TYREgate Information
Phone: +61 7 3346 4081
Fax: +61 7 3346 4067

EMESRT CATEGORY:

The Surface Design Philosophies (DPs) were developed for high priority safety issues common amongst the Surface EMESRT member companies.

To explore a specific Design Philosophy click the DP titles or 'read more' and access the relevant objective, outcomes, risks and mitigation examples.

Click to view this EMESRT Risk

TYREgate Reference:94

Working safely with tyres: highway style trailer haulage

Root & Contributing Causes:

- **Confined working environment.**
- **LTA tooling**
- **Failure of tyre or tube repair.**
- **Material fatigue**
- **Tyre fatigue**
- **Zipper failure**

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

Controlling the risk

Tyre design

Decide early on what tyre type to use.

Make a decision based on these factors: mine road conditions, the load to be carried, the total trip for each load, gradients, and tight curves. Calculating the Manufacturer's Approved Service Conditions Allowance helps set tyre maximum load rating (trailer load), recommended cold inflation tyre pressures and operating speed. The manufacturer can provide a tyre loading in excess of the standard design recommended load, but this is at the expense of speed and cold inflation pressure increase.

Develop tyre maintenance procedures that include condition monitoring and inflation pressure. Proper maintenance from new can extend tyre life.

Measure the life of the tyre. Although tyre fatigue and zipper failures are not necessarily linked, tyre usage (tonnes carried) may predict tyre life (useful when tyres are taken from one truck or trailer to another). Barcoding and chip insertion can assist tyre maintenance procedures.

Site Answers & Comments:

TYREgate Information
Phone: +61 7 3346 4081
Fax: +61 7 3346 4067

Speed

Give maximum loaded and unloaded speeds to drivers. Speed is the least controlled aspect of the manufacturer's allowance at a mine site. Drivers decide the speed so they should be given the maximum loaded and unloaded speeds.

Supervise and monitor compliance.

Roadside monitors (e.g. speed cameras) visually indicate speed to the driver and relay that to the base. Consider spot speed checks with hand-held speed cameras or a supervisor driving behind a truck who can radio a speeding driver.

Road conditions

Maintain roads. Road maintenance can reduce tyre damage and road sheeting can reduce cuts and punctures from sharp rocks.

Clear spillage from the road by grading. This prevents excessive tyre deflection caused by driving over large objects. A wheel in a soft spot takes a lesser load which overloads adjacent wheels: grading removes soft spots in the road. **Reduce tight turning circles to limit overloading**.

Load weight and consistency

Maintain consistent and correct loads. The weight in the trailer is critical to tyre fatigue. Consistently correct loads increase tyre life, reduce down-time from unplanned replacements, and increase tonnes carried when lightly loaded trailers are eliminated. Load cells and sensors help achieve consistency because they measure weight rather than heap size, and take into account wet or dry material. Load sensors show how much has been put into the trailer. Load cells on the trailer can show the driver when the trailer is at maximum load.

Tyre pressure

Maintain optimum tyre pressure. The greater the trailer weight and load, the greater the tyre pressure needed. Under-pressure tyres flex excessively, damaging their cords.

Re-inflate or test under-pressure tyres. Drivers, repairers and tyre fitters must know the manufacturer's stipulated minimum cold inflation pressure for that mine. Any tyres found below this level must be re-inflated to that level immediately or sent for testing by the manufacturer or a tyre fitter with the appropriate training, qualifications and equipment.

Run flat

Check pressure as a routine, not with ad hoc or unreliable 'tap and listen' tests. A calibrated pressure gauge is the correct tool to measure inflation pressure. Frequency of pressure checks should fit in with the maintenance window and history of tyre pressure loss at that mine. All tyres should be checked, including the inner dual tyre. A puncture, particularly a slow leak, can cause a tyre to be run for some time at a damaging pressure; vigilance in pressure testing is the best control.

Replace a flat tyre properly as soon as possible. Make the change promptly somewhere out of traffic flow with sufficient tools for the job. The longer a tyre has

TYREgate Information
Phone: +61 7 3346 4081
Fax: +61 7 3346 4067

operated at a low pressure, the more

excessive flexing and fatigue stress in the radial cords. Low tyre pressure has two effects: a small reduction in pressure reduces the tyre service lift and accelerates the formation of tyre separations and tyre overheating; a large reduction in pressure concentrates the sidewall flex bulge into a small area resulting in the flex fatigue breaking of some of the individual steel filaments that make the steel wire cord, weakening the cord.

Check removed tyres After removal, have the tyre inspected by trained maintenance personnel.

Discoloration of the inner lining and soft spots in the tyre wall are indications of advanced damage, but most often there are no visible signs to indicate fatigue in the embedded wires. Suspect tyres with no visible damage on internal examination are better left for the manufacturer or repairer to decide on continued life. A mine without trained tyre maintenance personnel should not use a suspect tyre until the manufacturer or a repairer has certified it fit for further use.

Click to view this TYREgate record.

Site Answers & Comments:

TYREgate Reference:95

Fatality and Serious Injury - Earthmover Wheel - Lockring Detachment Open Cut Coal Mine

Root & Contributing Causes:

- **LTA rim integrity**

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

No recommended actions given.

Click to view this TYREgate record.