1. CASE#: 9319
2. PROPERTY NAME: Hudson Transit
3a. ACCIDENT TYPE: Wheel Off
3b. Accident Severity Index: 0.05
4a. DATE: April 8, 2007
4b. TIME: 8:20 p.m.
5. ACCIDENT LOCATION: Westbound SR 17 one mile east of Exit 114
6. TOWN/CITY/BOROUGH: Wurtsboro, NY
7. SUMMONS: No
8. BUS NUMBER: 70902
8a. YEAR: 1994
8b. MAKE: MCI-DL3
9. NUMBER OF INJURIES: 1
10. FATALITIES: 0
11. HOURS OF SERVICE: 8 hr 15 min in last 24 hrs/39 hrs 30 min in last 7 days
12. SYNOPSIS:
At approximately 8:20 p.m., Hudson Transit Lines, Inc. (Shortline) bus #70902 was traveling west on State Route 17 (SR 17). Approximately one mile east of Exit 114, the left rear drive axle wheel set separated from the bus, rolled down a hill and collided with a Jeep, causing it to overturn and slide to a stop on its roof. The bus driver moved to the shoulder, exited the bus and utilized the on-board fire extinguisher to extinguish a small fire in the left rear wheel well. There were no reported injuries to the bus passengers who were safely evacuated to another bus and continued their trip. The Jeep driver claimed various minor injuries and was transported to a local hospital, treated and released. The bus sustained extensive damage to the left rear drive axle tube. The Jeep was also extensively damaged from the collision with the left rear wheel set.

In the vicinity of the accident site SR 17 (in the process of being converted to Interstate 86) is divided by a wide grassy median into east and west bound travel lanes. At the accident scene the westbound portion of the roadway is divided by dashed white pavement markings into three travel lanes. The rightmost lane is dedicated to slow moving traffic due to the uphill grade of the roadway. The roadway is asphalt paved and in good condition. At the time of the accident it was dark, the weather was clear and the pavement was dry. The posted speed limit is 65 mph.

Bus #70902 is a 45 foot 1994 MCI-DL3 over-the-road motor coach type bus with a seating capacity of 55 passengers. A review of the bus records showed that Preventive Maintenance Inspections are performed at regular 8,000 mile intervals, the most recent was completed on December 31, 2006 and the bus had traveled approximately 7,797 miles since then. There were no safety or recurring defects noted in the 45 days prior to the accident. The bus records did show that on April 7, 2007 a leaking left rear drive axle wheel seal had been replaced and that the bus had traveled approximately 137 miles when the accident occurred. A physical inspection of bus #70902 was performed by the Public Transportation Safety Board (PTSB) staff on April 12, 2007. The inspection found significant damage to the left rear drive axle tube with evidence of the wheel assembly having been exposed to extremely high heat (bluing of the metal, parts of the inner wheel bearing welded to the axle tube).
In addition, the outer wheel bearing assembly was missing as well as parts that secured the wheel hub assembly to the bus. The inner wheel bearings, although pieces of which were present, were destroyed. Inspection of other bus components showed no defects which could be considered a causative factor to the accident. Due to damage sustained in the accident decelerometer tests could not be performed on the bus braking systems although no defects of the braking systems was claimed and static examination of the braking systems showed that they should perform as designed.

The bus driver was hired by Hudson Transit Lines, Inc. on June 15, 2006 and completed the New Bus Operator Training Program. A review of the driver's Department of Motor Vehicles records for the past three years showed a "Property Damage" accident which occurred on 02/15/07. NYS Vehicle & Traffic Law, Article 19-A records were reviewed and found to be complete, in-order and up-to-date. A review of the driver's Hudson Transit accident record since his date of hire showed no collision accidents. Post accident drug and alcohol testing of the bus driver was not performed.

In an interview the bus driver indicated that he had reported to work (3:00 p.m.), picked up his assigned bus, performed the pre-trip inspection (finding no defects) and departed for NY City (4:30 p.m.) where he arrived at 5:30 p.m. The driver said that he experienced no problems during that portion of his trip. The bus driver indicated that he boarded his passengers and departed for Ithaca, NY at 6:30 p.m. and made one stop at the Ridgewood Park-and-Ride at 7:10 p.m. The bus driver again indicated that he did not encounter problems with the bus. The bus driver stated that when he reached Wurtsboro, NY (between Exit 113 and 114 on Rt 17) he smelled “something funny”, not anything burning just an odd smell. The driver said that he looked in the mirrors but did not see any smoke either inside or outside of the bus. Seconds later the bus driver said that he looked in the mirror again and observed smoke at the rear of the bus. The driver said that he immediately moved to the shoulder, exited the bus to find the left rear dual wheels missing and a small fire in the wheel well. The driver said that he retrieved the on-board fire extinguisher, extinguished the fire and called for assistance. The driver stated that approximately 45 minutes passed before a police officer stopped and told him that the missing wheels had rolled down a hill and struck a Jeep, overturning it and injuring the driver.

In an interview with the mechanic who repaired the leaking seal, he stated that he had no idea why the wheel set had separated from the bus and, in detail, went through the steps he took when making the repair. Specific steps mentioned were: Utilizing the proper tool to set the wheel seal; although not using a torque wrench (no such tool was in the maintenance facility), establishing and setting preload for the inner and outer bearings; lubricating the bearings with oil prior to inserting and securing the axle; and ensuring that the differential housing was properly filled with oil. Those steps were consistent with those in the bus manufacturer’s manual for making the repair of the wheel seal.

Additional facts:

- There are two systems used to insure proper lubrication of wheel bearings.
  - “Wet” systems use the differential oil to lubricate the rear wheel bearings and a small reservoir is utilized for front wheel and tag axle bearings.
  - “Dry” systems utilize grease to lubricate the bearings and a seal to insure that differential oil does not contaminate the rear wheel bearings.
At the time of the accident Hudson Transit Lines, Inc. did not provide a torque wrench to set the pre-load for bearings, using instead the experience of the mechanics to properly tighten the bearing and to then back it off to establish the pre-load.

Public Transportation Safety Board staff finds that the probable cause of this accident was the failure of one, or both, of the left rear drive axle wheel bearings. The exact cause of the failure of the bearings cannot be conclusively determined but was most likely caused by one, or more, of the following:

1. Failure of the mechanic to establish the proper pre-load (most likely too tight) on the wheel bearings after the repair of the wheel seal.
2. Failure of the mechanic to properly lubricate the bearings prior to installing the axle.
3. Failure of the mechanic to insure that the proper lubricant level was re-established in the differential housing following the repair of the wheel seal.
4. Failure of the mechanic to properly assemble the rear wheel hub components.
5. Mechanical failure of one or more of the rear wheel bearings.

Hudson Transit Lines, Inc. (Shortline) as a result of this accident purchased a torque wrench and instructed all of their maintenance personnel in the use of the wrench for setting the pre-load of wheel bearings to the specifications of the manufacturer. In addition, all maintenance personnel were reinstructed in the procedures for the proper replacement of wheel seals.

Based on the action taken by Hudson Transit Lines (Shortline) regarding this accident, the Public Transportation Safety Board staff makes no recommendation in this case.

INVESTIGATOR: Harry W. Gerham

Copy To:
Ms. Donna Young, Safety Director
Hudson Transit Lines, Inc.
4 Leisure Lane
Mahwah, NJ 07430