

Chronology of Defect / Noncompliance Determination**573.6 (c) (6) (7)**

Describe the chronology of events leading up to the defect decision or test data for the noncompliance decision:

In March, 2016, Isuzu identified a number of warranty claims involving the automatic transmission mounting bracket in N-Series vehicles in the U.S. An initial investigation found the condition impacted a certain cross-member used only in vehicles equipped with the 4HK1 Diesel engine. The overall occurrence rate was 0.085% and a Weibull analysis found a low risk of future failure. The investigation also found some "burrs" of between approximately 0.4-0.5 mm on the edge of the holes stamped into the frame cross-member to which the automatic transmission is attached via the transmission mounting bracket. The burrs impeded contact between the transmission mounting bracket and the frame cross-member, allowing over time for stress fatigue on the stud bolts, and leading the bolt eventually to shear or break. The failures (about 50 in total) generally occurred within approximately 60,000 miles, with a significant percentage impacting vehicles built in November, 2014, which were found to have burrs at the larger end of the approximate size range set forth above.

In May, 2016, Isuzu reviewed die maintenance procedure and initiated an inspection protocol at the end of the stamping process to grind out any burrs found on the holes stamped into the frame cross-members. Isuzu also began an evaluation into the source of the burrs, and replicated the bolt failure to evaluate the resulting movement of the automatic transmission and its effects by drive-testing on various road conditions. The engineering analysis confirmed the field experience. The engineering evaluation found no impact on vehicle control, braking or steering. The driver is made immediately aware of the problem, will hear loud noise and may begin to have difficulty shifting. Drivers have responded to the warnings by driving the vehicle off the roadway or, on occasion, directly to a service facility. Isuzu accordingly determined in June, 2016 that the condition did not pose a safety risk and continued to investigate the source of the burrs. Isuzu additionally tightened the mounting bracket stud bolts in the vehicles that were already at the ports in the United States.

Based on further evaluation conducted during the fall/winter of 2016, Isuzu has determined that the burrs were due to small particles or debris scraps between the lower die and the bolster of the stamping equipment. The debris may have led to minute shifts in the orientation of the die. Isuzu received individual and random warranty claims with regard to vehicles produced prior to May, 2013, with zero reported with regard to most months and no more than 3 reported with regard to any given month. No such warranty claims were received with regard to vehicles produced between June, 2013 and July, 2014. With regard to vehicles produced between August, 2014 and July, 2015, Isuzu has received 0-3 reports per production month, except that Isuzu has received 18 reports with regard to vehicles produced in November, 2014. The most recently produced vehicle on which Isuzu has received a warranty claim or report was built in July, 2015. Isuzu has not received any reports or warranty claims with regard to vehicles built after July, 2015.

In January, 2017, Isuzu considered whether to conduct a campaign to inspect certain of the vehicles in the field and, where necessary, to insert a metal shim to prevent stress fatigue on the stud bolts. The campaign would include vehicles produced between August, 2014 and May, 2016 (including the vehicles mentioned above, which had the bolts tightened at the U.S. ports) since those vehicles still could potentially experience bolt fatigue due to the stamping error. To the extent the condition impacted earlier built vehicles, the condition -- which tends to occur within about 60,000 miles -- would have already manifested itself in the field. Although the condition results in substantial warning to the driver and no loss of vehicle control, on February 10th, 2017, Isuzu decided to conduct the campaign as a safety recall.