Smoke Gets in Your Eyes

By LCdr. Brad Botkin

The smoke from our burning main-mounts was not thick enough to obscure the sparkling Pacific and the small islands offshore. I couldn't help thinking—while giving a thumbs-up to the fire trucks rolling up—had things gone as planned, those islands now would be in our mirrors.

Tower told the Tomcat on the runway, "Cancel position and hold, and taxi clear." The Hercules at six miles was told to expect a low approach at or above 500 feet because an F-4 was on fire on the left side of the departure end. I felt like running my seat down all the way. However, my curiosity on the status of firefighting efforts won out, and I kept my seat up to peer over the canopy rail.

The firefighters quickly worked their magic, and the smoke turned to steam, then dissipated. The fire was out and foam was under our jet. As the engines stopped, the firefighters cleared my pilot to shut down and to lower the boarding ladder. While we safed our seats and unstrapped, I was amazed my pilot still had the presence of mind to yell, "Two, one, open," to synchronize our canopies—a fact he vehemently denies and proof old habits die hard. I thought the cool canopy opening probably wouldn't smooth over our current situation.

Once on the ground, we realized that, although the pilot valiantly had tried to get off the runway, our tail still was hanging over the hold-short line. A glance at the puddled rubber and fused-brake assemblies confirmed that the jet would remain in place a while longer. With a jack, a couple of dollies, a tow bar, and a tractor, the jet was moved after 45 minutes. We caught a lift back to the hangar.

After lots of questions and some uncomfortable time standing tall, we were privileged to brief an AOM on the details that led to our unfortunate lack of flight time. We had briefed as a single, to launch on a ship's-services mission. Our task was to provide radar calibration and tracking training for a small boy in the sea range.

The brief was standard, covering all phases of flight, including mission-specific comms and

profiles. Man-up, start, and taxi were all standard. We encountered our first problem on the takeoff roll.

In blower, passing 90 knots, we noticed a left yaw and the pilot reported the left-engine nozzle was partly closed. We aborted the takeoff for a burner blow-out. Because we still were relatively slow and had over 8,000 feet of runway left, neither the drag chute nor the hook were necessary to stop comfortably. We taxied off the runway and discussed our options.

A burner blow-out in the F-4 was not uncommon, and the maintainers often performed a visual inspection of the engine. Flight crews would verify normal operation on subsequent flights. With this in mind, and, after discussing our options on base radio, we decided to taxi to the departure end and try again. To meet our range times, we expedited our taxi and were cleared for takeoff within 10 minutes.

As we accelerated through 100 knots, we noticed the same yaw and nozzle indications and aborted the takeoff. The jet again slowed normally. The drag chute and hook were not necessary. After passing over the long-field gear, however, our deceleration began to ease up. I waited several seconds, thinking my pilot was trying to get closer to the end so he could expedite our exit. I then suggested we slow a bit. His "I'm trying" response didn't give me a warm and fuzzy, so I asked what was wrong. He said the brake pedals felt normal, but he had the brakes on full. He had released and reapplied them, but we weren't slowing normally.

As the end of the runway approached, we were under 20 knots. With the lack of a significant overrun and no overrun gear, the pilot decided to keep the brakes on and to steer left into the large hold-short area at the end of the runway. As we started the turn, we felt the side G of a faster-than-normal turn. We were rewarded with a loud bang and left wing down as the left mainmount blew. On the positive side, the increased drag of the blown tire tightened our turn, and we slowed to a stop.

As we breathed a collective sigh of relief, the right wing started to settle, and we soon were wings level again. As we told tower about the blown tire and requested assistance, we saw wisps of sooty smoke curling around the starboard wing. We told tower our wheels probably were on fire, as well.

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How did we end up with smoke in our eyes and egg on our faces? We had overlooked that our first abort had put a significant amount of heat into our wheel assembly. With our second abort, we had exceeded the wheel assembly's heat capacity. Unable to transfer heat to the surrounding components, the brakes lost most of their stopping friction toward the end of our roll out.

Our left mainmount blew when the faster-than-normal turn decreased the weight on the wheel, until it lost traction and locked, bull's-eyeing the tire. The right mainmount-fuse plug melted from the wheel-assembly heat and, as designed, deflated the right tire.

What did we learn? Regardless of your platform, the laws of heat transfer and physics remain the same. Knowing you can exceed your aircraft's braking-heat capacity is key. What can you do differently on an abort when you suspect decreased braking capacity? Don't put yourself in the position of having to abort again. Brief that the hook will be mandatory in case of a second abort. Avoid turning while braking at speeds faster than a fast walk. If you have to turn and brake at higher speeds, ease braking on the inside wheel of the turn. Obviously, you will need nosewheel steering to keep the turn going when you take this action.

LCdr. Botkin currently flies with VAQ-139. He flew F-4s when assigned to Weapons Test Squadron, Naval Station Ventura County, Calif.

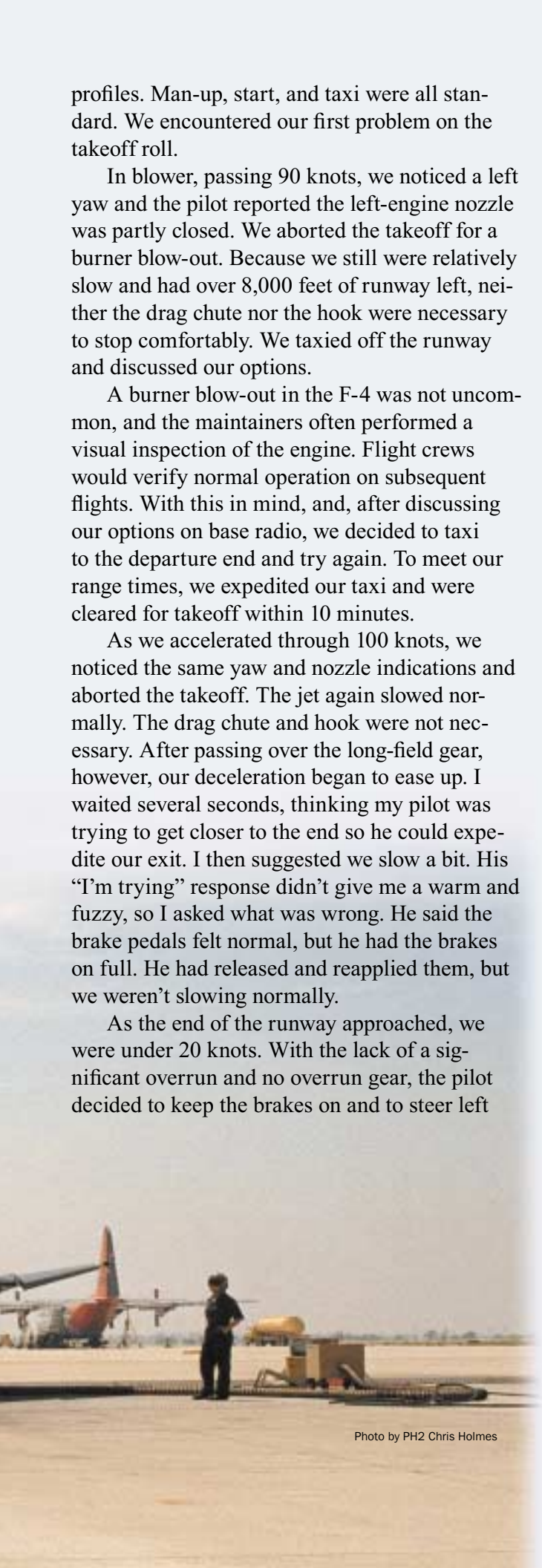

Photo by PH2 Chris Holmes