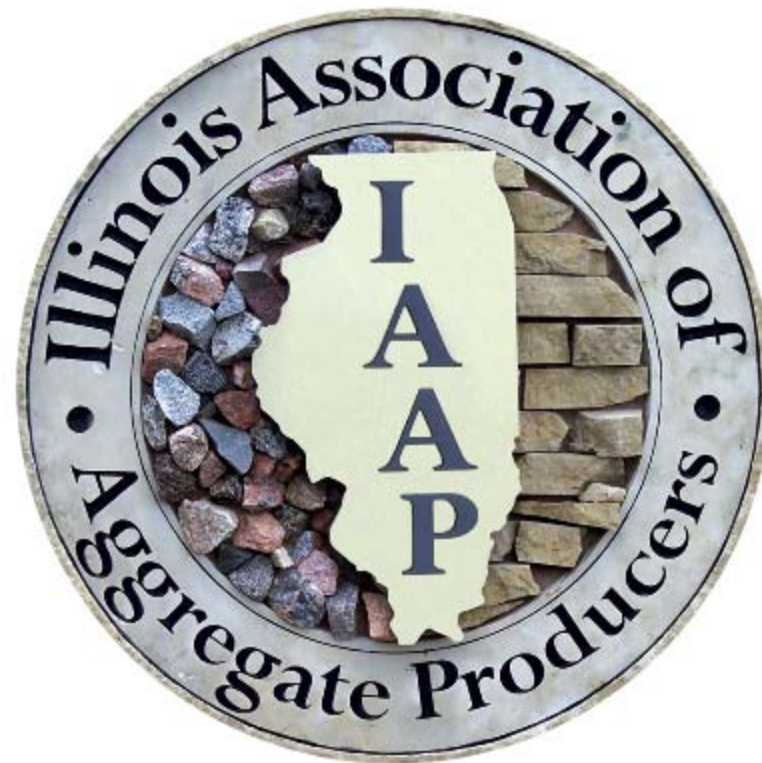
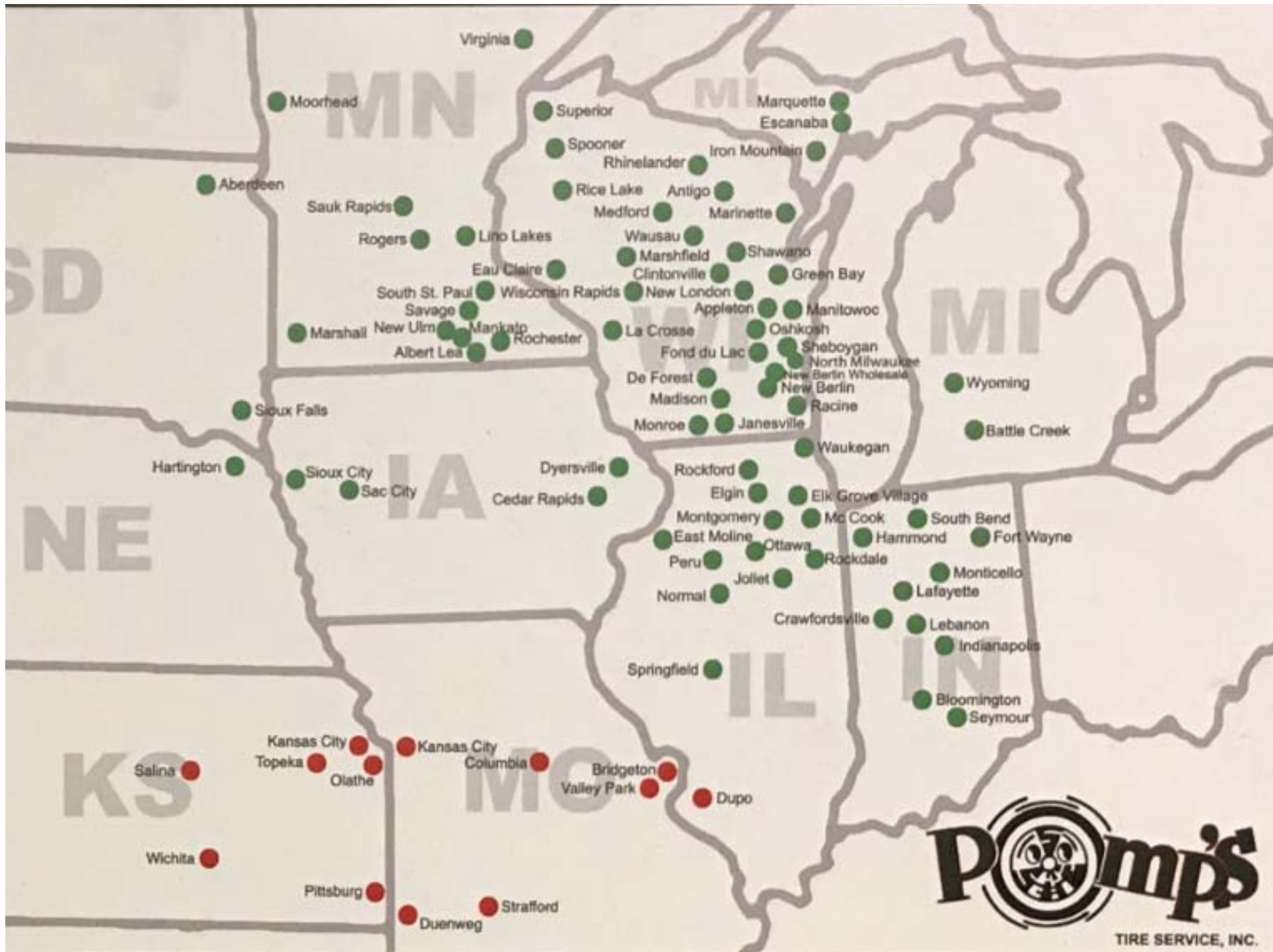


Tire and Wheel Safety and Maintenance



2018 Aggregate Miner Safety Conference

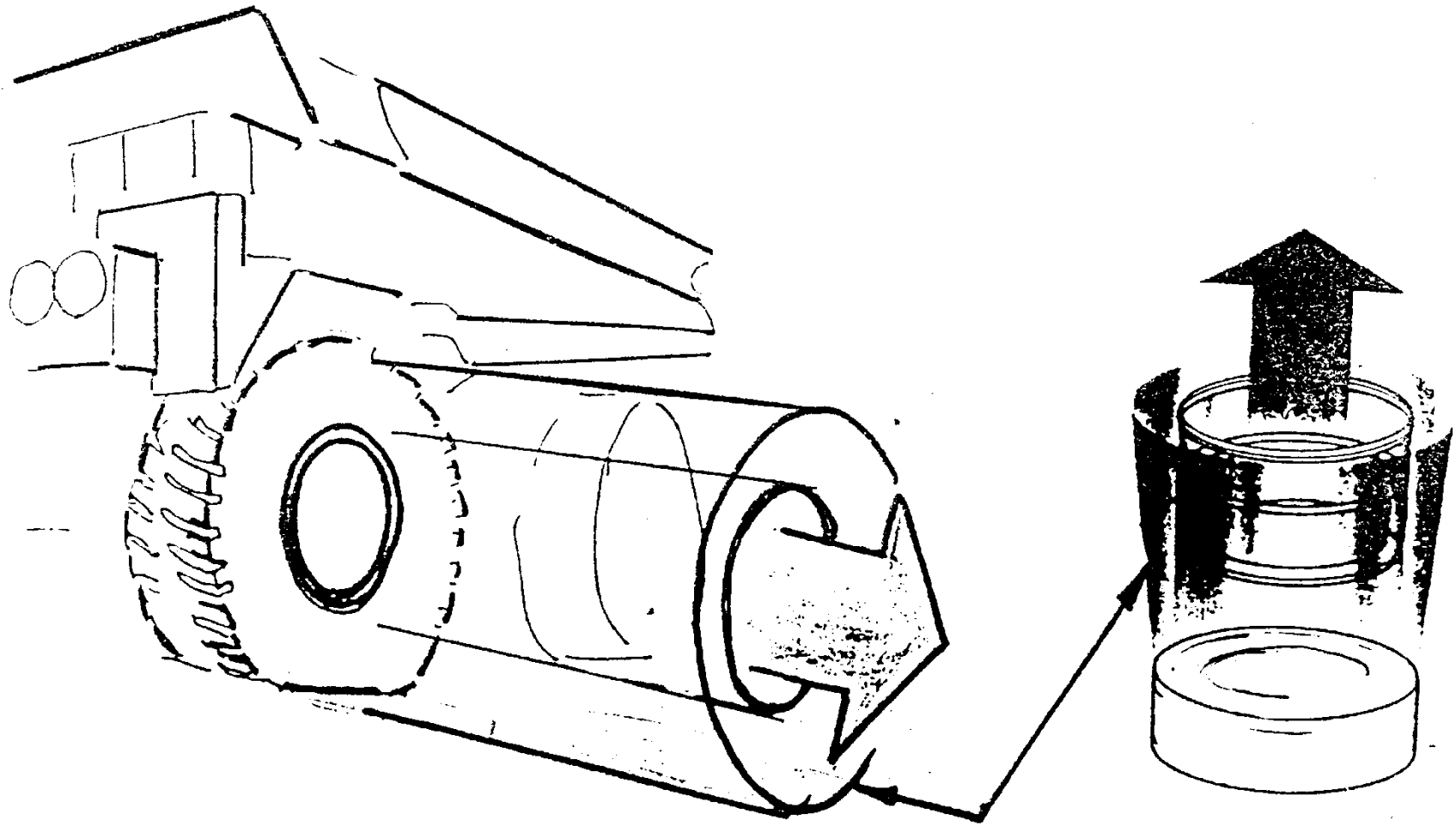


TIRE SERVICE, INC.

Tire and Wheel Safety



EXPLOSIVE POTENTIAL



Velocity and Energy Chart

<u>Tire Size</u>	<u>PSI Hot</u>	<u>Energy Ft/Lbs</u>	<u>200 Lb Person Vertical Ft</u>	<u>3,000 Lb Car Vertical Ft</u>
26.5R25	90	373,650	1,868	124
35/65R33	120	531,416	2,657	176
40.00R57	120	1,049,383	5,247	350

1 mile is 5,280 feet

There is no such thing as a small accident when it comes to tire or rim failure!

What Goes Up....



Agenda

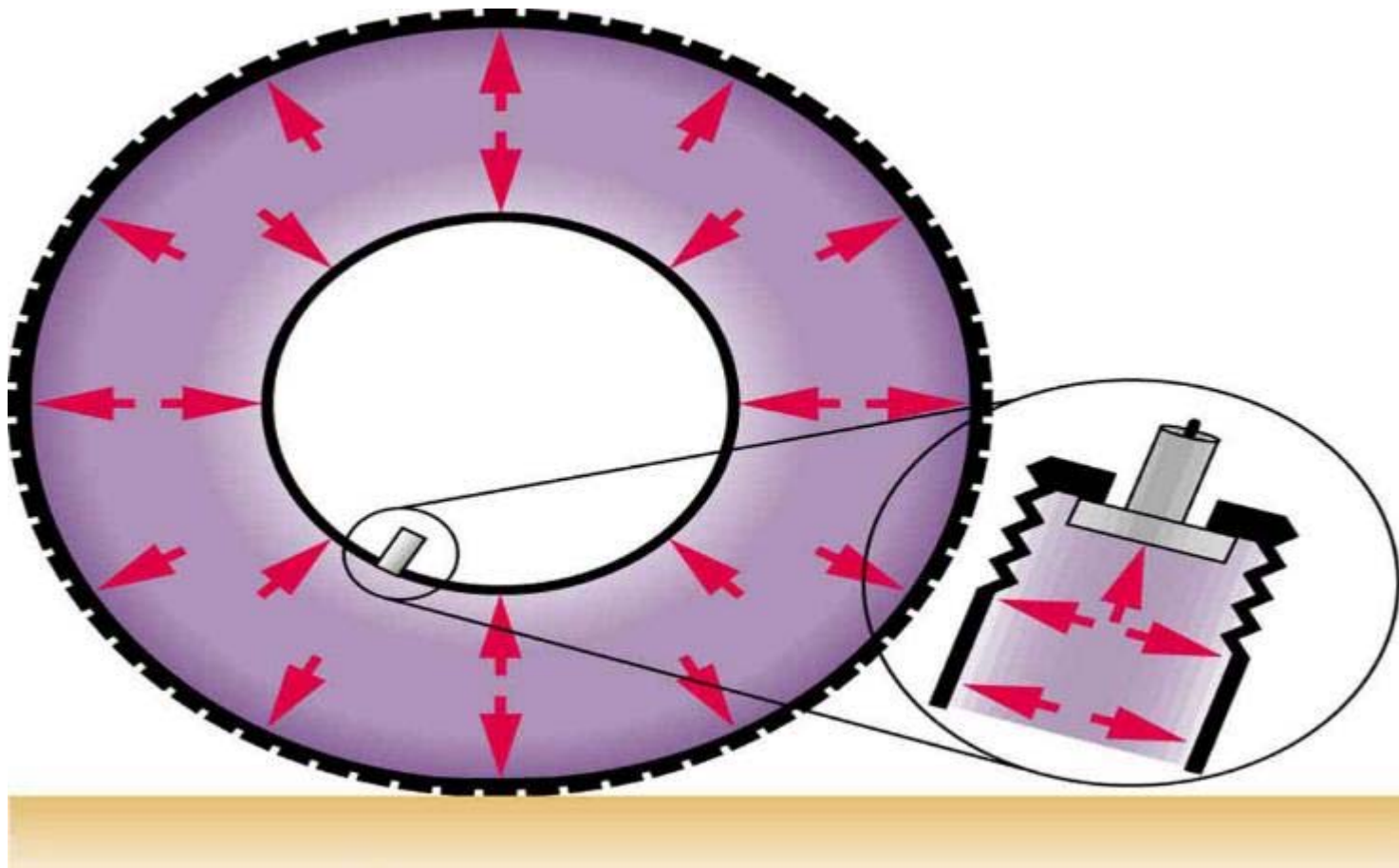
- What is a tire?
- Importance of proper air pressure
- Proper tire inflation procedures
- Tire pressure monitoring system options
- Never apply heat to a wheel or rim
- Proper pre and post shift tire and wheel inspection
- Operating conditions that effect tire wear

A Tire is a Pressure Vessel



Respect them and the damage they can cause

**Air pressure inside the pressure vessel
pushes against the tire, wheel and valve
core**



Functions of a Tire

- Support the load of the vehicle
- Provide traction/braking
- Control the direction of travel
- Absorb road shocks
- Overcome road hazards (most of the time)

Tires Limitations

Tires are limited to:

- How much load they can carry
- How fast they can travel
- How much heat they can sustain
- How much impact they can absorb
- How much external forces they can withstand

The Biggest Danger to a Tire is HEAT

- Heat causes components to fatigue
- Heat allows external forces to cause separations
- Heat allows more and deeper penetrations
- Heat causes faster tread wear
- Heat allows cuts/impacts to grow into major separations

Air Pressure

Why Should I Check the Air in My Own Tires?

- I want my tires to last as long as possible
- I drive the car
- My wife drives the family car
- My children ride in the car with my wife and me
- I am my family's source of income

Why Should I Have an Air Pressure Program at Work?

- I stand by the tires on the equipment from time to time
- I am responsible for the safety of my employees and myself
- It will reduce unnecessary downtime
- Low air pressure over time leads to less tire life
- Less tire life equates to more tire purchases
- More tire purchases equates to less **PROFIT**
- More expenses increase my Cost per Ton
- Less **PROFIT** may affect my personal **INCOME**

Correct Inflation Pressure

- **Proper inflation pressure** is the single most important feature of a good tire maintenance program
- Proper inflation pressure is dependent upon
 - Load/Overload
 - Speed/Distance
 - Type of service
 - Tire type
 - Tire brand
- “Published” inflation pressures are for standard loads
- In general... When overloads are encountered , inflation pressure should be increased 2% for each 1% of overload

Proper Air Pressure

- Proper tire pressure maintains the designed shape of the tire
 - Reduces the amount of deflection
 - The deflection occurs in the appropriate areas
 - Overall heat levels are kept to a minimum
 - Provides the best traction/braking
 - Provides the best vehicle control
 - Allows the optimum level of road hazard absorption

Good Inflation Program

- Conscientious personnel who appreciate the importance of proper inflation
- Valve cap on every valve stem
- Accurate air pressure gauges
- Cold inflation check whenever possible - ideally weekly
- Daily hot air pressure checks – Post shift inspection
- Write it down on the daily VIR or air pressure form
- Large increases in pressure from the cold inflation, could be a possible problem - (**Monitor if this happens**)

Checking Air Pressure



Large Bore Swivel Liquid Gauge



Dial Gauge with Bleed Out Button



Digital Gauge with Bleed Out Button



Inexpensive Cap Gauge



PT Gauge



Tire Pressure Monitoring System



Safety Precaution

- Do not re-inflate a tire that has been run flat or under inflated until it has been properly inspected
- If a tire has less than 80% of its recommended air pressure, it should be considered under inflated/flat and removed for inspection
- The equipment should be tagged out and parked
- Call Tire Service Provider to pull and inspect the tire

When Inflating ANY Tire Stay Out of the Trajectory Zone

- OSHA definition:

“Trajectory-Means any potential path or route that a rim wheel component may travel during an explosive separation or sudden release of the air pressure...”

- 45 degrees from the center of the tire/wheel in either direction

Airing Up Tires While Staying Out of the Trajectory Zone?

- MSHA Standard 56.14104
- Use a clip on air chuck with at least 25 feet of hose
- Use a remote inflation system
- Have a system that allows for air pressure release if a problem arises – Add a dump valve
- NEVER inflate a tire with the valve core in the stem (replacement tire process)
- Safety cage or similar restraining device

MSHA Standard 56.14104

§56.14104 Tire repairs.

(a) Before a tire is removed from a vehicle for tire repair, the valve core shall be partially removed to allow for gradual deflation and then removed. During deflation, to the extent possible, persons shall stand outside of the potential trajectory of the lock ring of a multi-piece wheel rim.

(b) To prevent injury from wheel rims during tire inflation, one of the following shall be used:

(1) A wheel cage or other restraining device that will constrain all wheel rim components during an explosive separation of a multi-piece wheel rim, or during the sudden release of contained air in a single piece rim wheel; or

(2) A stand-off inflation device which permits persons to stand outside of the potential trajectory of wheel components.

There Has Got to be a Better Way!



Stand-Off Inflator

I-330-25

Spring Loaded Inflator Gauge



I-330-25

- » Safely removes operator away from blast zone by using the 25 ft. hose
- » Spring loaded trigger enables operator to stop inflation for proper tire inspection
- » Includes 377OP and CH-360OP air chucks for Large and Standard Bore inflation
- » Safety coupler to relieve pressure from the tire in an emergency

Auto Inflation

- Accurate and Safe



Effects of Low Air Pressure

- Run Flat Damage – Inner liner break down
- Increases the potential for zipper rupture
- Less tire performance – mileage
- Poor fuel mileage
- Vehicle performance – handling

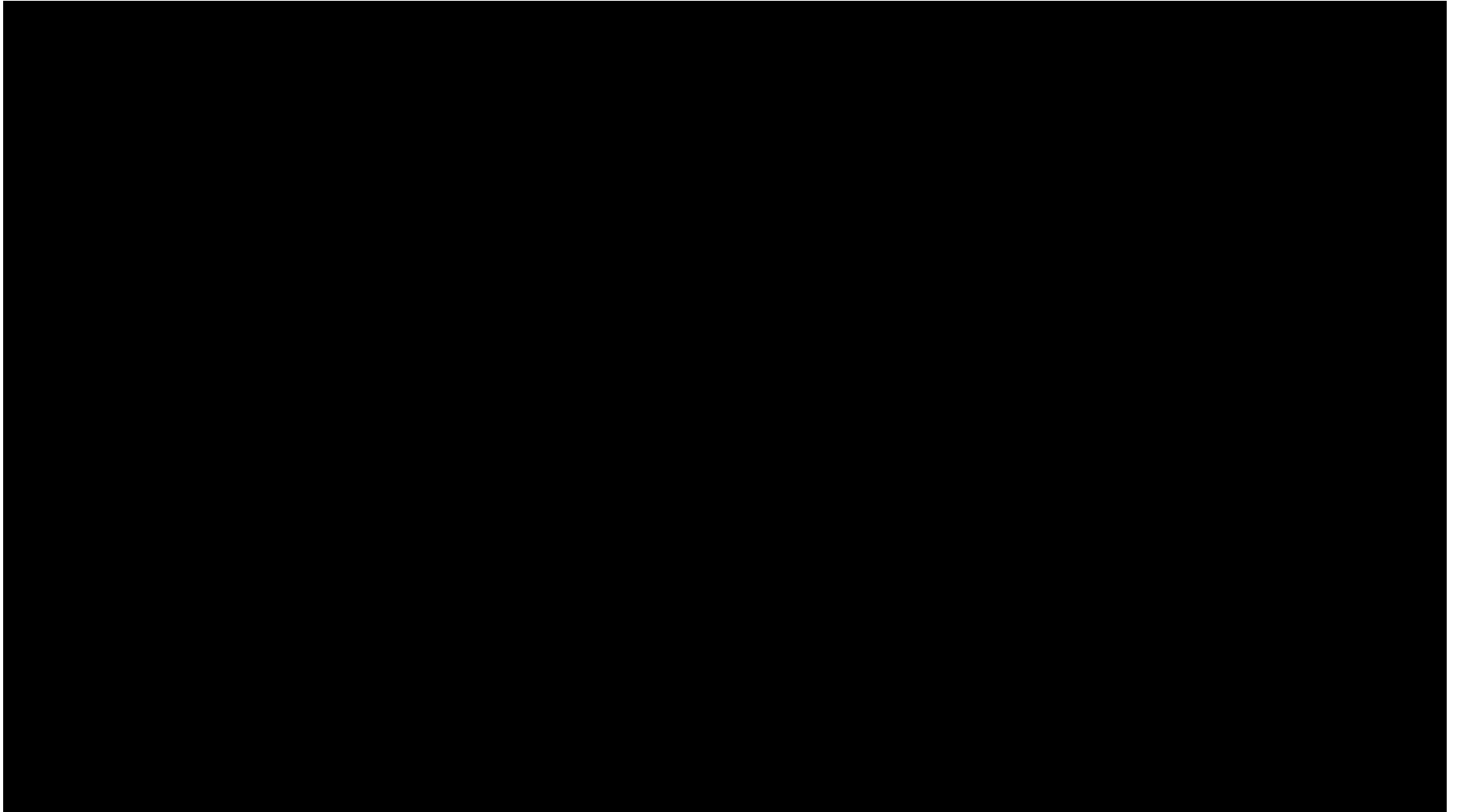
Overload/Run Flat Damage



“Zipper” Rupture



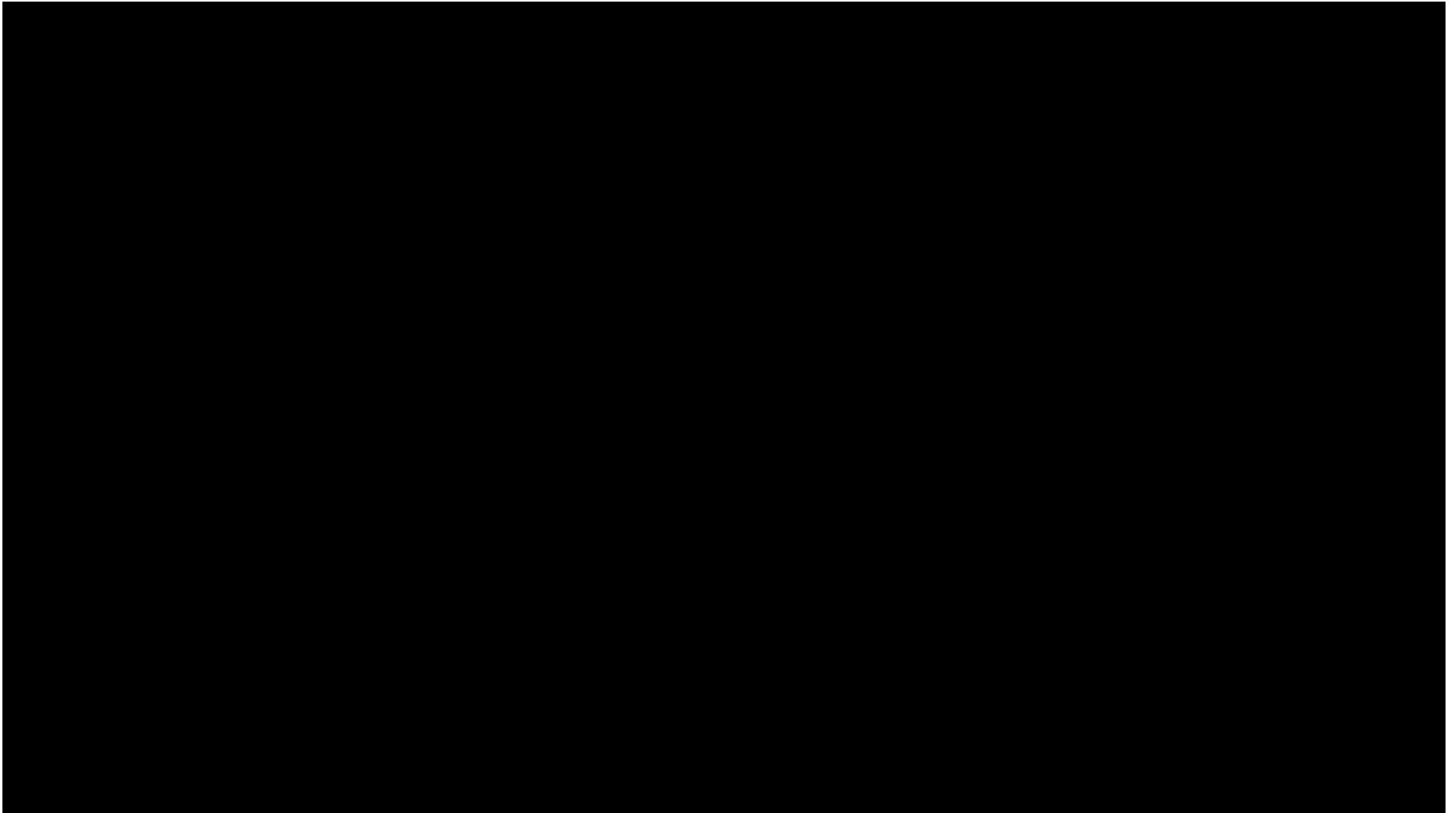
Zipper Rupture



Applying Heat to Wheels

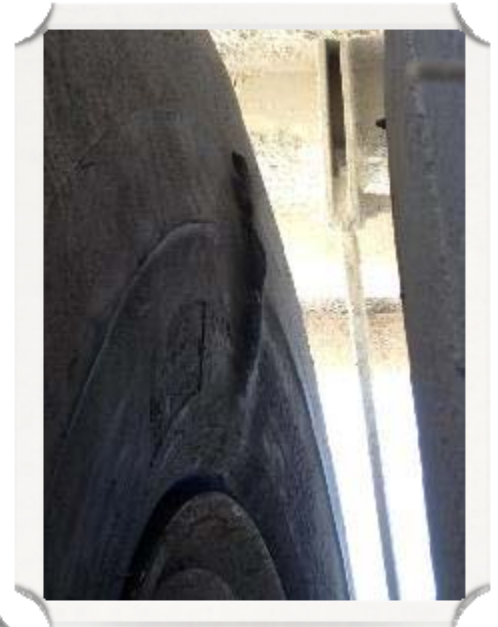
- OSHA standard 1910.177(f)(11)
- “No Heat shall be applied to a multi-piece wheel or wheel component”
- Dangerous and catastrophic results can occur

Applying Heat to Wheels



Pre and Post Shift Inspection Checklist

- Low Air Pressure
- Missing Valve Caps
- Missing/Loose Lug Nuts
- Misalignment
- Cracks in Rim or Wheel
- Cracks in Flanges or Lock Rings
- Worn Tread
- Cuts in sidewall/Tread Area
- Exposed/Rusty Steel Cable
- Bulges/Bubbles/Separation
- Bent Rock Knockers
- Leaking Struts or Bent Struts



Sidewall Bulges Indicate Broken Cords... Report It



If There are Steel Cords Exposed... Report It



Inspect Wheels and Wheel Parts



Rims, Wheels and Parts Don't Last Forever



- Wheel manufacturers basic warranty is 10,000 hours
- Overload, poorly maintained haul roads and under inflated tires will cause premature failure **(or worse a life threatening accident)**

Hardware

Worn Side Ring



Good Side Ring



- When inspecting wheels look for cracks and damage
- In addition, inspecting the hardware will insure you achieve optimal tire performance
- Radial tires flex more which results in wearing out wheel parts quicker than bias ply tires

Wheel - Back Section Failure



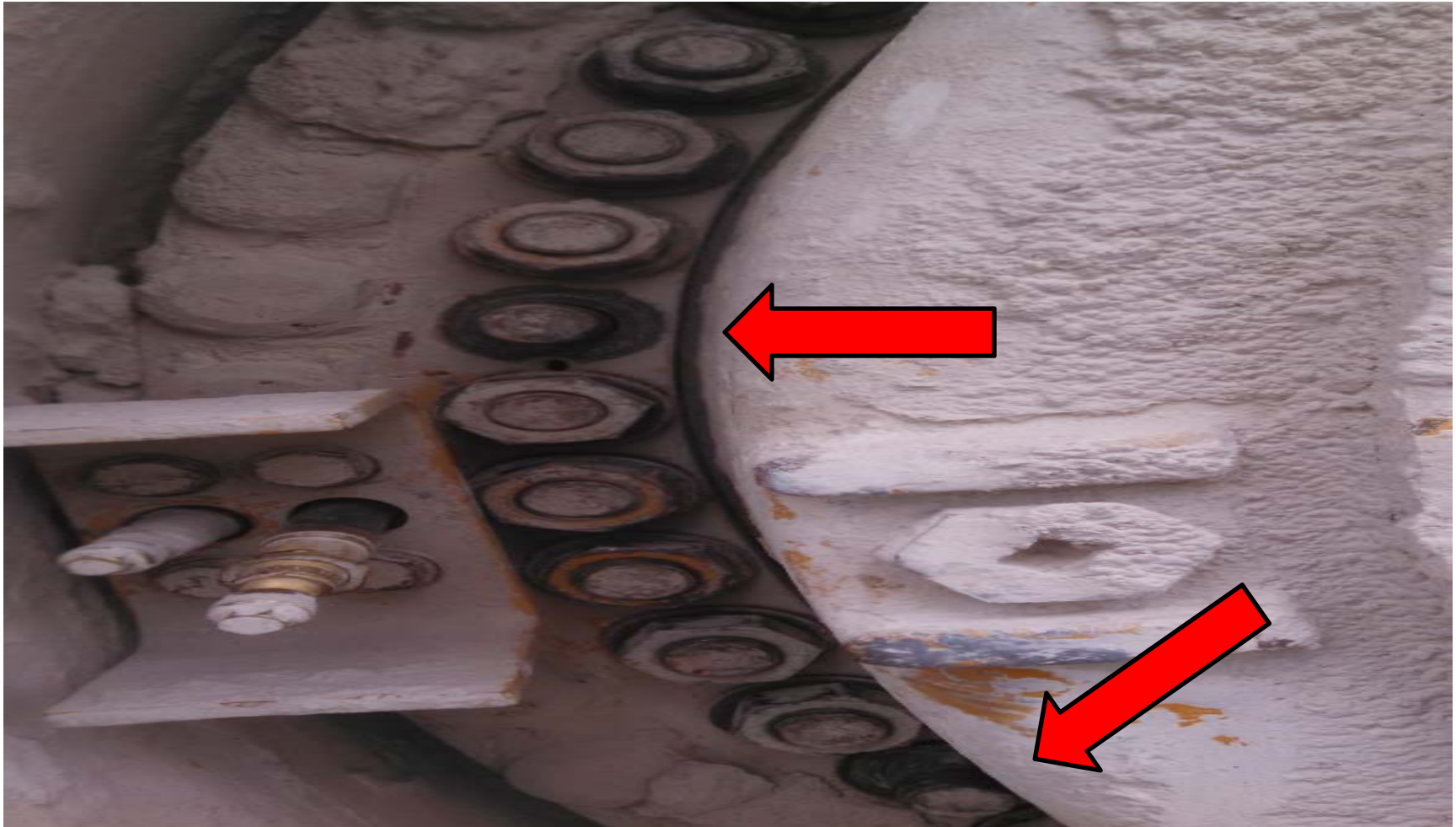
Inspect Pre and Post Shift



Lock Rings Hold it ALL Together



Check the Wheel/Rim Nuts

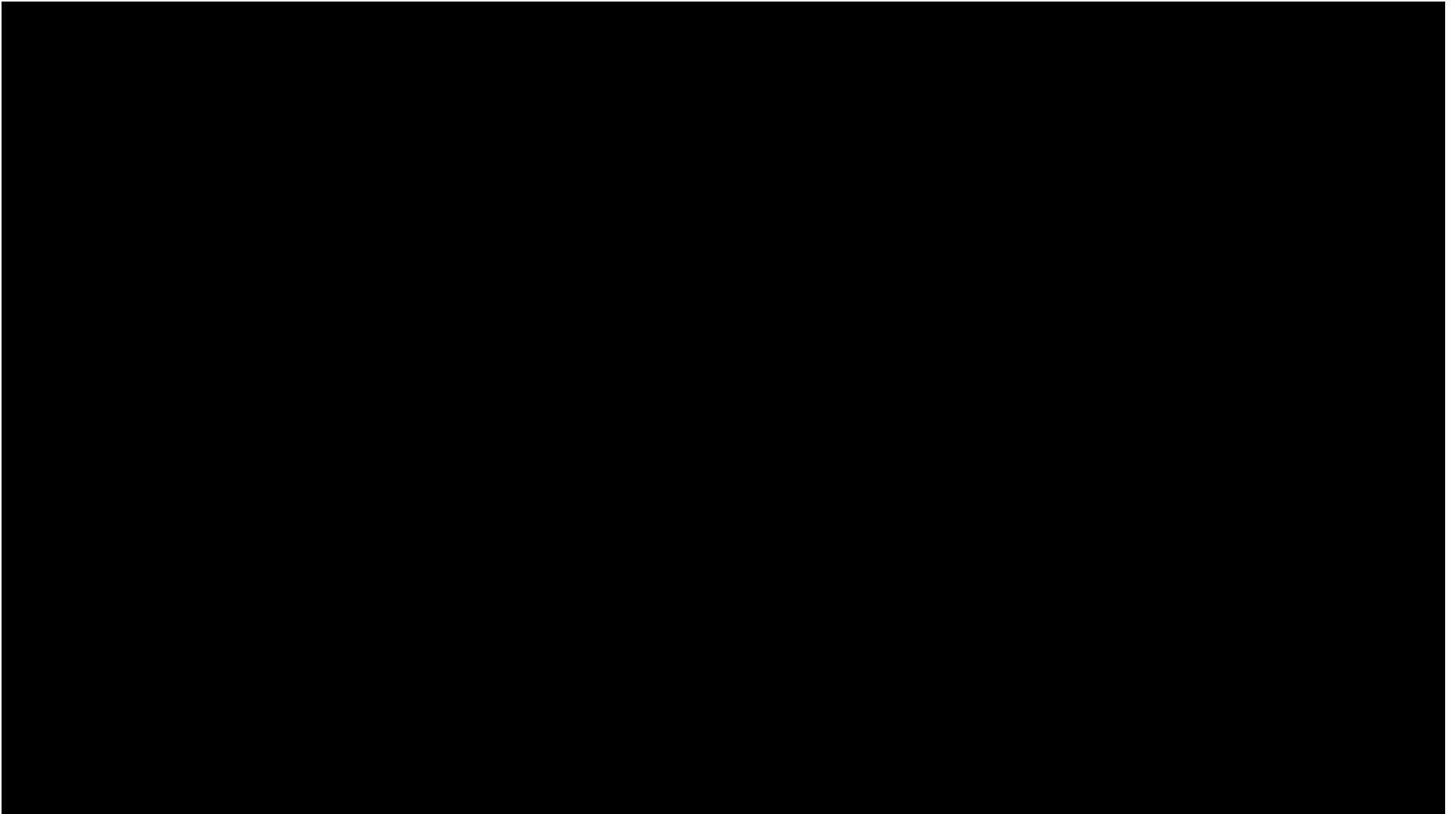


Check for Fluid Leaks

- May Cause Rim Spin



OTR Tire Inspections



Reasons for Removal

What is taking Your tires out of service?

GOAL - TO WEAR OUT 80% of Tires

Cut	45%
Impact	29%
Separation	11%
Worn Out	7%
Other	8%
<hr/>	
	100%



Source: Actual data, World-Class Mine

Why is Water Bad for Tires?



Wet Tires Cut Easier



Fist Sized Rocks



Cause major damage!

Fist Sized Rocks



The majority of tires that BLOW-OUT are caused by rocks the size of your fist

Hank's Video



How Did This Happen?



Maybe When They Loaded Me?



Maybe at the Crusher?



Don't Back Over Rocks!!



Clean Dump at Crusher

Follow the Industry Standards

When servicing tires and rims, please refer to the following documents in addition to this presentation: OSHA (U.S. Occupational Safety and Health Administration), Code of Federal Regulations 29 CFR Part 1910.177, "Servicing multi-piece and single-piece rim wheels". MSHA (Mine Safety and Health Administration) Introduction guide series IG60 SAE (Society of Automotive Engineers) J1337 Off-Road Rim Maintenance Procedures and Service Precautions. RMA (U.S. Rubber Manufacturers Association) "CARE AND SERVICE OF OFFTHE-HIGHWAY TYRES" RMA (U.S. Rubber Manufacturers Association) "TIRE INFORMATION SERVICE BULLETIN" "Tire and Rim Handling Manual", published by tire manufacturer. "Work Manual", published by vehicle manufacturer.

We Also Do Custom Work



Thank You For Your Time!



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