OFFICIAL SURVEY

Technology & Maintenance Council

Turning Experience Into Practice

Incidence of Component Damage Due to Heavy-Duty Oil & Hydraulic Leakage

Developed by the Technology & Maintenance Council's (TMC)
S.1 Electrical Study Group

ABSTRACT

Based upon reports that premature seal deterioration and component leakage related to heavy-duty cycle hydraulic fluids and/or engine oils may be more severe than in past experience, TMC conducted a survey of its fleet and service provider members to determine if action is required to help equipment users avoid truck failures with pump seals, wiring harnesses and other components.

Based on survey results, TMC research does not indicate a wide-spread negative impact. However, any leakage of lubricating fluids can affect wiring harnesses, especially if the wiring specification falls outside of TMC recommendations. When cabling is affected, it most likely leads to a loss of function in the components powered by or using said cabling. Reported instances of failures were mostly associated with severe duty cycles.

TMC will continue to monitor this issue and follow with additional surveys and research as needed.

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COUNCIL OF ATA

Technology & Maintenance Council (TMC)
80 M Street, SE, Suite 800 • Washington, DC 20003
Ph: (703) 838-1776 • *tmc@trucking.org* • *http://tmc.trucking.org*

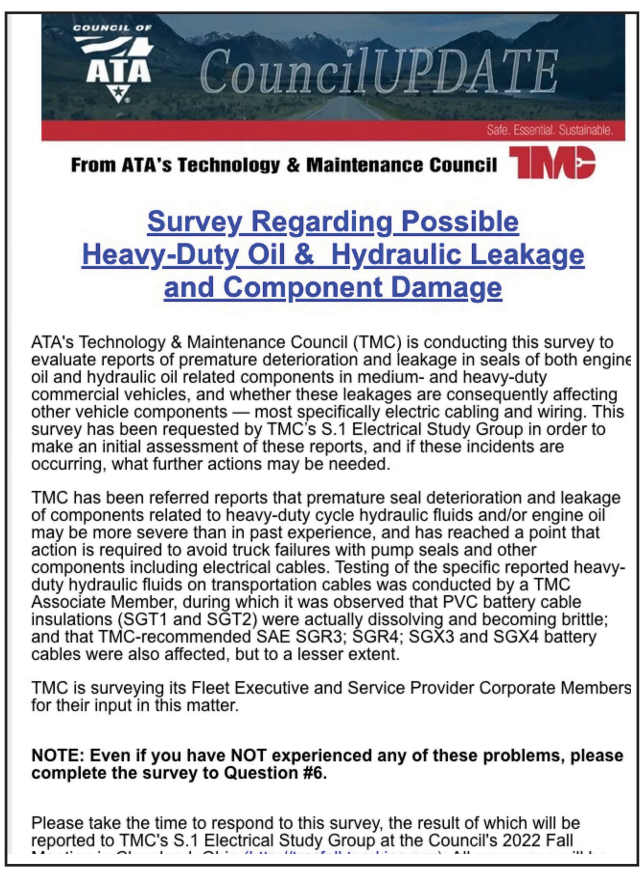
INTRODUCTION

In 2022, ATA's Technology & Maintenance Council (TMC) received reports that premature seal deterioration and component leakage related to heavy-duty cycle hydraulic fluids and/or engine oils may be more severe than in past experience, and may have reached a point that action is required to avoid truck failures with pump seals, wiring harnesses other components. Initial testing of the impact of these fluids and oils on wiring harnesses was conducted by a TMC Associate Member, during which it was observed that PVC battery cable insulations (SGT1 and SGT2) were actually dissolving and becoming brittle; and that TMC-recommended SAE SGR3, SGR4, SGX3 and SGX4 battery cables were also affected, but to a lesser extent.

Lubricants have evolved to improve engine efficiency as well as performance in auxiliary equipment in liftgate and vocational applications. Should these fluids contact and interact negatively with other components, maintenance personnel need to know as soon as possible. The potential maintenance and operational implications of any unanticipated electrical cable deterioration is concerning, especially given the increasing prevalence of electric vehicles, higher voltages, and automated vehicle technologies.

Accordingly, TMC's S.1 Electrical Study Group developed a survey for its Fleet Executive and Service Provider Corporate Members on their experience with this issue. Members were asked to complete the survey even if they have not experienced the problems similar to these reports, so as to provide an indicator as to how widespread the experiences may be and the types of duty cycles involved.

The survey sought to identify if there was an increase in frequency and severity, and if so, do TMC's recommendations for wiring harness specification need to be revisited or replaced.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From ATA's Technology & Maintenance Council TMC

Survey Regarding Possible Heavy-Duty Oil & Hydraulic Leakage and Component Damage

ATA's Technology & Maintenance Council (TMC) is conducting this survey to evaluate reports of premature deterioration and leakage in seals of both engine oil and hydraulic oil related components in medium- and heavy-duty commercial vehicles, and whether these leakages are consequently affecting other vehicle components — most specifically electric cabling and wiring. This survey has been requested by TMC's S.1 Electrical Study Group in order to make an initial assessment of these reports, and if these incidents are occurring, what further actions may be needed.

TMC has been referred reports that premature seal deterioration and leakage of components related to heavy-duty cycle hydraulic fluids and/or engine oil may be more severe than in past experience, and has reached a point that action is required to avoid truck failures with pump seals and other components including electrical cables. Testing of the specific reported heavy-duty hydraulic fluids on transportation cables was conducted by a TMC Associate Member, during which it was observed that PVC battery cable insulations (SGT1 and SGT2) were actually dissolving and becoming brittle; and that TMC-recommended SAE SGR3; SGR4; SGX3 and SGX4 battery cables were also affected, but to a lesser extent.

TMC is surveying its Fleet Executive and Service Provider Corporate Members for their input in this matter.

NOTE: Even if you have NOT experienced any of these problems, please complete the survey to Question #6.

Please take the time to respond to this survey, the result of which will be reported to TMC's S.1 Electrical Study Group at the Council's 2022 Fall

Figure 1

METHODOLOGY

Survey alerts were sent via email to all TMC Fleet Executive and Service Provider Corporate level members on August 12, 2022, with reminder notices being sent on September 1 and 13, 2022. **Figure 1** illustrates how the survey notice email appeared to recipients.

The survey was conducted using SurveyMonkey. Eblast alerts were generated using the Adestra email management system. Thirteen members fully completed the survey form. The survey was closed September 14, 2022.

RESULTS

Thirteen members responded to the survey, comprised of six for-hire fleets, four private fleets and three service providers. This was admittedly a small sample, and the results presented may be of limited value, but there was represented a good mix of truckload, less-than-truckload, flatbed, tanker, pickup & delivery, drayage and vocational operations.

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The fleets varied in size from small (11-100) to very large (more than 1,000) medium- and heavy-duty commercial combination vehicles. Half of the fleets also reported operating medium- and heavy-duty straight trucks. Fleet operations were distributed across local (less than 100 miles), regional (101-500 miles), inter-regional (501-1,000 miles) and longhaul (more than 1,000 miles).

Five (38 percent) of the respondents said that they had experienced premature leakages in seals related to engine oils and heavy-duty hydraulic fluids. Four of these reported engine oil seal leakages. These fleets stated that both frequency and severity of these problems was consistent to their historical experience in reporting increased frequency and severity. All four indicated that these leakages resulted in deterioration of electrical cable jackets due to exposure to engine oils. The common outcome was loss of function in the vehicle's components related to shorting in that cabling.

Only one fleet reported leakage issues with heavy-duty hydraulic fluids, with those leakages being associated with loss of function in non-electrical components.

The majority of the respondents experiencing problems indicated that maintenance interventions to correct leakages at seals was necessary at from six months to a year in service.

CONCLUSIONS

The sample was too small to provide any statistically supported indication of what type of action may be warranted, if any. However, the consistency among the responses received could arguably indicate further research and discussion is justified due to the operational implications of lubricant leakages. The results are to be reported to the S.1 Electrical Study Group at TMC's 2022 Fall Meeting, to be held at the Huntington Convention Center in Cleveland, Ohio, September 25-29.

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