

technically speaking

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Proper vs. Improper Truck Nail Hole Repair

The pneumatic tire is a chamber for pressurized air which carries the vehicle load. Without air, a pneumatic tire cannot carry a load. To allow for multiple lives through retreading and repair, tires must satisfy many requirements, including:

- ride comfort
- traction
- low rolling resistance
- good wear characteristics
- casing durability

All pneumatic radial tires are susceptible to penetrating objects which cause a loss of pressurized air, resulting in a damaged tire. Proper tire repairing can allow the damaged tire to be recycled into a safe and usable product once again.

The most common damage which occurs to radial tires is the nail hole puncture. The industry size limitation for nail hole damage is 3/8 inch (10mm) or smaller in truck tires.

A proper nail hole repair is a combination of many important procedures, performed by trained personnel. Most tire manufacturers and the repair industry agree that two conditions must be obtained to have a proper tire repair. In basic terms, a nail hole repair requires the injury to be filled and the appropriate repair unit placed over the injury for support and sealing of the innerliner. In other words, a plug only or a repair unit (patch) only is **NOT** a proper repair and is unsatisfactory.

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Photo 1 shows an on-the-wheel or plug only tire repair which is not recommended by any industry association or tire manufacturer.

The use of this type of repair does not allow for complete tire inspection or injury analysis.

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The results of using this improper repair method are shown in Photo 2. An on-the-wheel repair does not seal the innerliner or support the injury, thus resulting in premature tire failure. This type of repair and its potential consequences magnifies the importance of removing the tire from the rim and using industry approved repair procedures.

3

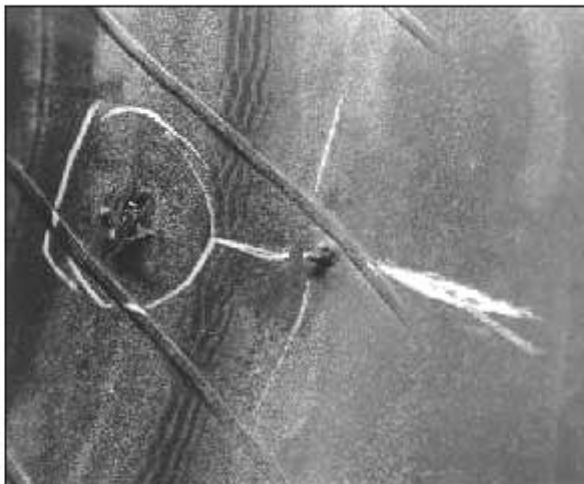


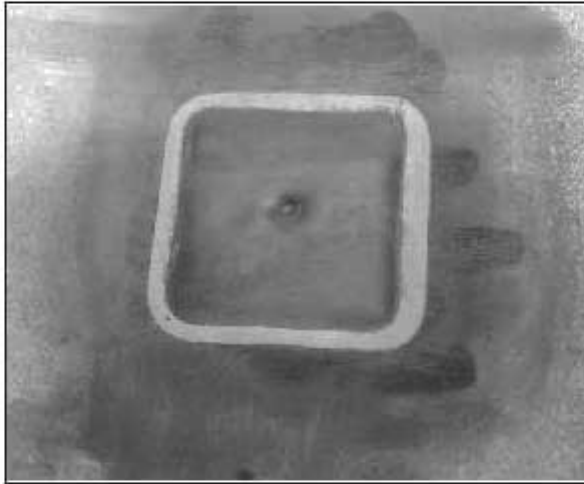
Photo 3 illustrates the importance of removing the tire from the wheel assembly for a thorough inspection before beginning the repair process.

The sharp object in the center of the photo penetrated the tire through the tread area. The tire began to lose air pressure causing severe deflection of the sidewall areas and eventual contact with the penetrating object. This created the internal damage which is circled in Photo 3. Notice the tubeless innerliner is damaged along with the radial cord body plies.

Obviously this tire is not repairable, but illustrates the necessity for inside inspection of all tires.

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The industry requires the filling of the injury along with ensuring that the appropriate repair unit is placed over the injury for support and sealing of the innerliner, as criteria for a proper tire repair.

Using a repair unit (patch) only over the damage on the inside of the tire is not satisfactory.

Photo 4 illustrates the patch-only repair. Notice the depression, or dimple, in the repair unit. The internal air pressure of the tire is forcing the repair unit into the unfilled injury, which eventually will create tire failure due to tire repair failure.

Without filling the injury, the cord body and belt package are exposed to further contamination resulting in injury growth, cord deterioration/separation, premature failure, or possible total tire destruction.

5



As shown in the above photo, severe rust, separation and steel cable looseness will not permit further repair of this tire. TECH always advocates "filling" the injury on "all" tires to ultimately preserve the casing for retreading, to fulfill the tire manufacturers' warranties, and to reduce liability.

Punctures in the sidewall area of steel radial truck tires should be considered a section repair and sent to a full service tire repair facility.

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Photo 6 shows a repair unit which failed when placed over an injury in the sidewall area of the tire. Notice that the repair unit's reinforcement package has fatigued and is loose. Also notice the deep depression extending outward through the top side of the repair unit.

In this case, the depression is caused by the steel body cables pulling away from the injury due to improper repair techniques.

7



Photo 7 illustrates damage to the steel body cord after the failed repair unit was removed. The injury was too large for a small nail hole repair unit to reinforce properly, the injury was not prepared or filled, and now the injury has grown larger due to improper repair techniques. This injury should have been a section repair.

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Photo 8 allows you to see the damaged cord body once the sidewall rubber was removed. A proper section repair could have extended the performance expectations of this tire.

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Photo 9 is a cross section of a proper tire repair that illustrates proper injury removal, a complete seal of the injury, and reinforcement of the innerliner to protect the integrity of the tire without sacrificing the safety of you or your customer. It is just as easy to repair a tire properly as it is to improperly repair a tire.

Proper tire repair optimizes tire life and performance while achieving lowest cost per mile opportunities, and satisfying tire warranties.