

“OMG FOD”

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Having flown fighter aircraft for many years, I have been asked from time to time if I ever had to eject. The quick answer is no; the longer answer is...almost. How does this question relate to glider safety? Give me a couple of minutes and I think you will see.

A number of years ago I was going through fighter lead-in training at Holloman Air Force Base in Alamogordo, New Mexico. We accomplished our training in AT-38 aircraft, a derivative of the sleek T-38 aircraft which has been the Air Force's high performance trainer for nearly 50 years. The training consisted of formation flying, low level navigation, weapon delivery, and Basic Fighter Maneuvers (BFM..."dog-fighting").

On one mission I was a hapless passenger in the backseat with an Instructor Pilot (IP) who was doing BFM. During the very last set, the offensive aircraft closed in for a simulated gun shot. To defeat a gunshot, one has to move the aircraft out-of-plane from the bullet stream during the time of flight of the bullets. This is typically done by unloading the aircraft, rolling some number of degrees, and re-applying some positive G's. An alternative is to push forward on the stick and use negative G's to spoil the tracking solution. This particular time the IP chose the negative G maneuver...banging my helmeted head against the canopy while having me...a new student...wonder what the heck he was doing. After all, I was new to this stuff.

Immediately after this maneuver he yelled at me over the intercom asking if I had my hand on the throttles. I said no. He then responded with a "uh-oh" and I knew we had a problem. Both throttles were solidly stuck...they could not be retarded. The good news though is that they were stuck in the right place...93% on an AT-38. If they had been higher, we would have had too much power to land; any lower, and we would have not had enough power to continue flying. The pilot handled the situation very well. He shut down one engine on the way back to base, put the speedbrakes out to slow us down (otherwise we would have still been too fast to land even on one engine), and upon touchdown he shutdown the remaining engine. We coasted to a stop. This easily and certainly could have turned out much differently.

So, what caused the throttles to get stuck? It turns out that a mechanic had accidentally left a wrench in the engine bay. The negative G unload caused the wrench to migrate to a highly undesirable location — into the throttle cables that modulate the engine. This almost resulted in the loss of an aircraft...and our reliance on some rather old ejection seat technology.

Foreign Object Debris (FOD) is an enemy of all aircraft. While fighters are especially vulnerable due to dynamic maneuvering and their complex systems, gliders are also susceptible to FOD

and its consequences. Our older 2-33's with their open flooring are clearly at risk to FOD. However, a pen, loose change, sunglasses, etc dropped by a pilot or their passenger can migrate within the cockpit of any glider and get into the flight controls. Likewise, a tool unaccounted for during repairs or annual inspections can also cause serious problems. The best way to prevent a FOD related incident or accident is of course to account for everything taken into the aircraft and every tool used to repair them. Take a look too as you enter the cockpit for stuff that others may have left . That said, what if you encounter a jammed flight control inflight? Hopefully you have a parachute and sufficient altitude to use it. If neither is the case, then what? You'll need to get creative. If it is the elevator and it is in a favorable position, hopefully that will take you to a safe landing field. If the elevator is positioned such that your nose is rising and perhaps leading to a stall, maybe you can roll the aircraft to get the nose back below the horizon. (The nose will certainly fall as you approach 90 degrees of bank.) If your aircraft has a trim tab, you may be able to use it to control your pitch. If the ailerons are jammed, perhaps the rudder will allow you to change heading. If the spoilers/airbrakes are stuck closed, slip the aircraft to lose altitude. If the spoilers/airbrakes are stuck open...get the nose down to keep airspeed and pick a landing spot accordingly. Regardless of which flight control is jammed, assess whether the aircraft is landable as is. If so, recommend landing versus trying to fix the flight controls by force. (In my AT-38 story above, the pilot did not try to force the throttles. His concern was that if he forcefully pulled them aft he would not be able to advance them again to flyable thrust. We landed...he made the right decision.) If the problem is with the rudder or ailerons, you might try cycling between positive and negative G's to free what may be FOD in the controls. All of these are merely ideas...things to think through on the ground just in case you encounter such a problem one of these days.

In closing, FOD can lead to incidents, accidents, and fatalities. We all must apply due diligence by accounting for everything we take into the cockpit and every tool we use to work on the aircraft.