

Whining and Grinding



Photo by Matthew J. Thomas

By Lt. Matthew Densing

In naval aviation, the unwritten yet implied rule is that everyone in their career will encounter in-flight emergencies. As we briefed for a local, basic, aerial-maneuvering flight, our crew certainly didn't expect we'd soon face a compound emergency. The operations goal for the flight was twofold: to get flight time for our guest pilot, and to get basic-aircraft-maneuver (BAM) training for two squadron ECMOs.

After a standard NATOPS brief, the crew manned up and took off without incident. Our BAM flight in the Olympic MOA went as briefed, and we turned back toward Whidbey, looking forward to the end of another day's worth of flying. As we neared the field, the pilot lowered the gear, flaps, and slats to configure the jet for landing. The integrated-position indicator (IPI) shifted to show flaps 30, slats out, gear down, and a tow-link indication. After some expletive venting, we broke out our pocket checklists (PCLs) and read through the emergency steps.

According to the NATOPS checklist, we needed a visual inspection of our nose gear to determine whether the tow link was up or down. We told the field of our problem and arranged to have an LSO on station to inspect the gear as we made a low approach. We headed east of the field, double-checking the NATOPS checklists and waiting for an LSO to arrive.

Our day suddenly took a turn for the worse as we noticed a loud, high-pitched whining and grinding sound coming from the right side. About one to two seconds later, our right engine instruments showed decreasing engine rpm, with rising exhaust-gas tem-

perature (EGT) and oil pressure rapidly dropping below 20 psi. Five seconds later, the pilot quickly secured the right engine. We told the field we now were operating single engine, with a tow-link indication. After we had stepped through the single-engine-landing checklist, the LSO called in on-station. We turned back toward the field to set up for a single-engine low approach.

As we dragged ourselves skyward after the approach, the LSO said our tow link appeared up. With the short-field arresting gear previously derigged, we turned downwind and made a normal landing.

After engine shutdown back in our line, the maintainers saw oil pooled in the tailpipe, along with oil residue inside the engine-bay door and on the compressor case, keel, and starboard empennage. When they checked for freedom of rotation, they found the compressor stage made a grinding noise when rotated and did not rotate the turbine stage.

Several days later, an engineering inspection revealed a 4.5 engine-bearing failure. Historically, the last three 4.5 bearing failures in which the compressor stage failed all had resulted in Class-A mishaps. The extremely rapid nature of this failure, from initial cockpit indications to turbine-shaft separation and possible engine fratricide, makes this a time-critical emergency. Our crew's avoidance of another possible Class-A mishap can be attributed to the pilot's mere-seconds reaction in shutting down the engine. Good crew coordination also helped to bring the jet back in one piece. 🛩️

Lt. Densing flies with VAQ-140.