SAFETY ADVISORY

Commander Owners Group

This notice is being sent to you to make you aware of a possible safety issue with your Commander Aircraft.

The Commander Owners Group (COG) has no regulatory or legal authority; but in the absence of an operating support function being offered by the Type Certificate holder, we feel an obligation to keep owners advised of any information or condition, of which we become aware, that may affect the safe operation of your aircraft. As owner, you alone are responsible for your aircraft and COG accepts no liability for any actions taken, or not taken, by any owner, or owner's agent, as a result of the information contained within this document. To be stated more succinctly, "Use at your risk".

Safety Advisory #1 – Wheel Plate Bolts

Orig. August 18, 2016
Rev. 1B, Oct. 8, 2016

Affected Models:	All Models, all Serial Numbers
Issue:	Main Landing Gear Failure to Extend
COG Recommendation:	Ensure that your aircraft has the correct wheel Plate hardware and that it is installed correctly as per the IPC. In addition, inspect your rubber stop bumpers for condition.
Purpose:	Eliminate a binding condition that can cause the main gear assembly to hang up and not extend

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Background

Recently we had an owner experience a main landing gear that failed to extend (downward) as a result of being hung up in the wheel well. The primary cause was determined to be a bolt on the lower landing gear yoke assembly which holds the *Plate* (**Figure 1**; 112/114 IPC 2-15-8, AN5-24A) having been installed backward and the exposed threads then becoming caught on the edge of the Up-Stop Bracket when the gear is in a raised position. (**Figure 2**; *Bracket, MLG Up-Stop pn 42385-3.* Note: 42385-3 is not shown in 112IPC)

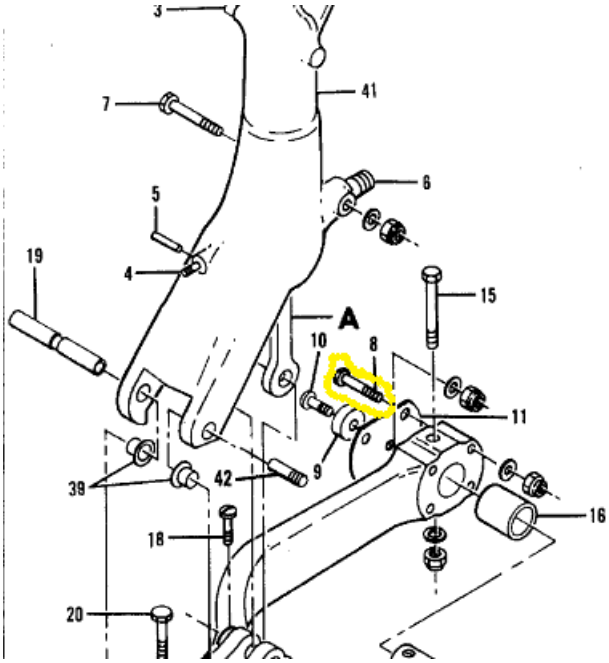


Figure 1

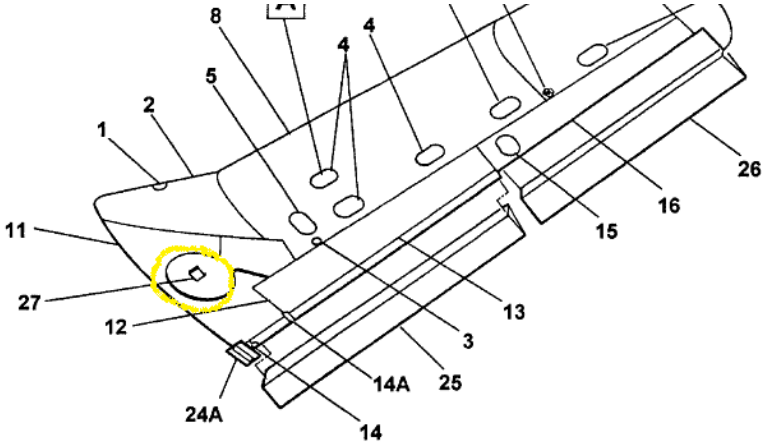


Figure 2

Here is a picture of the results of the exposed threads wearing into the MLG Up-Stop Bracket:

Figure 3 - MLG Up-Stop Bracket Wear

It was subsequently determined that multiple factors contributed to the event.

1. Bumper that was worn out and compressed
2. Bolts on the Main Landing gear Yoke assembly fastening the *Plate* (2-15-11, pn 42308-3) being installed in a reversed condition. (Yoke is Item #22 Figure 2-15 in Commander IPC)
3. Incorrect longer bolts installed. (Bolts are Item #8 Figure 2-15 and item #14 or 27, Figure 2-16)
    a. **Note: the nut specified on the AN5-24A bolt is a thin profile MS20364-524 nut**
4. The *Bracket, MLG Up-Stop* that the bumper contacts in the wheel well has been found to be in slightly different wheel well locations on each plane due to the hand assembly of each wing structure. See *Figure 2*.

At the time, there was a lengthy discussion about this event in the COG web forum, and it was recommended that all owners inspect their main landing gear to insure the bolts were installed as they are depicted in the IPC and that the bumpers are maintained in good condition and not collapsed from wear.

When replacing the rubber bumper as a part of routine maintenance, if properly installed, the gear yoke bolts and wheel must to be removed to allow access to the nut that retains the bumper to the

yoke plate. It is believed that well intentioned AP mechanics may have reversed the bolts on some aircraft (so the nuts face the inside of the yoke) to make changing the rubber bumpers a less time consuming task. It is not uncommon for A&P's to want bolts installed in a way that the nut is available for inspection, but in this particular application the nut on the same side as the bumper sets up a condition where the bolt threads can potentially eat into the Up-Stop Bracket and eventually catch on the edge of the plate. Because the hydraulic system exerts substantial force in raising the gear, the binding created can be sufficient to hold up the weight of the gear assembly when trying to lower the gear.

On Aug 11, 2016 there was another situation where a pilot had to land with the right main gear stuck in the well. Again it was determined that this was caused by the gear yoke bolt being reversed and possibly too long. The condition of the bumper is not yet known.

Recommended Action

It is highly recommended that as soon as practical, you inspect your main landing gear to insure that the correct length bolts are properly installed with the bolt heads on the same side as the rubber bumper. Any deviation from the IPC parts specifications and position guidance should be corrected immediately.

Figure 4 - Incorrect

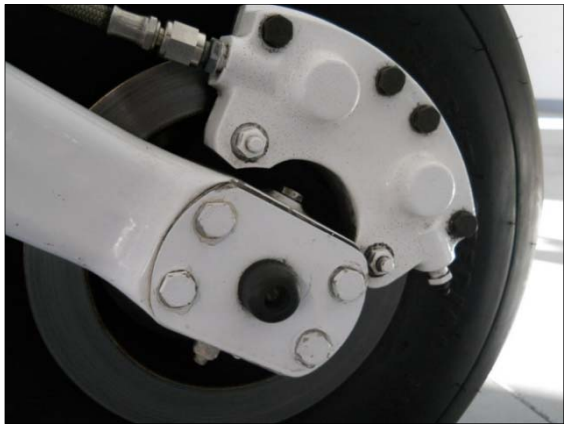


Figure 5 - Correct

Owners are advised that the gear system on the Commander is primarily a gravity-based system and the hydraulic gear actuator does not provide sufficient mechanical leverage to overcome the resistance if a yoke bolt becomes hung on the bumper contact plate. If bolt threads should catch on the edge of the bumper contact plate, the emergency gear extension system WILL NOT FUNCTION as the wheel will NOT gravity drop out of the wheel well to allow the gear springs to lock the gear into a fully extended condition.

In 1999, the Commander factory recognized the desirability of a solution to allow quick changing of the rubber bumpers without having to remove the wheel, and created and engineering order which detailed installation of a nut plate to the back side of the bumper mounting plate See Figure 6.

Figure 6

The COG suggests that you considering this small modification as it not only facilitates servicing the rubber bump stops, but by eliminating the need to remove the wheel and plate, the possibility of installing the attaching bolts incorrectly is removed.

Engineering drawings courtesy of Commander Aircraft Corporation.

S ■ P □ M □ E □	ENGINEERING ORDER	PAGE 1 OF 3
DRAWING NUMBER 42308	**Commander AIRCRAFT COMPANY**	ADVANCE ■ / COMPLETE □ — REVISION LETTER A-5A
DRAWING TITLE BUMPER ASSY-UP STOP, MLG	WILEY POST AIRPORT Bethany, Oklahoma 73008	DESCRIPTION OF CHANGE MAJOR □ MINOR ■

REASON FOR CHANGE: NEED TO CORRECT MAT'L HARDNESS C/O & ADD NEW DASH NO.

AFFECTS -1

1. CHG NOTE, WAS:

△1 SDH 65 NEOPRENE RUBBER BUMPER WITH STEEL WASHER INSERT.

REQ'D:

△1 SDH 65+/-5 NEOPRENE RUBBER BUMPER WITH STEEL WASHER INSERT.

2. CREATE -501 S/A -1 EXCEPT AS SHOWN, & ADD TO PL:

-501	-1	PART NO.	NAME	
1		MS21047-L3	NUTPLATE	
	1	AN365-1032	NUT	
1	1	MS35207-265	SCREW	
	1	AN960-10L	WASHER	

NOTE: 45010 HAS BEEN DEACTIVATED.

N/A 45017

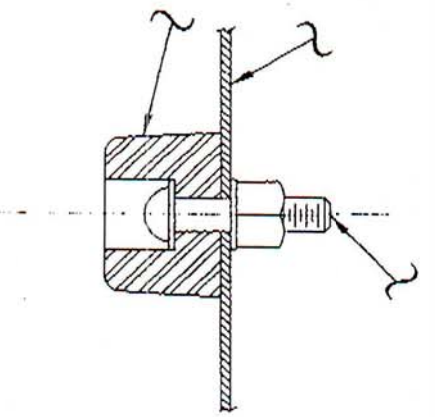
A	1) CHGD N/A, WAS: 45010	BY	PD	B Thiessen
		DATE	3-4-99	3/9/99

DISPOSITION	SERIAL EFFECTIVITY
ASSYS MADE ACCEPTABLE, ACCEPTABLE TO USE UP EXISTING STOCK	112/114: ALL & ALL SPARES

	ISSUED	APPROVED
BY	PD	B THIESSEN
DATE	2-9-99	2-10-99

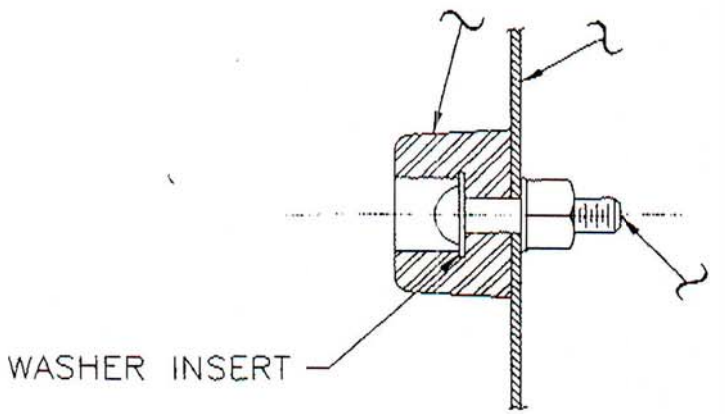
S ■ P □ M □ E □	ENGINEERING ORDER	PAGE 2 OF 3
DRAWING NUMBER	Commander	ADVANCE ■ / REVISION LETTER
42308	AIRCRAFT COMPANY	COMPLETE □ / A-5A
DRAWING TITLE	WILEY POST AIRPORT Bethany, Oklahoma 73008	DESCRIPTION OF CHANGE
BUMPER ASSY-UP STOP, MLG		MAJOR □ MINOR ■

3. CHG SEC A-A, WAS:



SECTION A-A

REQ'D:

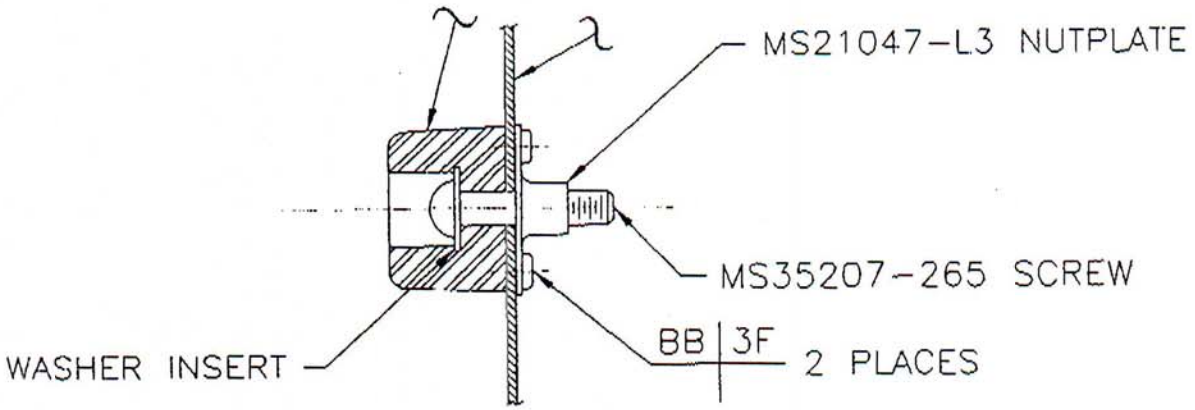


SECTION A-A

(-1 ONLY)

S ■ P □ M □ E □	ENGINEERING ORDER	PAGE 3 OF 3
DRAWING NUMBER	Commander	ADVANCE ■ / REVISION LETTER
42308	AIRCRAFT COMPANY	COMPLETE □ A–5A
DRAWING TITLE	WILEY POST AIRPORT	DESCRIPTION OF CHANGE
BUMPER ASSY–UP STOP, MLG	Bethany, Oklahoma 73008	MAJOR □ MINOR ■

4. ADD SECOND SEC A–A, S/A SEC A–A EXCEPT AS SHOWN:



SECTION A–A
(–501 ONLY)