

# Tony's Corner

## Response to Airworthiness Concern Sheet (Cessna 402C, Jammed Rudder)

Mr. Bob Busto:

I am responding to your request for further information regarding rudder gust lock jamming on certain Cessna aircraft. Having fulfilled the position of technical director for the owners' organization the Twin Cessna Flyer for 14 years, I receive a great deal of feedback from the almost 1500 owner/operators of twin Cessna aircraft that are members. In addition I am the director of maintenance/ chief inspector for my own company, TAS Aviation, which personally maintains almost 200 aircraft of this type annually. This level of involvement allows me a diverse knowledge of the ongoing condition and operation of these aircraft models.

During the preceding 10 years I have not been aware of any ongoing problems with this style rudder lock if properly used. I have found this style lock to be very robust and to exhibit no unusual wear, or any mechanical failures while in extended service.

Several years ago, I was informed of an instance when the rudder of a Cessna 414A was properly secured with the gust lock and the overnight, severe winds caused deformation to the rudder and subsequent bending of the lock pin. This resulted in the rudder jamming and the lock pin not being able to be disengaged. Severe structural damage to the rudder also occurred, that if left undetected, could have resulted in catastrophic in-flight rudder failure. This instance, however, was simply a significant design

The Pilot Operating Handbook and FAA Approved Airplane Flight Manual (POH) for the 402C describe the optional rudder lock and its operation in Section 7. The disengagement method is given as "The rudder lock is disengaged by rotating the external handle to the unlock position." No other method for operation is ever mentioned at this, or in any other location, throughout the

overload of the system by the surface winds and not an inherent design fault of the locking mechanism.

As you are aware, there are two ways to unlock this design rudder lock. The first is to move the external rudder lock handle to the disengage position. The second is to lift the elevator from its full down position and a cam assembly on the elevator torque tube will disengage the lock. Lifting the elevator can be done from inside by the control column or outside by moving the elevator up by hand. Having observed flight crew members over the years, (including that of a Cessna 425 and 441 which have the same style system installed) it is my observation that most release the lock by moving the elevator. This was accomplished either from inside or outside the aircraft. My summation of the reason for this as the preferred method is that the external locking lever is somewhat difficult to reach and disengage, especially for a short individual.

In the report of the 402C that was given in the ACS, the cause of the deformation of the locking cam and ensuing jamming of the rudder was a result of right rudder input while lifting of the control yoke. This obviously was caused by the flight crew disengaging the lock while sitting in the crew seats and may likely to have occurred during taxi operations.

While this type of damage would not be improbable when this system was operated in this method it would definitely be an action that is contrary to standard pilot procedures.

POH. Disengagement of the lock pin by lifting the elevator was only provided by Cessna as an added safety assurance that the flight crew would not have it engaged if proper pre-flight procedures were not accomplished. Nowhere is it stated that lifting the elevator is an alternate method for rudder gust lock disengagement. Additionally a bold type warning states "Ensure all control locks

are removed before starting the engines thus disengagement during taxi operations is defiantly contrary to POH directions. The only proper method of disengagement is to move the external lock lever to the unlock position.

The problem appears to have occurred not as result from a faulty system, but from operators who are not following procedures, not performing proper preflight inspections, or are not adequately informed of correct procedures. Several conditions may be contributory to this.

The POH does not list the lifting of the elevator as the method for disengagement of the rudder, but then, neither does it state that the disengagement should NOT be accomplished by this method. It may be necessary to add a POH supplement or issue a Supplemental Aviation Information Bulletin (SAIB) specifically and emphatically stating that unlocking the rudder locking pin is **NOT** to be accomplished by lifting the elevator. In addition it should state that if the rudder is found in the locked position during subsequent phases of operation, including taxi, that the pilot secure the aircraft and disengage the rudder lock from outside the aircraft by unlocking the external locking lever and should then visually check for proper, complete, disengagement of the rudder lock pin.

Another problem that I have found is that the required placard showing the **Alock** and **Aunlock** position of the rudder lock handle is frequently missing or painted over on numerous aircraft. Additionally the lock pin handle was painted red on the bottom side to help identify the locked position when the aircraft were manufactured. This red color-coding was not spelled out in the POH or in the maintenance manual and many aircraft have lost this color-coding distinction through the ensuring years. Refurbishment of the red color on the handle and installation of proper placards will make the handle and its position more visible during pre-flight.

It may also be advantageous to add another placard on panel near pilot control stating

**External Rudder Control Locks Installed On This Aircraft**. It is important to remember that this system was optional equipment on these aircraft so that not all aircraft of the same model will have it installed. This could happen in a fleet type operation where only certain aircraft would have the installed locks and others not. These equipment differences could lead to a pre-flight oversight of rudder lock installation and the identification of a locked external rudder gust lock, leading to inadvertent failure to properly unlock it.

It is may hope that a simple solution can be found in this matter. I feel that it has been shown in the past that pilots who receive proper education coupled with pertinent information can greatly improve aviation safety.

Thank you for your consideration of this matter and if further information is required please feel free to contact me.

Sincerely,

Anthony R. Saxton  
Technical Director - The Twin Cessna Flyer

*The above published response is the official response as sent to the FAA by The Twin Cessna Flyer. Our thanks to Tony for his continued support of and dedication to our organization. We value his input as our Manager of Technical Support.*

*Editor*