Flight Information File 2009-05

SUBJECT: Analysis of an Aircraft Incident
DATE: September 24, 2009

This Flight Information File is taking a slightly different approach from previous FIF's. Rather than a cold non-personal notification to pilots about changes in policy or procedure, this FIF analyzes a recent aircraft incident at the College of Aviation. The intent of this analysis is not to point fingers or place blame but to look at some of the how's and why's concerning errors made and to identify alternative actions that would have resulted in a better outcome.

Early one morning last week, a flight instructor was in the dispatch "glass house" looking out at the flight line. One particular aircraft caught his attention as it wasn't sitting quite the same as the others. Upon closer examination, the flight instructor noticed that the aircraft was indeed sitting with a nose-down attitude, the propeller tips were bent and there was slight damage to the nose wheel fairing. At this point, the flight instructor initiated the College's accident/incident response plan: appropriate individuals were notified; aircraft maintenance attended to and completed an initial aircraft status inspection, the airport was notified of the possibility of FOD contamination on the runway, and management started their initial investigation of where, when and to whom did this happen.

Maintenance technicians discovered what is an all too common outcome to a bad landing. All three propeller blades had struck the runway and were bent back [Figure 1]. One propeller blade showed evidence that it struck the nose wheel fairing. The nose wheel landing gear pucks, designed to absorb most of the landing forces, were crushed and even pushed back to the point where they impacted and caved in the oil filter [Figure 2]. The initial estimate from maintenance is that this will cost approximately $30,000.00 to repair the aircraft and that it may be out of service for two to three weeks.

Figure 1

Airfield personnel promptly inspected the runways for any debris that would lead to foreign object damage (FOD). No runway contamination was found during their inspection.

Figure 2

Dispatch records revealed that the last activity involving the subject aircraft was a solo flight. The pilot profile, however, was not what would have been expected with a landing incident. The pilot on the previous flight was someone who was FAA certificated and was experienced in Cirrus, including nearly 12 hours of experience in the last month. An interview with the pilot was definitely the next step.

When debriefed, it was apparent that the pilot was unaware of any aircraft damage. The pilot reported that the intent of his training lesson was to gain experience in the traffic pattern performing takeoffs and landings. After a weather brief, he initiated, and completed the flight involving eight night landings at Battle Creek Airport (KBTL).

On the third from the last landing, although the aircraft was on glide path and on approach speed, the pilot reported that he flared too soon. The aircraft subsequently developed a high sink which the pilot countered by adding a slight amount of power to arrest the sink. The aircraft hit the runway main landing gear first (quite hard) and bounced. The next contact with the runway was nose wheel first. The pilot reported that he had full back stick applied to prevent the nose wheel from striking, but it hit anyway. He also reports that he heard the stall horn prior to the nose wheel hitting. Following the nose wheel strike, the pilot added full power to go around. He completed his go-around by retracting the flaps when it could safely be done.

The pilot's next landing was much better. He reported he had concerns about the integrity of the aircraft after the prior hard landing. To check the airworthiness, he swerved the aircraft right then left of centerline to make sure the aircraft "felt right" and switched the MFD to the engine page to check for any anomalies. He noted no problems with either of these checks. The pilot indicated that he took off one more time for another trip around the pattern, again with a successful landing outcome.

When all landings were completed, the pilot parked the aircraft on the terminal ramp outside of dispatch. During post flight he inspected the tail tie down for signs of a tail strike and did not note any damage. He tied the aircraft down for the night, returned the tin to dispatch and completed the activity with the SOF.

Following a debrief with the pilot, the next action was to examine the data from the aircraft's MFD. A unique feature of Cirrus aircraft is that the MFD records certain parameters every six seconds of operation. This is exceptionally useful to help recreate a flight when needed. In this particular situation, the MFD data did not shed any light beyond the pilot's account. It did however show that the pilot was very consistent in his traffic patterns [Figure 3].

Analysis of the pilot's personal account and the collected data followed. While it is obvious that there was a bad landing resulting in aircraft damage there were a number of other "errors" that occurred. While it is very easy to be an "armchair quarterback" we must remember the intent is not to place or focus blame on the pilot. Many of the errors noted have also been seen in other incidents and occurrences involving College aircraft. The analysis of errors is to educate all of WMU's pilots and provide them with guidance should they find themselves in similar situations.

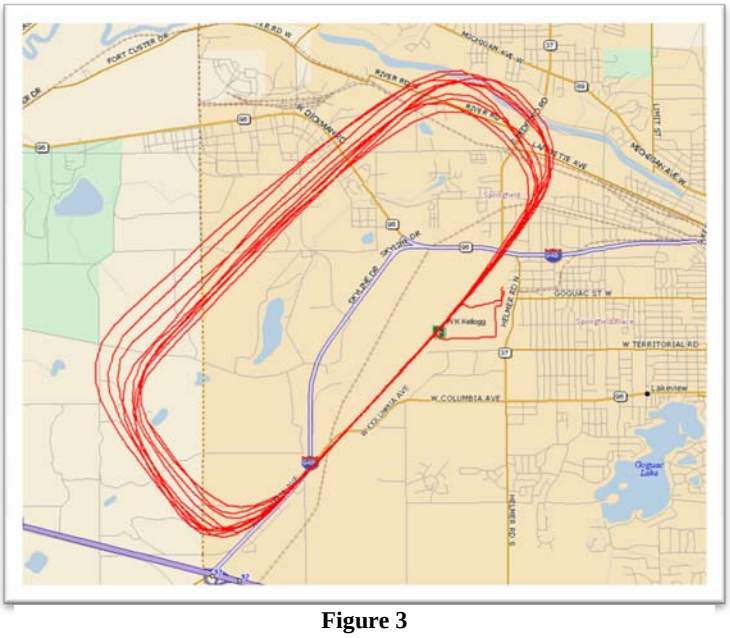

Figure 3

The most significant errors executed by the pilot were:

- The pilot allowed himself to become complacent during his practice of landings.
- The pilot did not execute an appropriate timely recovery for a bad approach and landing.
- The pilot elected to ignore a "Stop Sign" and continued his training lesson.
- The pilot did not perform an adequate post flight inspection.

Let's take a closer look at each of these errors in more detail.

The pilot allowed himself to become complacent during his practice of landings. By his own admission, the pilot stated that he became a little complacent during the pattern leading to the incident. The flight was going great, all of the previous patterns were solid and the landings were being "greased on". The pilot likely let his guard down somewhat and became a little complacent. A long time saying in the training business is "Fly It Until You Tie It!" meaning it is the pilot's responsibility to remain in positive control of the aircraft all the way until it is tied down post flight. It's easy to become complacent when the flying tasks are easy but this is one of the times when we need to be attentive. We cannot afford to allow ourselves to slip into the complacent mode.

Another contributing factor to the pilot's complacency may have been in the form of chronic fatigue. The pilot reports that he has a job where he is required to work the swing shift seven to eight hours, five days a week. A normal individual's sleep pattern consists of seven to eight hours of sleep at night. Any disruption to that pattern increases the risk of sleep deprivation and consequent impairment. It has been proven that disruptions in the circadian rhythm and states of chronic fatigue can have the same impact on pilot performance as flying while intoxicated. While the pilot believes that fatigue was not a contributing factor, it is not possible to rule it out. Ironically, the safety slogan or "Pegasus Prose" posted outside of dispatch last week stated "It is better to crash into a nap rather than nap into a crash." [Author Unknown].

The pilot did not execute an appropriate recovery for a bad approach and landing. The pilot recognized that his stabilized approach became un-stabilized when the timing of the flare went awry. The aircraft flared high and a high sink rate ensued, he added "a touch of power" to arrest the increased sink. This action is generally an accepted practice if the sink rate is not excessive but it does require the pilot to have a certain level of experience to judge the timing and the amount of power to apply. Another acceptable practice is to execute a go-around. If there is any question which practice would be most effective, the pilot should execute a go-around.

Since the College of Aviation has operated Cirrus aircraft, there have been seven landing incidents that have resulted in propeller strikes. Analyzing data from these incidents show that faulty approach and landings usually fall into one of two categories of error: those with low energy and those with high energy. Let's examine both.

Low Energy Landing Incidents A low energy incident usually occurs when the aircraft approaches to land with too little energy. There are a number of reasons why this might occur but the end result is that the aircraft approaches the runway with a relatively low speed and high sink rate. The resulting touchdown usually results in a very firm "bounced" landing. Initial pilot reaction is to lower the nose after a bounced landing. This can result in a very firm nose wheel impact and likely propeller strike. While it is possible to recover from a bounced landing with a judicious addition of power, an unexpected bounce often is better dealt with by executing a go-around.

High Energy Landing Incidents A high energy incident usually occurs when the aircraft approaches to land with too much energy resulting in a shallow landing attitude and relatively high speed touchdown. The aircraft usually "skips" slightly sending the aircraft airborne again. The pilot often relaxes elevator back pressure resulting in a "nose wheel first" touchdown. The firm suspension of the Cirrus landing gear pushes the aircraft nose airborne again about the same time the main gear is contacting the ground. The aircraft is sent airborne and pilot action again is to lower the nose. This "oscillating cycle" often results in what is called a porpoised landing with each cycle increasing in amplitude until the aircraft incurs a propeller strike. There are two accepted recoveries for a porpoised landing. For a mild porpoised landing, establishing the proper landing pitch attitude along with a small addition of power usually results in an adequate recovery. Another method of recovery is to execute the go-around maneuver. If there is any question of which recovery method to use, the go-around is the preferred recovery method.

The pilot elected to ignore a "Stop Sign" and continue his training lesson.

The pilot reported during the debrief that after the "botched" landing, he had concerns about the airworthiness of the aircraft. He stated that after the next landing, he reviewed engine performance on the MFD and that he swerved slightly both right and left to check the integrity of the aircraft gear. *The pilot had concerns about the airworthiness of the aircraft but elected to continue to fly the aircraft.* This is not the first time we have seen this type of pilot behavior. During a different training flight, a pilot experienced a brake lock-up that nearly resulted in a runway excursion. Rather than shutting down and inspecting the aircraft, the pilot elected to do a quick

brake check and continue on with the training lesson. If there is any doubt about the airworthiness of the aircraft or any of its systems, and you are on the ground, do not take the aircraft airborne again. Shut down, inspect and if necessary, gain the expert advice of our maintenance department or the SOF.

The pilot did not perform an adequate post flight inspection. After flight, the pilot did take the time to inspect the tail of the aircraft. Unfortunately he did not inspect the front of the aircraft. The resulting error placed the aircraft back into airworthy service, potentially jeopardizing the welfare of fellow classmates who may have been dispatched this aircraft. While this is said, it is almost guaranteed that the aircraft damage would have been discovered on the subsequent preflight. Not all aircraft damage however is so visually obvious. This is why it is imperative that a thorough post flight inspection is conducted after each and every flight and that all aircraft abnormalities and hard landings are reported to maintenance.

As mentioned previously in this FIF, the reason for reviewing these pilot errors is not to place or focus blame on the pilot but to provide all pilots guidance should they find themselves in similar situations. Remember,

Safety Is No Accident.

When in Doubt, Go-Around!