



**Stan/Eval Newsletter
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
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Maxwell AFB, AL 36112**



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Handle With Care (Maj M. Banner, FLWG)

Consider the following statement from a pilot involved in a ground handling mishap with a Cessna 172. “In the absence of a tow bar, I helped move the airplane into a hangar. While I pushed on a propeller blade, another person pushed on the propeller spinner and a third person pushed the tail down to elevate the nose wheel to steer the airplane into the hangar; then we heard the wing strike the hanger door.” Consequently, the right aileron was damaged (Fig 1).



Fig. 1

What was done improperly? How could this mishap have been prevented? Although the mishap did not involve a Civil Air Patrol airplane, it could have, and it illustrates how to *improperly* move an airplane into a hangar.

Attitudes of carelessness and nonchalance, as well as ignorance can lead to a damaged airplane, especially when attempting to move it by hand into a hangar. Repairing propellers and other parts of an airplane like a crushed vertical stabilizer, rudder and wing tip for example are expensive! Therefore, it is so important to handle airplanes with care when moving them.

In recent years, Civil Air Patrol has experienced many avoidable aircraft ground handling mishaps. To provide a high level of safety awareness and to minimize mishaps, all personnel who come in contact with aircraft are required to view an aircraft ground handling training video and take a short test every second year. Only CAP personnel that have CURRENT aircraft ground handling training are authorized to move or supervise the moving of aircraft.

Fig. 2 AIRPLANE GROUND HANDLING CHECKLIST

Prior to moving the airplane

1. Identify a “person in charge” who is responsible for moving the airplane on the ground.
2. Conduct a RM safety briefing to include:
 - a. Minimum two person crew
 - b. Sterile flightline / hangar, i.e., non-essential conversations and otherwise *distracting actions* shall not occur while moving the airplane (no unnecessary talking, no use of cell phones).
 - c. Instruct the crew to yell “Stop” if anyone should see any hazardous situation such as objects in hangar or structures of the hangar building and other aircraft which could damage the airplane being moved.
 - d. Just before moving airplane, perform a 360 degree walk-around the airplane to visually inspect all cardinal points (nose, rudder, horizontal stabilizer, right wing and left wing) for safe clearance from any obstacles along the entire path of intended movement and ensure hangar doors are fully open and locked in position.

Moving the airplane

1. *Steer with tow bar, push / pull on approved areas of the airplane*
 - a. Never push / pull on the propeller or spinner
2. Maintain sterile flightline procedures
3. Continue to view all cardinal points of the airplane to ensure safe clearance from all obstacles.

Checklist review

For risk management (RM) safety reasons, prior to moving an airplane, review an appropriate checklist (Fig. 2). All personnel involved in moving an airplane in and out of a hangar are obliged to follow checklist procedures.

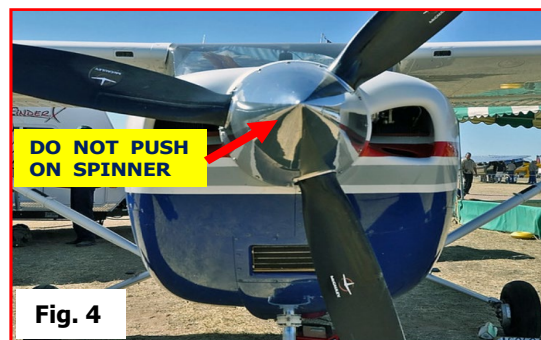
Moving airplane on ground

One hazardous method of moving an airplane is to *push down on the horizontal stabilizer to pivot and move the airplane; this is a big no-no!* (Fig. 3)

In fact, Cessna provides a note in the *Pilot's Operating Handbook* for the 172 and 182 airplanes, specifically addressing the potential for damage. Stated in Section 8 of the handbooks is the following: "Do not apply pressure on the elevator or horizontal stabilizer surfaces when pushing down on the tail cone". The horizontal stabilizer is designed to take aerodynamic stress evenly across the surface, not for a concentrated force to be applied in a small area as when pushing down on the tail. Pushing down on the horizontal stabilizer can cause cracks in the structure and costly repairs.

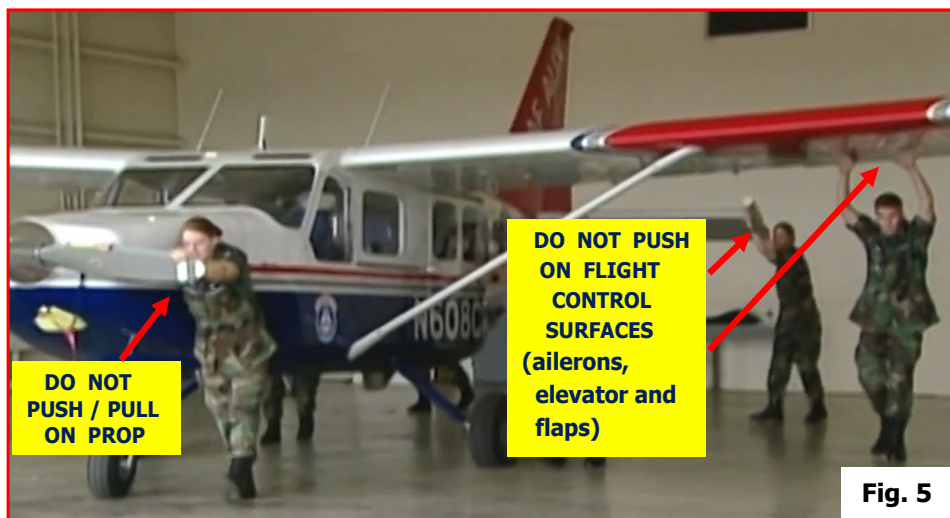


Another hazardous method is to push or pull on the propeller to move the airplane, as even a moderate amount of force on a propeller blade can damage propeller attachment connections at the hub. Aluminum blades can bend, and it doesn't take much to put the blades out of track with one another. Forget what anyone has told you about pushing/pulling near the hub or the strength of a propeller blade from the hub to the propeller tip. *You will never find an FAA or a CAP publication stating it is safe and appropriate to push and pull an airplane by using the propeller.* Avoid pushing the airplane by the spinner! The spinner and backing plate are built to be light, so they're quite fragile. Pushing on them can cause the backing plate to crack and can lead to spinner failure (Fig 4). Also, pushing on flight control surfaces and open doors is hazardous, predisposing to airplane damage (Fig 5).



Three factors to consider prior to moving the airplane are: (1) Ensure the brakes are not applied; (2) Have a team member check the nose and main landing gear tires for proper inflation; (3) For moving into and out of a hangar, paint three lines on the pavement that extend into the hangar so the direction of each tire can be assured.

To move the airplane, pilots and ground personnel should think of the tow bar as a *steering bar* for steering and turning the airplane on the ground. Use the proper/authorized tow bar that is in good condition. The wrong type of tow bar, or makeshift equipment, can cause damage to



the airplane. ONLY, push or pull on approved areas of the airplane. For example, for most CAP airplanes, push on the wing struts near the fuselage (Fig 6). Station a wing walker at each wingtip and tail walker to ensure adequate clearance from any obstruction in the path of the airplane. These walkers are responsible for properly signaling as soon as it appears the airplane is in danger of colliding with an obstruction. For example, while moving one of Florida Wing's airplanes from its hangar, no one noticed that one hangar door was not fully open and locked. Consequently, one of the airplane's wings impacted on the hangar door and the leading edge of a wing and wing tip were damaged substantially.

Get help moving airplane.

If you are a solo CAP pilot scheduled to fly a sortie, get help from FBO line personnel to extract the airplane from the hangar. Similarly, following completion of a sortie, a solo pilot should get help from FBO personnel to help move the airplane back into the hangar. Apply the same RM procedure as used for extracting the airplane from the hangar by using the checklist; ascertain that the hangar doors are fully open and locked open and have a monitor for each wingtip and the vertical stabilizer. Do not attempt to place an airplane into a hangar alone. If no one is available, tie the airplane down on the flight line.

Airplane movement on paved and grass surfaces

Additional precautions need to be considered when moving an airplane off a paved surface and onto a grass surface and vice versa. For example, a mishap in Florida Wing involved a crew that moved a Cessna 172 from a paved area onto an adjacent grassy area for parking purposes. Prior to moving the airplane, the crew did not thoroughly inspect the grassy area next to the paved area and did not pay close attention to the *transition area* between the paved and grassy areas. The pavement was several feet higher than the ground in the transition area. Due to high and dense grass overgrowth, no one noticed that the ground was substantially lower than the pavement. When the airplane was pushed to the grassy area and its main wheels moved off the pavement, the airplane dropped suddenly downwards which, in turn, caused the airplane to accelerate rearward, its tail lowered forcefully resulting in a ground tail strike and a significantly damaged elevator. Consequently, the airplane was declared non-airworthy and could not be flown.

If an airplane is parked in a grassy area, pilots should never taxi while under power from the grassy area to an adjacent paved area. In this situation the first move the airplane by hand from the grassy surface onto the hard surface. Only then should the engine be started and used to taxi the airplane.

Always consult the *Pilot's Operating Handbook* for guidance on how to safely move an airplane while on the ground. Review best practice RM

procedures prior to moving an airplane, and continuously monitor its movements. Make it a priority to handle all Civil Air Patrol aircraft carefully and safely!



Confusion, Ambiguity Assumptions and Safety (Capt B. Trussell, DEWG)

We are often introduced to some of the rules and operating procedures in aviation without the benefit of understanding the genesis of them. Often, a rule or practice has its origin in an accident investigation as corrective actions or recommendations. Spending a little time reviewing a final accident report can be very instructional. The FAA as well as CAP actively look for ways of preventing recurring incidents that cause injury or damage to aircraft and property on the ground or worse. Such is the case with one accident that happened a long time ago, December 1, 1974.

On that date, a Boeing 727 operated as Trans World Airlines Flight 514 crashed 25 nautical miles northwest of Washington Dulles International Airport after encountering trees and terrain while the flight was descending for a VOR/DME approach to runway 12 in instrument meteorological conditions. All 92 occupants lost their lives, and the aircraft was destroyed. This accident might not have been so memorable were it not for what facility was under the accident site, the subject of much speculation.

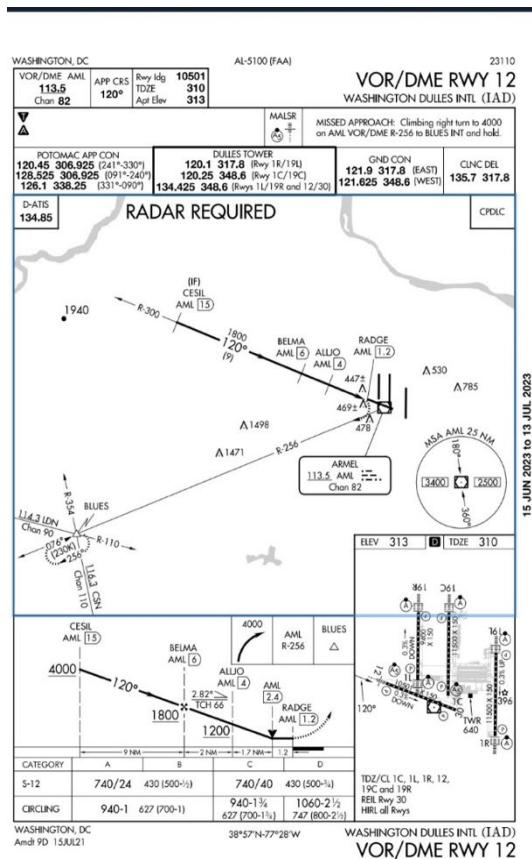
While there are too many details of the accident to describe in this article, some of the more important details are as follows (quotation marks are included where the report is quoted directly. Bold text and underlined is used for emphasis only):



- “The Dulles approach controller cleared the flight for a VOR/DME approach to runway 12 when the aircraft was about 44 NM from the airport. The clearance contained no altitude restrictions.”
- “The captain **assumed** that the flight could descend to 1,800 feet, immediately. The first officer, who was flying the aircraft, initiated an immediate descent to 1,800 feet.”
- The Washington Air Route Traffic Control Center controller vectored the flight to intercept the 300 Degree radial of the Arnel VOR at a point about 80 NM from the VOR. **This portion of the radial was not part of the published instrument approach.**
- “The approach clearance was given to the flight without altitude restrictions because the flight was not being handled as a radar arrival and because the controller expected the crew to conduct the approach as it was depicted on the approach chart.” The chart for the approach as it is designed today is provided below.

From the details above we can start to draw some comparisons between the way the system operated nearly 50 years ago and today’s operations. First, the approach clearance being issued in the manner that it was is not the standard today with improvements made to take out any ambiguity or confusion. We expect to receive headings, courses, and altitude restrictions to intercept the final approach course and commence the approach, and getting the approach clearance nearly 50 miles out? Not likely. While we know today that one should “assume” nothing in aviation and if there is any question on a clearance issued, we should ask. In fact, in this case, the accident investigators provided a footnote in their report “Subsequent to the accident the FAA amended 14 CFR 91.75(a) to reemphasize that “If a pilot is uncertain of the meaning of an ATC clearance, he shall immediately request clarification from ATC.”

There was considerable discussion and confusion surrounding the issue of when flights are or are not radar arrivals. Adding to the confusion are statements by investigators indicating that a pilot might not realize that, under some circumstances, his flight, without formal notification, might be a nonradar arrival and subject to a different ATC procedure. The expectation and result of this practice had the effect of moving the responsibility from the controller to the pilot, sometimes without the pilot being specifically informed. The terms radar arrival and nonradar arrival were not defined at the time of the accident.



Well prior to the accident, in 1967, the accident investigators noted that “the United States Air Force (**USAF**) questioned the FAA's procedures for instrument approaches with regard to the responsibility for terrain clearance.....The USAF made an emergency change to AF Manual 51-37 which instructed military pilots that: maintain last assigned altitude until established on the published final approach course. “

Good for the Air Force to recognize a situation that could become a critical issue well in advance of a real-world scenario. For the record, TWA arrived at a similar conclusion later, but before the accident. After laying out the facts of the accident the investigators began the presentation of their conclusions by saying “The ATC system was deficient in that the procedures were not clear as to the services the controllers were to provide under the circumstances of this flight.”

As for probable cause of the accident, the report concludes:

“The National Transportation Safety Board determines that the probable cause of the accident was the crew's decision to descend to 1,800 feet before the aircraft had reached the approach segment where that minimum altitude applied. The crew's decision to descend was a result of inadequacies and lack of clarity in the air traffic control procedures which led to a misunderstanding on the part of the pilots and of the controllers regarding each other's responsibilities during operations in terminal areas under instrument meteorological conditions. Nevertheless, the examination of the plan view of the approach chart should have disclosed to the captain that a minimum altitude of 1,800 feet was not a safe altitude.”

The response from the FAA to the investigators was to include those things that they had done or were doing because of this accident including:

- Directing that that all air carrier aircraft be equipped with a ground proximity warning system by December 1975
- Revised the provisions of 14 CFR 91 regarding pilot responsibilities and actions after receiving a clearance for a non-precision approach.
- Established an incident reporting system which is intended to identify unsafe operating conditions in order that they can be corrected before an accident occurs.
- Changed its air traffic control procedures to provide for the issuance of altitude restrictions during non-precision instrument approaches.

The FAA also noted that they were installing a modification to the ARTS III system that will alert air traffic controllers when aircraft deviate from predetermined altitudes while operating in the terminal area. Most of the above actions should sound familiar to all of us. There were a few advances made in safety risk mitigations because of this accident. Clarifications provided in operating procedures and training were no doubt updated to inform pilots of these changes. Technical changes were made to approach radars and aircraft equipment that gave controllers and pilots other tools to keep planes and passengers safer.

After haggling over nonradar vs approach radar and when radar services are or can be terminated for approaches, it is important to note that the VOR/DME approach to KIAD now says “RADAR REQUIRED”. Curious as to why?

Read the full report (<https://www.baaa-acro.com/sites/default/files/2019-03/N54328.pdf>)

Safety in the Practice Area (M. Schwartz, ATP, A&P, CFI)

One of the attributes of a good pilot is the ongoing effort to improve their flying skills. In pursuing this goal, we often find ourselves in the local practice area seeking out some space to polish and improve our flying techniques.

If you think back to your student pilot days, (maybe you are a student pilot and are thinking about your dual training days), you can probably recall your instructor briefing you on “see and avoid” procedures. This is more important than ever since most of our local practice areas are near, under, or sometimes within very busy and heavily trafficked airspace. The key is to clear the area visually before beginning any maneuver which could possibly limit your ability to see and avoid. Always keep a constant awareness of your position to remain clear of any Temporary Flight Restrictions and Class B, C or D airspace.

If your practice area has an advisory frequency that is used to improve situational awareness, you should self-announce your altitude and location in the blind every fifteen minutes or so.

If time and frequency use permit, it is helpful to check in with the nearest approach control facility or tower and let them know your position and intentions. I always let the local airport know when I am practicing holds at the nearby VOR, so they are aware of my presence. Even though they can see me on radar, by establishing radio communication, they are able to let me know of any possible traffic conflicts.

Do not let yourself become complacent and less vigilant just because ATC is providing you advisories. Many aircraft are not equipped with transponders or ADSB out capabilities and may not be seen on radar. You must never forget the **see and avoid** concept.

Take responsibility in the practice area to set an example to keep the practice area safe and trouble free. Then they will continue to be there for our use and for the use of the next generation of students and pilots.

Articles for the National Stan Eval Newsletter:

These articles have been written to present ideas, techniques, and concepts of interest to CAP aircrews rather than provide any direction. The articles in this newsletter should in no way be considered CAP policy. We are always looking for brief articles of interest to CAP aircrews to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share.

Please send your contribution to stephen.hertz@vawg.cap.gov. You can view past issues [here](#).