PACCAR Inc
Law Department

October 15, 2009

Richard Boyd
Office of Defects Investigation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, DC 20590

Re: EA09-008 Engineering Analysis Relating to Certain Horton Fan Hub Failures

Dear Mr. Boyd,

PACCAR acknowledges your July 31, 2009 letter indicating that NHTSA's Office of Defects Investigation (ODI) has upgraded its Preliminary Evaluation (PE09-002) investigating Horton fan hub failures to an Engineering Analysis. We understand that the scope of ODI's present inquiry has been expanded to include all MY 2003 through 2010 Peterbilt and Kenworth Class 7 and 8 vehicles which are equipped with Horton fan hubs. As detailed below, the affected vehicle population for both divisions is 385,722 trucks (166,179 Kenworth and 219,543 Peterbilt).

ODI concluded during its Preliminary Evaluation that mounting bolt breakage is not a significant contributing factor in the reported current failures. Therefore, we understand ODI to now be focused on other causes, including the seizing of the hub bearings. We further understand that ODI believes a hub failure may lead to eventual engine overheating and shutdown, potentially causing a vehicle to be disabled on a roadway or roadway shoulder.

As ODI is aware, the bearings failures have been addressed recently by both PACCAR and the component manufacturer, Horton Worldwide, through a series of product improvements. For the reasons detailed in response to ODI's specific questions, PACCAR does not believe that the premature bearing failures indicate a defect trend, nor do they implicate motor vehicle safety. Moreover, PACCAR class 8 trucks travel an average of 105,000 to 110,000 miles per year. PACCAR medium duty trucks travel an average of 37,000 to 44,000 miles per year. For the affected population, the vehicles have traveled **in excess of 200 billion vehicle miles** without any reported death, injury, or crashes related to a vehicle becoming disabled on a roadway or shoulder due to a Horton fan hub failure.

Representatives within Peterbilt Motors Company ("Peterbilt") and Kenworth Truck Company ("Kenworth") investigated the issues addressed in ODI's letter. The investigation has included a thorough review of the warranty and customer service databases, the legal database, project documentation, as well as customer interviews. PACCAR's responses to ODI's requests are listed below.

1. *State by make, model and model year, the number of subject vehicles PACCAR has manufactured for sale or lease in the United States. Separately, for each vehicle manufactured to date by PACCAR, state the following:*
    a. *Vehicle identification number (VIN);*
    b. *Make;*
    c. *Model;*
    d. *Model Year;*
    e. *Date of manufacture;*
    f. *Date warranty coverage commenced;*
    g. *Fan Hub make, model, and part number;*
    h. *Engine cooling package configuration;*
    i. *Engine make, model and rating (horsepower/torque); and*

j. Vehicle's intended use (Over The Road ("OTR"), local, construction, etc.).

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "KENWORTH PRODUCTION DATA" and "PETERBILT PRODUCTION DATA" for additional detail. Note that there are separate spreadsheets for Peterbilt and Kenworth data. The separate spreadsheets are necessary because each division operates independently of one another and has different databases.

2. *State the number of each of the following, received by PACCAR, or of which PACCAR is otherwise aware, which relate to, or may relate to, the alleged defect in the subject and peer vehicles:*
   a. *Consumer complaints, including those from fleet operators;*
   b. *Field reports, including dealer field reports;*
   c. *Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, resulting in property damage claims, consumer complaints, or field reports;*
   d. *Property damage claims;*
   e. *Third-party arbitration proceedings where PACCAR is or was a party to the arbitration; and*
   f. *Lawsuits, both pending and closed, in which PACCAR is or was a defendant or codefendant.*

RESPONSE: Kenworth has 67 consumer complaints for the affected population. Peterbilt has 59 consumer complaints for the affected population. Kenworth has 141 Field Reports and Peterbilt has 33 Field Reports for the affected population.

There are no reported crashes related to the affected population. There are no reported fatalities involving the affected vehicle population. There is one unconfirmed report of an injury to the driver of a truck within the affected population. In December 2008, Peterbilt's Customer Service department was notified by one of its dealers of a fan hub failure involving a model 320 cab over engine truck. It was reported that a portion of the fan pierced the doghouse and struck the driver's leg, allegedly causing a laceration which required nine stitches. No claim or lawsuit has resulted from the incident.

There is one lawsuit concerning trucks within the affected population. The lawsuit, which is venued in El Paso County, alleges breach of warranty and violation of the Texas Deceptive Trade Practices Act in connection with the sale of 29 Kenworth tractors. The case relates primarily to alleged engine problems. However, 8 of the 29 tractors are alleged to have had Horton fan hub failures (all the tractors have Horton fan hubs). The lawsuit is being actively defended.

There are no arbitration claims or other claims relating to the affected population.

Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER TWO DATA," for further responsive information. The requested documents are attached to this response.

3. *Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, provide the following information:*
   a. *PACCAR's file number or other identifier used;*
   b. *The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);*
   c. *Vehicle owner or fleet name (and fleet contact person), address, and telephone number;*
   d. *Vehicle's VIN;*
   e. *Vehicle's, make, model and model year;*
   f. *Fan hub's model and part number;*
   g. *Engine make, model, and rating (horsepower/torque);*
   h. *Vehicle's mileage at time of incident;*

i. *Date of manufacture;*
j. *Date warranty coverage commenced*
k. *Incident date;*
l. *Report or claim date;*
m. *Did fan or fan hub separate from the engine;*
n. *Whether the vehicle was towed or not;*
o. *Whether a crash is alleged;*
p. *Whether property damage is alleged;*
q. *Number of alleged injuries, if any; and*
r. *Number of alleged fatalities, if any.*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER TWO DATA," for responsive information. The requested documents are attached to this response.

4. *Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method PACCAR used for organizing the documents.*

RESPONSE: PACCAR has submitted the requested documents as attachments to this letter.

5. *State, by make, model, and model year, a total count for all of the following categories of claims, collectively, that have been paid by PACCAR to date that relate to, or may relate to, the alleged defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.*

Separately, for each claim, state the following information:
a. *PACCAR'S claim number;*
b. *Vehicle owner or fleet name (and fleet contact person) and telephone number;*
c. *VIN;*
d. *Vehicle's make, model, and model year;*
e. *Fan hub's make, model and part number;*
f. *Engine make, model and rating (horsepower/torque);*
g. *Vehicle build date;*
h. *Warranty start date;*
i. *Repair date;*
j. *Vehicle mileage at time of repair;*
k. *Whether the vehicle was towed or not;*
l. *Whether the fan or fan hub separated from the engine;*
m. *Repairing dealer's or facility's name, telephone number, city and state or ZIP code;*
n. *Labor operation number;*
o. *Problem code;*
p. *Replacement part number(s) and description(s);*
q. *Concern stated by customer; and*
r. *Comment, if any, by dealer/technician relating to claim and/or repair.*

RESPONSE: PACCAR has submitted warranty claim records as attachments to this letter.

Please see the tabs of the Excel Spreadsheets entitled WARRANTY DATA SUMMARY, EXTENDED WARRANTY CLAIMS - HORTON, POLICY CLAIMS – HORTON, STANDARD WARRANTY CLAIMS – HORTON, TIB CLAIMS – HORTON, LABOR LINE DETAIL, and PARTS LINE DETAIL for responsive information.

6. *Provide a list of all non-Horton Fan hub options offered for vehicle production and installed by PACCAR on the subject vehicles.*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled KENWORTH NON-HORTON OPTIONS and PETERBILT NON-HORTON OPTIONS.

7. *State, by make, model and model year, a total count for all of the following categories of claims, collectively, that have been paid by PACCAR to date that relate to, or may relate to, failures, malfunctions or unsatisfactory performance of fan hubs identified in question 6 above in PACCAR vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.*

   Separately, for each such claim, state the following information:
   a. *PACCAR's claim number;*
   b. *Vehicle owner or fleet name (and fleet contact person) and telephone number;*
   c. *VIN;*
   d. *Vehicle's make, model, and model year;*
   e. *Fan hub's make, model and part number;*
   f. *Engine make, model and rating (horsepower/torque);*
   g. *Vehicle build date;*
   h. *Warranty start date;*
   i. *Repair data;*
   j. *Vehicle mileage at time of repair;*
   k. *Whether the vehicle was towed or not;*
   l. *Any information on whether the fan or fan hub separated from the engine;*
   m. *Repairing dealer or facility's name, telephone number, city, and state or ZIP code;*
   n. *Labor operation number;*
   o. *Problem code;*
   p. *Replacement part number(s) and description(s);*
   q. *Concern stated by customer; and*
   r. *Comments, if any, by dealer/technician relating to claim and/or repair.*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled NON-HORTON WARRANTY DATA for responsive information.

8. *Describe in detail the search criteria used by PACCAR to identify the claims identified in response to Request No. 5 and 7, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make, model and model year, the terms of the new vehicle warranty coverage offered by PACCAR on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that PACCAR offered for the subject vehicles and state by option, make, model, and model year, the number of vehicles that are covered under each such extended warranty. Additionally, provide documentation of any component warranty provided by Horton.*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER EIGHT DATA," for responsive information.

9. *Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles that PACCAR has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other similar entities. This includes, but is not limited to,*

bulletins, advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Also, include the latest draft copy of any communication that PACCAR is planning to issue within the next 120 days.

RESPONSE: The requested documents are attached to this response. PACCAR is not planning to issue any dealer or customer communication relating to Horton fan hubs within the next 120 days.

10. *Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries, and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, PACCAR. For each such action, provide the following information:*
    a. *Action title or identifier;*
    b. *The actual or planned start date;*
    c. *The actual or expected end date;*
    d. *Brief summary of the subject and objection of the action;*
    e. *Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and*
    f. *A brief summary of the findings and/or conclusions resulting from the action.*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER TEN DATA," for a summary of the information related to this request. The corresponding documents are attached to this letter.

11. *Provide a list of all engine cooling packages offered by PACCAR for the subject vehicles. For each package include:*
    a. *Package identified (ordering code or similar);*
    b. *Component list (include part numbers and descriptions of each);*
    c. *Vehicle make and model application;*
    d. *System operating design parameters (speed, duration, etc.); and*
    e. *Intended application (OTR, Heavy haul. Local; etc.).*

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER ELEVEN DATA."

12. *Describe all modifications or changes made whether or not by, or on behalf of, PACCAR in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of the subject vehicle's production through the current date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:*
    a. *The date or approximate date on which the modification or change was incorporated into vehicle production;*
    b. *A detailed description of the modification or change;*
    c. *The reason(s) for the modification or change;*
    d. *The part number(s) (service and engineering) of the original component;*
    e. *The part number(s) (service and engineering) of the modified component;*
    f. *Whether the original unmodified component was withdrawn from production and/or sale and if so, when;*
    g. *Whether the modified component was made available as a service component; and*
    h. *Whether the modified component can be interchanged with earlier production components.*

Also, provide the above information for any modification or change that PACCAR is aware of which may be incorporated into vehicle production within the next 120 days.

RESPONSE: The requested summary is attached to this response. PACCAR is not aware of any modification or change which will be incorporated into vehicle production within the next 120 days.

13. *What is the intended design life of a fan hub? If it differs based on the application, provide answers relative for each application.*

RESPONSE: The expected life of a fan hub is dependent on vehicle application, operating environment, and vehicle maintenance. All fan hub bearings will need to be replaced at some point during the life of the vehicle, regardless of component manufacturer and OEM.

The fan clutch is a wear item which requires periodic inspection and maintenance. Horton recommends inspection of the fan clutch every 25,000 miles, or at each oil change. Additionally, PACCAR recommends inspection of the fan assembly every 60,000 miles and inspection and adjustment of the belt every 15,000 miles. Regular preventive maintenance of wear items such as the clutch lining and air cartridge should identify any wear on the bearings.

14. *What are the expected warning signs and indicators that a fan hub needs to be replaced? For each such indication, what is the recommended allowable safe duration between initiation and repair?*

RESPONSE: A bearing failure in a fan clutch is progressive condition which develops over time and offers advance warning signs to an operator or mechanic. As the lubrication in the bearings degrades over time, the bearings and bearing races may begin to prematurely wear. As wear increases, the bearings make an audible, high-pitched squealing noise which should be readily detectible. The noise is generally not intermittent. Over time, the clutch pulley may become misaligned, resulting in belt slip and additional noise.

If the noise is ignored, the hub unit can become overheated, and the air cartridge unit within the hub can melt. If the air cartridge melts, the fan will run continuously rather than the customary 10% of the time. Continuous fan operation is another warning sign of progressive failure. Continuous fan operation also may result in overcooling of the engine and a hard start condition.

Horton has measured the intensity of bearing noise in tests of three hub units that had been returned due to excessive noise. The Horton test report is attached to this response. A new fan clutch was measured at a distance of one meter with a noise level of 86 dBA in order to establish a baseline value. The three returned units were recorded with maximum noise levels of 101, 110, and 115 dBA. By way of comparison, 101 dBA (the volume level of a motorcycle) is three times louder than the baseline value of 86 dBA. 110 dBA (the volume level of a power saw from three feet) is six times louder than 86 dBA and 115 dBA (the volume level of a loud rock concert) is eight times louder. Based in part on these tests, both PACCAR and Horton believe the audible warning signs should be detectible in normal operating conditions.

Horton also assessed the expected duration between the initiation of bearing noise and the complete failure of the bearing. It estimated the audible warning would be apparent for weeks before the bearings seized. For example, the first bearing tested ran for 48 hours without failure. The test equates to at least 2,400 miles of driving at highway speeds.

If the audible warning signs are ignored for an extended period of time, the bearings could seize and cause the fan clutch to be inoperable. If the fan clutch is inoperable, a truck with a dedicated clutch belt could continue to operate at typical highways speeds (60 mph) and average ambient temperatures and grade conditions for extended periods due to the intake of ram air. If the truck is being operated in low speed, heavy load, or climbing conditions which require the use of the belt-driven fan for cooling or if progressive damage might occur, the engine would eventually become overheated. An engine overheating condition, as well as low coolant condition, triggers visual lights and audible alarms within the truck cab. The operator would be able to safely exit the roadway or pull to the shoulder.

If the visual and audible alarms are ignored and the engine coolant temperature continues to rise, the engine will actively de-rate and eventually a "stop engine" light may illuminate. Although the engine is still operable in the de-rate condition, PACCAR advises the operator to stop the vehicle as safely as possible, turn off the engine and have the vehicle serviced.

15. *Provide a copy of any maintenance requirement(s) published by PACCAR concerning the hub in the subject vehicles.*

RESPONSE: The requested documents are attached to this response.

16. *Provide ODI with the following components for a subject vehicle:*
    a. *New Horton fan hub, and*
    b. *Used Horton fan hub (presumably a warranty replacement) that is unfit for continued service but not completely failed.*

RESPONSE: PACCAR will provide ODI with a new Horton fan hub. ODI will need to specify the truck(s) which will be used for testing so that the correct hub can be supplied. PACCAR does not have possession of used Horton fan hubs which have not completely failed. PACCAR has communicated this request to Horton and Horton will provide the requested hubs. ODI will need to specify the models of hubs which it will need for testing.

17. *State the number of each of the following that PACCAR has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), make, model and model year of the vehicle in which it is used and month/year of sale:*
    a. *Subject component; and*
    b. *Any kits that have been released, or developed, for use in service repairs to the subject component/assembly.*

    For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also, identify by make, model and model year, any other vehicles of which PACCAR is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

RESPONSE: Please see the tabs of the Excel Spreadsheets entitled "REQUEST NUMBER SEVENTEEN DATA" for responsive information.

18. *Furnish PACCAR's assessment of the alleged defect in the subject vehicle, including:*
    a. *The causal or contributory factor(s);*
    b. *The failure mechanism(s);*
    c. *The failure mode(s);*
    d. *The risk to motor vehicle safety that it poses;*
    e. *What warnings, if any, the operator and other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning, and*
    f. *The reports included with this inquiry.*

RESPONSE: As discussed above, PACCAR does not believe the condition of premature bearing failure is a safety-related defect.

a. The causal or contributory factor(s);

Horton's Fan Hub design utilized a bearing that had insufficient resistance to high operating temperatures due to seal material, grease specification, bearing cage design/material, and race hardness.

b. The failure mechanism(s)

PACCAR's investigation has shown that the failure mechanism may be the result of separation of the internal fan hub bearing lubricant to its oil and wax components. This may result in purging of the internal fan hub bearing lubricant.

c. The failure mode(s)

With regard to the bearings, PACCAR's analysis of its records shows the following possible failure modes:

(1) The fan clutch does not work;

(2) The fan clutch seizes;

(3) The fan clutch is noisy;

(4) The fan clutch pulley separates from the base;

(5) The fan clutch binds or sticks; and/or

(6) The fan is pulled into the radiator and shroud.

d. The risk to motor vehicle safety that it poses;

PACCAR does not believe that premature bearing failure poses an unreasonable risk to motor vehicle safety.

First, making certain reasonable assumptions about vehicle miles traveled, the affected vehicle population has traveled ***over 200 billion vehicle miles*** without any report of a vehicle crash related to Horton fan hub failures. Moreover, there have been no reported fatalities related to Horton fan hub failures. The one injury described above was not related to a vehicle becoming disabled on the shoulder of the roadway.

Second, PACCAR has reviewed its records and interviewed selected customers. In all cases, the records or information collected suggest that an operator experiencing a Horton fan hub failure is able to move his truck safely off the roadway onto a shoulder, or to some other safe location should an active de-rate and "stop engine" light occur. Specifically, there are no reports of trucks stalling or otherwise being stranded on the roadway in traffic as a result of a Horton fan hub failure.

Third, PACCAR is aware that NHTSA has identified rear impacts of light duty passenger vehicles into heavy trucks that are stopped on the side of the road as a potential safety concern. NHTSA has communicated some statistics showing the rate of fatal crash involvements of stopped heavy trucks is greater than the rate of fatal crash involvements of stopped passenger cars or other light duty vehicle models (such as SUVs). PACCAR does not believe that these statistics provide valid empirical support for a conclusion that rear impacts into stopped heavy trucks pose an unreasonable safety risk. PACCAR believes, rather, that these statistics tend to confirm the elevated safety risk from collisions with heavy trucks – whether stopped or not – compared to collisions with light vehicles. PACCAR's preliminary statistical analysis shows that the degree of elevation of the rate of fatal crash involvements with rear impacts to ***stopped*** heavy trucks is approximately the same as the degree of elevation of the rate of fatal crash involvements with rear impacts to ***moving*** heavy trucks going straight. Thus, the elevation documented by these statistics pertains to rear-impact collisions with heavy trucks generally, rather than to rear-impact collisions with stopped trucks specifically. In other words, passenger vehicles incur an elevation of the risk of fatal crash involvements inherent in sharing the road with heavy trucks to approximately the same degree, regardless of whether the truck involved in the fatal collision is stopped on the side of the road, or engaged in on-road transit.

Finally, fatal collisions involving a disabled truck on the side of the road are very rare. In 2007, according to the most recent data released by NHTSA and FMCSA, there were only 51 such collisions (i.e., a fatal multi-vehicle crash involving a large truck on the roadside), which is only 1.5% of all fatal multi-vehicle crashes involving a large truck. By contrast, 3,189 fatal multi-vehicle crashes (94.8% of all fatal crashes involving a heavy truck) involve a truck on the roadway. *Source: FMCSA Large Truck and Bus Crash Facts 2007, Table 42.* The theoretical possibility of an as-yet unobserved increase in these rare collisions

cannot reasonably support a conclusion that the alleged defect presents an unreasonable risk to motor vehicle safety, particularly when there have been no such collisions in more than seven years of operation of the subject vehicles, and 200 billion miles of vehicle operation.

e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning;

As mentioned in response to question 14, fan hub bearing failures are progressive and provide audible warning. The first stage is bearing overheating, causing a separation of the bearing lubricant to oil and wax within the bearing. The bearing lubricant is then able to purge from the bearing. With the loss of lubricant, the next stage is a period of continued operation with an audible high-pitched whining or squealing. The failing bearing noise can be heard at various engine speeds. An operator or mechanic would be able to hear the sound with the hood down and possibly while in the cab during operation of the vehicle.

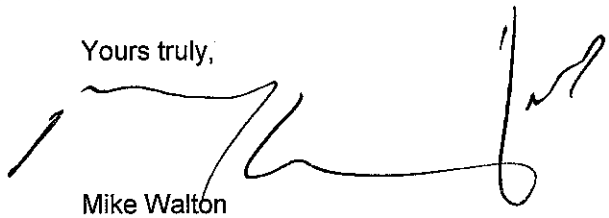
If the operator hears and does not respond to the audible signals, the next stage in the progressive failure of the bearings is the misalignment of the fan hub pulley and/or seizing of the bearings. This can cause the drive belt to derail from the fan hub and/or accelerated drive belt wear. In addition to the auditory warnings described above, an operator may smell rubber caused by a drive belt running on a misaligned fan hub pulley. The initial stages of separation can also be confirmed physically in the fan hub geometry before fan blade separation occurs. The hub will be loose and can be moved (with the engine not running) by shaking the fan blades or the hub assembly.

f. The reports included with this inquiry.

ODI's Preliminary Evaluation included as attachments nine National Service Records submitted by Peterbilt as part of its EWR data. No further reports were submitted with the Engineering Analysis.

It is our hope that we have addressed all of your questions or concerns. If you have any additional questions or require further information, please feel free to contact me.

Yours truly,



Mike Walton
Counsel
PACCAR Inc