



THE WEEKLY PLOG—TRAINING NEWS FROM HANGAR 4

“Kill the Engine” Part 3 - Training for Emergencies

17 December 2007

The airplanes that we fly at WMU are well maintained, most are relatively new and they usually do not fail catastrophically. Regardless, we practice emergency situations so that we are prepared for them if they do occur. As I mentioned a couple of issues ago, my student pulled the mixture to idle cutoff when faced with a simulated engine fire. I reacted by doing nothing and the student immediately restored the mixture when the power dropped off. Why did this student make such a bad mistake?



AIRCRAFT SIMULATION HAS COME A LONG WAY.

When we train, we would like to make everything as realistic as possible and have the student react as if it were a real situation. Sometimes it is difficult to setup or perform realistic situations in the airplane during training because it would be unsafe; can't pull the CAPS in the Cirrus, can't ditch in a lake or set the engine on fire. With the development of simulation, it is possible to replicate the real world and safely perform what would otherwise be a dangerous procedure. The question we are investigating is how to transfer what we have learned during simulation to the airplane and maintain an acceptable level of safety in the process.

As I was going through initial training many years ago, simulation was scarce. My first introduction to a simulator was an ATC 610 table top device. It came complete with a plotter, one VOR/LOC receiver, a DME, the standard 6 pack of instruments, and engine controls. The plotter could be used for navigating a small area in California. This device was meant for instrument training only. After completing an instrument approach, you had to push a button to see if you made it to the field; green light was good and red light was bad.

When it came to training emergency procedures, we could only talk on the ground about how to do it. In the airplane we pretended to do it. My instructor hammered home this point: “when under stress, you will perform an emergency exactly the way that you practiced it.” We had to be careful in the airplane not to do anything unsafe, like move the mixture to idle cutoff or turn the magnetos off. When practicing an emergency in an airplane, we used a procedure called ‘*touch drills*’. During a *touch drill*, we moved any control that could be safely moved (throttle, carb heat, prop controller, etc.) but only touched the other controls (mixture, mags, fuel selector, etc.). When touching a control, we verbally announced the action that needed to be performed. For example, during an engine securing drill, a pilot would touch the mixture control and say “mixture idle cutoff.” The combination of touching an item and announcing the action helped to establish a ‘*psychomotor connection*’. When a pilot is under duress, they are more likely to perform at a level that requires very little thinking or cognizant mental activity. So the ultimate goal of this training was to get a pilot to perform on an automatic level and without hesitation.

Lets say that a pilot has never gone through this type of training, but has only verbally announced the required actions during training (i.e. no touching/moving the controls). In an actual emergency when stress levels are high, they are more likely to revert back to a level of performance that requires very little thought and may only talk about what they should do instead of performing it. When I was a student, my instructor gave me an unexpected, but simulated engine failure. We were only at 1,500' agl so my response was quite hurried. My previous instructor wanted me to quickly get through my tasks so that I could concentrate on my landing area. I did the basics of establishing the best glide speed, picking the field and *touching* every control. At that time I was *only* touching items and not even saying the required action. My hand must have touched the carb heat at least a dozen times. I kept expecting to have the engine restored every time I touched the carb heat. My instructor only wondered why I did not *pull* the carb heat on. In my duress, I reverted back to a level of performance that required very little thought, and my previous practice did not involve pulling on carb heat, only touching it.

Since we have realistic simulation for IFR and VFR flying, we can safely learn and practice emergencies. The process for learning an emergency procedure starts with your student reviewing the checklist and reading about the procedure in the POH. Quiz your student; they should be able to *explain* the procedure to you. The next step is to learn the procedure in a procedures trainer. This device is a great tool to help

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THE BACK SIDE

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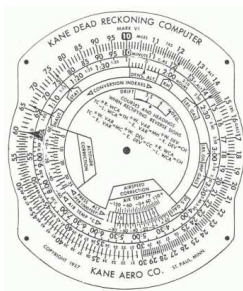
your student develop a memory flow pattern. Repetition is the key to using a procedures training. Next, the emergency procedure can be *practiced* in a training device or simulator. Your student should be able to do the procedure correctly, but may need some guidance from you as well. Your student is now ready to perform these procedures in the airplane. If the emergency is being simulated in the airplane, the instructor and student need to know what controls can be moved and which ones are touch/announce only controls.



HOW WILL YOUR STUDENT REACT IN A REAL EMERGENCY?

My student who pulled the mixture to idle cutoff for the simulated engine fire, had just practiced the procedure in a flight training device the day before. When I introduced the engine fire, he reverted back to his previous experience. He simply did not think about what he was doing, rather he reacted just the way he had been trained. It is always a good idea to have your students periodically review how to perform emergencies in the airplane; especially if they recently reviewed them in a training device or simulator.

When Navigation Logs Go Bad



NOT ALL COMPUTERS ARE THE SAME.

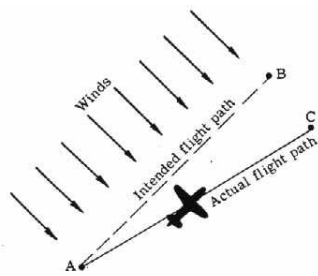
Being able to use a manual flight computer is an integral part of being a pilot. The flight computer that we use today is modeled after those used by World War II airmen. Not much has changed since those days except that different companies have made different versions of them. Today, most pilots know the manual flight computer by the name E-6B, but others may know it as CRP-5 or CR-3. I'm sure that there is some history lesson to the letters, but not all flight computers are made alike.

Recently I looked over the cross-country flight planning of a student and pointed out that the wind correction was applied in the wrong direction. He got out his flight computer and showed me how he came up with his numbers. To my surprise, he wasn't using the standard E-6B model; which accounts for why he made the mistake in the first place. His flight computer was a 1957 Kane Dead Reckoning Computer known as the MK-6B.

For the most part, it works the same way as the standard E-6B, but it has some additional formulas for determining different type of wind vector problems, other than WCA. The student used the wrong formula to determine wind correction.

There are two lessons to learn here: 1) Know how to use your flight computer, regardless of which version it is. In fact, our local FSDO expects that all flight instructors know how to use the manual flight computer. 2) Double check that your answers make sense. If the wind is coming from the right side of the airplane, make sure that you are correcting to the right. And remember, the best thing about the manual E-6B flight computer is that you do not have to ever buy batteries for it.

Quiz Time



CALCULATING MAX DRIFT IS EASY.

Did you know that the maximum amount of wind drift is a function of True Airspeed and the wind strength? Max Drift is calculated by multiplying the wind speed by 60 and dividing the result by TAS. The answer is the number of degrees that an airplane would drift if the wind was off a wingtip.

Compare Max Drift for an slow piston powered airplane at 120ktas and a VLJ at 360ktas. The wind for both aircraft is 30 knots.

The answer is online at <http://homepages.wmich.edu/~nicolai>