

MIFACE INVESTIGATION REPORT #17MI007

SUBJECT: Truck Driver Died After Being Thrown Back by Air Release from a Pressurized Tire Sidewall Failure

Summary

A 61-year-old male truck driver died in the winter of early 2017 when he was thrown onto a concrete floor as a result of air released from a pressurized tire sidewall failure. The decedent was a contract driver for an owner/operator; the owner operator's trucks were leased by the company where the incident occurred. The decedent's truck had a flat inside left tire on the rear axle of his truck; the tire was off bead.



Figure 1: Incident scene

After several unsuccessful attempts to inflate the tire, the two mechanics working on the tire used a jack to raise the rear of the truck to take the pressure off of the tire. After several more unsuccessful attempts to inflate the tire, the mechanics removed the outside tire. After the outside tire was removed, the mechanics again attempted to inflate the tire; this time it was successful (they were able to get the bead) using a TSI Cheetah bead seating tool, but they could hear air leakage from the tire. Mechanic #1 asked the decedent to release the cheetah's air brake. The tire was rotated and a piece of metal was found. Mechanic #2 left the scene to retrieve a tire plug kit. Mechanic #1 was positioned to the right of the tire. The decedent walked up to the left of Mechanic #1 (the decedent was standing directly in front of the tire) presumably to point out the metal. Mechanic #1 warned the decedent to move away while he removed the air chuck. The sidewall of the pressurized tire failed releasing the pressurized air. The force of air from the "explosion"

launched the decedent backward. He landed approximately 12 feet away on his back and struck his head on the concrete floor. Emergency response was called and the decedent was transported to a local hospital where he died.

MIFACE identified the following key and possibly contributing factors:

- The decedent was not trained on truck maintenance safety, including safe practices during tire maintenance.
- The company's program to ensure that only trained and authorized personnel were allowed entry to the maintenance area was not enforced.
- A tire cage was not used during the attempted inflation and maintenance of a tire.

RECOMMENDATIONS

- Ensure that only properly trained and authorized employees are able to gain access to the maintenance area.
- Use best safety practices, such as a tire cage, when performing tire maintenance, and provide training on the procedures.
- Perform routine inspections of tire integrity.

BACKGROUND

A 61-year-old male truck driver died in the winter of early 2017 when he was thrown onto a concrete floor as a result of air released from a pressurized tire sidewall failure. MIFACE researchers were made aware of the fatality through the MIOSHA 24-hour ASAP reporting system. MIFACE contacted the safety representative from the truck driver's employer, who agreed to be interviewed by MIFACE researchers. During the writing of this report, the death certificate, medical examiner and police reports, and the MIOSHA compliance file were reviewed. The pictures used in this report were courtesy of the MIOSHA compliance file, and have been altered to maintain confidentiality.

The decedent was a full-time truck driver for an owner/operator, who was in turn contracted to a larger transportation contractor. At the time of the incident, this contractor employed approximately 175 such drivers via contracts with owner/operators, as well as an additional 225 drivers employed directly by the firm. The decedent had been driving for the contractor through the owner/operator for 2 years, and held irregular hours depending on his assigned schedule.

The firm trained its drivers in general safety rules and practices, as well as in pre- and post-trip vehicle inspection, in accordance with federal Department of Transportation requirements. The employer conducted maintenance on the trucks as needed, and drivers were generally only responsible for the pre- and post-trip walk-around inspections. Company rules stated that drivers were not allowed in the maintenance area at the time of the incident; however, drivers would sometimes accompany the truck during maintenance and observe or assist.

Company Remediation

Since the incident, the company has implemented training and controls to ensure that only maintenance personnel have access to the maintenance area. The MIOSHA investigation noted that the employer installed combination locks on the doors to the maintenance bay, and provided training and posted signs stating that drivers are not to enter the area.

MIOSHA Citations

MIOSHA General Industry Safety and Health Division issued the following Serious citation to the company at the conclusion of its investigation:

SERIOUS: AUTOMOTIVE SERVICE OPERATIONS, GI PART 72, RULE 408.17211(a):
An employer shall provide training to an employee as to the hazards, safe operations of the assigned job, and applicable rules of this part.

Training in the hazards and safe operations of automotive tire servicing had not been provided to an employee that was assisting and located in the vicinity where automotive service mechanics were engaged in repairs to a semi-truck tire. The training did not cover the hazard of explosive air decompression from damaged tires, troubleshooting and repair of damaged tires and bead seating and inflation practices.

INVESTIGATION

The decedent was starting his shift in the evening, having finished approximately 12 hours previously. The driver brought his Freightliner truck in to the maintenance department because of a flat tire on the inside wheel of the third axel on the driver's side. The decedent's truck was the only one present in the maintenance area that evening. The tire was a General Tire Model ST250, and had previously been retreaded. The driver accompanied the truck in the maintenance area (Figure 1), and was assisting two mechanics by setting and releasing the air brake as needed.

The mechanics initially tried inflating the tire with an air chuck and, when this failed, jacked up the truck to relieve pressure on the tire and attempted to inflate it again. After a further lack of success, the mechanics removed the outer tire, and used a TSI Cheetah bead seating tool to get the tire to take its bead. Following further attempts to inflate the now-seated tire using a clip-on air chuck, it was noticed that the tire had a leak. While one of the mechanics left to retrieve a tire plug kit, the decedent released the air brake and approached the tire to inspect it. He noticed a small piece of metal sticking out of the tread of the tire (Figure 2), and pointed this out to the remaining mechanic. According to the interview, the mechanic began letting air out of the tire in order to remove the piece of metal.

The mechanic warned the decedent about standing directly in front of the tire. At this time, the sidewall of the tire ruptured (Figure 3). The decedent was standing directly in front of the tire sidewall, approximately three feet away according to the MIOSHA investigation. The tire model

had an inflation pressure of 105 pounds per square inch; however, as the tire was flat and in the process of being repaired, it is unknown what the pressure of the tire was at the time of rupture. The driver was knocked back by the force of the pressurized air release, striking his head on the concrete floor, according to the mechanic present at the time. The decedent landed on his back with his head approximately 12 feet away from the tire.

The maintenance area was a closed bay area where drivers were not authorized to enter, and drivers were not generally responsible for the maintenance of their trucks. However, due in part to some of the trucks being owned by independent owner/operators who wanted their drivers to be able to observe and assist in maintenance and repair of their trucks, drivers oftentimes entered the maintenance area while their trucks were under repair.



Figure 2: Metal debris stuck in tire

Mechanics at the company received yearly and quarterly training on safety and health issues related to truck maintenance. The mechanic present at the time of the rupture stood next to the tire instead of in front of it. This, in addition to him being located on the opposite end of the tire from where the sidewall failed, led to him being unharmed by the pressurized air release following the rupture. Blown tires were not uncommon, per the interviewee. The mechanic who had left to get the plug kit noted in the MIOSHA investigation that he had seen sidewall failures before on retreaded tires. The training the mechanics received and their experience with tire failures likely contributed to the mechanic present surviving the incident unharmed, and might have helped prevent the driver's death should he have been similarly trained.

Following the tire rupture, the mechanic who had left to retrieve the plug kit contacted emergency services. The decedent was transported to a local hospital, where he was pronounced dead.

After the incident, the employer instituted new policies regarding drivers' access to the maintenance bay. Combination locks were installed on the entrances to the service area, while training was



Figure 3: Ruptured tire sidewall

provided to drivers instructing them not to enter the service area. This message was reinforced with signs posted near the maintenance bay.

CAUSE OF DEATH

The cause of death as listed by the medical examiner on the death certificate was massive blood loss as a consequence of a ruptured abdominal aortic aneurysm complicating the concussive force of a tire rupture. It is not known if drug/toxicology testing was performed.

RECOMMENDATIONS

- Ensure that only properly trained and authorized employees are able to gain access to maintenance areas.

Both the MIFACE and MIOSHA investigations found that, while the employer's rules did forbid drivers from being in the maintenance area, the employer was aware of, and permitted, drivers frequently observing, or assisting in, maintenance and repair tasks. The maintenance area should be an authorized work area, entry to which should be limited to employees who have received training in safety and health issues surrounding truck maintenance and repair. Such training should be documented, and a list of employees authorized to access the area should be updated regularly, contingent upon ongoing training. Employees who are not authorized should not have access to the area, and this limitation should be strictly enforced by both management as well as other employees, including maintenance personnel. If a truck driver or owner/operator requests that the driver be present in the maintenance area with the truck during repair services, the driver should undergo safety training and become an authorized employee. In this instance, the decedent should have been required to be trained and authorized to be in the maintenance area, or kept out of the area entirely. In either case, his death would likely have been prevented. The company now uses training and posted signs to inform drivers that they are not allowed into the maintenance area, and combination locks on the doors to ensure unauthorized personnel do not enter.

- Use best safety practices, such as a tire cage, when performing tire maintenance, and provide training on the procedures.

Maintenance personnel, alongside any other employees or drivers authorized to be present during truck maintenance, should be trained in in best safety practices regarding tire maintenance and repair, including methods to prevent, or minimize the effects of, a tire explosion. The inflation of a tire should be performed while the tire is restrained within a device such as a tire safety cage. Cages absorb some of the impact of a tire explosion, and shield employees from components of the tire or rim that may be projected during the explosion. During this incident, the tire was being inflated and worked on while it was still mounted on the truck. The use of a cage or other restraint might have weakened the effect of the explosion and better communicated the hazards present to unaware employees, including the decedent.

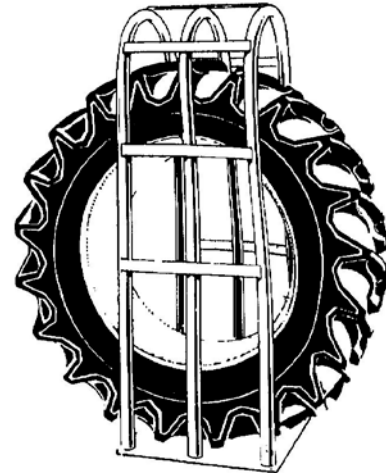


Figure 4: Illustration of a tire cage (source: <https://www.osha.gov/Publications/OSHA3086/osh3086.html>)

- Perform routine inspections of tire integrity.

During their training for pre- and post-trip inspections, drivers should be instructed on how to look for signs of wear or damage on their tires, such as extensive or uneven tread wear or cracks or breaks in the rubber of the tire, including in the sidewall. Care should be taken to inspect inside dual tires, such as the one involved in this incident, as signs of damage might more easily be missed on inside tires due to their location. If a tire has been found to be underinflated (or, as in this instance, flat), the integrity of the sidewall should be carefully inspected, as this is a known contributor to the weakening of tire sidewalls.

KEY WORDS: Struck By, Transportation and Warehousing, Truck Driver, Automotive Service, Tire

RESOURCES

More information regarding the hazards associated with tire ruptures, as well as guidelines for performing pre-trip tire inspections, can be found within the following resources:

- [OSHA: Servicing Single-Piece and Multi-Piece Rim Wheels](#)
- [Rubber Manufacturers Association Bulletin: “Inspection procedures to identify potential sidewall “zipper ruptures” in steel cord radial truck, bus and light truck tires”](#)
- [Bridgestone Tires “Tire Pre-Trip Inspection Guidelines”](#)
- [Michelin Tires “Pre-trip inspection”](#)

Federal Motor Carrier Safety Administration guidance on regulations pertinent to this report:

- [Section § 393.75: Tires.](#)
- [Section § 396.11: Driver vehicle inspection report\(s\).](#)
- [Section § 396.13: Driver inspection.](#)

MIFACE summaries of MIOSHA inspections involving similar fatalities:

- [Case 282: 29-year-old certified mechanic died when he was struck by an exploding rim of a tractor-trailer tire.](#)
- [Case 308: 27-year-old service technician for a tire company died when the manure spreader tire he was servicing at a farm exploded.](#)

MIOSHA standards cited in this report may be found at and downloaded from the MIOSHA, Michigan Department of Licensing and Regulatory Affairs (LARA) website at: http://www.michigan.gov/lara/0,4601,7-154-11407_15368---,00.html. MIOSHA standards are available by writing to: Michigan Department of Licensing and Regulatory Affairs (LARA), MIOSHA Regulatory Services Section, Stevens T. Mason Building, 530 W. Allegan Street, Lansing, Michigan 48933, calling (517) 284-7740, or by FAX (517) 284-7735.

- MIOSHA General Industry Safety Standards, Part 72. Automotive Service Operations: http://www.michigan.gov/documents/lara/lara_miosha_GI_72_422576_7.pdf

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