

**DATE:** September 23, 1992

**FROM:** Fatal Accident Circumstances and Epidemiology (FACE) Project  
Minnesota Department of Health (MN FACE)

**SUBJECT:** MN FACE Investigation MN9208  
Owner of Heavy Equipment Maintenance Business Dies After Being Struck by an  
Exploding Split Rim of a Test Roller Tire

## **SUMMARY**

A 32-year-old male owner of a heavy equipment maintenance business (victim) died as a result of injuries he received when the split rim of a test roller's tire exploded as he attempted to remove the wheel. He was struck by the exploding unit and thrown approximately 45 feet. He had no training or experience with this type of split rim tire and used no protective equipment except for earmuffs during the procedure. The repairman was subcontracted to repair a wheel of the test roller, which was rubbing against the concrete weights. It was necessary to remove the wheel and tire from the axle to facilitate repair. The victim removed inappropriate bolts on the split rim, which resulted in the unintentional dismantling of it, when he apparently only intended to remove hub nuts to remove the wheel. MN FACE investigators concluded that, in order to prevent similar occurrences, the following guidelines should be followed:

- > manufacturer instructions and warnings should be consulted prior to removing split rim tires to ensure that proper nuts and bolts are removed to avoid unintentional dismantling;
- > only personnel familiar with and trained in controlling the hazards of split rim-mounted tires should attempt to remove them from equipment; and
- > split rim and axle bolts on wheels should be incompatible so split rims are identified from axles and require two different tools to remove the different bolts.

## **INTRODUCTION**

On July 14, 1992, MN FACE personnel were notified by the Minnesota Occupational Safety & Health Division (MN OSHA) of a July 10, 1992, work-related construction fatality. The county sheriff and coroner were contacted and reports were requested. The MN OSHA compliance officer assigned to the incident was also contacted and information was obtained. A representative for the general contractor was interviewed via telephone. A site investigation to view the test roller was not possible due to a lack of response from the necessary individuals.

The victim was the sole owner of a heavy equipment maintenance and repair company. There were no other employees in the company. He had owned this company for about two years and been in the maintenance business for about fourteen years. He worked on all types of industrial equipment, but mainly as a welder, doing such repairs as reinforcing scraper or dozer blades. He had no training or experience in split rim tire repair.

## **INVESTIGATION**

The test roller was a large, two-wheeled cart holding about 60,000 pounds of concrete. It is used in highway construction to test the road surface or base for compaction and deflection. The victim was subcontracted to repair a wheel of this test roller, which had been observed smoking earlier in the day and was apparently rubbing on the concrete weights. To facilitate repair, the victim was attempting to remove the wheel and tire from the axle in order to inspect it. He was removing wheel nuts with an air impact wrench. The county sheriff's report indicated that he was wearing earmuffs for noise control at the time of the incident.

The split rim tire was held together with 20 bolts. The tire had a two-piece outside rim and a separate inside ring retainer; it was, in effect then, a three-piece rim. The rim was 25 inches in diameter, and the tire was estimated to be 5-6 feet in diameter. Normal air pressure for the tire was about 70 PSI. The air had not been let out of the tire and, although the tire looked relatively new, there were abrasions on the inside of it where it had rubbed against the concrete. The axle of the test roller was blocked up indicating there was no intention to actually dismantle the tire, only to remove the wheel from the hub.

According to a witness, the victim had removed all but two of the bolts holding the rim together. Neither he nor the victim apparently realized the bolts being removed would dismantle the rim and were not simply the hub nuts attaching the wheel to the axle. The witness walked away from

the scene. As the victim removed the nineteenth bolt, the tire exploded apart and he was struck by part of the outside rim. He was thrown approximately 45 feet and suffered multiple traumatic injuries.

A call was placed by radio for emergency help. County sheriff and an ambulance service responded within minutes of each other. The victim, however, was dead at the scene and resuscitation was not attempted.

## **CAUSE OF DEATH**

The cause of death listed on the county coroner's summary report was cerebral contusions and lacerations.

## **RECOMMENDATIONS/DISCUSSION**

*Recommendation #1:* Manufacturer instructions and warnings should be consulted prior to removing split rim tires to ensure that proper nuts and bolts are removed to avoid unintentional dismantling of the rim.

*Discussion:* Despite his generally extensive experience around industrial equipment, the victim in this incident unknowingly dismantled the tire while attempting to remove the wheel from the hub, endangering himself and others. Since tires with multi-piece rims can vary from manufacturer to manufacturer, instructions for specific tires should be consulted before work with them begins. If questions still exist, work should be delayed until specific directions are obtained.

*Recommendation #2:* Only personnel familiar with and trained in controlling the hazards of split rim tires should attempt to remove them from equipment.

*Discussion:* Deflating the tire before removal may have prevented this incident. Because of the extreme danger and severe consequences of improper handling of tires with multi-piece rims, only personnel well trained in safety practices for work related to them should attempt any type of manipulation of them. Employers should implement and enforce strict rules and measures to prohibit unqualified workers from working with tires with such rims.

*Recommendation #3:* Split rim and axle bolts on wheels should be incompatible so split rims are

identified from axles and require two different tools to remove the different bolts.

*Discussion:* Having different and incompatible split rim and axle bolts could reduce the likelihood that a split rim would unintentionally be dismantled. Different sized bolts or different shaped bolt heads (8 sides vs. 4 sides) would require different tools for removal. Personnel not having qualifications to dismantle split rim tires may not have the necessary tools, and if they did, they might question the reason for the two different bolts and check with manufacturer instructions.