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Re: Aerostar 600 crash X14

Brian:

I have done considerable research in historically how Multi-engine Instructors are trained and specifically Aerostar Instructors. The Airplane Flying Handbook on page 13-35 out lines some generic but important considerations flight instructors should consider when providing flight instruction in multi-engine aircraft.

One caveat given by all multi-engine instructors is to watch the hands of the training pilot when administrating single engine operations during flight. A good example is some Beech Aircraft that I have trained on in the past such as the B-55, B-58, B-60A, and early model 58P Barons. These aircraft had the flap and landing gear handles reversed from other normal multi-engine aircraft of the same vintage. Gear handle was on the right side of the power quadrant and the flap handle was on the left. On more than one occasion I caught the transitioning pilot reaching for the wrong handle i.e., such as clearing the runway and their hands going for what they thought was the flap handle, but in reality, they were getting ready to deploy the gear handle. This could lead to a costly and embarrassing mistake for both the instructor and transitioning pilot.

More specifically I will talk about instructing in the PA-60 Aerostar Series Aircraft. I was transitioned in 1988 into the Aerostar by Bob Scott, Piper Training Center Manager, and Lester Kyle, Senior Flight Instructor at the Piper Training Center. The other authority recognized in the Aerostar community for training was Tommy Tompkins, Flight Safety Instructor in Lakeland, FL training center. They also taught the Aerostar concurrently with Piper. Mr. Tompkins was a retired Air Force Master Aviator with extensive flight operations from WWII and Korea. Mr. Tomkins had exchanged operational data on the Aerostar between FSI and Piper on a regular basis. This information included teaching different aspects of the Aerostar during flight operations.

Items that were stressed to all instructors were specific systems in the Aerostar, such as the hydraulic and fuel, because of their idiosyncrasies associated with these systems. We were

briefed upon being hired at Piper that no engine cuts would be administered on any Aerostar during the takeoff roll because of the large counter weights installed on the crankshaft of the Lycoming engine and potential detuning of the cranks shaft and resultant damage to the engine.

The next item that was emphasized during our check outs was minimum altitude in which we could render an engine inoperative during flight. The height was 400 FT AGL. All engine cuts at that altitude had to be administered via throttle cuts. Steady retardation of the throttle to the shutoff position, but no rapid movements of the throttle as explained in the paragraph above about detuning the engine crankcase. Also, the signal for us to consider rendering an engine inoperative immediately after takeoff was the training pilots retracting the gear handle. Until the pilot retracted the gear, the onset of an engine failure, the pilot was to retard the throttles and land in the best site within the forward path of the aircraft.

Normal procedures for single engine training work were for the instructor pilot to request the training pilot to an altitude on 6,500 AGL above a suitable landing field. There the flight instructor would have the training pilot do a drag demo on the aircraft, using a simulated zero thrust setting on the critical engine, normally the left engine in the Aerostar. After that we would proceed with a Vmca demo with a modification to the demo by inducing the Vmca condition by rolling the aircraft to the dead engine via a heavy rudder push to simulate total loss of control of the aircraft. This maneuver was started with a ten-knot loss below the aircraft's VYSE number. As an aside, most training pilots though completely briefed in both the classroom and the pre-mission part of the training, would not correctly retard the power on the operating engine, push forward on the elevators, add power on the operating engine, and simultaneously add right rudder. Though this maneuver is a zero-sum operation less than fifty percent of the training pilots accomplished this maneuver satisfactorily the first time.

Normally on the second flight after a through flight brief, we would go back up to 6,500 AGL and initiate an engine failure through the use of the aircraft's fire detection system. Since the hydraulic pump for the aircraft's hydraulic system is located on the right engine and will cause a complete pump failure if the hydraulic pump shut off valve is used to shut the MILSPEC 5606 fluid from the pump to the aircraft system. We simulate a loss of the hydraulic system by shutting the right engine down. Before this operation is accomplished in the air. The operation of the stand-by hydraulic is checked on the ground to make sure it is operational. If it fails the check on the ground no intentional shut down of either engine is contemplated.

This is where it the Aerostar flight instructor earns his/her money. Upon hearing and seeing the right engine fire detection go off the pilot declares he has a fire in the right engine and will shut the right engine down via the mixture knob on the power quadrant. The flight instructor should slide his hand behind the left mixture knob so that the training pilot does not inadvertently shut down the left engine while talking about shutting the right engine down. It potentially happens more than you think. The right engine is feathered via the right propeller knob. Again, blocking of the left propeller knob by the flight instructor is required so that inadvertent feathering of

the left engine does not take place with the mixture knob on the right engine already secured in the off position. The shutdown check list is read at this time to ensure that the appropriate system is secured and one engine operations are being handled. The Aerostar flies so well on one engine, I often ask if they want to take a picture of the right engine feathered.

There are a couple of "Gotches" that may pop up if you are not familiar with the Aerostar. One is the checklist directing the fuel shutoff switch of the feathered engine to be closed. I used to do that religiously until one day over VRB I went to restart the engine and could not get to go, tried everything but the engine would not start. Landed the Aerostar on one engine and taxied to Piper's maintenance facility. One other advantage the Aerostar presents that other GA light twins don't have is nose wheel steering, allowing the pilot to operate the aircraft on the ground with an engine shut down. The lead Aerostar mechanic at Piper greeted me and asked what the problem was with the engine. Told him my tale of woe about not getting the engine to restart after the shutdown. He said I forget to tell you that the fuel shut off switch is inoperative before you took off. All the fuel gates on the Aerostar are electrically driven. If you turn the switch off and the switch fails, there is no way to get fuel to the shutdown engine. After that day when demonstrating engine shutdowns when I get to that portion of the security checklist about shutting the valve off, I ignore it. I will list another in-flight "gotcha" later in the restart sequence.

After securing the right engine we then do an emergency gear extension under hydraulic pressure. We instruct the training pilot to use the flap lever up and down not to exceed twenty degrees flap deployment and the airspeed on the aircraft not to go below VYSE. We inform the training pilot that we will lose six hundred to a thousand feet of altitude during this demonstration. After "milking" the flaps until the main and nose gear lock into position, we have the training pilot turn on the auxiliary hydraulic pump and allow the pressure to build to 1,000 PSI then retract the landing gear. Here is where another I "gotcha" comes into being. Holding the airspeed at VYSE, the gear tries hard to go back into the wells. But the auxiliary hydraulic pressure just won't bring it up. You have to bring the aircraft below VYSE by five to seven knots in order to allow the gear to cycle into the gear wells. Once in the wells we are set to do an aerial restart.

Normally if the outside air temperature is below 60-degree F on the surface we do not recommend doing a shut down.

The restart exercise requires engine priming with the mixture knob and boost pump. Moving the prop lever slightly out of the detent position and engaging the starter switch. Usually after a few blades turns the engine starts to run and a warmup period of a few minutes is initialed until the cylinder head temperature reaches 100F and then the propeller lever is slowly advanced to rejoin with the operating RPM setting. Radios are turned on and a normal flight profile is established.

Another single engine operation we teach is while conducting instrument approaches where we render one each inoperative and also fail a radio system. If the instrument approach entails a circle to land maneuver, the pilot maybe forced to clean up the airplane in order to get the airplane to fly to the landing point via the arc.

One single engine operation that I find rewarding is an engine failure on a half mile final after announcing that the training is complete and we are returning to the airbase. The results of this operation are often very revealing about the mental process of the training pilot. After taking the engine out on short final, normally airspeed and altitude control start to deteriorate very quickly. Most of the time it is simply that the training pilot does nothing to correct the flight situation, which would lead to a potential disaster while still in the air.

Brian, I hope these few paragraphs regarding single engine operations in the Aerostar are of some help to you in understanding what most flight instructors qualified in the aircraft would teach in one form or another.

Safety in instruction is all of our collective efforts. Nothing beats experience and currency in the aircraft when flying a complex airplane like the Aerostar.