

Dear [Sir]

I forwarded your request for field approval on the installation of Cessna 150 seat rails and seat into a Cessna 140 to the Boston Aircraft Certification Office (ACO) for Engineering Assistance. They have identified the following deficiencies in the submitted data.

The information supplied for the seat and track installation does not appear to meet the requirements of CAR 4a.192. The accelerated flight conditions described are the aircraft's maneuver load factors (Figure 4a-3) or based on the aircraft's maximum design maneuver load envelope. The seat track and the seat track attachment to the aircraft, is to be able to withstand the loads generated from these maneuver flight loads on both the seat and occupant weights. The data provided only accounts for the occupant weight and the factor of safety applied. It does not address the seat weight or the maneuver load factors to ensure that the seat will stay attached during all flight conditions. The Seat Stop Kit should also be reviewed to ensure that it could handle the loads specified in CAR 4a.192. In this case, the maximum load that the seat track and seat track attachment needs to be tested or analyzed is 1263 lbs. (Occupant and seat weight multiplied by the factor of safety and maneuver load factor) $((170 \text{ lb} + 24.4 \text{ lb}) \times 1.5 \times 4.33)$

Another area that should be reviewed is the use of the oak wood spacers. Any downward load acting on the seat and seat rail would be distributed through this spacer to the floor assembly. As this is part of the seat load path, it should be maintained. Wood products may have voids or other manufacturing discrepancies internally that cannot be detected by external examinations. Repetitive loading through this wood spacer over time may result in the wood cracking and thus, part failure. Failure of the spacer would create a bending moment on the seat track and bolt attached at the floor assembly. An analysis to ensure that even with the failed spacers, the bolts will ensure that the seat and seat track will remain attached to the floor assembly. Though, as wood failure may occur, a periodic inspection would be beneficial to ensure the installation integrity is maintained.

Also, as the seats may be individually adjusted, the seat belt angles should be evaluated in accordance with Advisory Circular (AC) 43.13-2A. Any position of the seat that creates a seat belt angle that exceeds those listed in the AC should then be listed and marked as a seat installation limitation.

Based on the above comments, this office cannot concur with the modifications, as the analysis presented does not meet the regulations to ensure an airworthy installation. This installation would be acceptable if the seat track attachment is shown to be capable of withstanding the loads identified above and the seat belt angles are maintained in accordance with the referenced AC.

If you have any question regarding this mater, please call me at 860-654-1055.

Mark Hesselton
Aviation Safety Inspector