

Air Safety Investigation Examination Report

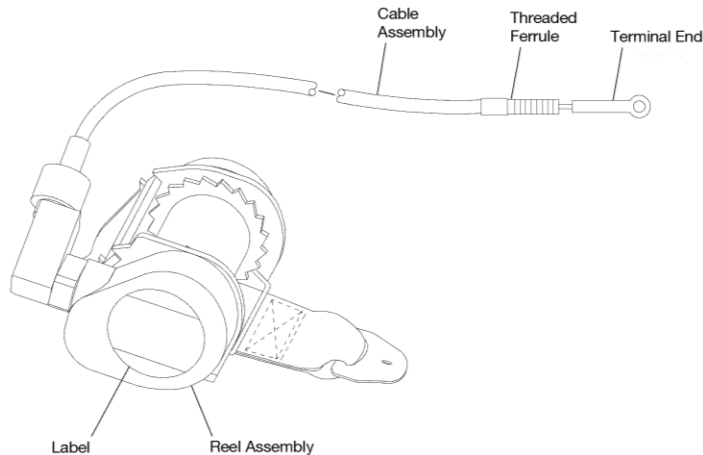
Aircraft Incident/ Accident Information	Year: 1959	Make: Cessna	Model: 180B
	Serial number: 50367		Registration: N5067E
Location: Waterloo, IA			Date: 06-06-15
Aircraft Owner		Aircraft Operator	
Rickenbach Brothers Aviation, LLC 806 Westpark Dr. Chadron, NE 69337-2559		Same as Aircraft Owner	

The FAA examined the aircraft shortly after the accident occurred. The FAA inspector who conducted the examination provided photographs of the aircraft to the NTSB-IIC.

On 06-25-15, the NTSB-IIC and an Air Safety Investigator from Textron Aviation examined the aircraft. The examination occurred at A&M Aircraft which is located at the Chadron, NE, airport. The individual who operates A&M Aircraft is the same individual who had been conducting the maintenance on the aircraft. Both wings, the horizontal stabilizer, elevators, and rudder had been removed from the aircraft. In addition, seat 1 had been removed from the aircraft and the secondary seat stop reel was no longer attached to the cabin floor. No deformation was noted to the cabin floor.

Secondary seat stop reel overview

The installation of the secondary seat stop reel is detailed in Cessna Aircraft Company Service Bulletin SB 07-05. The service bulletin lists four service kits that can be used based on the aircraft and seat position being installed. The applicable service kit for the accident aircraft was SK210-174B.



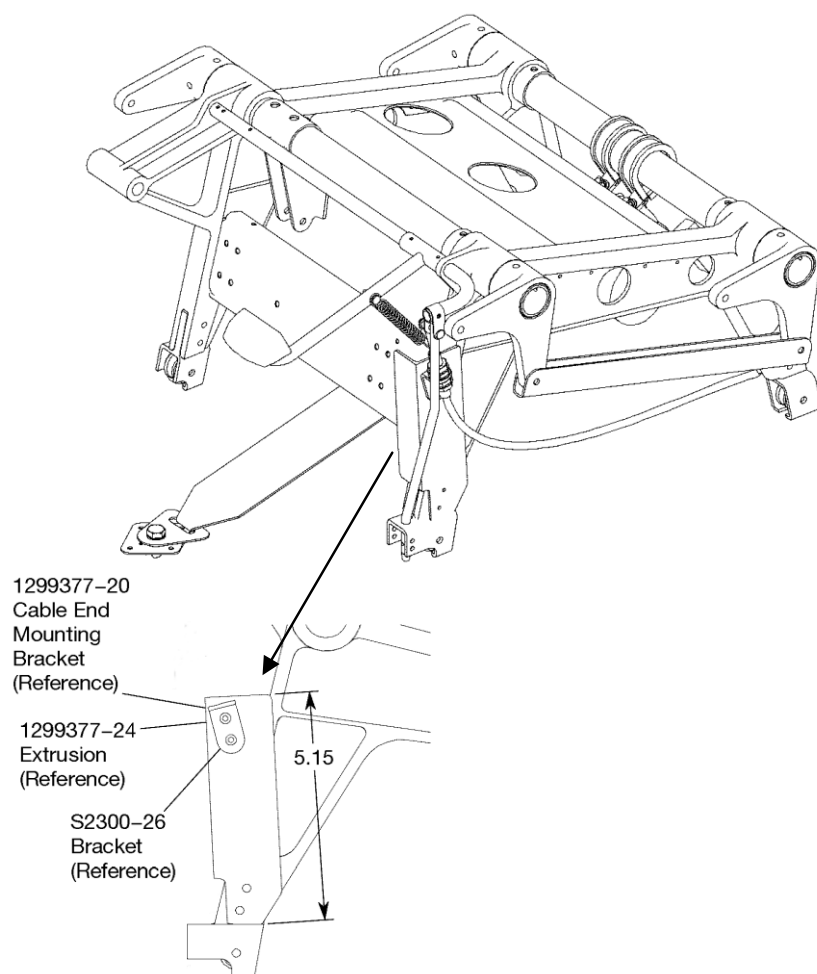
The secondary seat stop reel consists of a reel assembly, cable assembly with a threaded ferrule and a terminal end. The reel assembly is mounted to the seat frame using adel clamps. The cable assembly passes around the seat and the threaded ferrule is mounted to a bracket. The terminal end is then attached to the seat at or near the seat pin adjustment mechanism.

Service Kit SK210-174B contains instructions for the installation of the secondary seat stop reel on 12 different types of seats, labeled installation "A" through installation "M." Because the original Cessna

180 seat had been replaced by a Cessna 185 seat, the instructions applicable for the pilot's seat in the accident aircraft were installation "G." There are various seats listed in the airplane's part catalog. The installed seat was not listed. It is unknown what seat was installed in the aircraft before the Cessna 185 seat was installed.

Cable terminal end installation

Included in the service kit is extrusion 1299377-24. The extrusion is a piece of aluminum bent 90° lengthwise. The installer is to trim the extrusion as required to meet the measurements shown in the service kit for the installation chosen. When the extrusion has been trimmed it becomes bracket 1299377-20. The installation instruction calls for 1299377-20 to be installed on the outboard side of the forward, outboard seat leg with the 90° portion pointing inboard. A second bracket, S2300-26 is attached to the outboard side of bracket 1299377-20. The threaded ferrule is then installed in S2300-26 and secured with nuts and lock washers. The terminal end of the cable is then attached to the pin adjustment mechanism by replacing the installed pin with a kit installed pin. The terminal end is secured on the pin using a cotter pin. Up to three washers can be installed on the pin.



Images taken from SK210-174B

Brackets 1299377-20 and S2300-26 installations on Accident Aircraft

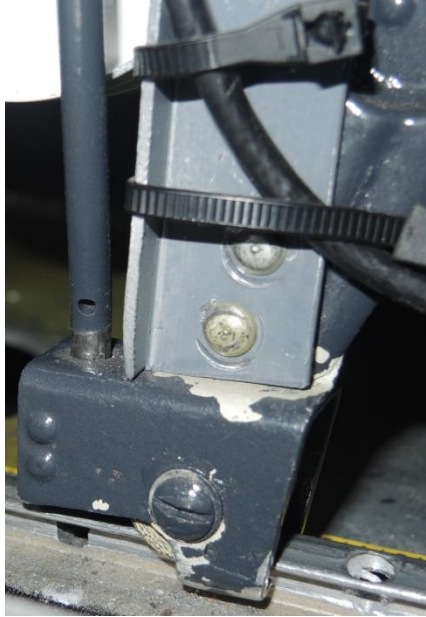
During the NTSB examination it was observed that bracket 1299377-20 was installed with its angled portion facing outboard instead of inboard. In addition, bracket S2300-26 was installed facing forward on 1299377-20 instead of facing outboard. Wear marks were observed on the side of S2300-26 where the seat adjustment pin was rubbing against S2300-26. The position of S2300-26 appeared to cause the seat adjustment pin to be pushed outboard. 1299377-20 exhibited rivet tool marks around the rivets used to attach the bracket to the seat leg.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-020.jpg" showing installation of 1299377-20 and S2300-26. Camera is looking inboard and left side of photograph is forward.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-021.jpg" showing seat adjustment pin sitting against S2300-26. Camera is looking aft and right side of photograph is outboard.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-027.jpg" showing rivet tool marks on 1299377-20.

Secondary Seat Stop Terminal End Installation on Accident Aircraft

The condition of the seat during the NTSB supervised examination did not match a photograph of the secondary seat stop cable terminal end taken by an FAA inspector.



FAA provided photograph showing two washers and nut installed on pin.

In the FAA provided photograph, two thick washers are located on the cotter pin side of the terminal end and a nut is located on the other side of the terminal end. The service kit does not detail the installation of a nut on the pin which the cable assembly is attached to. The FAA inspector stated during his examination that he found the terminal end of the secondary seat stop reel to be unmovable

due to the tightness of the assembly. The mechanic at A&M Aircraft also stated he found that the terminal end was binding on its pin and that he subsequently removed the cotter pin, washers, and nut that were installed. He stated that when he removed the cotter pin one of the washers “shot” across the room due to the tension it was under. He reported he then installed the “correct” washers.

During the NTSB examination, two thin washers were found located on the cotter pin side of the terminal end and five thin washers were located on the other side of the terminal end. The terminal could be rotated by hand.



Textron Aviation photograph “Wreckage exam ASI-15-BQ-021.JPG” showing washer stack.

The service kit limits the number of washers to a total of 3 NAS1149FN432P washers. The washers installed during the NTSB examination appeared to be thinner than a NAS1149FN432P washer.

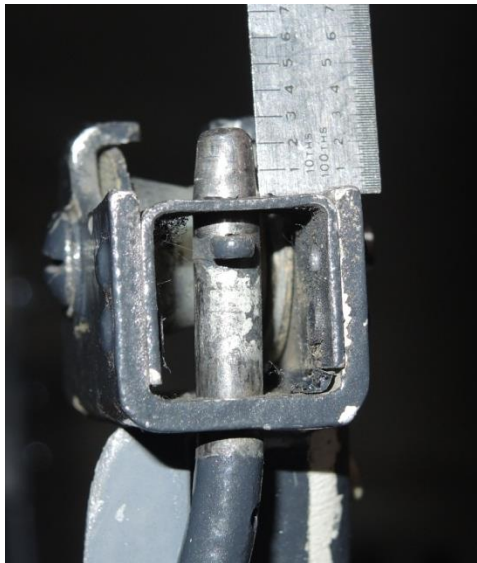
Secondary Seat Stop Cable Condition

During the NTSB examination it was observed that the secondary seat stop reel cable assembly was bent in two places, once at the base of the terminal end and again approximately 1 inch along the cable where it exited the cable sheath. The bends were “set” and the cable would not return to an unbent condition. Two broken strands were observed at the bend at the base of the terminal end.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-020.jpg" showing double bend in cable and two separated cable strands at base of terminal end. Camera is looking inboard and left side of photograph is forward.

It was also noted that the seat adjustment pin was not fully extending into the seat rail. The seat adjustment handle could be push down and the adjustment pin would fully extend. If the adjustment handle was pulled up the pin would not return to the fully extended position. This appeared to be caused by the bends in the secondary seat stop cable. The bends caused the cable to function like a spring and apply upward pressure to the adjustment pin thus preventing it from fully extending down into the seat rail. The adjustment pin would extend approximately 0.35 inches from the housing when the handle was pushed down. Without pressing the handle down the adjustment pin would extend approximately 0.20 to 0.25 inches from the housing.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-024.jpg" showing adjustment pin position.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-028.jpg" showing adjustment pin not engaging in seat rail.



Textron Aviation photograph "Wreckage exam ASI-15-BQ-029.jpg" showing adjustment pin not engaging in seat rail.

Seat 1 outboard seat rail

The outboard seat rail for seat 1 had 9 vertical holes in it. The first hole was covered by a seat stop bracket and hole 9 was located at the approximate midpoint of the seat rail. The next five holes were

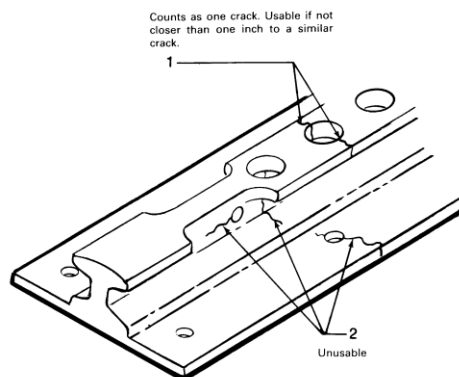
labeled 1 through 5, forward to aft, by the investigators. The seventh hole appeared to be drilled off center and was labeled "A" by the investigators. Hole "A" was elongated laterally and the outboard edge of the seat rail was missing along the circumference of the hole. The bottom of the hole exhibited drill marks not observed in holes 1 through 5. The eighth hole was labeled "B" by the investigators. The hole was also elongated laterally and what appeared to be a crack was observed where the hole meet the outboard edge of the seat rail. The bottom of the hole exhibited drill marks similar to the bottom of hole "A".



Textron Aviation photograph "Wreckage exam ASI-15-BQ-018.jpg" showing Seat 1 outboard seat rail.

Holes 1 through 5 were examined using a using a McFarlane Seat Rail Wear Gauge. All of the holes exhibited wear less than 0.42 inches. FAA Airworthiness Directive (AD) 2011-10-09 requires seat rails to be replaced if they exhibit wear greater than 0.42 inches.

Cessna Service Information Letter (SIL) SE83-6, dated 03-11-83 provides inspection guidelines and seat rail replacement recommendations for seat rails that are found cracked. Item (g)(8) of AD 2011-10-09 requires a visual inspection of the seat rails for cracks and reiterates the guidance provided in SIL SE83-6. Item (g)(8)(i) of the AD states, "If there are seat rail cracks that exceed the crack criteria in figure 5, before further flight, replace the seat rail." The image below is labeled "Figure 5" in the AD.



REPLACE SEAT RAIL WHEN:

- (1) Any portion of web or lower flange is cracked (index 2).
- (2) Any crack in crown of rail is in any direction other than right angle to length of rail.
- (3) Number of cracks on any one rail exceeds four, or any two cracks (index 1) are closer than one inch.

NOTE

Use of seat rail cargo tie-downs is not permissible on seat rails with cracks.