



by Dale Goudie, MASC PEng



Reconstructing Heavy-Truck Accidents

When dealing with heavy-truck accidents it is important to obtain key information quickly. Time will be of the essence if the vehicles are repairable as owners will want to get their trucks back to work. Unique features of heavy-trucks may also require the expertise of specialized investigators. This article is meant to help you understand who can help you, how to work with experts and what technical information you should be gathering, particularly when beginning the investigation, to best reconstruct the accident later on.

Early responders

If warranted, police officers with specialized training, called traffic analysts, or vehicle inspectors will attend the accident scene. Traffic analysts usually survey the incident scene and take photographs while vehicle inspectors conduct mechanical inspections of the vehicle, particularly the air brake system. Inspectors will also take photographs and typically provide their inspection results in a separate report to the police. The data from the traffic analyst and vehicle inspector, however, may not be available until much later. Therefore, if at all possible, speak with the police to determine if traffic

analysts and vehicle inspectors attended and what kinds of information may be expected from them in the future.

Accident reconstruction engineer

These forensic experts are usually Mechanical Engineers who have experience using their knowledge of physics to investigate motor vehicle accidents. Their primary role is to interpret the physical evidence, including the findings of the police and vehicle inspectors. When hiring an accident reconstruction engineer it is important to hire someone with the right qualifications. While there are many who have experience with car accidents, the analysis of a heavy-truck accident can require special expertise because, compared to cars, heavy-trucks have different braking systems, power-to-weight ratios, accident avoidance capabilities, driver visibility, turning radii, maintenance requirements, cargo requirements, driver requirements, electronic data recording capabilities, tire to road friction coefficients and so on.

Sometimes the information gathered by the police and vehicle inspectors is not a sufficient foundation for an engineering analysis. Therefore,

accident reconstruction engineers may also need to examine the crashed vehicles and the accident location. For example, relative vehicle positions and speeds can often be calculated based on measurements of vehicle damage not generally made by the police or vehicle inspectors. Furthermore, evidence and features at the accident location, like gouge marks in the asphalt or skid marks, can indicate where vehicles were on the road, how fast they were going or where a driver detected a hazard. Some engineers also have the equipment required to download electronic crash data from heavy trucks if they can get to them shortly after the crash.

Independent vehicle inspectors

Heavy duty mechanics are the right kind of experts to determine the mechanical condition of a truck following an accident. Look for someone with inspection experience and consider instructors from local technical schools. Often these experts will work closely with an accident reconstruction engineer to ensure the information required for a successful reconstruction is documented.

Professional driver behavior experts

Sometimes an experienced professional driving instructor is the expert you need. These experts can discuss the necessary standard of care and what professional drivers are taught to do, and not to do, in particular circumstances.

Unique heavy-truck issues

BRAKING

Heavy-trucks are generally equipped with air-brakes which function in a fundamentally different manner than car brakes. A heavy-duty mechanic with training in inspecting and maintaining air-brake systems is the right kind of expert to determine the condition of heavy-truck brakes following a crash. However, often determining the condition of the brakes is only part of a bigger picture.

A reconstruction engineer can consider physical evidence documented at the accident scene and determine whether or not the condition of the brakes played a role in the accident.

CASE STUDY 1: After a dump truck drove into a line of stopped cars on a highway, a heavy-duty mechanic found the brakes on the truck were improperly maintained. Further investigation by a reconstruction engineer found the condition of the brakes did not contribute to the collision because skid marks on the road indicated the driver did not apply the brakes until after the collision. Heavy-truck brake systems experience a longer lag between brake pedal application and deceleration, and heavy-truck tires typically have a lower coefficient of friction against the road. These factors need to be taken into account when investigating heavy-truck braking issues.

MANEUVERING

Due to their size and the presence of trailers, heavy-trucks make wide turns that sometimes result in collisions with smaller vehicles attempting to pass. Engineers can analyze the turning path, speed and timing based on the physical characteristics of the vehicle and scene while driving experts can discuss driver training and safe turning methods.

CASE STUDY 2: A tractor-trailer making a slow right turn into a narrow driveway had to move to the left lane prior to turning right. A car attempted to pass on the right and collided with the trailer as the truck was making the turn. Subsequent analysis indicated in the moments leading up to the collision, the car was positioned behind the truck far enough to respond and avoid the collision but failed to do so.

ELECTRONIC CRASH DATA

Like many modern cars, heavy-trucks have on-board computers that may retain electronic data in the event of a crash. However, heavy-truck data is collected differently than passenger cars and specialized equipment is required to download the data. It is important to retain an expert who

understands how to download and interpret the data properly. Contact a qualified expert to determine if such data may be present in your particular case. Some trucking fleets track their vehicles using GPS technology. This kind of information can be useful in reconstructing the timeline surrounding a crash.

CASE STUDY 3: A road crew was working on a snow covered mountain road that was restricted to single lane alternating traffic with a speed limit of 20 mph. A tractor trailer was descending the hill when a police car attempted a U-turn in front of the truck. The truck driver swerved to avoid the police car and struck a pedestrian.

There was no physical evidence to determine the truck speed, but the driver said he was going 20 mph and the police officer said he did not observe the truck speeding. The flagging crew gave conflicting statements and data from the engine control module (ECM) showed the truck was traveling at 44 mph prior to the accident. Further examination of the data and physical examination of the truck found that the actual rear axle drive ratio did not match the ECM programmed settings. Testing showed the ECM speed reading was off by 240%. Correcting for this error, the ECM data indicated the truck was actually traveling at 19 mph.

It is important for experts, and those hiring them, to know the limitations of their expertise. Heavy-truck investigations can require specialized knowledge beyond the qualifications of many accident reconstruction investigators. In addition to engineers with heavy-truck experience, heavy-duty mechanics and heavy-truck driving instructors can be key members of your investigation team.

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