

Addressing Heavy Truck Driver Fatalities in Sweden

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I. INTRODUCTION

Although heavy trucks made up only 6% of the total mileage in 2023 [1] they were involved in 20% of fatal crashes on Swedish roads [2]. In a large majority (92%) of these crashes, the opponent is the fatal victim [3]. Similar numbers have been shown on a European level [4]. Therefore, Euro NCAP introduced safety ratings of heavy trucks in 2024 [5]. As a first step, crash avoidance systems are included in the tests. With a longer lead-time for passive safety re-design, crash compatibility with other vehicles and vulnerable road users, and occupant protection is planned to be included in new tests in 2031. The largest problem in Sweden is head-on crashes, where a PhD research project on frontal crash compatibility was granted funding and initiated early 2025 [6]. A working group in Euro NCAP was recently initiated on the topic but also including VRU impact protection and HGV occupant protection. A study on German data showed that a majority of pedestrians have a head injury from the vehicle front when seriously injured by a truck [7]. Less is known about injury mechanisms for truck occupants.

II. METHODS

As part of the Vision Zero initiative to understand the cause of fatal crashes and find countermeasures Trafikverket (Swedish Transport Administration) makes in-depth investigations of all fatal road crashes in Sweden [8]. An accident investigator goes to the scene and investigates the vehicle within 3–5 working days. Further, police reports with witness statements, autopsy reports etc. are collected. Suicides and natural deaths are excluded. This database was queried for fatal crashes between January 1st2010 and December 31st2024 where a heavy truck driver (commercial heavy goods vehicle (HGV), exceeding 3.5 tons) was fatally injured. A detailed case-by-case study was performed on fatal single crashes.

III. INITIAL FINDINGS

From a total of 3195 fatal road crashes with 3453 fatalities in this period, 568 of those (17.8%) involved a heavy truck with 637 fatalities (18.4%). Of those 568 crashes, the truck driver was fatally injured in 58 crashes (10.2%). For all fatal truck crashes, the dominant accident type is head-on (43%), while single crashes dominate (60%) when the truck driver is fatally injured (see Figure 1).

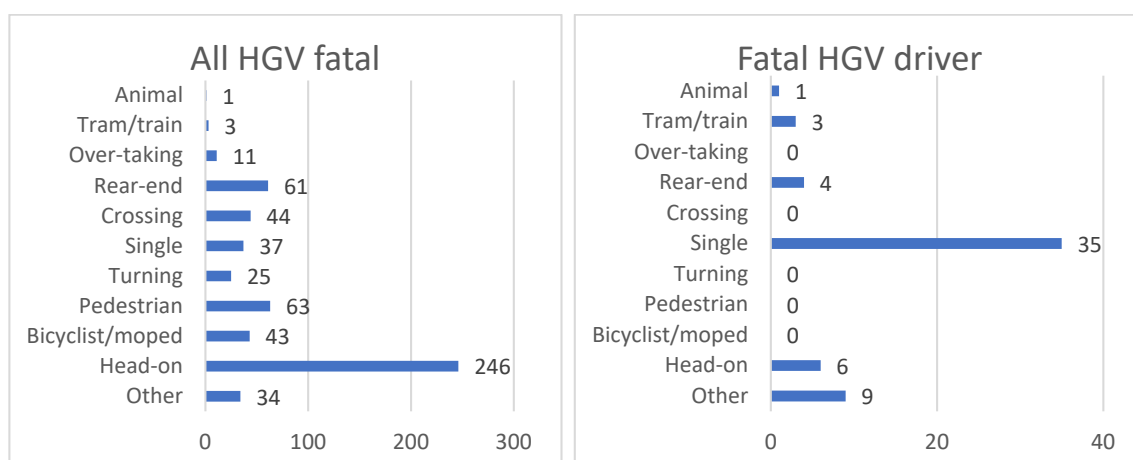


Figure 1. Accident type distribution Left: all fatal crashes including heavy trucks. Right: crashes with heavy truck driver fatally injured.

The heavy truck fatal crashes where the driver was fatally injured (n=58) were studied in further detail. The median model year was 2010, and the mean curb weight (unloaded) was 12.2 tons. The driver was belted in 30% and unbelted in 40% (unknown 30%).

For the single accidents (n=35, 60%) the driver was unbelted and rollover occurred in a majority of the cases, see Figure 2.

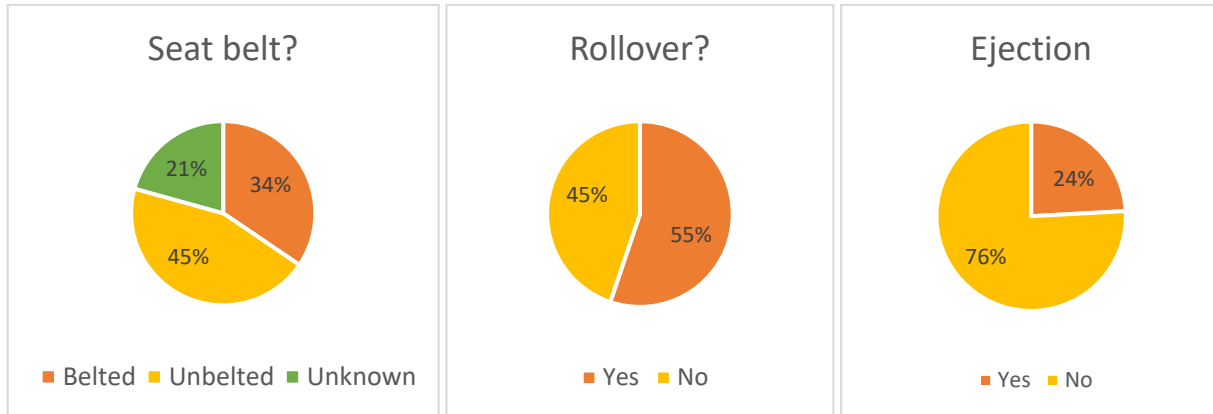


Figure 2. Seatbelt wearing rate (left) and rollover rate (middle) in fatal single crashes where truck driver was killed. Right chart shows ejection rate in fatal rollover crashes.

IV. DISCUSSION

The findings indicate that when a heavy truck driver is fatally injured in a crash (in Sweden), the dominating injury mechanism is an unbelted driver fatally injured in a rollover. Effective countermeasures could be seatbelt reminder, interior padding and inflatable side curtain. The curtain could potentially address both interior impact and ejection (24% of rollovers). Further study is needed to understand detailed injury mechanisms and consequently effective countermeasures. This can then assist upcoming safety tests in consumer testing programs or eventually upcoming vehicle safety regulations.

V. REFERENCES

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