

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: (2000)

In June 2019, Isuzu received a report of a MY 2018 FTR truck having been towed to a dealership in April due to a no-start condition. The customer reported seeing smoke from the engine compartment and the Technical Assistance Report described a hole in the power steering hose. In July 2019, Isuzu received another report of a no-start condition with a melted power steering hose. Review of the returned part from the first report found that the starter ground cable had broken at the starter side terminal eyelet. The cable was internally corroded and the power steering hose was ruptured near one of the end fittings. A US-based investigation was opened through Isuzu North America Corporation's (INAC) internal investigation process and a corollary investigation was begun at Isuzu Motor Limited (IML) in Japan.

Isuzu collected healthy ground cables from the field for further analysis, and continued to collect parts associated with reported failures. In late August 2019, Isuzu received a report of a no-start condition with excessive resistance. The occurrence differed from the prior instances in that this claim mentioned slow cranking and there was no damage found to the power steering hose. As the investigation progressed, Isuzu received six additional reports of no-start conditions during the remainder of 2019, with five of those not indicating degradation to the power steering hose. Isuzu was collecting healthy (non-failure) ground cables, and conducting analyses, through which it determined that the starter ground cables were subject to excessive stress. By the end of 2019, Isuzu directed its Engineering group to consider replacing the specification for the ground starter cable to reduce the stress and to prevent the no-start condition.

Between January and March, 2020, Isuzu conducted evaluations with a proposed replacement supplier. By the end of March, however, that supplier informed Isuzu that it lacked capacity to service Isuzu's needs. A new supplier was identified in April and further development of a new starter ground cable began and was completed as of June 11, 2020. Before initiating a field action, Isuzu reviewed the field experience. Isuzu had received an additional eight reports of a no-start condition, all requiring replacement of the starter ground cable and three of which also involved replacing the power steering hose. In one of those cases, the driver reported seeing smoke from the back of the cab. Further investigation of the relationship between the ground starter cable issue and the power steering hose issue was necessary.

When initial internal investigation was found inconclusive, returned parts were sent to the supplier for destructive testing. Additional investigation was also conducted internally. The results of that testing were reported on July 30, 2020. Although the supplier concluded that the power steering hose failures might have been caused by the use of low grade power steering fluid, Isuzu's analysis suggested that under a starter ground cable open circuit condition, the electrical current could flow instead through the steel braiding of the power steering hose during cranking and increase the temperature of the steel braiding. Under certain conditions, the temperature could increase to a level causing damage to the power steering hose.

Based on its analysis, Isuzu determined that damage to the power steering hose is a secondary impact from the no-start condition caused by a failed starter ground cable. Isuzu therefore initiated a change on the production line on August 14th, 2020 to utilize a longer starter ground cable with a larger bend radius and L-shaped retainers. Isuzu also prepared to conduct a field action to replace the starter ground cable in all field vehicles. In reviewing the field campaign, it was noted that the potential for the power steering hose to degrade, melt and rupture is dependent on the driver continuing to try to restart the truck from a no-start condition or holding the key in the engine start position for an extended period of time. To the extent that power steering fluid may leak onto a hot surface and lead to smoke, the smoke is readily apparent to the driver and the driver would cease trying to start the engine. The issue arises only in the circumstance of a no-start condition and not while the vehicle is in motion. Isuzu has not received any reports that a power steering hose leak did, and does not believe that such a leak would, move beyond a thermal event to an actual flame. Nonetheless, due to the nature of the issue and out of an abundance of caution, Isuzu decided on September 3, 2020 to conduct the field campaign as a safety recall.