

# Fit-for-purpose equipment

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**2024 Small Mines Roadshow Presentation**

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February to April 2024



# Fit-for-purpose equipment

Ensuring your machine is safe and fit for purpose by having site-specific standards and compliance systems in place



# Resources Regulator - mine design guideline (MDG)

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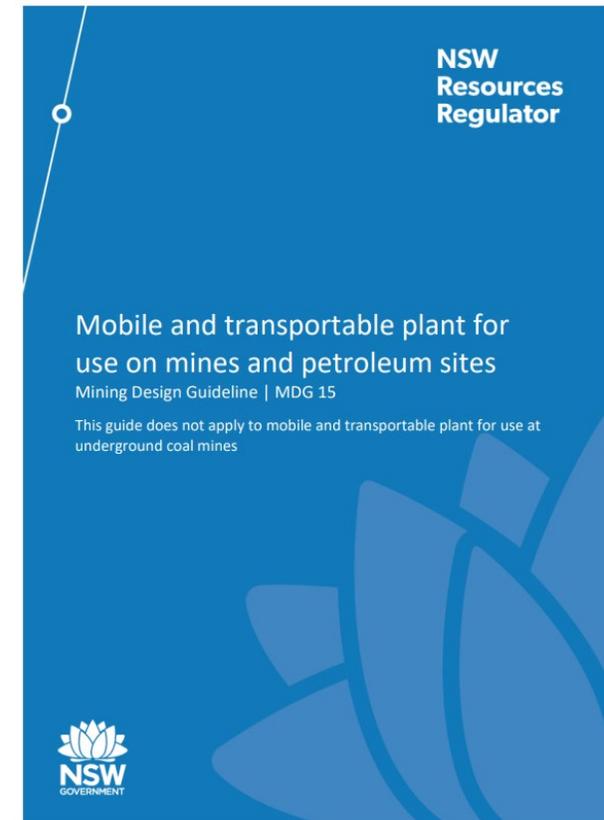
MDG15 Mobile and transportable plant for use on mines and petroleum sites.

This document is not mandatory, but it is a best practice document and OEMs and mine operators should consider its contents.

## Definition

### 1.5.1. Fit for purpose

Plant that is sufficient and able to reliably perform the function it was designed to do for the intended use, over the lifetime of the plant.



## MDG15 highlights minimum areas that need to be addressed including:

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- Fire prevention and fire control
- Unplanned movement
- Safe means of egress/access
- Vibration/ergonomics
- Isolation
- Guarding
- Safety-critical systems – steering, braking including handbrakes, seatbelts, warning systems, etc
- Wheels, rims, tyres, tracks.
- Human factors
- Proximity detection

# So when do we need to check compliance?

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When we purchase new or used machinery



When we hire machinery



When contractors bring machinery to our site



When we are maintaining our existing machinery



Assessment of hire or contractors for ongoing/longer terms

# So how do we do that?



We need compliance systems in place for each of those 5 points and these need to be documented (eg in the Mechanical Engineering Control Plan for Tier 2 quarries or in the Safety Management System such as procedures for Tier 3 quarries)



Best to have simple systems that workers follow



Best to have systems that cover as many of those points as possible



Ensure that equipment meets the site standard



Mine Operator must ensure that workers are competent to complete pre-starts and other inspections and must know the minimum standards expected

# So how do we do that?

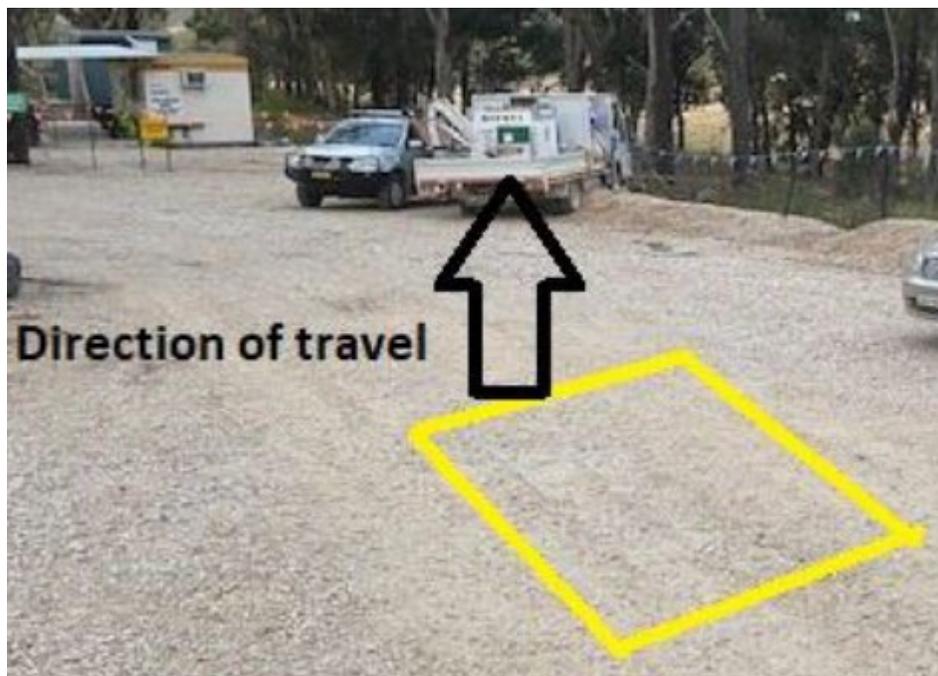
Purchasing specifications or list of minimum requirements

Checklists such as pre-start inspections (Note: best practice is to have a traffic light system on pre-starts to categorise faults especially safety critical systems)

Regular inspections and maintenance to maintain standards

Ensure workers including Supervisors are trained and competent to identify non-compliances and know the site system in place to fix them

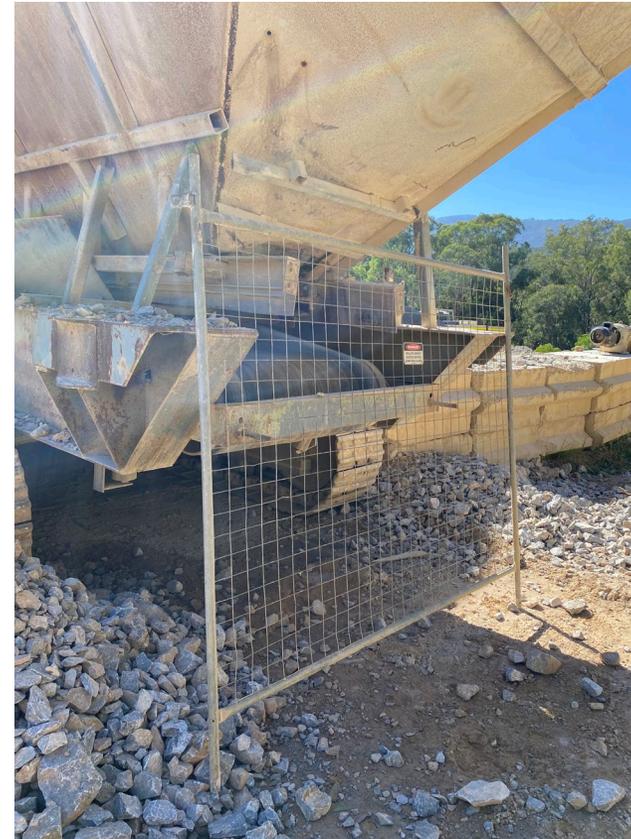
# What can go wrong if your compliance system fails?



# Compliance system failure - Seatbelt not accessible, not used, not reported



# Compliance system failure - Lower step broken off and guard not secured



# Compliance system failure - E-stop inadequate and hydraulic hose failure



# Example of minimum safety requirements

## Note: ensure a minimum level of competency to complete assessments

**Mobile Equipment: Minimum Safety Hardware Requirements**

This document lists critical safety hardware requirements that may or may not be standard on the equipment. The Operations Support Team should be consulted for current full specifications when purchasing new equipment.

Mobile Equipment type = Quarry Mobile Crusher / Screen



Site: *Dubbo Quarry* Arriving from: [Redacted] Hours: *20*

Date: *14-01-2021*

Completed by: [Redacted]

Machine Description: *CR2 - C1545*

Existing	Transferred	<u>hired</u>	Contractor

Hardware	Detail	OK
1. Lockout Switch	Full current lockable battery isolator fitted (refer <a href="http://www.locksafe.com.au">www.locksafe.com.au</a> ).	✓
2. Start-up Alarm	Audible Delayed start-up sequence as per OEM design	✓
3. Amber LED Beacon or Flashing Amber Light – continuous operation	Where fitted, an amber light must be clearly visible for both pedestrians and other mobile equipment that share the work area in which the equipment operates.	✓
4. Guarding	All nip points to be adequately protected to prevent personal injury and meet Australian Standards.	✓
5. Emergency Stops	All conveyors to be fitted with a lanyard type E-stop feature. The mobile plant should be fitted with a button style E-stop as close to ground level as possible. Optional - remote control unit 'kill' switch.	✓
6. Fire Extinguisher	Two 4.5kg Dry Chem extinguishers fitted (accessible at cab and as close to ground level as possible). Check charged and inspected.	✓
7. Access steps and handrails	Access to equipment shall allow three points of contact.	✓
8. Movement Alarms	Movement alarms provide a warning to pedestrians or other mobile equipment.	✓
9. Safety Sticker kit	Original Equipment Manufacturer (OEM) stickers clearly showing controls	✓

10. OEM Support equipment	OEM pins & support equipment for extendable/supported structures	✓
11. Environmental	Dust suppression & sound deadening as required	✓
12. Identification Number	An identification number that easily visible shall be marked clearly on the machine and match mechanical records.	✓

**Additional Safety Inspections**

13. Hoses & Fittings	General inspection of Hydraulic components	✓
14. Condition of Main frame	Structural integrity inspection of equipment main frame	✓
15. Condition of Conveyors	Structural integrity inspection of main/side conveyors & supports	✓
16. Under Carriage	Track tension & Condition, sprockets/rollers	✓
17. Screen Box	Condition of counter weight guarding, springs, Structural integrity of screen decks.	✓
18. E-Stop	Physical check of all e-stop equipment before commencing service including remote control unit.	✓
19. Hand Rails	Hand rails to be checked for fatigue/vibration cracking. All pins to be in place.	✓
20. Structural Support Pins	Are all support pins in place (adjustable structures)	✓
21. Daily/Monthly Check sheets	Ensure equipment carries daily/monthly check sheet, review previous check sheet/log for historical or up-coming maintenance issues.	✓
22. Auto grease with ground fill point	Optional – as determined by risk assessment. Grease points should be piped outside the guards.	✓

Actions/Comments	Who	When	Done
<i>No structural Support Pins (adjustable structures)</i>	[Redacted]		
<i>No battery isolator fitted</i>	[Redacted]		
<i>Develop daily &amp; weekly check sheets</i>	[Redacted]		
<i>Apply dust suppressors</i>	[Redacted]		
<i>Held by stainless steel rope and turn buckles.</i>			

# Examples of pre-start checklists



Clearly shows traffic light system showing categories of faults and the action required

**VEHICLE PRE-START** Plant Hire Checklist No: **24615**

Date: 05-06-23 Site: WTG  
 Client: RQA WTG Hour Reading Start: 13 774  
 Plant #: 45127 Hour Reading End: 13 789

PLEASE MARK THE CHECKLIST BOXES AS FOLLOWS

<input checked="" type="checkbox"/> OK, No obvious defect	<input type="checkbox"/> Fault Identified (Use Fault/Default Report* below)	N/A Item not applicable to machine or operator	
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**BEFORE COMMENCING OPERATIONS CHECK:**

	M	T	W	T	F	S	S
Steps - Steps/Grab rails, seatbelts, loose objects, controls							
Visibility - Windscreen, windows, wipes, washers, mirrors							
Electrical system - lights, amber beacon, horn, rev/travel alarm							
Hydraulics - rams, hoses, leaks, wear							
Leaks - engine, transmission, final drives, cooling systems							
Brakes - emergency, service and park							
Fluid Levels - Engine, transmission, radiator, hydraulic tank							
Compulsory signs, reflective tape, reflectors							
Miscellaneous - air conditioning, fire extinguisher - tagged and in date							
Damage to - panels/guards, cracks to chassis/frame/body							
Wheels, tyres, tracks - wear/tension/pressure							
Hitch (safety pin) - wear							
Buckets/Blades and Attachments - Wear and condition							
Articulated joint/linkage - Wear and Condition							

Date: 05-06-23 Operator: Tane Molton Signature: \_\_\_\_\_

\*Details of faults or defects and action taken: Broken handrails, no seatbelt, no aircon fan, Major Hydraulic and Eng oil leaks cracks in quick hitch and bucket - pin 140 hours overdue for service.

Fault Reported to: Brad James Position: Supervisor / Manager Date: 05-06-23  
 Does fault constitute a safety hazard?  Yes  No Does machine require immediate repair?  Yes  No  
 Body Damage: \_\_\_\_\_ Photos Taken:  Yes  No

Operator Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Daily Pre-Start Checklist - Dump Trucks**  
 A Pre-Start Checklist must be completed before starting each shift

Date: 2-5-23 Operators No: \_\_\_\_\_ Signature: \_\_\_\_\_ Asset Number: WC 2060 Start Hours: 15900 Finish Hours: \_\_\_\_\_ Fuel Used: \_\_\_\_\_

Legend:  
 OK - In good order N/A - Not Applicable  
**F Fault Code - Category A Faults** - The machine NOT to be operated until the fault is rectified. Notify your supervisor immediately.  
**Category B Faults** - Machine NOT to be operated unless fault is rectified or operation approved by a competent person (e.g. Manager / Supervisor).  
**Category C Faults** - Corrective action required. Report the fault to the Manager / Supervisor.

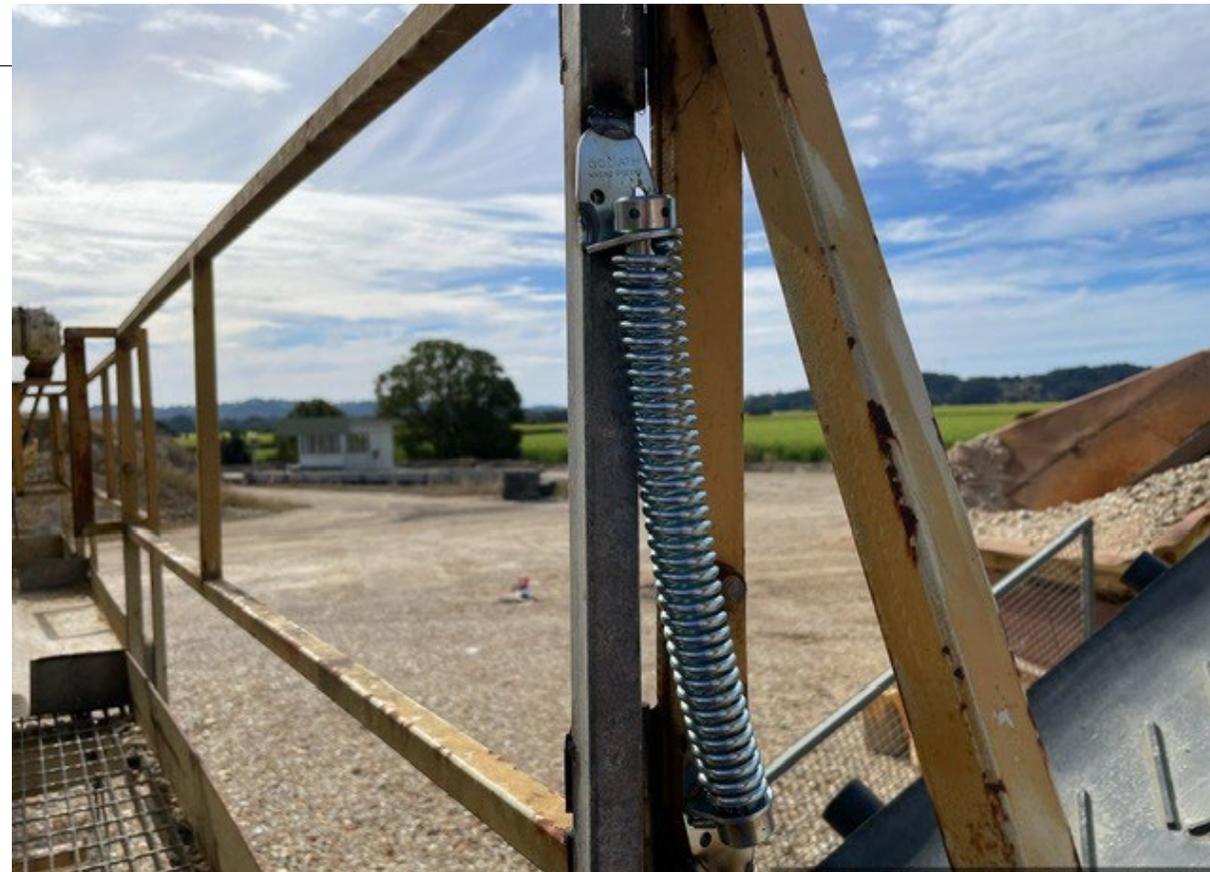
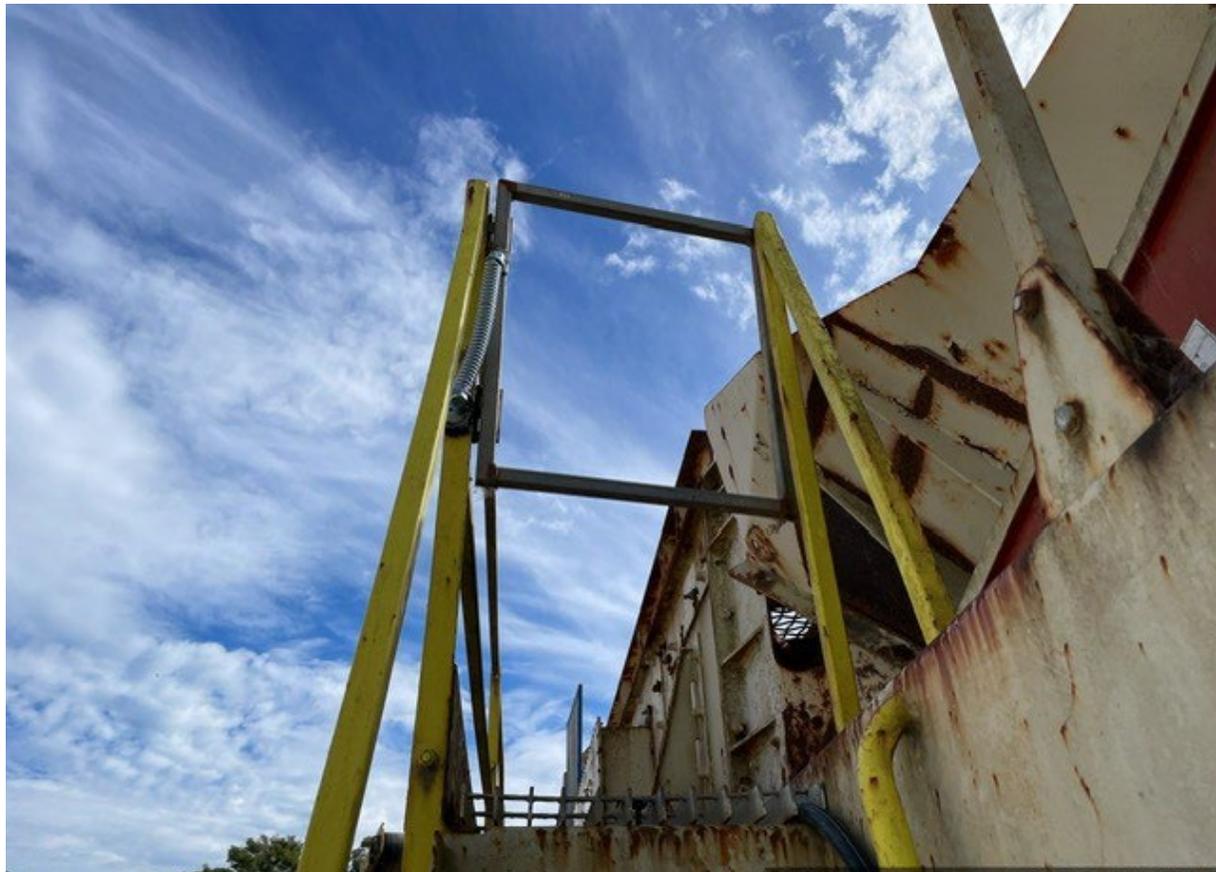
	CAT	OK	F	Action	Init.	CAT	OK	F	Action	Init.	CAT	OK	F	Action	Init.
<b>FROM THE GROUND - Damage, Wear, Leaks, Cracks, Cleanliness</b>															
E Stops	A					Fuel Tank	B				Flushing Light	B			
Tyres / Rims / Wheel Nuts	B					Oil Levels	B				Rear Tyre Rock Defectors	C			
Duo-cone Seal Area / Oil Leaks	B					Belts / Hoses / Guards	B				Lights / Indicators	C			
Pins & Bushes	B					Access / Egress Steps	B				Dump Body	C			
Cylinders & Hoses	B					Air / Hydraulic Tanks / Where fitted	B				Auto Greaser / Lines	C			
Handrails	C										Overall-Clean / Damage	C			
<b>ENGINE COMPARTMENT - Levels, Leaks, Blockage, Damage, Indicators, Cleanliness</b>															
Fire Suppression / Where fitted	B					Leaks - Oil, Water, Air	B				Filter / Pre cleaner / HEPA / Where Fitted	B			
E Stops	A					Radiator / Oil Cooler	B								
Oils & Coolant Levels	B					Engine Bay / Covers	C								
<b>ON THE MACHINE, OUTSIDE THE CAB (TOP PLATFORM) - Damage, Leaks, Cracks, Rust</b>															
ROPS / FOPS Structure	A					Battery Isolator	B				Platforms / Handrails	C			
Fire Extinguisher	A					Lights / Mirrors	C				Windows / Wipers	C			
<b>INSIDE THE CAB - Damage, Function, Levels, Cleanliness</b>															
Seat Belt & Mounting	A					All Indicators / Alarms	B				UHF / 2-Way Radio	B			
Seat Belt Alarm / Where fitted	B					Reversing Camera / Where fitted	B				A/C	B			
Park Brake Alarm	A					E Stops	A				Overall Interior	C			
Steering Tests inc. Eng	A					Fire Extinguisher	A				Horn Operation	B			
Brake Tests inc. Eng	A					Dump Body Controls	B				Check that the cabin air clean supply is turned on & working / Where Fitted	B			
Travel / Retard Controls	A					Gauges / Switches	B				Pressure Display to show the system is working / Where Fitted	B			

Fault Description / other faults: \_\_\_\_\_

Supervisor/Manager Name: \_\_\_\_\_ Supervisor/Manager Signature: \_\_\_\_\_

**DHARM TODAY** NEVER OPERATE UNSAFE EQUIPMENT

## Examples of fit-for-purpose: spring-loaded self-closing gate



# Examples of fit-for-purpose: access walkways (rather than vertical ladders)



Example of side access system

Example of front access system



## Examples of fit for purpose – Handrails and kickplates around engine bay



## Examples of fit-for-purpose: hydraulic hoses (refer also to MDG41)



Spiral wrapping prevents rubbing wear and good clamping segregates hoses

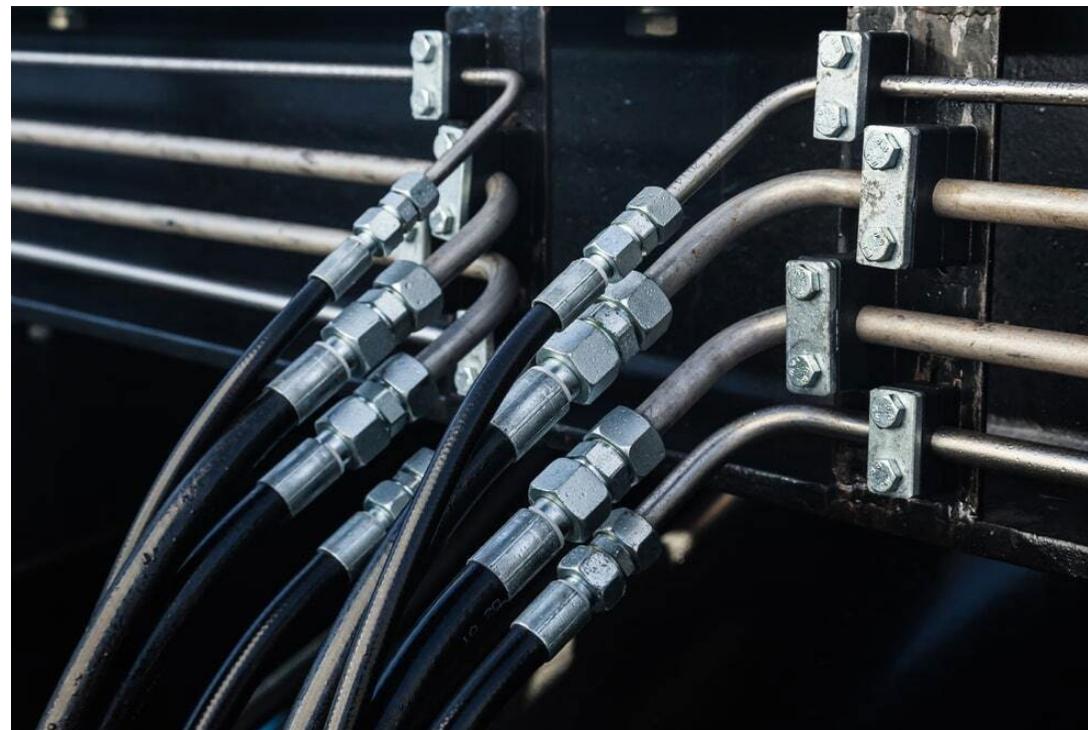


Sheathing prevents fluid injection

## Examples of fit-for-purpose: hydraulic hoses (refer also to MDG41)



Whip check prevents failed hoses from flailing near operators



Good clamping keeps hoses segregated.  
NO cable ties

## Examples of fit-for-purpose: automatic fire suppression



# Examples of fit-for-purpose: manual fire extinguishers



Extinguishers easily accessible from the ground but covered for protection is best practice

## Examples of fit-for-purpose: door seals and air conditioner (for dust)

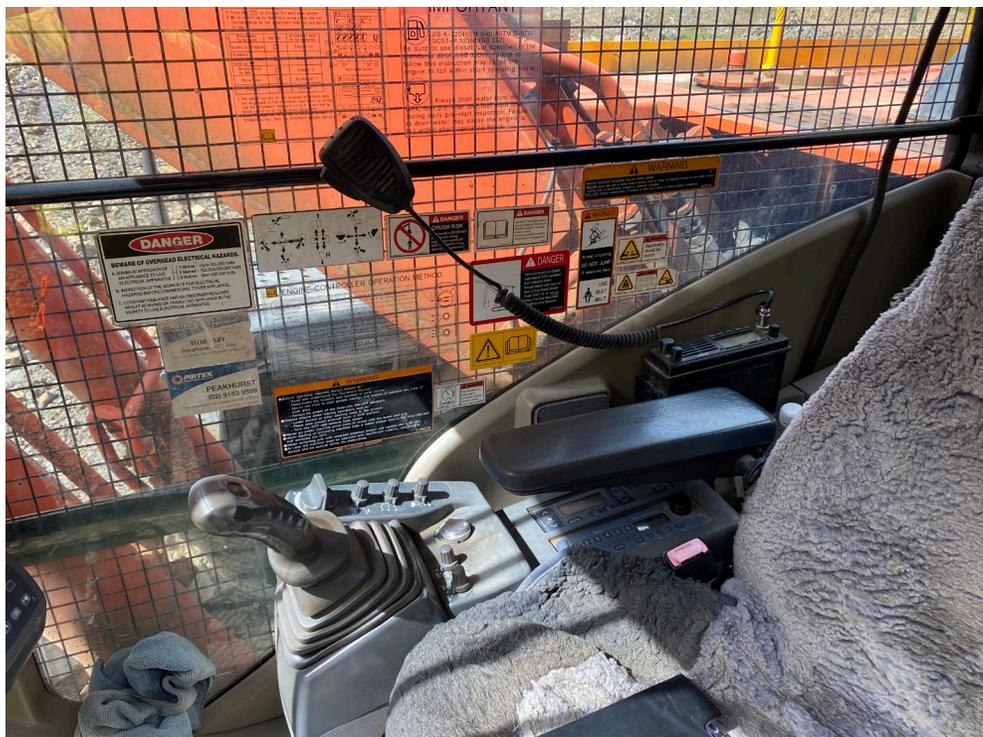


Door seals in good condition and on the pre-start checklist

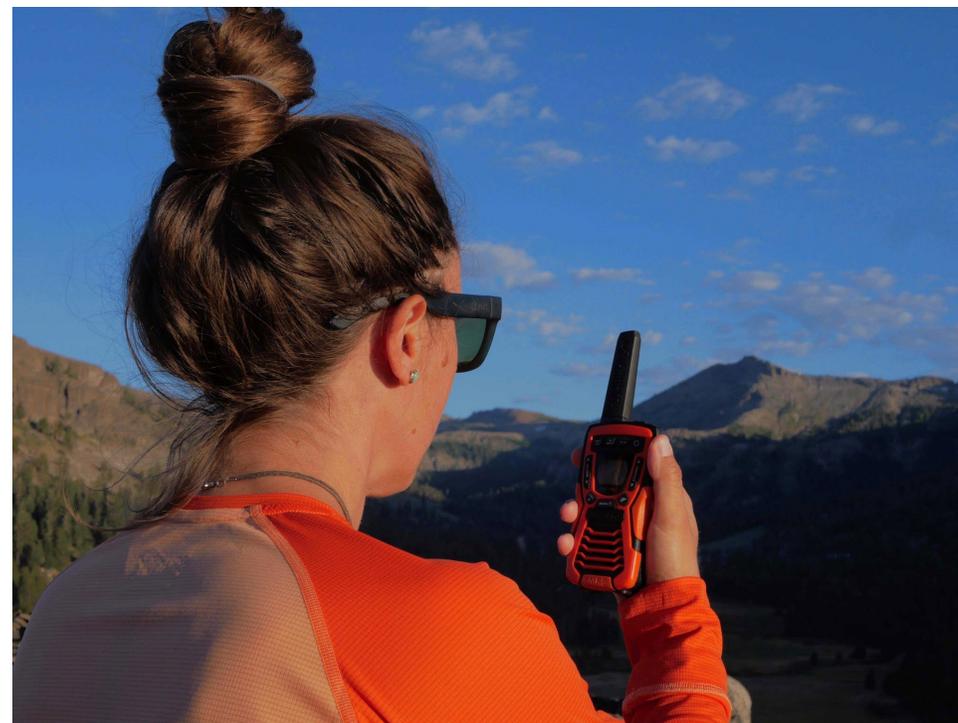


Air conditioner operational and on the pre-start checklist and checks and maintenance of (eg HEPA) air filters

## Examples of fit-for-purpose: operational and easily accessible 2-way



2-way radio operational, easily accessible and on the pre-start checklist



2-way radio operational for workers on the ground providing positive communication

# Examples of compliance – improved vision and proximity detection



Are OEM options available for your machines?

Rear camera and load camera



In-cabin monitor

## Examples of fit-for-purpose – improved vision



Flashing beacon and  
reversing alarm



Photo from Holcim Teven:  
Flashing blue LED reversing lights fitted  
to FEL.

# To summarise

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- Know how you are going to manage equipment that is fit for purpose for the different situations
- Know how you are going to ensure ongoing compliance
- Have simple and easy to use systems that are documented
- Ensure ALL workers understand the systems and are trained and competent

**Thank you**

**Any questions?**