lost workdays), or those involving back injuries only (as identified by OWCP's nature of injury codes); generally, these cases should always be subsets of the overall set of lost-time cases used for variable 65 |

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|---|---------------|--|----------------------------------|---------------|---|
| 67. cost: indemnity cost per lost-time case | outcome       | mean indemnity payments for accepted lost-time cases | na                               | OWCP          | this can be calculated variously as the sum of first year payments only, as the sum of all payments made to date, or as the sum of all past payments and all projected future payments; this variable can also be calculated as including or excluding payments for continuation of pay; preferable method is to include continuation of pay and all projected payments |
| 68. cost: medical cost per lost-time case   | outcome       | mean medical payments for accepted lost-time cases   | na                               | OWCP          | should include all medical and medically related costs (e.g., physical rehab); notes from variable 67 also apply  |
| 69. cost: total cost per lost-time case     | outcome       | mean total cost for all accepted lost-time cases     | na                               | OWCP          | calculated as the sum of all medical and indemnity payments divided by number of accepted lost-time cases; notes from variable 67 also apply  |

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|--|---------------|--|----------------------------------|---------------|--|
| 70. cost: cost per employee            | outcome       | per employee payments for accepted lost-time cases                                   | na                               | OWCP          | calculated as total costs for all accepted lost-time cases divided by total number of full-time employees as of 30 June 1991; notes from variable 67 apply   |
| 71. index: combined incidence and cost | outcome       | (total costs times number of lost-time cases) divided by number of employees squared | na                               |               | a proposed index reflecting both rates and severity/case management efforts (better case management and less severe cases both produce lower costs); the relative rankings by UIC produced by this index roughly correspond to cost per employee (variable 70), however its properties are somewhat different; e.g., if population and costs are held constant, this index will move in concert with any change in rates, whereas cost per employee would not change at all under the same circumstances |

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| 13. ABSTRACT (Maximum 200 words)<br><br>Costs to the Department of the Navy for occupational mishaps suffered by its civilian employees reached \$250 million in 1993. Data are available to help identify the reasons for these rising costs. However, they reside in multiple databases maintained by separate organizations.<br>This report proposes a means for using available data to identify factors influencing the Department's workers' compensation costs. Emphasis is placed on the development of methods for identifying those factors which present opportunities for the reduction or control of costs.<br>A design is proposed for a Mishap Cost-Reduction and Quality Assessment Model for the Navy Occupational Safety and Health Program. The proposed Model will be derived from an integrated database built from data obtained from the Office of Workers' Compensation Programs, the Navy Civilian Personnel Data System, and the Navy Inspector General. These sources provide information on the cost and occurrence of occupational mishaps at Department facilities, on worker demographics, and on safety inspections. Analyses will be based on mishaps that occurred at the Department's 150 largest facilities during the period of 1 July 1991 to 30 June 1992. Actuarial projections of the total costs expected to accrue as a result of these mishaps exceed \$357 million. |                                |  |                                    |
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# NAVAL HEALTH RESEARCH CENTER

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***COSTS FOR DEPARTMENT OF THE NAVY CIVILIANS  
DUE TO THE FEDERAL EMPLOYEES' COMPENSATION ACT:  
HOW MUCH DOES A CASE COST?***

*E. J. Doyle*

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*Report No. 93-6*

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NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND  
BETHESDA, MARYLAND



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Due to the Federal Employees' Compensation Act:  
How Much Does a Case Cost?**

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## EXECUTIVE SUMMARY

### *Problem*

The annual bill from the Office of Workers' Compensation Programs (OWCP) to the Department of the Navy for costs resulting from work-related injuries and illnesses among its civilian employees has been rising for over a decade, reaching \$250 million in 1993. This growth in payments has caused concern about future expenditure levels, as well as about the effectiveness of current mishap prevention and cost-control programs. But despite these concerns, fundamental information needed to assess the economic value of these programs has been lacking. For instance, the average cost of a new injury or illness is not known.

### *Objective*

Our purpose was to find a means for projecting the total future costs arising from a cohort of new injuries and illnesses, thereby making it possible to answer the question "What does a case cost?" We also sought to develop a method for classifying groups of cases with substantially different costs and to do so using information available early in a case's history, thereby facilitating the early prediction of cases with high potential costs.

### *Approach*

We obtained OWCP's end-of-year computerized case records for the Department of the Navy for 1990, '91, '92, and '93. From these, cohort files were created, each containing records only of those people newly hurt within a given year. For cohorts whose mishaps occurred prior to 1990, 4-year partial payment histories could be reconstructed; for the 1990 and later cohorts, complete inception-to-date histories were constructed.

Using these data an actuarial consulting firm created a model capable of projecting through 32 years the cumulative costs that will accrue for a new cohort of injury and illnesses cases. From the model we projected cumulative costs for the 1990 cohort and then allocated this total among five categories of mishaps, using as the basis for our allocations the actual costs paid to members of each classification group through 1993. Costs per case were then calculated within each category.

***Results***

Through the end of 1993, \$89 million had been spent on 22,546 cases involving injuries or illnesses newly occurring in 1990. An additional \$302 million in expenses are predicted by the model for years 5-32, yielding a total predicted cost through 32 years of \$391 million for this one cohort. Using this predicted total, the average cost of a case newly occurring in 1990 and accepted for coverage by OWCP will be \$18,632. Among the five mishap classification categories, the average cost for an accepted case ranged from \$2,406 for an injury involving between 1 and 45 days of lost time, to \$166,716 for an injury involving more than 45 days of lost time.

***Conclusions and Recommendations***

Using actuarial methods to estimate per-case costs of newly occurring injuries and illnesses provides estimates that are far higher—and "truer"—than any previously available. While the annual cost per Department of the Navy employee for events newly occurring in 1990 through 1993 appears to be holding steady, the total cost predicted to accrue from events in these 4 years is nearly \$1.5 billion. Refinement of these methods needs to continue and their implications for policy need to be considered.

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## INTRODUCTION

Provisions for the care and compensation of civilian federal employees harmed at the workplace are contained in the Federal Employees' Compensation Act (FECA). First passed in 1916, FECA requires the federal government to pay all medical expenses incurred by its employees who sustain bona fide work-related injuries or illnesses and to replace most of their lost wages. The act is administered by the Office of Workers' Compensation Programs (OWCP), Employment Standards Administration, U.S. Department of Labor.<sup>1</sup>

OWCP makes payments directly to injured or ill individuals and their medical providers, and then "charges back" to the federal agency for whom the individual worked the amount paid by OWCP on the agency's behalf. Between 1986 and 1991, OWCP's annual chargebacks to the Department of the Navy rose from \$171 million to \$227 million.<sup>2</sup> During the same period, the sum of these annual chargebacks for all federal agencies combined increased from \$1.07 billion to \$1.52 billion—an annual increase of 7.8 percent.<sup>3</sup>

In contrast, the amount paid by private U.S. businesses (including those who are self-insured) for workers' compensation insurance premiums increased during this period at an annual rate of 10 percent, reaching \$44.4 billion in 1991.<sup>4,5</sup> This greater rate of growth is difficult to reconcile with a history of cost-control efforts so aggressive in the private sector as to have frequently included the achievement of legislative reform.<sup>6</sup> One explanation, however, may lie in the different way costs are counted in the two systems.

By law, private insurers in all 50 states are required to estimate the cost of workers' compensation cases (which, in turn, dictate the cost of premiums that will be charged) on a *pre-funded*,<sup>7</sup> or *accrual*,<sup>8</sup> basis, the key feature of which is that the full projected cost of a new injury or illness is estimated at the time at which it occurs and that this cost is then treated as a liability attributable to the year in which the injury or illness occurs. Conceptually, the method is similar to the "incidence approach" referred to by some health economists.<sup>9</sup> Its underlying rationale is that sufficient reserves should be set aside when a worker is injured to ensure that all future benefits can be paid without regard to an insurer's future solvency or continuation in business. The principal alternative to this system is the *cash*, or *pay-as-you-go*, method<sup>7,8</sup> (also referred to as the "prevalence approach"<sup>9</sup>), in which the cost for an injury or illness is attributed to the year in which payment is made rather than

to the year in which the event occurred. This is the accounting method used by OWCP and similar governmental agencies, for whom the continued availability of funds is not in doubt.

Under the accrual method a worker who experiences in 1994 a disabling injury expected to result in payments totaling \$500,000 spread over 20 years will generate for his insurer a liability in 1994 of \$500,000 (ignoring discounts for future value). Under the pay-as-you-go method, however, this injury will be treated as having a cost in 1994 equal only to the actual amount paid that year, say \$25,000. While neither accounting system is distinctly superior in all circumstances, the accrual method most clearly relates accidents and exposures with the costs to which they give rise. It is, note Fahs et al., the method of choice for evaluating the impact of injury or illness prevention programs.<sup>9</sup> For example, the "true" cost of the aforementioned hypothetical injury is readily recognized as \$500,000 using accrual accounting methods, and a safety or other prevention program that managed to avert this injury could be valued accordingly. In contrast, use of the pay-as-you-go method obscures the true cost of a given injury or illness (and the attendant value of its prevention) because payments for new and old cases are intermixed without distinction.

Figure 1 shows the effect of this intermixing. The Figure is derived from OWCP's 1990 end-of-year chargeback records for the Department of the Navy (OWCP's accounting year runs from 1 July to 30 June; the 1990 chargeback year therefore encompasses the period 1 July 1989 to 30 June 1990). The Department's chargeback bill for that year was \$219 million; approximately 46,000 records are on the tape, each representing an individual for whom a claim for an occupational injury or illness was filed or for whom a payment was made for a claim filed previously. A rudimentary calculation—\$219 million divided by 46,000 cases—suggests that an average case that year cost \$4,800. However, sorting these cases by the year in which their mishaps originally occurred, as in Figure 1, reveals that while cases originating in 1990 comprised 40 percent of the total number of cases, they generated only 7 percent of the payments; all remaining payments were made for cases originating in preceding years—including over \$1 million paid for 72 cases whose injuries occurred in 1961 or earlier.

Clearly, the pay-as-you-go data shown in Figure 1 could not be used to determine the economic worth of a prevention program established in 1990. Even if such a program had prevented all new injuries and illnesses that year, the Department would still have faced a

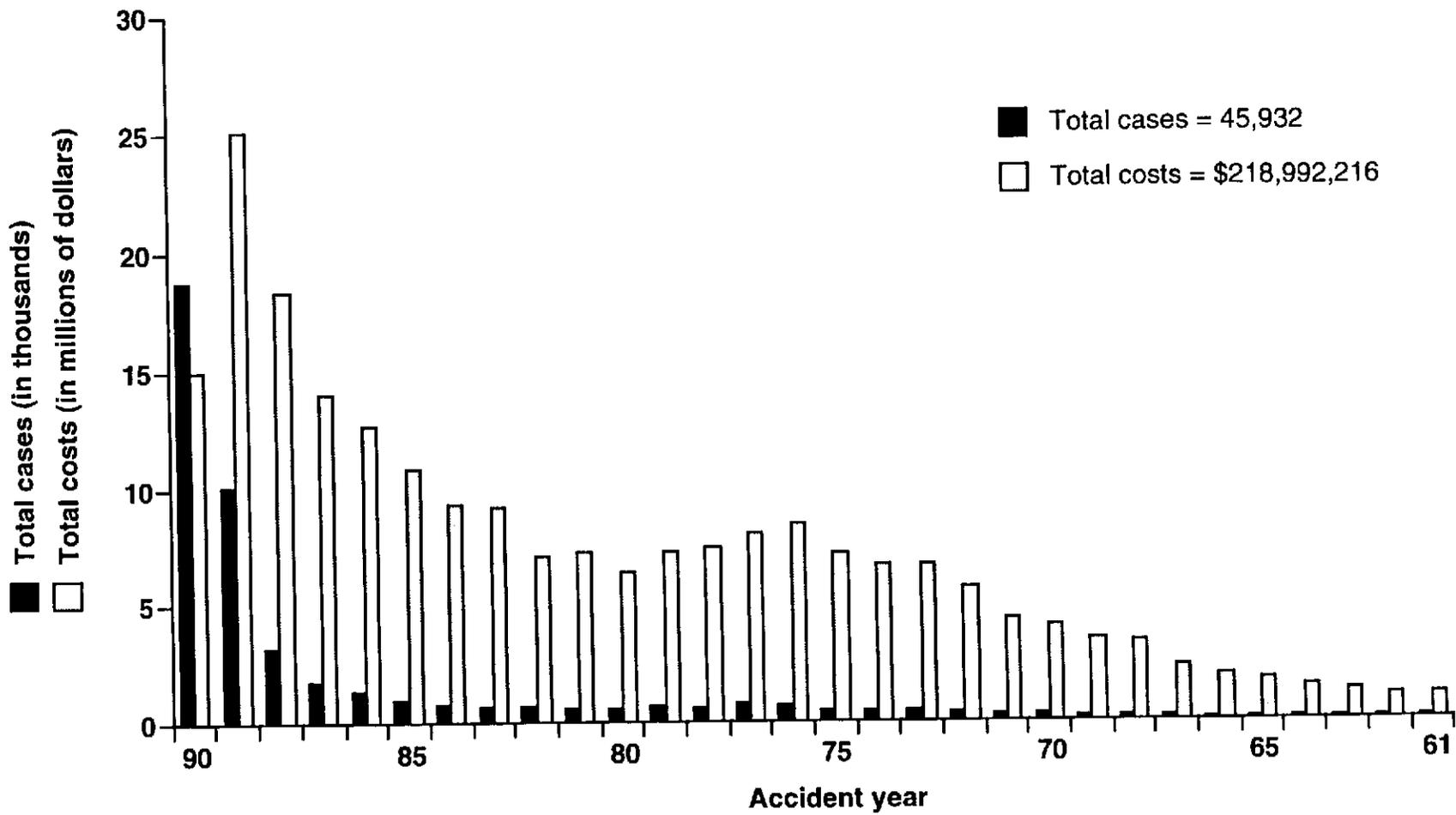


Figure 1: Case counts and costs, by year of original occurrence, for all Department of the Navy cases appearing on the Office of Workers' Compensation Programs' (OWCP) 1990 end-of-year chargeback tape

chargeback bill of \$204 million. Nor can the data answer the question "What did a case cost?" if by that is meant "What did an average new case that year cost and what was the value of its prevention?" Using the Figure and looking at just the cases newly occurring in 1990 suggests a cost per case of \$800 (\$15 million paid divided by 18,700 cases); yet some of these cases will generate payments for years to come (as have the 72 cases from 1961) and the ultimate cost of these cases is unknowable from the data in Figure 1.

Nonetheless, pay-as-you-go accounting data of the sort used in Figure 1 have been routinely used within the Department of the Navy and the federal government to generate cost-per-case estimates and to inform policy. Table 1, for example, shows various estimates of the mean cost of an occupational injury or illness calculated using routinely reported figures from OWCP. The mere size of the differences between these estimates raises questions about their accuracy. In addition, however, the accounting methods used to produce these estimates all share the feature of allocating to newly occurring cases costs that are predominately generated by established, older cases. In other words, the costs being counted are by and large not associated with the cases currently being created.

The same problem appears in a recent annual report on federal agency occupational safety and health programs submitted to the President.<sup>3</sup> The report includes end-of-year chargeback totals for all major federal agencies and, again, makes no distinction between the occurrence of new cases and payments made as the result of established cases. In fact, the report treats the two as closely linked, stating, for instance, that "in 1988 an increase in total cases led to a cost rate increase of 7 percent."<sup>3</sup> p. 5 Yet this is not plausible. Given the data in Figure 1, a 7-percent increase in the total amount paid would have required a doubling of the number of new cases from the preceding year. Similarly, current Navy policy seeks to reduce workers' compensation costs in part by making local commanders responsible for their activities' chargeback bills.<sup>10</sup> However well intentioned, such a policy clearly cannot have its intended effect when the bill received by a commander is almost entirely the result of injuries and illnesses that occurred during his predecessors' commands.

Because, as Secretary of Labor Robert Reich has noted, good policy requires good data,<sup>11</sup> our purpose was to develop and apply a method of calculating the true cost of new injuries and illnesses experienced by Department of the Navy civilian employees using accrual accounting methods. Secondarily, our purpose was to begin to develop a

**Table 1**

*Estimated Average Cost for an Occupational Injury or Illness Experienced by a Federal Civilian Employee Calculated From Pay-As-You-Go Accounting Data*

| Agency                        | Data source   | Dates covered              | Cases  |         | Costs           |          |
|-------------------------------|---|----------------------------|--|---------|-----------------|----------|
|                               |   |                            | Specification of cases counted                 | Number  | Total           | Per case |
| Dept. of the Navy             | OWCP 1990 chargeback tape   | 1 July 1989 - 30 June 1990 | all cases newly created* or incurring payments | 45,932  | \$218,992,216   | \$4,768  |
| Dept. of the Navy             | Navy Office of Civilian Personnel Management report YCFD1Q (based on OWCP's 1993 chargeback tape <sup>12</sup> )      | 1 July 1992 - 30 June 1993 | all cases incurring payments                   | 34,516  | \$250,552,061   | \$7,259  |
| All federal agencies combined | Secretary of Labor's annual report to the President (based on OWCP chargeback data <sup>3</sup> )                     | 1 Oct 1989 - 30 Sept 1990  | all cases newly created*                       | 179,869 | \$1,440,980,764 | \$8,011  |
| U.S. Navy                     | Chief of Naval Operations, Logistics (N-454C), annual report to OSHA (based on OWCP "Table 2" reports <sup>13</sup> ) | 1 Oct 1989 - 30 Sept 1990  | all non-first-aid, newly created cases*        | 19,613  | \$201,000,000   | \$10,248 |

\* OWCP counts among its "newly created cases" all cases filed and created, including those cases that are eventually denied benefits. For the federal government as a whole during the 1990's, the denial rate for injury claims (i.e., those filed on a CA-1 form) has been approximately 4 percent; for illnesses (those filed on a CA-2 form) the denial rate has been about 33 percent.<sup>14</sup>

classification scheme whereby cases with substantially different costs might be grouped and differentiated on the basis of information available at or near the time a case is first reported.

## METHOD

### *Primary Data Source and Cohort Definition*

The primary data sources available for this study were four computer tapes containing OWCP's end-of-year chargeback records for the Department of the Navy for chargeback years 1990, 1991, 1992, and 1993, respectively. (Again, OWCP's accounting year runs from 1 July to 30 June; the 1990 chargeback year, for example, therefore encompasses the period 1 July 1989 to 30 June 1990.) The data for each case on these tapes comprise what OWCP refers to as a "summary record," which includes a variety of recordkeeping, demographic, descriptive, diagnostic, and accounting information contained in 74 separate fields.<sup>15</sup> Records are created on a tape for every case newly reported to OWCP as well as for every pre-existing case that generates an accounting transaction (i.e., a payment). For each case, three accounting totals are available: (1) the sum of all payments made during the year to health care providers, (2) the sum of all payments made by OWCP during the year to the claimant or beneficiary for lost wages (i.e., compensation, or "indemnity" payments), and (3) the grand total of these two sums. Cases are individually identifiable by social security number and by a unique OWCP-assigned case number.

The four chargeback years for which we had tapes were all similar with respect to overall case count (about 45,000 per tape) and case distribution by year of occurrence. Figure 1 shows this distribution (along with the cases' attendant costs) for the 1990 chargeback year. To obtain these distributions we defined a case as belonging to a given accident year (or "injury cohort") if the date of an individual's injury or diagnosis of illness fell within the 1 July to 30 June time frame of a corresponding OWCP accounting year. For example, an individual hurt in June 1961 was assigned to the 1961 injury cohort and an individual hurt in July 1988 was assigned to the 1989 injury cohort, even though both cases might have had accounting transactions, and therefore records, on the 1990 chargeback tape.

### *Formation of the 1990 Injury Cohort*

As previously noted, the 1990 chargeback tape contains records for 72 people first hurt in 1961. This group is all that remains from an inception cohort that might originally

have consisted of 20,000 to 25,000 workers injured in 1961. Data about this original cohort and its intervening history were not available to us, however, nor were such complete data available for any cohort prior to 1990. In 1990, 18,743 cases were reported to OWCP as having injuries or illnesses newly occurring that year. These cases do not constitute the entire 1990 cohort, however, because many cases involving injuries or illnesses newly occurring in a given year do not get reported until much later.

To identify cases injured in 1990 but not reported until later, we searched the 1991, 1992, and 1993 chargeback tapes for cases not previously reported but with injury or illness dates that fell within the time frame defining the 1990 injury cohort. All records for all cases in the 1990 cohort were then retrieved from the four available chargeback tapes and consolidated into a single database; whether a case was immediately opened and then closed, or whether it remained active through the end of the 1993 chargeback year, this database contained the complete history of all persons hurt in 1990, from the date of their injury or illness through 30 June 1993.

#### *Secondary Data Source and Continuation of Pay*

In addition to the taped data from OWCP, we obtained information from the Defense Finance Accounting Service regarding continuation of pay. Under the Federal Employees' Compensation Act, OWCP does not begin compensating an injured worker for lost wages until 45 days after the date of injury (this provision does not apply to illnesses, for which OWCP assumes immediate responsibility for compensation).<sup>16, Subpart C</sup> During the first 45 days following an injury a worker's wages are paid by his or her employing activity as if the employee were uninjured and still working (i.e., payment is made at 100 percent of the employee's salary and is fully taxable; later, if the employee begins to receive compensation from OWCP, payment is two-thirds or three-quarters of the employee's salary—depending on whether the employee has dependents—and is tax-free).

The amount paid to injured workers receiving continuation of pay is reported in aggregate by employing activities each quarter to the Defense Finance Accounting System. To supplement our OWCP data on costs generated by the 1990 injury cohort, we obtained the quarterly reports summarizing the continuation of pay records for all Department of the Navy facilities for the period 1 July 1989 to 30 June 1990. This information included the

total amounts paid as well as the number of employees and number of days for which payments were made.

### *Modeling Future Cost Development*

The use of accrual accounting methods requires projections of the total amount of money of that will be paid on a group of injuries or illnesses from the time they first occur until they are finally resolved. These projections are derived by applying a model, or models, to whatever information is already known about an injury cohort.

The preferred tool in actuarial modeling is called the loss development factor.<sup>7, 17</sup> These are multiples, or ratios, derived from inception-to-date payment histories for accident year cohorts. For instance, experience from the longitudinal observation of several accident-year cohorts might indicate that the payments made in the second year of a cohort's existence tend to be twice the amount paid in its first. From these data a mean loss development factor of 2 would be calculated. In turn, this value could be used to predict that for a new injury cohort incurring \$1 million in payments during its first year of existence, an additional \$2 million would be paid in its second year of existence (yielding a projected cumulative total of \$3 million through the end of the cohort's second year).

Because the calculation of loss development factors requires the organization of payment data by accident year, our first step in creating a model for use in projecting costs was to total the per-case payments on each of the four chargeback tapes by accident year and then to arrange these totals so the year-by-year payment totals for each individual injury cohort could be viewed side-by-side. Payments made in 1990 for the 1990 injury cohort, for example, were aligned next to the payments made for this same cohort in 1991, 1992, and 1993, thereby permitting a ready calculation of the total amount paid for each injury cohort during the 4 years for which data were available. This procedure was performed separately for medical payments, for compensation payments, and for both medical and compensation payments combined.

Projections based on loss development factors are considered highly reliable within the insurance industry; moreover, their application is relatively straightforward. Their calculation, however, requires complete inception-to-date payment histories. Because such histories were available only for the four most recent injury cohorts (1990 to 1993), and

because the longest-running of these histories only extended for 4 years, loss development factors alone were inadequate for our needs.

To ensure the best selection and application of additional techniques, we engaged an actuarial consulting firm with extensive experience in the field of workers' compensation (Towers Perrin, St. Louis, MO.). Using the data described, along with Department of the Navy annual full-time civilian employee population counts dating back to 1961,<sup>18</sup> this firm developed a two-part model for the projection of future costs.<sup>19</sup> Loss development factors were used for years 1 through 3, and "persistence ratios" for years 4 through 32. Persistence ratios are calculated after standardizing each injury cohort's current case counts to reflect the number of employees originally at risk, and express the proportion of cases that tend to persist from one year to the next. A persistence ratio of 0.95 for the 30th post-accident year would suggest, for example, that if the 1963 injury cohort had 100 cases still active in 1993, it would have 95 cases still active in 1994. Persistence ratios take advantage of the relative stability after the first few years of cohort case history patterns under FECA. The resulting projected annual case counts can then be multiplied by historically derived annual per-case expenditure estimates to produce annual projected costs.

A third model segment was also provided to permit the estimation of projected costs beyond 32 years. However, because of its lack of supporting data (the oldest injury cohort for which we had data, the 1961 cohort, had only 32 years of history), we chose not to use this segment. The two-part model was therefore used to predict the total costs generated by the 1990 injury cohort as they are projected to accrue through 32 years.

### *Classification Scheme*

We sought to test and apply a classification scheme using information available early in a case's history and which we believed would identify groups of cases with substantially differing costs. Accordingly, we classified cases as being either an injury or an illness, as involving either no or some time lost from work, and, if a lost-time injury, as involving less or more than 45 days of lost time (generally, a claim for compensation cannot be filed until 45 days have elapsed from the date of injury; the absence of such a claim was therefore used as a proxy for injuries involving less than 45 days of lost time). Details of the construction of this algorithm are shown in Figure 2.

The resulting five "case severity" categories were as follows: (1) injuries with no lost time, (2) injuries with lost time of less than 45 days, (3) injuries with lost time of more than 45 days, (4) illnesses with no lost time, and (5) illnesses with lost time.

***Cost Determination and Breakdowns for the 1990 Injury Cohort***

Three sets of figures were summed to estimate the total cost that will be generated by the 1990 injury cohort through 32 years: (1) the actual costs that have been paid for the cohort by OWCP through 4 years; (2) the projected annual payments for years 5 through 32, from the actuarial model; and (3) the actual continuation of pay totals for the 1990 chargeback year, from the Defense Finance Accounting System.

Once an estimate of total projected cost for the entire cohort had been produced, costs were allocated within the five case severity categories in the following manner. All cases in the cohort were classified as per Figure 2. Actual costs paid through 4 years for cases within each severity grouping were then summed. Projected costs for years 5 through 32 were allocated to each of the five severity categories after determining for each category the number of cases still open at the end of 4 years (it was assumed that all costs projected to accrue from years 5 through 32 would be due to these cases). Within this subgroup of cases still open after 4 years, a calculation was made of the proportion of actual costs paid through 4 years for which each severity category was responsible. Projected costs for years 5 through 32 were then allocated to each severity category according to this proportion. This procedure was applied separately for both medical and compensation costs.

Continuation of pay costs were allocated only between the two lost-time injury categories. All injured individuals classified as having lost more than 45 days from work were assumed to have received the maximum possible continuation of pay (based on the average amount paid per day, multiplied by the average number of paid workdays in a 45-day calendar period, which is 33). The balance was then allocated to those injuries involving less than 45 days of lost time.

Once the estimated total cost for the cohort had been allocated among the five severity categories, cost-per-case estimates were calculated using as denominators the case counts within each category.

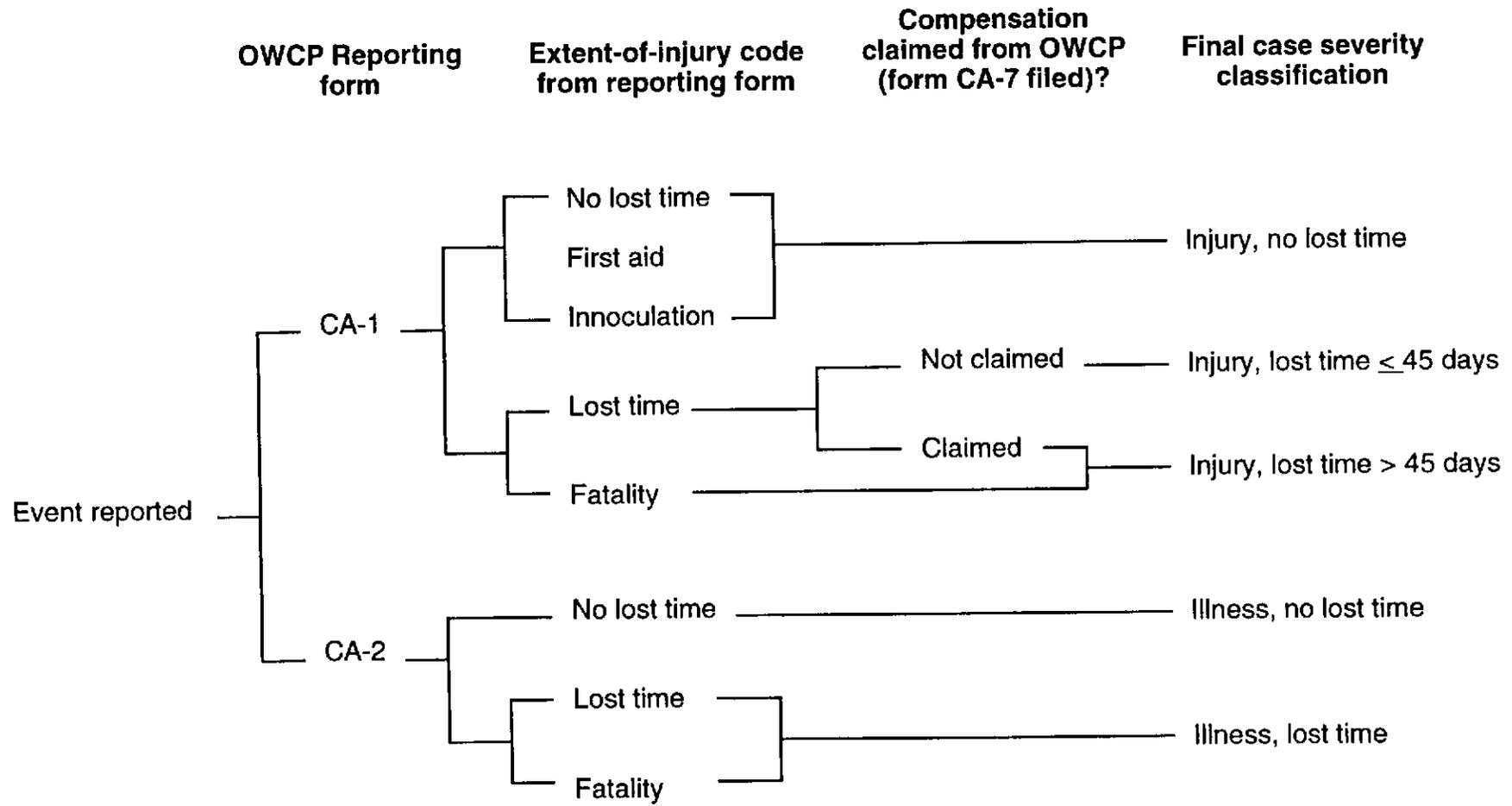


Figure 2: Algorithm for determining case severity classification

## RESULTS

Table 2 shows the case counts and cost totals (medical and compensation combined) of the four OWCP chargeback tapes, by accident year (i.e., the year in which an individual was originally injured). Also shown in Table 2 are inception-to-date cost totals for the four injury cohorts with complete histories. The 1990 cohort, for example, had generated nearly \$80 million in payments from OWCP through the end of the 1993 chargeback year.

The actuarial loss development factors calculated from the inception-to-date data are shown in Table 3. The "1st/2nd," "2nd/3rd," and "3rd/4th" terminology refers to the ratio of the cumulative amount paid for a cohort through the end of the earliest year referred to (e.g., the 1st) to the amount paid cumulatively through the end of the latter (e.g., the 2nd). Multiplying together the means of the available loss development factors yields a projected cumulative cost for a new injury cohort through the end of the farthest year out available, in this case, 4 years. For example, the amount paid for the 1993 injury cohort in its first year of existence was \$13.7 million. The cumulative total projected to have been paid for this cohort through the end of 1996 is therefore \$13.7 million times 2.879 times 1.505 times 1.272, or \$75.5 million.

The result of the more comprehensive two-part cost projection model developed by the Towers Perrin actuaries is shown graphically for the 1990 cohort in Figure 3. After the \$80 million known to have been paid after the first 4 years, the model predicts annual payments on the order of \$10 million per year, for a projected cumulative total (exclusive of continuation of pay) of \$382 million after 32 years.

Table 4 shows the cumulative cost projections from the model for the 1990 through 1993 injury cohorts, expressed both in aggregate and per each member of the Department of the Navy's civilian work force.

The composition of the 1990 injury cohort by case severity group and reporting year is shown in Table 5. The number of cases identified as belonging to the cohort is 22,546. (This total differs from the sum of the 1990 year-by-year active case counts provided in Table 2 because the latter are not mutually exclusive. The difference between the two tables in the number of 1990 cases reported in the 1990 chargeback year (18,743 versus 18,740) is accounted for by three individuals thought by OWCP in 1990 to be Department of the Navy employees but later identified as employees of another government agency.)

Table 2

*Department of the Navy Civilian Employee Injury Cohort Histories  
by OWCP Chargeback Year*

| Accident year<br>(1 July to<br>30 June) | Cases*        |               |               |               | Costs**          |                  |                  |                  | Inception-<br>to-date*** |
|---|---------------|---------------|---------------|---------------|------------------|------------------|------------------|------------------|--------------------------|
|   | 1990          | 1991          | 1992          | 1993          | 1990             | 1991             | 1992             | 1993             |                          |
| ≤1961                                   | 72            | 67            | 62            | 64            | \$1068           | \$1007           | \$1002           | \$1002           |                          |
| 1962                                    | 81            | 80            | 72            | 68            | 1080             | 1075             | 1047             | 1006             |                          |
| 1963                                    | 80            | 77            | 69            | 69            | 1299             | 1097             | 1105             | 1171             |                          |
| 1964                                    | 100           | 99            | 95            | 87            | 1495             | 1538             | 1342             | 1344             |                          |
| 1965                                    | 119           | 117           | 113           | 110           | 1765             | 1789             | 1622             | 1711             |                          |
| 1966                                    | 133           | 117           | 112           | 113           | 1913             | 1715             | 1672             | 1530             |                          |
| 1967                                    | 166           | 160           | 149           | 139           | 2319             | 2042             | 2039             | 2148             |                          |
| 1968                                    | 224           | 201           | 202           | 197           | 3401             | 3061             | 3152             | 3169             |                          |
| 1969                                    | 254           | 228           | 213           | 214           | 3445             | 3123             | 3161             | 3071             |                          |
| 1970                                    | 307           | 282           | 273           | 264           | 4050             | 4186             | 4089             | 3985             |                          |
| 1971                                    | 344           | 312           | 289           | 275           | 4352             | 4577             | 4180             | 4244             |                          |
| 1972                                    | 409           | 384           | 364           | 344           | 5679             | 5510             | 5677             | 5698             |                          |
| 1973                                    | 474           | 440           | 446           | 418           | 6724             | 6527             | 6660             | 6200             |                          |
| 1974                                    | 535           | 501           | 461           | 450           | 6722             | 7224             | 6762             | 6729             |                          |
| 1975                                    | 540           | 508           | 484           | 461           | 7169             | 6617             | 6696             | 6669             |                          |
| 1976                                    | 673           | 653           | 627           | 559           | 8458             | 8324             | 7845             | 8041             |                          |
| 1977                                    | 773           | 755           | 726           | 630           | 8038             | 8705             | 7983             | 7595             |                          |
| 1978                                    | 590           | 585           | 548           | 532           | 7498             | 7638             | 7032             | 6832             |                          |
| 1979                                    | 655           | 586           | 575           | 520           | 7224             | 7224             | 7453             | 6854             |                          |
| 1980                                    | 612           | 583           | 566           | 523           | 6427             | 6230             | 5926             | 6192             |                          |
| 1981                                    | 622           | 593           | 554           | 511           | 7301             | 6487             | 6546             | 6861             |                          |
| 1982                                    | 643           | 575           | 569           | 555           | 7084             | 6490             | 6456             | 6813             |                          |
| 1983                                    | 708           | 662           | 597           | 585           | 9192             | 7791             | 8136             | 7833             |                          |
| 1984                                    | 816           | 770           | 698           | 659           | 9274             | 8961             | 9177             | 9153             |                          |
| 1985                                    | 952           | 868           | 763           | 708           | 10878            | 9773             | 9273             | 9314             |                          |
| 1986                                    | 1329          | 1167          | 993           | 878           | 12692            | 12021            | 11059            | 10252            |                          |
| 1987                                    | 1757          | 1281          | 1004          | 891           | 13999            | 12319            | 11316            | 10360            |                          |
| 1988                                    | 3187          | 1974          | 1400          | 1146          | 18365            | 15329            | 14122            | 12931            |                          |
| 1989                                    | 10034         | 3380          | 2054          | 1474          | 25126            | 18638            | 16588            | 13823            |                          |
| 1990                                    | 18743         | 9672          | 3317          | 2204          | 14955            | 26469            | 21473            | 17074            | \$79,971                 |
| 1991                                    |               | 17303         | 8927          | 3435          |                  | 13566            | 26747            | 19823            | 60,136                   |
| 1992                                    |               |               | 16929         | 9072          |                  |                  | 14468            | 27425            | 41,893                   |
| 1993                                    |               |               |               | 15543         |                  |                  |                  | 13702            | 13,702                   |
| <b>Total</b>                            | <b>45,932</b> | <b>44,980</b> | <b>44,251</b> | <b>43,698</b> | <b>\$218,992</b> | <b>\$227,053</b> | <b>\$241,806</b> | <b>\$250,555</b> |                          |

\* Individuals newly reporting an injury or illness to OWCP, or, if previously reported, for whom a payment has been made during the chargeback year.

\*\* Combined totals for medical and compensation payments made by OWCP (in 000s).

\*\*\* Not available for cohorts with inception dates prior to 1990.

Table 3

*Loss Development Factors for the Department of the Navy Civilian Employee 1990 - 1992 Injury Cohorts*

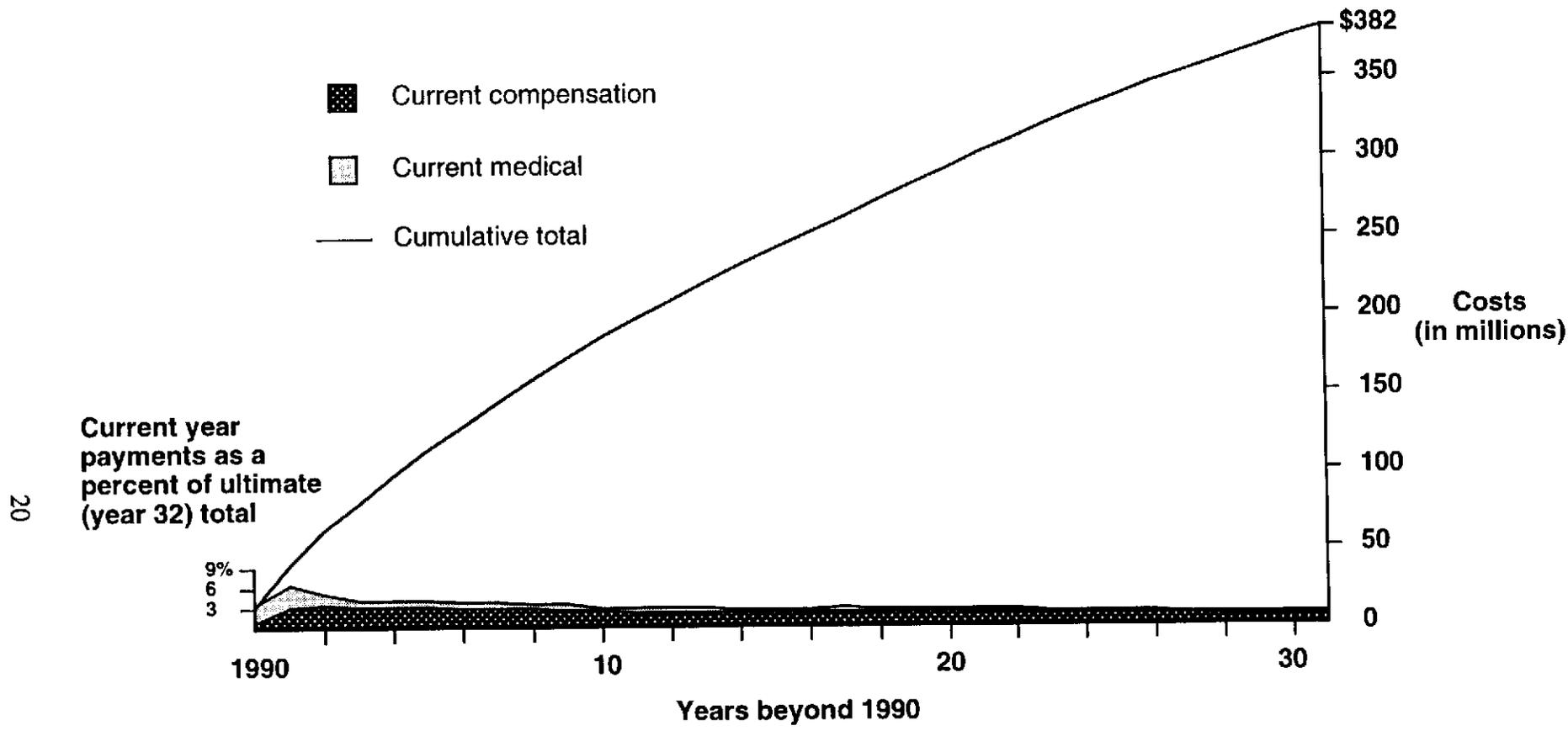
| Accident year<br>(1 July to 30 June) | 1st/2nd | 2nd/3rd | 3rd/4th |
|--------------------------------------|---------|---------|---------|
| 1990                                 | 2.770   | 1.518   | 1.272   |
| 1991                                 | 2.972   | 1.492   |         |
| 1992                                 | 2.896   |         |         |
| mean                                 | 2.879   | 1.505   | 1.272   |

Table 4

*Model-Based Cumulative Cost Projections Through 32 Years for the Department of the Navy Civilian Employee 1990 - 1993 Injury Cohorts*

| Accident year<br>(1 July to 30 June) | Projected cumulative costs through 32 years (medical and compensation combined, and exclusive of continuation of pay) | Estimated size of midyear full-time work force* | Cost per full-time civilian employee |
|--------------------------------------|---|---|--------------------------------------|
| 1990                                 | \$382,110,000   | 318,112   | \$1,201                              |
| 1991                                 | 381,564,000   | 308,198   | 1,238                                |
| 1992                                 | 367,202,000   | 298,615   | 1,230                                |
| 1993                                 | 338,809,000   | 287,921   | 1,177                                |

\* Interpolated for 31 December from annual population counts for 30 September from the Office of Civilian Personnel Management, Department of the Navy.<sup>18</sup>



**Figure 3: Actuarial projections of eventual Department of the Navy costs for occupational mishaps occurring during chargeback year 1990 (1 July 1989 - 30 June 1990)**

Source: Actuarial model created by Towers Perrin, St. Louis, MO, using data from the Office of Workers' Compensation Programs, Employment Standards Administration, U.S. Department of Labor, as supplied by Naval Health Research Center (reference 19).

Table 5

*Department of the Navy Civilian Employee 1990 Injury Cohort  
by Severity Group and Chargeback Year Reported to OWCP*

| Severity group           | Chargeback year (1 July to 30 June)<br>Cases reported<br>(Row percent) |                 |              |             | Total           |
|--------------------------|--|-----------------|--------------|-------------|-----------------|
|                          | 1990   | 1991            | 1992         | 1993        |                 |
| <b>Injuries</b>          |  |                 |              |             |                 |
| No lost time             | 6,635<br>(85.6)  | 1,053<br>(13.6) | 47<br>(0.6)  | 18<br>(0.2) | 7,753<br>(100)  |
| Lost time $\leq$ 45 days | 9,491<br>(87.0)  | 1,379<br>(12.6) | 26<br>(0.2)  | 10<br>(0.1) | 10,906<br>(100) |
| Lost time $>$ 45 days    | 1,469<br>(86.2)  | 224<br>(13.1)   | 8<br>(0.5)   | 4<br>(0.2)  | 1,705<br>(100)  |
| <b>Illnesses</b>         |  |                 |              |             |                 |
| No lost time             | 800<br>(53.7)  | 461<br>(30.9)   | 144<br>(9.7) | 85<br>(5.7) | 1,490<br>(100)  |
| Lost time                | 345<br>(49.9)  | 268<br>(38.7)   | 45<br>(6.5)  | 34<br>(4.9) | 692<br>(100)    |
| <b>Total</b>             | <b>18,740</b>  | <b>3,385</b>    | <b>270</b>   | <b>151</b>  | <b>22,546</b>   |

From the data in Table 5 it is apparent that injuries and illnesses differ in the timeliness with which they are reported to OWCP. Of the 20,364 injuries claimed during a four-year time period to have been newly occurring during 1990, more than 99 percent had been reported as of the end of the second year. In contrast, only 86 percent of the claimed illnesses had been reported after the same period of time. Extrapolations from the data in Table 5 suggest that the total reported size of the 1990 injury cohort could ultimately increase by approximately 200 individuals over the next 4 or 5 years, with almost all these new cases representing claimed illnesses.

Table 6 shows the costs known to have been paid over 4 years for the 1990 injury cohort. Injuries involving more than 45 days of lost time clearly predominate over other categories of injuries and illnesses with respect to cost. In aggregate, these injuries (which comprise only 8 percent of all cases) are responsible for 60 percent of the costs generated by the entire cohort through 4 years; on a per-case basis they are nearly five times more expensive than the next most expensive category at this point, lost-time illnesses.

Counts and costs through 4 years for cases that were still open and active at the end of the 1993 chargeback year are shown in Table 7. These cases were assumed to be responsible for the additional costs yet to be generated by the cohort in years 5 through 32, and the allocation of these projected costs is shown in Table 8. Table 8 also shows the projected grand total for the 1990 injury cohort through 32 years (\$391 million, which includes continuation of pay costs), and various cost-per-case estimates.

Just under 7 percent of the cases reported were denied benefits in OWCP's adjudication process.<sup>16, Subpart B</sup> Because these cases are associated with few, if any, costs, the "per case" estimates in Table 8 are only for cases accepted by OWCP as qualifying for benefits. These estimates indicate that the average cost that will accrue over 32 years to the Department of the Navy for a work-related injury or illness that occurred in 1990 and was reported to OWCP and accepted for coverage was \$18,632. However, no single category of cases behaved like the "average," with a greater than seventyfold difference in the average cost per case in the least expensive category as opposed to the most expensive. In all categories, cases that remained open beyond 4 years were exceptionally expensive.

Table 9 presents data consolidated from previous tables to facilitate cost comparisons with sources that use the traditional dichotomization of cases as no lost-time or lost-time.

Table 6

*Department of the Navy Civilian Employee 1990 Injury Cohort:  
Actual Costs Through 4 Years, by Severity Group*

| Severity group           | Cases reported | Payments (000s) |                          |                              |                 | Per case (mean) |
|--------------------------|----------------|-----------------|--------------------------|------------------------------|-----------------|-----------------|
|                          |                | Medical         | Compensation (from OWCP) | Continuation of pay estimate | Total           |                 |
| <b>Injuries</b>          |                |                 |                          |                              |                 |                 |
| No lost time             | 7,753          | \$5,618         | \$4,241                  | \$0                          | \$9,859         | \$1.3           |
| Lost time $\leq$ 45 days | 10,906         | 7,214           | 1,519                    | 5,390                        | 14,123          | 1.3             |
| Lost time $>$ 45 days    | 1,705          | 22,010          | 28,259                   | 4,045                        | 54,314          | 31.9*           |
| <b>Illnesses</b>         |                |                 |                          |                              |                 |                 |
| No lost time             | 1,490          | 1,616           | 4,867                    | 0                            | 6,483           | 4.4*            |
| Lost time                | 692            | 1,312           | 3,316                    | 0                            | 4,628           | 6.7*            |
| <b>Total (mean)</b>      | <b>22,546</b>  | <b>\$37,770</b> | <b>\$42,202</b>          | <b>\$9,435</b>               | <b>\$89,407</b> | <b>(\$4.0)</b>  |

\* Differs from all other group means ( $p < .05$ ) using Scheffe's multiple pairwise comparisons test. (Statistical testing was conducted prior to the addition of the continuation of pay estimates for the two lost-time injury groups; means at this time were \$0.8 thousand for the injury group with less than 45 days of lost time, and \$29.5 thousand for the injury group with more than 45 days of lost time.)

Table 7

*Department of the Navy Civilian Employee 1990 Injury Cohort:  
Actual Costs Through 4 Years for Cases Still Open at the End of 4 Years,  
by Severity Group*

| Severity group           | Cases still open after 4th year | Payments (000s) |                          |                              |                 | Per case (mean) |
|--------------------------|---------------------------------|-----------------|--------------------------|------------------------------|-----------------|-----------------|
|                          |                                 | Medical         | Compensation (from OWCP) | Continuation of pay estimate | Total           |                 |
| <b>Injuries</b>          |                                 |                 |                          |                              |                 |                 |
| No lost time             | 155                             | \$2,151         | \$3,015                  | \$0                          | \$5,166         | \$33.3          |
| Lost time $\leq$ 45 days | 85                              | 850             | 986                      | 42                           | 1,878           | 22.1            |
| Lost time $>$ 45 days    | 600                             | 15,200          | 21,809                   | 1,423                        | 38,432          | 64.1*           |
| <b>Illnesses</b>         |                                 |                 |                          |                              |                 |                 |
| No lost time             | 251                             | 673             | 2,652                    | 0                            | 3,325           | 13.2            |
| Lost time                | 104                             | 761             | 2,676                    | 0                            | 3,437           | 33.0            |
| <b>Total (mean)</b>      | <b>1,195</b>                    | <b>\$19,635</b> | <b>\$31,138</b>          | <b>\$1,465</b>               | <b>\$52,228</b> | <b>(\$43.7)</b> |

- \* Differs from all other group means ( $p < .05$ ) using Scheffe's multiple pairwise comparisons test. (Statistical testing was conducted prior to the addition of the continuation of pay estimates for the two lost-time injury groups; means at this time were \$21.6 thousand for the injury group with less than 45 days of lost time, and \$61.7 thousand for the injury group with more than 45 days of lost time.)

**Table 8**

*Department of the Navy Civilian Employee 1990 Injury Cohort:  
Total Cost Projections Through 32 Years, by Severity Group*

| Severity group         | Cases         |               | Payments (000s) |                          |                  |                         | Cost per:         |                          |
|------------------------|---------------|---------------|-----------------|--------------------------|------------------|-------------------------|-------------------|--------------------------|
|                        | Reported      | Accepted      | 4-year actual   | Projected for years 5-32 |                  | Projected 32-year total | Accepted case     | Case open after 4th year |
|                        |               |               |                 | Medical                  | Compensation     |                         |                   |                          |
| <b>Injuries</b>        |               |               |                 |                          |                  |                         |                   |                          |
| No lost time           | 7,753         | 7,545         | \$9,859         | \$6,410                  | \$23,580         | \$39,849                | \$5,282           | \$226,813                |
| Lost time ≤ 45 days    | 10,906        | 10,133        | 14,123          | 2,535                    | 7,722            | 24,380                  | 2,406             | 142,803                  |
| Lost time > 45 days    | 1,705         | 1,621         | 54,314          | 45,318                   | 170,615          | 270,247                 | 166,716           | 424,065                  |
| <b>Illnesses</b>       |               |               |                 |                          |                  |                         |                   |                          |
| No lost time           | 1,490         | 1,201         | 6,483           | 2,008                    | 20,754           | 29,245                  | 24,351            | 103,932                  |
| Lost time              | 692           | 515           | 4,628           | 2,271                    | 20,925           | 27,824                  | 54,027            | 256,087                  |
| <b>Total (average)</b> | <b>22,546</b> | <b>21,015</b> | <b>\$89,407</b> | <b>\$58,542</b>          | <b>\$243,596</b> | <b>\$391,545</b>        | <b>(\$18,632)</b> | <b>(\$296,614)</b>       |

Table 9

*Department of the Navy Civilian Employee 1990 Injury Cohort:  
Average Cost Projected Through 32 Years for Accepted  
Cases Classified as No Lost-Time or Lost-Time*

| Case type    | Accepted cases | Projected 32-year payments per case |            |          |
|--------------|----------------|-------------------------------------|------------|----------|
|              |                | Medical                             | Indemnity* | Total    |
| No lost time | 8,746          | \$1,790                             | \$6,110    | \$7,900  |
| Lost time    | 12,269         | \$6,574                             | \$19,707   | \$26,281 |

\* Includes compensation from OWCP and continuation of pay

## DISCUSSION

The issues of whether federal workers' compensation costs indeed rose more slowly than private sector costs during the period 1986 to 1991, and why, are unresolvable from our results. The requisite data (e.g., cost-per-employee estimates for the entire federal government for the time span in question) are simply not available.

Nonetheless, the value of using accrual rather than pay-as-you-go accounting methods in policy-making decisions is demonstrated clearly in this study. In 1990 the Department of the Navy's OWCP chargeback bill was \$219 million. While alarming in itself, this figure understates the true cost of the work-related injuries and illnesses that occurred that year. Given the available data, at least \$391 million in costs can be expected to accrue to the Department of the Navy over 32 years as a result of the new cases that occurred in 1990. (The true cost is likely to be higher still because neither costs beyond 32 years nor the value of in-house medical care provided by the Department of the Navy have been included.) Similarly, the highest estimate of the average cost of a case in 1990 using pay-as-you-go data (\$10,248, from Table 1) is just over half the \$18,632 that we estimate the average new case that year will cost.

Whether viewed in aggregate or on a cost-per-case basis, pay-as-you-go accounting methods substantially and consistently underestimate the cost of new injuries and illnesses and therefore the economic value of their prevention. Moreover, they obscure trends in the

data that may reflect the effects of recent prevention and cost-control efforts. For example, annual OWCP chargebacks to the Department of the Navy have risen from \$219 million in 1990 to \$250 million in 1993,<sup>2</sup> suggesting that efforts to control costs have been ineffective during this period. However, when accrual methods are used and expressed on a per-employee basis, as in Table 4, the results show that costs have held steady during this period, implying that injury prevention and cost-control efforts have been more effective than might otherwise be supposed.

As mentioned, costs that will accrue beyond 32 years have not been included in the model upon which this analysis is based. Drawing from previous actuarial studies, Towers Perrin estimates "very roughly" that these costs may add 25 percent to the expense predicted through 32 years.<sup>19</sup> Obviously, this portion of the predictive model needs development; similarly, Towers Perrin has described a variety of methods (most requiring additional data) by which the accuracy of the existent model could be enhanced. Nonetheless, its general validity can be assessed by comparing the cost-per-case estimates to which it gives rise with those from other sources.

Table 10 shows the estimated average cost to the Department of the Navy for an accepted lost-time injury or illness occurring in 1990, as derived from the analyses described in this paper. Also shown are estimates of averages for similar cases covered by private insurers and for cases covered under the U.S. Longshore and Harbor Workers' Compensation Act, which is similar to FECA with the major exception that it limits all beneficiaries' indemnity payments to two-thirds of salary and its cap on maximum indemnity benefits is about half that of FECA's. Both sets of estimates are from the National Council on Compensation Insurance, a nonprofit data-collection and research organization for providers of workers' compensation insurance.<sup>17, 20</sup>

The comparisons made in Table 10 suggest that the cost estimates generated by our model are consistent with those for similar cases covered by other insurers. There is little difference in estimated medical expenses under the three program types, and the differences in indemnity expenses are as expected. The Harbor Workers' costs are estimated to their "ultimate" resolution,<sup>17</sup> and adding 25 percent (or some similar amount) to our estimate to account for expenses likely to accrue beyond 32 years makes the total projected indemnity

Table 10

*Estimated Average Cost of a New Lost-Time Case Under Three  
Different Workers' Compensation Insurance Programs*

| Expense   | Cost per case                        |                                    |   |
|-----------|--------------------------------------|------------------------------------|---|
|           | Department of the Navy<br>under OWCP | Representative private<br>insurers | U.S. Longshore and<br>Harbor Workers'<br>Compensation Act |
| Medical   | \$6,574                              | \$6,679                            | \$8,704   |
| Indemnity | \$19,707                             | \$14,098                           | \$22,466  |
| Total     | \$26,281                             | \$20,777                           | \$31,170  |

**Notes:** Accident year dates are as follows:

|                                |                                     |
|--------------------------------|-------------------------------------|
| Department of the Navy (OWCP): | 1 July 1989 to 30 June 1990.        |
| Private insurers:              | 1 January 1990 to 31 December 1990. |
| Harbor Workers' Act:           | 1 February 1988 to 31 January 1989. |

The National Council on Compensation Insurance is the source of estimates for both the private insurers and the Harbor Workers' Act (references 20 and 17, respectively).

costs under the two programs highly consistent. Our estimate of indemnity costs for the Department of the Navy should be higher than those for private insurers because of the greater generosity of benefits under FECA than under the state laws that govern private insurers (the benefit cap is higher, beneficiaries tend not to be subject to negotiated settlements, and, if it is to their financial disadvantage, they needn't convert to social security upon eligibility).

#### *Utility of the Case Severity Classification Scheme*

A common rule of thumb in the field of occupational safety and health is that 10 percent of injury cases account for 80 percent of workers' compensation costs.<sup>21</sup> This concentration of costs suggests the possibility of substantial savings if such cases can be prevented or identified sufficiently early in their course to permit effective use of intervention strategies such as return-to-work or light-duty assignments.<sup>10</sup> In our study, 90 percent of the

total projected costs were attributable to just 5 percent of the accepted cases—specifically, those that were still open 4 years after they originally occurred.

While this represents an even greater concentration of costs than is conventionally described, the formulation is less than ideal for cost-control interventions given that it requires the passage of 4 years before these expensive cases can be identified. The case severity classification scheme developed in this study, however, does begin to offer a potentially more useful alternative for this purpose.

The scheme relies on four dichotomous pieces of information: whether a case was (1) an injury or an illness, (2) associated with time lost from work, (3) associated with a claim for wage-replacement compensation from OWCP via the filing of a CA-7 form, and (4) accepted by OWCP for coverage. The first and second of these pieces of information are immediately available when a claim is filed, and the third is available within 45 days of the date of injury. Analysis of the 1990 cohort indicates that the median time to availability of the last bit of information—the decision by OWCP to accept or deny the case for coverage—is between 51 and 57 days from the date the injury or illness occurred (data not shown). Within 60 days, therefore, enough information will usually be available to permit the discrimination of cases that, on average, will cost \$2,406 from those that will cost \$166,716.

Cruder discriminations are possible earlier (the moment a lost-time illness claim is filed, for instance, it can be predicted from Table 8 that it will cost eight times as much as a no-lost-time injury). And finer discrimination will become possible through the application of appropriate statistical techniques<sup>22</sup> and the use of additional key information available at the time a case is filed (e.g., the anatomical location of an injury).<sup>15</sup> Yet even in its current stage of development, the classification scheme we describe should be of use to Navy Injury Compensation Program Administrators<sup>10</sup> and others whose job it is to oversee day-to-day case management of claims and to promote and apply appropriate and effective interventions for cost control. (One such intervention is readily apparent from the preceding discussion. Slow claims processing—whether associated with reporting or adjudication—is associated with increased costs.<sup>23, 24</sup> Yet the *median* time between the occurrence of an event in 1990 and its adjudication was close to 2 months. This delay is entirely within the joint control of the

Department of the Navy and OWCP, and should be subject to meaningful reduction through concerted effort.)

Similarly, a case's continued active status 4 years after the original occurrence of an injury or illness is a marker for a considerable increase in average costs. In 1992 OWCP began a program to review the continued eligibility for benefits of cases that had been assigned to its long-term roles within the preceding 5 years. Because the average cost of a case will increase roughly seven-and-one-half times from the end of the 4th to the end of the 32nd year, programs such as this have the potential to be highly cost-effective.

### *Conclusions and Recommendations*

The highest estimate previously available of the average cost to the Department of the Navy for newly occurring injuries and illnesses is approximately half the amount indicated by our findings. From this it can be assumed that previous economic evaluations of prevention and other cost-control programs have been correspondingly low.

The reliance on pay-as-you-go accounting methods within the Department of the Navy (and the federal government as a whole) to estimate the costs of work-related injuries and illnesses has led unavoidably to flawed or erroneous assumptions about workers' compensation costs, the influences on these costs, and their trends. The ability to estimate the cost of an injury or illness from the time of its occurrence to the time of its resolution is widespread outside the federal government, and the absence of this capability within the federal government currently limits policy-makers, safety managers and others from designing and assessing prevention and cost-control programs that are optimally effective. Program effectiveness cannot be gauged if program outcomes are not correctly measured.

We have demonstrated the feasibility of projecting future costs for injuries and illness newly occurring among the Department of the Navy's civilian employees. The cost projection model upon which this study is based nonetheless offers important additional opportunities for enhancement,<sup>19</sup> primarily through the acquisition and incorporation of additional data. In addition, the current model only provides the ability to project costs in terms of contemporary dollars paid, and the inclusion of parameters that permit the calculation and presentation of results in terms (e.g., inflation-adjusted constant dollars or net present value<sup>8</sup>) that help address the changing value of money over time would increase the

model's utility. We recommend that these enhancements be developed and that this occur in close cooperation with experienced actuaries.

OWCP or the Office of Federal Agency Programs<sup>3</sup> are the logical homes for the development of comprehensive cost projection models suitable for use throughout the federal government. Until such time as these agencies are able to provide this capability, however, we recommend that the Department of the Navy continue to develop its own expertise internally. We recommend further that the Department's ability to estimate the full cost of injuries and illnesses be sufficiently refined to enable the accurate projection of costs at the facility level. Doing so will permit the annual chargeback bills passed to commands to reflect contemporary rather than historical losses, thereby better achieving the Navy's intent of making commanding officers more aware of the influence their actions have on costs.<sup>10</sup>

Finally, we recommend that consideration be given to incorporating the case severity classification scheme developed here into the annual Occupational Safety and Health Program Improvement Plans currently required from Echelon II commands and large activities.<sup>25</sup> <sup>10505</sup> These plans are intended in part to reduce injury- and illness-related costs. But because most mishaps are relatively inexpensive, it is possible for an activity to achieve an impressive reduction in its overall mishap rate without appreciably reducing its costs. Rather than set as a goal an overall reduction in rates, it may therefore be more effective for an activity to seek to reduce its rate of a specific class of injuries or illnesses. Substantial savings could be realized, for example, by focusing solely on reducing the rate of injuries involving more than 45 days of lost time, and the setting of such goals should be supported by policy-makers.

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## PART II

### Federal Agency Annual Report

### Safety and Health Program Activity Questionnaire

Instructions: Circle the letter that best describes your agency's level of activity during the reporting period. Where requested, provide other appropriate responses here and/or on the attached sheets. Label all documentation clearly and appropriately.

#### Program Development and Resource Commitment

|   |  |                                     |
|---|--|-------------------------------------|
| <p>1. What was the level of development of your safety and health program during the reporting period? (A program is fully developed when all component parts are in place.) (1960.8(c))</p> <p>Please provide a copy of any revisions or additions made to your program during the reporting period.</p> <p>If your response is less than 100%, please identify those program components which have not yet been developed and a completion timetable.</p> | <p>Stage of Development:</p> <p><input checked="" type="checkbox"/> a. 100-90%</p> <p>b. 89-75%</p> <p>c. 74-50%</p> <p>d. 49-0%</p> <p>Comments: <u>See Attachment 2 to Annual Report.</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a</p> <p>b</p> <p>c</p> <p>d</p> |
| <p>2. Were staff resources available and adequate during the reporting period to conduct self-evaluations, annual inspections, accident investigations, data collection and analysis, training and administrative processing? (1960.6(b)(2))</p> <p>If the answer is "no," please identify those program requirements which were not addressed or were not fully addressed.</p>   | <p><input checked="" type="checkbox"/> a. Yes</p> <p>b. No</p> <p>Comments: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;">(continue on addendum)</p>   | <p>a</p> <p>b</p>                   |

|  |   |                   |
|--|---|-------------------|
| <p>3. Were adequate funds available during the reporting period for the following: (1960.7)</p> <p>a. Abatement of unsafe and unhealthful workplace conditions?</p> <p>b. Safety and health sampling, testing, and diagnostic/ analytical tools and equipment, including laboratory analyses?</p> <p>c. Necessary contracts to identify, analyze and evaluate unsafe and unhealthful workplace conditions and operations?</p> <p>d. Safety and health promotional materials?</p> <p>e. Technical materials?</p> <p>f. Medical surveillance programs?</p> | <p><del>XXX</del> Yes Overall.</p> <p>b. No</p> <p>Comments: _____</p> <p>a. No. Budget request submitted through POM. _____</p> <p>b. Yes. _____</p> <p>c. Yes. _____</p> <p>d. Yes. _____</p> <p>e. Yes. _____</p> <p>f. Yes. _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(continue on addendum)</p> | <p>a</p> <p>b</p> |
| <p>4. Were "corrective action priorities" established with respect to the factors which caused occupational accidents, injuries, and illnesses during the reporting period? (1960.6(b)(6))</p> <p>If the answer is "no," please provide an explanation.</p>  | <p><del>XXX</del> Yes</p> <p>b. No</p> <p>Comments: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(continue on addendum)</p>   | <p>a</p> <p>b</p> |

## Employee Involvement, Awareness and Performance

|   |   |                |
|---|---|----------------|
| <p>5. Did employees exercise their right to report unsafe and unhealthful working conditions during the reporting period? (1960.10(c))</p> <p>If the answer is "yes," please indicate the number of reports filed during the reporting period.</p> <p>Comment on how the number of reports filed for this reporting period compares with the number of reports filed during each of the preceding four (4) years.</p> | <p><del>xxx</del> Yes<br/>b. No</p> <p>Reports Filed: <u>Not available.</u></p> <p>Comments: <u>Data not available</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b</p> |
| <p>6. Did the establishment official (or representative) and a representative of employees participate in all agency conducted inspections during the reporting period? (1960.27(a))</p> <p>If the answer is "no," please provide an explanation?</p>   | <p>a. Yes<br/><del>xxxx</del>No</p> <p>Comments: <u>Generally, employee representatives do not participate in inspections.</u></p> <p>_____</p> <p style="text-align: center;">(continue on addendum)</p>   | <p>a<br/>b</p> |
| <p>7. Was the safety and health performance of managers and supervisors evaluated during the reporting period? (★★★ 1960.11 could be cited by an OSHA compliance officer during a worksite inspection.)</p> <p>If the answer is "no," please provide an explanation.</p>  | <p><del>xxx</del> Yes<br/>b. No</p> <p>Comments:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____ (continue on addendum)</p>   | <p>a<br/>b</p> |

# Hazard Identification and Abatement

## Agency Inspections

|  |   |                |
|--|---|----------------|
| <p>8. Were all agency work areas inspected at least once during the reporting period by a qualified safety and health inspector? (★★★ 1960.25(a) and (c) could be cited by an OSHA compliance officer during a worksite inspection.)</p> <p>If the answer is "no," please provide the number and percent of work areas that were not inspected and an explanation.</p> | <p><input checked="" type="checkbox"/> Yes<br/> <input type="checkbox"/> b. No</p> <p>Comments: <u>On only 7 of 99 oversight inspections was any deficiency in this program element identified.</u></p> <p>_____</p> <p>_____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b</p> |
|--|---|----------------|

## Accident Investigations

|  |  |                |
|--|--|----------------|
| <p>9. Were all accidents involving fatalities or more than five (5) hospitalizations investigated? (1960.29(b))</p> <p>If the answer is "no," please provide an explanation, including the number and percent of accidents investigated.</p> | <p><input checked="" type="checkbox"/> Yes<br/> <input type="checkbox"/> b. No</p> <p>Number investigated: <u>6</u><br/> Percent investigated: <u>100</u></p> <p>Comments: _____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b</p> |
|--|--|----------------|

## Abatement of Unsafe and Unhealthful Working Conditions

|  |  |                                  |
|--|--|----------------------------------|
| <p>10. What percent of inspections during the reporting period received follow-up inspections to verify the abatement of hazardous conditions? (1960.25(c))</p>          | <p>a. &lt; 5%<br/> b. 5-25%<br/> c. 26-50%<br/> d. 51-75%<br/> <input checked="" type="checkbox"/> 76-100%</p> <p>Comments: (continue on addendum) Cited on 5 inspections.</p>                                   | <p>a<br/>b<br/>c<br/>d<br/>e</p> |
| <p>11. What percent of follow-up inspections resulted in "failure to abate" notices? (1960.30(b))</p> <p style="text-align: center;">(We do not issue such notices.)</p> | <p><input checked="" type="checkbox"/> &lt; 5%<br/> b. 5-25%<br/> c. 26-50%<br/> d. 51-75%<br/> e. 76-100%</p> <p>Comments: <u>Not applicable.</u></p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b<br/>c<br/>d<br/>e</p> |

# Occupational Injuries and Illnesses

## Records and Logs

|  |  |                |
|--|--|----------------|
| <p>12. Were records or logs of occupational injuries and illnesses maintained at each establishment during the reporting period? (1960.67(a))</p> <p>If the answer is "no," please provide an explanation.</p> | <p><del>xxx</del> Yes<br/>b. No</p> <p>Comments: _____<br/>_____<br/>_____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b</p> |
|--|--|----------------|

## Annual Summaries

|  |  |                |
|--|--|----------------|
| <p>13. Were summaries of occupational injuries and illnesses compiled during the reporting period based on the records or logs of occupational injuries and illnesses? (1960.69(a))</p> <p>If the answer is "no," please provide an explanation.</p> | <p><del>xxx</del> Yes<br/>b. No</p> <p>Comments: _____<br/>_____<br/>_____</p> <p style="text-align: center;">(continue on addendum)</p> | <p>a<br/>b</p> |
|--|--|----------------|

## Serious Accidents

|  |   |  |
|--|---|--|
| <p>14. How many accidents occurring during the reporting period resulted in a fatality or the hospitalization of five (5) or more people? (1960.70)</p> <p>How does the number of incidents for this reporting period compare with the number of incidents for each of the preceding four (4) reporting periods?</p> <p>Comment on the cause or causes for the increase or decrease.</p> | <p>Total all incidents: <u>  6  </u><br/>         No. w/ fatalities: <u>  6  </u><br/>         No. w/ injuries only: <u>  0  </u></p> <p>Comments: <u>  See charts, data, and narrative in annual report Section 2A.  </u><br/>         _____<br/>         _____<br/>         _____</p> <p style="text-align: center;">(continue on addendum)</p> |  |
|--|---|--|

## Self-Evaluations

15. Were self-evaluations conducted during the reporting period to determine program effectiveness? (1960.8(c) and 1960.6(b)(5))

If the answer is "yes," what was your agency's overall effectiveness rating?

If the answer is "no," please provide an explanation.

- a. Yes
- b. No
- a. Very good
- b. Good
- c. Fair
- d. Poor
- e. Other: \_\_\_\_\_

Comments: No specific data available or collected.  
Requirements are in Attachment 2.

(continue on addendum)

a  
b  
a  
b  
c  
d  
e