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INTERNATIONAL
DIESEL DIVISION

Technical Bulletin / Safety Alert

Unique ID No: TBS2011-TBSA-01 **Rev:** 0

Subject: VLI Driftrunner Transport Braking System – Door Interlock Valve

Date: 16th November 2011

Applicable to: Design Registered Transport Braking Systems
(MDR 083991 TBS, MDR 083991 TBS-1 & MDR 096013 TBS)

Note: Minimum PPE required to carry out any inspections contained in this TBSA shall be protective clothing & footwear, safety glasses, hearing protection & any site specific requirements. A JSA or equivalent should be carried out prior to performing these tasks.

Introduction:

VLI Diesel Division (VLIDD) advises the recent occurrence of an incident in relation to the transport braking system (covered by design registration no. MDR 083991 TBS) at a NSW Coal Mine.

The incident involved the unplanned movement of a VLI Driftrunner Personnel Transporter due to the failure of a pneumatic door interlock valve. Specifically, an operator attempted to exit the driver's position of the VLI Driftrunner without manually applying the park brake and the driver's side door interlock did not automatically apply the park brake when the door was opened.

A site based investigation of the incident was completed by the end user and the contributing factors to the incident identified during the investigation were categorised using the Incident Cause Analysis Method (ICAM). The incident report and ICAM report were supplied to VLIDD for review and comment.

Incident Review & Discussion:

An excerpt from the site based incident investigation report follows:

> *Investigation of the reason for failure of the door interlock found:*
>
> *- On initial visual inspection the door interlock park valve was in the brake released position.*
> *- The valve was removed from the circuit and inspected and valve was in the brake applied position.*
> *- The park brake functioned when a pull test was completed on the SMV.*
> *- The safety and brake circuit on the SMV were functioned tested with air from a second machine. These circuits tested as okay.*
> *- The passenger side door interlock valve was tested and operated correctly.*
> *- A new door interlock valve was fitted to the driver's side and the circuit was retested. The valve operated correctly when tested.*
> *- The failed valve from the driver's side was function tested and tested okay.*
>
> *The valve was then refitted to the SMV and functioned correctly when tested.*
>
> *- When the failed valve was disassembled, there was contamination within the valve and small markings on the o-ring.*
> *- The door interlock valves were inspected on two other machines and one door interlock was found to be slow to spring return, but within OEM recommendations.*
> *- Internal lubrication of the valve improved the response of the valve application.*
> *- A lubrication system is non-standard on the air circuit.*
> *- Of the three ports on the valve, two are open to atmosphere and have no filters or plugs fitted. This is the standard design of the valve.*
> *- A small spot weld was found on the inside of the SMV door. This weld did not align properly with the valve spool. The spot weld can apply a horizontal load to the valve spool. It is unknown why the spot weld was applied to the door. It doesn't appear to have been a contributing factor in this incident.*

Following initial notification of the incident VLIDD completed a review of the design risk assessment and failure modes effect analysis (FMEA) for the Design Registered Driftrunner Transport Braking System (MDR083991TBS) as required under Section 88 of the Occupational Health and Safety Regulation 2001.

As a result of this review VLIDD considered the existing controls as identified in the design risk assessment satisfactory provided the transport braking system is serviced and maintained in accordance with the requirements of MDR 083991 TBS and OEM recommendations. (Refer supporting information below for excerpt w.r.t this system)

Upon receipt of the incident investigation report from the end user an independent re-validation of the safety related parts of MDR 083991 TBS in accordance with AS4024.1 2006 1501 & 1502 – Safety Category was also completed, with the following results:

1. *Due to redundancy within this system, the door interlock valve still meets CAT 3 standard.*
2. *The original FMEA identified the risk of contamination and accordingly an additional filter was added to the circuit for the MDR 083991 TBS. All systems should be upgraded to this design registered system as the Previous MDA approval has expired.*
3. *In addition to the already comprehensive OEM Maintenance recommendations an additional recommendation from this review is to remove and clean the door interlock valve at Code D (2000 hrs or two years).*
4. *Further to this an additional plug to prevent ingress of foreign material is being introduced (refer image below).*

Cut off fitting in the exhaust port. Note orientation of fitting to minimise ingress of foreign material.

Conclusions:

The VLI Driftrunner door interlock pneumatic valve failure to operate as designed was a result of valve contamination.

VLIDD has completed a review of the design risk assessment and failure modes effect analysis (FMEA) for the Design Registered Driftrunner Transport Braking System (MDR083991TBS) as required under Section 88 of the Occupational Health and Safety Regulation 2001.

VLIDD considered the existing controls as identified in the design risk assessment satisfactory provided the transport braking system is serviced and maintained in accordance with the requirements of MDR083991TBS and OEM recommendations.

An independent re-validation of the safety related parts of MDR 083991 TBS in accordance with AS4024.1 2006 1501 & 1502 – Safety Category has confirmed CAT 3 has been met.

Recommendations:

1. All VLIDD transport braking systems to be serviced and maintained in accordance with OEM recommendations.
2. All transport braking systems to be upgraded to the appropriate design registered system.
3. Door interlock valves to be removed and cleaned at the Code D mechanical inspection interval (every 2000hrs or 2 years, whichever occurs first).
4. Door interlock valves to have cut off fittings installed to exhaust ports to assist with the prevention of ingress of foreign material.

Supporting Information:

[Excerpt – MDR 083991 TBS] Routine Service Schedules not included.

General Operation:

The owner or operator of the equipment must ensure personnel are fully trained and competent to operate the equipment.

Service brakes are activated by using the foot brake pedal (as in a typical motor car, truck etc). Caution must be observed when applying brakes whilst descending down a steep grade at speed as this can result in high brake wear.

A Service Brake Air Pressure Gauge is provided to monitor available air pressure to the Service Brake System.
GREEN ZONE indicates safe operating range.

Park/Emergency brakes must be applied using the main select valve located in the operator's compartment. A large brake pressure gauge located on the dashboard must read Zero pressure before the driver opens the door to exit the vehicle.

- Zero pressure Park/Emergency brakes are applied.
- GREEN ZONE indicates the Park/Emergency brakes are fully released.

The vehicle must not be driven when the brake gauge indicator is in the RED ZONE, as this may cause component damage, brake drag and additional brake wear.

NB. The Park/Emergency Brake select valve located in the operator's compartment is the primary means provided to apply the Park Brake under normal operation. The door brake interlock valve is provided as a secondary means of applying the Park/Emergency brake in the event of the door opening inadvertently or the operator forgetting to apply the main Park/Emergency select valve when exiting the vehicle.

Brake Testing:

The owner/operator of the equipment must ensure appropriate policies and procedures are in place to conduct and monitor routine brake testing.

Pre-Shift Testing (recommended by VLI Diesel Division)
Park/Emergency Brake Test. Must be carried out in a safe place with engine running

- select park/emergency brake ON (brake pressure gauge must read ZERO)
- select 2nd gear
- select FWD
- select 4WD
- accelerate to full RPM for one (1) second

VEHICLE MUST NOT MOVE

Service Brake Test. Must be carried out in a safe place with engine running

- ensure service brake pressure reads in GREEN ZONE
- fully apply service brakes via foot brake pedal
- select 2nd gear
- select FWD
- select 4WD
- accelerate to full RPM for one (1) second

VEHICLE MUST NOT MOVE

Door Interlock Test. Must be carried out in a safe place with engine running.

- Select Park/Emergency brake OFF (brake pressure gauge must read in GREEN zone)
- Open operator's door
- Park/Emergency brake valve must select ON [< 1 second] (brake pressure gauge must read ZERO)

In the event of failure of any of the above tests the vehicle must be correctly isolated and reported as per the appropriate mine site procedure.

In Service Testing Using a Brake Performance Meter:

It is the responsibility of the owner/operator to designate their preferred period between each test. VLI Diesel Division recommends a maximum operating period of 250 operating hours. Brake performance criteria are:
Service Brakes - minimum 0.32 g de-acceleration
Park/Emergency Brakes - minimum 0.29 g de-acceleration

If the minimum requirement cannot be achieved, the most probable cause is excessive brake wear and may require the brake plates to be renewed.

Please ensure this document is circulated to all relevant personnel within your organisation.

Should you have any further queries please contact your VLI Diesel Representative.

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