NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Washington, D.C. 20594

June 27, 2019

Video Study

NTSB Case Number:
HWY18FH015

A. ACCIDENT

Location:	Boise, Idaho
Date:	June 16, 2018
Time:	11:28 p.m.
Vehicle No. 1:	2019 Volvo tractor in combination with a 2015 Great Dane trailer
Vehicle No. 2:	2009 Jeep Wrangler
Vehicle No. 3:	2003 Volvo tractor in combination with a 2008 Great Dane trailer

B. AUTHOR

Dan T. Horak
NTSB

C. ACCIDENT SUMMARY

For a summary of the accident, refer to the Crash Summary Report in the docket for this investigation.

D. DETAILS OF INVESTIGATION

The goal of this study was estimating the speed of the 2019 Volvo tractor before its impact with the Jeep based on a video recorded by a Garmin device installed on the tractor. The video had 1920x1080 resolution and frame rate of 30 fps. In addition to recording the video, the Garmin device also recorded the GPS location of the tractor and the tractor speed it computed based on the GPS locations. The GPS location and the speed were superimposed on the video and were updated once per second. The superimposed GPS-based speed at the time of impact was 62 mph. Figure 1 shows a frame from the video recorded about 1.3 seconds before impact.

Figure 1. Video Frame Recorded 1.3 Seconds before Impact

The superimposed speed did not consider the visual information in the video. This study estimated the speed based on the visual information in the video without considering the GPS location information provided by the Garmin device.

Three speed estimates were derived. First, the average speed was estimated over a 1182 feet long road segment that ended about 100 feet before the location of impact. This segment was selected because its end points were clearly visible in the video. Its starting point was on a steel guardrail and its end point was on the Jersey wall at the site of the accident. Google Earth was used to measure the distance from the starting point to the end point. The time it took the tractor to travel this distance was 12.9 seconds. The average speed in this segment was 1182/12.9=91.6 ft/s, or 62.5 mph.

The broken white lane lines on the highway consisted of 12 feet long segments and 38 feet long gaps. Google Earth measurements showed that these dimensions were accurate. The second speed estimate was derived over a road segment that was 550 feet long. It ended on the Jersey wall at the same location as the first segment. The starting point was 11 white segments before the end point, resulting in segment length of (12+38)x11=550 feet. The travel time was 6.0 seconds. The average speed in this segment was 550/6=91.7 ft/s, or 62.5 mph.

The third speed estimate was aimed at detecting any speed changes just before impact, possibly indicating braking. It consisted of measuring the time it took the tractor to move from the end of a white 12 feet long segment to the end of the next 12 feet long segment, i.e., 12+38=50 feet. It was measured over the 11 segments that were used in

the second estimate described above, resulting in 11 speed estimates. The test showed that the speed was a constant 62.5 mph up to the time of impact.

E. CONCLUSIONS

Video recorded by a Garmin device installed on a 2019 Volvo tractor was used for estimating its speed when it impacted a Jeep Wrangler. The estimated speed was a constant 62.5 mph up to the time of impact. This video-based speed estimate is in close agreement with the GPS-based speed estimate computed by the Garmin device.