Ford Motor Company

Automotive Safety Office
Environmental and Safety Engineering

March 17, 2006

Mr. Jeffrey Quandt, Chief
Vehicle Control Division
Office of Defects Investigation Safety Assurance
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington D.C. 20590

Dear Mr. Quandt:

Subject: EA04-034:NVS-213dsy

This is in response to the agency's March 3, 2006 email requesting additional information relating to the subject investigation. We have listed each of your requests and then provided our response.

Wheel Survey Assessment

Request 1

> Please advise if Ford intends to send ODI the results of HL's MA State Police wheel assessment when completed, or to hold those results until all the wheels have been done? If you anticipate a long delay on the wheels from other agencies, my preference would be to have the MA results once completed.

Answer

Ford plans to provide wheel assessment data as it becomes available. Hayes Lemmerz (HL) has completed their analysis of wheels from Massachusetts State Police and has recently received wheels from Douglas County Sheriff in Colorado, and the Cleveland Police Department.

Massachusetts State Police Wheels

Assessment data for the Massachusetts State Police wheels is provided electronically in Appendix A (directory: 2006-03-17 Appendix A; filename "MA Scans.pdf") on the enclosed CD. The data includes a wheel map, Akron Standard uniformity measurements and CMM plots for each of the twelve wheels. HL also recorded wheel balance information on the Akron Standard data sheets, and wheel leak and dye penetrant results on the wheel maps for each wheel.

Dye penetrant testing was conducted in the weld area on the tire side of the rim to search for indication that any fatigue cracking had started. None of these wheels leaked during dunk tank testing, nor did they exhibit cracks using dye penetrant detection methods. HL reported that the balance measurements were high in some cases, but also noted that many of the wheels had mud and dirt caked on the inside of the rim, resulting in increased imbalance.

All of the wheels were within original specification for runout. The wheel identified as MA #2 showed definite evidence of impact as shown by the inboard CMM plot contour. None of the wheels had any visible signs of damage. HL also provided several photos showing typical condition of the wheels, these are included in Appendix A (filenames: "MA photo01.jpg" through "MA photo05.jpg").

Request 2

> As part of their assessment of these wheels, please have HL look for and record (photograph) any signs of physical damage to the wheels, such as strike through or impact damage.

Answer

HL will photograph any visual signs of physical damage and identify the location on a wheel map.

Request 3

> Please ask HL if they have radiography capability for weld seem assessment.

Answer

HL does not have radiography capability.

Warranty Return Program

Request 4

> For the returned wheels HL are assessing, do they plan on producing a wheel map, AS and or CMM data, for all the wheels, a portion, or none?

Answer

For each of the warranty return wheels, HL plans to conduct a leak test, produce a wheel map, and conduct Akron Standard measurements. CMM plots will not be generated on each wheel, but they can generate plots on selected wheels as required.

Request 5

> As part of their assessment of these wheels, please have HL look for and record (photograph) any signs of physical damage to the wheels, such as strike through or impact damage.

Answer

HL will photograph any visual signs of physical damage and identify the location on a wheel map.

Curb Strike/Pot Hole Testing

Request 6

Ford will submit the data from this testing (video tapes, AS, CMM, etc) to ODI during the week of 3/6/2006. ODI's understanding (based on this discussion) is that no strike through damage occurred during any of this testing; please advise if this is not the case.

Answer

The requested data were submitted to NHTSA on March 7, 2006 (DHL shipping number 15215567555). There was no strike through during the high speed video demonstration.

Request 7

Ford agreed to gather further detail and or data from HL regarding (their opinion that) road hazard impact borne wheel damage that does not leave observable evidence of occurrence on the wheel (i.e., strike through or other impact type damage).

Answer

Ford Engineering and HL are of the opinion that wheel deformation can occur without incidence of strike through to the rim. Typical strike through damage to the rim is evidenced by local visible marks on, or deformation of, the rim, whereas non-strike through deformation is typically detected using Aleron Standard measurements and from the contour of the CMM plots. The data provided in Appendix A for wheel MA #2 is an example of a wheel that shows evidence of an impact that resulted in inboard rim deformation, but has no visible signs of damage caused by strike through.

Crack Propagation Testing

Request 8

Ford agreed to provide further technical detail regarding this testing and the use of strain gages to monitor crack growth; this should include details of where the strain gages are mounted on the wheel and relative to the cracks.

Answer

The wheel map included in Appendix B (directory: 2006-03-17 Appendix B; filename "Wheel Map KG1492.pdf") on the enclosed CD shows the location of the existing cracks on the test wheel, as well as the location of each strain gauge, numbered one through ten. Use of strain gauges for this evaluation is solely intended to provide some indication of crack propagation without suspending the test and removing the tire to visually inspect the wheel. The strain gauges are mounted on the tire side of the rim in the heat affected zone

as shown in photos included in Appendix B (filenames "KG1492 photo1.jpg" and "KG1492 photo2.jpg"). If a crack propagates to a location where a gauge is located, we expect the gauge to indicate a change in output. As we have discussed in telephone conversations, this method of using strain gauges in the bead seat area of the rim has not been attempted before, and we are not certain it will successfully indicate crack propagation. Ford expects the testing of the strain gauged wheels to begin the week of March 20, 2006.

CHP Training Vehicle Wheel Analysis

Requests 9 & 10

Ford agreed to provide HL's report on their assessment of the wheel involved in the CHP incident to ODI during the week of 3/6/2006.

ODI's understanding (based on this discussion) is that evidence of an overload regain (similar to that discussed in the Central Labs report for the PSP wheels) was found by HL. Please ensure HL's report identifies where on the wheel the overload region was found; ODI would like to know the location of this region before 3/8/2006 if possible.

Answer

The requested analysis was provided in Appendix C of our March 7, 2006 response.

Request 11

Ford agreed to determine what warranty agreement or policy (or practice), if any, applies to subject vehicles used at police training facilities.

Answer

Though wheels used in police training applications are often subjected to harsh conditions, Ford does not attempt to separately identify or exclude them from the standard three year/36,000 mile coverage.

If you have questions, please contact me.

Sincerely,

R. A. Nevi
Assistant Director
Global Automotive Safety and Compliance

Attachments