

Chronology of Principal Events

April, 2016	<p>SMC received an initial Field Technical Information Report (“FTIR”) from its Canadian distributor that indicated that there is no power steering assist when turning the steering wheel at low speed.</p> <p>It was confirmed that this vehicle had a replacement power steering pump (PS pump) installed for the 15V-587 recall (Suzuki VS recall for PS pump failure), reported to NHTSA in September 2015.</p> <p>SMC collected this PS pump from the Canadian distributor and asked the supplier to investigate the failure. SMC received the following investigation results from the supplier:</p> <ol style="list-style-type: none">1) The supplier confirmed that there was seizure of the cartridge sliding surface inside the PS pump.2) For the VS recall countermeasure PS pump, the lower limit of the spool clearance value was changed from 24µm ~ 30µm to 27µm ~ 30µm. The clearance was measured at 29µm, which was within the standard value range.3) For the VS recall countermeasure PS pump, the lower limit of the cartridge clearance value was changed from 18µm ~ 22µm to 20µm ~ 22µm, but this clearance could not be measured due to seizure and it was not known whether it was within the standard value range.4) 11.6mg of contamination was found inside of the PS pump. The supplier manufacturing process contamination control value is 5 mg or less. Also, while there is no possibility of sand entering during the supplier manufacturing process, sand contamination was found. <p>From the above investigation results, SMC could not identify the reason why the cartridge sliding surface seized.</p>
May, 2016	<p>SMC received shipping inspection data of this PS pump from the supplier. The data showed that the spool clearance was 29.2µm and the cartridge clearance was 20.2µm, both of which were within the standard value range.</p>
February, 2017	<p>SMC received a second FTIR from its Canadian distributor. SMC confirmed that it involved a vehicle that had the VS recall correction.</p>
March, 2017	<p>SMC collected the second PS pump and asked the supplier to investigate the failure. SMC received the following investigation results from the supplier:</p> <ol style="list-style-type: none">1) The supplier confirmed that there was seizure of the cartridge sliding surface inside the PS pump.2) The spool clearance was measured to be 29µm, which was within the standard value range (standard value range is 27~30µm).3) The cartridge clearance was measured to be 20µm, which was within the

	<p>standard value range (standard value range is 20~22µm).</p> <p>4) 9.8mg of contamination was found inside of the PS pump. The supplier manufacturing process contamination control value is 5 mg or less.</p> <p>From the above investigation results, SMC could not identify the reason why the cartridge sliding surface seized.</p> <p>SMC received a third FTIR from its Canadian distributor. SMC confirmed that it involved a vehicle that had the VS recall correction. SMC collected the third PS pump and asked the supplier to investigate the failure.</p>
<p>April, 2017</p>	<p>SMC received the following investigation results from the supplier:</p> <ol style="list-style-type: none"> 1) The supplier confirmed that there was seizure of the cartridge sliding surface inside the PS pump. 2) The spool clearance was measured to be 28µm, which was within the standard value range (standard value range is 27~30µm). 3) The cartridge clearance was measured to be 20µm, which was within the standard value range (standard value range is 20~22µm). 4) 7.7mg contamination was found inside of the PS pump. The supplier manufacturing process contamination control value is 5 mg or less. <p>From the above investigation results, SMC could not identify the reason why the cartridge sliding surface seized.</p> <p>SMC received a fourth FTIR from its Canadian distributor. SMC confirmed that it involved a vehicle that had the VS recall correction. SMC collected the fourth PS pump and asked the supplier to investigate the failure.</p>
<p>May, 2017</p>	<p>SMC received the following investigation results from the supplier:</p> <ol style="list-style-type: none"> 1) The supplier confirmed that there was seizure of the cartridge sliding surface inside the PS pump. 2) The spool clearance was measured to be 28µm, which was within the standard value range (standard value range is 27~30µm). 3) The cartridge clearance was measured to be 21µm, which was within the standard value range (standard value range is 20~22µm). 4) 5.7mg contamination was found inside of the PS pump. The supplier manufacturing process contamination control value is 5 mg or less. <p>From the above investigation results, SMC could not identify the reason why the cartridge sliding surface seized.</p>
<p>January to March, 2018</p>	<p>SMC received 15 additional FTIRs from Canada and 9 FTIRs from the United States. The total FTIRs for this period is 24. SMC had received a cumulative total of 28 FTIRs. SMC confirmed that all of the vehicles involved had the VS recall correction.</p>

	<p>SMC asked the supplier to compare aspects of seizure of cartridges and abrasion of spool holes, and measurement and comparison of surface roughness for the PS pumps that had occurred after the VS recall correction and PS pumps before the VS recall countermeasure was implemented.</p> <p>SMC received the above investigation results from the supplier. No difference was recognized between the failed PS pump before the VS recall countermeasure and the failed PS pump that occurred after the VS recall correction was implemented, so it was not possible to identify the cause.</p>
April to June, 2018	SMC received 3 additional FTIRs from Canada and an additional 9 FTIRs from the United States. The total FTIRs for this period is 12. SMC had received a cumulative total of 40 FTIRs.
June to August, 2018	<p>SMC received 2 additional FTIRs from the United States. SMC had received a cumulative total of 42 FTIRs.</p> <p>SMC began to coordinate with a supplier of competing PS pumps to request an evaluation test of the VS recall countermeasure PS pump. The schedule for conducting the evaluation test in September was finalized.</p>
September, 2018	The competing PS pump supplier carried out low temperature accelerated tests of the VS recall countermeasure PS pump, which SMC attended, and the required specifications were satisfied. The cause of the PS pump seizure could not be identified.
October, 2018	<p>SMC is currently conducting the following investigation:</p> <ol style="list-style-type: none"> 1) For all components related to the power steering system, identification of the history of design changes and the history of changes to Suzuki's and suppliers' manufacturing processes, and investigation of the factors leading to failures. 2) Implementation of a re-examination of the Fault Tree Analysis ("FTA") conducted during the VS recall. 3) Investigation of the differences in all parts related to the power steering system in vehicles with and without the problem involving the PS pump. 4) Comparative survey of contamination in the power steering system as a whole in vehicles with and without the problem involving the PS pump.
November, 2018	SMC decided to report the existence of a safety-related defect. SMC is working diligently to identify the root cause of the PS pump failures, and to determine a recall countermeasure. Suzuki will amend its Part 573 report when this information is available.