



FLYING LESSONS for September 6, 2018

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FLYING LESSONS uses recent mishap reports to consider what *might* have contributed to accidents, so you can make better decisions if you face similar circumstances. In almost all cases design characteristics of a specific airplane have little direct bearing on the possible causes of aircraft accidents—but knowing how your airplane's systems respond can make the difference as a scenario unfolds. So apply these *FLYING LESSONS* to the specific airplane you fly. Verify all technical information before applying it to your aircraft or operation, with manufacturers' data and recommendations taking precedence. **You are pilot in command and are ultimately responsible for the decisions you make.**

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This week's LESSONS:

Engine fire in flight is one of the most frightening emergency scenarios. It rarely happens—but if it does, you need to know exactly what to do, and how to do it.

There is little in the engine compartment that will burn except the contents of fuel and oil lines. If a fire goes unchecked, however, it may burn through engine or even structural components, making matters far, far worse. Engine fires have been known to burn through firewalls, letting flames enter the cockpit of single-engine airplanes and even burn through wing spars in twin-engine airplanes.

Turbocharged and turbonormalized engines have a documented history of exhaust leaks and tailpipe attachment hardware that have led to engine fires and catastrophic structural failures. The Federal Aviation Administration recently issued its [Best Practices Guide for Maintaining Exhaust System Turbocharger to Tailpipe V-Clamp Couplings/Clamps](#) to make airplane owners and mechanics aware of the threat, and inspection and replacement recommendations to avoid failure. Airworthiness Directives mandate specific exhaust and hardware inspection and replacement schedules across a wide range of airframe and engine manufacturers.

See: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/cos/aging_aircraft/media/maintaining_exhaust_system_best_practices.pdf

Regardless of the size of the fire, smoke and hazardous gases can enter the cabin in single-engine airplanes, and potentially in pressurized twins through the pressurization system.

The Pilot's Operating Handbook (POH) for most types of aircraft contains a simple but critical checklist for limiting the damage and avoiding the hazards of an engine fire in flight. With variations for the specific aircraft —*check the manual for each type you fly*—the **Engine Fire in Flight** checklist tells us to:

1. **Stop the smoke.** This could be shutting off the heater, closing a firewall shutoff, or pulling a pressurization cutoff control, to prevent or limit additional contamination of cabin air.
2. **Fuel selector: OFF.** This prevents additional fuel from entering the engine compartment; cutting off most of the combustible fluid (you can't do anything about the oil).
3. **Mixture: OFF.** This completes the fuel cutoff steps.
4. **Cabin: Ventilate.** Open windows, crack open doors, whatever is needed to get toxic and choking smoke out of the airplane.

Most airplane POHs call for immediate shutdown of the engine at the first sign of an engine fire. Others have different recommendations—advising to fly the burning airplane to a point from which landing is assured, and only then shutting off the engine—or they may have no Engine Fire in Flight checklist at all.

You could probably debate the merits of shutting the engine down immediately upon detecting an engine fire in flight, versus flying with a burning engine using whatever power you have remaining until you're within gliding range of a runway or a landing field. Me, I'm not too keen on keeping an engine fire alive in flight. I would rather shut it off now and then worry about precisely where I'll land...just as if I had an engine failure in flight. You may think otherwise.

The key is to think about these things now, in a comfortable chair at home or at the office, and decide what you'll do *before* you have to make a choice under the extreme stress of an engine fire in your airplane in flight.

If the fire goes out, you have initiated a total engine failure in flight condition. Perform the Glide and Landing without Power procedures in single-engine airplanes, or the Engine Securing and Single-Engine Approach and Landing procedures in twins. Each of these procedures has short memory steps of its own.

To be ready if an engine fire happens to you I suggest this exercise:

1. Sit in your airplane on the ground.
2. Do not start the engine, but put all controls in their normal inflight positions: throttle forward, propeller control forward, mixture forward, battery and alternator switches on, fuel selector on one of the tanks, etc. **Caution: Do not move the gear handle in retractable gear airplanes.**
3. From memory, complete the Engine Fire in Flight checklist steps. Actually move the controls, shutting off the fuel, pulling the mixture control, etc., both to intellectualize the checklist steps and to ingrain the muscle memory needed to perform them while still controlling the airplane.
4. When you're complete, pull out the POH and consult the checklist. See if you've completed all memory items of the Engine Fire in Flight checklist. Score your performance.
5. Reset the controls and practice the procedure two or three more times or until you have it memorized.
6. Use the Shutdown/Securing checklist to secure the airplane at the end of your practice.
7. Repeat the exercise in a month to see if you remember all the steps, and then every few months for as long as you fly the aircraft.

Repeat this exercise enough to be able to perform it easily from memory. Then practice the exercise occasionally to retain this level of skill, for the unlikely event you ever have to quickly and correctly respond to an inflight engine fire.

An engine fire in flight is one of the scariest and most dangerous scenarios you face as a pilot. It's very unlikely to occur. But you have to be ready to act correctly without having to think about it if it does.

Questions? Ideas? Opinions? Send them to mastery.flight.training@cox.net



How Much Flight Risk Should You Accept?

Watch this video for a thought-provoking answer to this important question.



See https://www.pilotworkshop.com/how-much-risk?utm_source=flying-lessons&utm_medium=banner&utm_term=&utm_content=&utm_campaign=risk&ad-tracking=fl-risk

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Reading List

Recent items worthy of your attention:

Why do professional pilots crash airplanes as a result of “unprofessional behavior” or “unprofessional acts?” Aviation Information Network ([AIN Online](#)) provides [AIN Insight: Achieving Extreme Professionalism in Aviation](#), including a link to the [National Business Aviation Association’s Professionalism in Business Aviation](#) web page.

See:

www.ainonline.com

<https://www.ainonline.com/aviation-news/blogs/ainsight-achieving-extreme-professionalism-aviation?eid=325912989&bid=2118034#>

www.nbaa.org

<https://www.nbaa.org/ops/safety/professionalism/>

[Air Facts Journal](#) explains how “[Three Cirrus Stall Scenarios Offer Important Lessons](#).”

See:

www.airfactsjournal.com

<https://airfactsjournal.com/2018/06/accident-report-roundup-three-cirrus-stall-scenarios-offer-important-lessons/>

The recent NTSB Roundtable Discussion about Loss of Control in Flight Yields Some Important Ideas. This item includes a link to the 2018 [EAA Innovation Prize](#) that rewards fresh ideas for reducing Loss of Control – Inflight (LOC-I) crashes. [This video](#) shows some highlights of the presentations.

See:

<https://safetycompass.wordpress.com/2018/05/14/roundtable-discussion-about-loss-of-control-in-flight-yields-some-important-ideas/>

<https://www.eaa.org/en/airventure/eea-airventure-news-and-multimedia/eea-airventure-news/eea-airventure-oshkosh/07-26-2017-three-high-school-students-awarded-founders-innovation-prize>

<https://www.youtube.com/watch?v=cOBoYh-MRmc&list=PL5aVmmm4Qt9FjuYX-0okUTRLCqmtgnoZB>

At another NTSB event, the [NTSB Road Show](#) held at EAA AirVenture 2018, NTSB safety investigators, an FAA analyst, and other GA experts advocated for awareness through additional training and modern technology, including further adoption of angle of attack indicators (AOAs). A panel of expert presenters noted that “[more general aviation pilots and passengers die from accidents involving loss of control than any other single cause](#)” and offered ideas for reducing the repeat of LOC-I crashes.

See: <https://myemail.cox.net/appsuite/#!/&app=io.ox/mail>

The AOPA Air Safety Institute has published the [twenty-seventh edition of the Joseph T. Nall Report](#). The report, according to AOPA, “continues the positive trend of another record setting year, with a reduction in both overall accident and fatal accident rates. Although the number of total accidents increased slightly, the number of fatal accidents decreased by 4

percent. Meanwhile, general aviation flight activity increased by 3.6 percent, meaning we're flying more and we're having fewer fatalities. This good news is also indicative of the constant work by all in the GA industry to drive safety initiatives that produce results in preserving aircraft and saving lives.”

See <https://www.aopa.org/training-and-safety/air-safety-institute/accident-analysis/joseph-t-nall-report>

“**Fatigue-related performance problems in aviation** have been consistently underestimated and underappreciated”—so says *Business and Commercial Aviation* in “[Flying Tired: Recovery From Sleep Loss is Not So Simple.](#)”

See:

<http://aviationweek.com/b-c-a>

<http://m.aviationweek.com/business-aviation/flying-tired-recovery-sleep-loss-not-so-simple?eid=forward>

Questions? Comments? Suggestions? Let us know, at mastery.flight.training@cox.net

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Pursue Mastery of Flight.

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