7 March 2025

Response to stakeholder feedback

TRG 41 technical reference guide - Fluid power safety systems at mines

The Resources Regulator circulated TRG 41 technical reference guide: Fluid power safety systems at mines for targeted consultation in April and May 2024. This document summarises the issues raised by stakeholders and details the Regulator's response.

The feedback has been categorised into themes and the Regulator's responses are set out below.

1. Include MDG 10 Design guidelines for hydraulic load locking valves for use in coal mines

A stakeholder suggested including relevant parts of MDG 10 in the TRG as it is still relevant to fluid power systems.

Resources Regulator's response

The Regulator agreed and included relevant parts of MDG 10 in section 3.5.7 of the TRG

2. Include that the measurement unit of pressure 'ba'" can also be used

A stakeholder requested that the measurement unit of pressure "bar" be included as it is still commonly used alongside SI units of measurement.

Resources Regulator's response

The Regulator agreed and 'bar' has been included throughout the TRG were relevant.

3. Include further concepts in the definition section and amendments to others

Several stakeholders suggested including definitions for designers and rated working pressure and amending the definition of fluid power system to not include pneumatic systems

Resources Regulator's response

The Regulator agreed and included definitions for both designer and rated working pressure and amended the definition of fluid power system in section 1.2.4 of the TRG

4. Section 2.3.1 the designers obligation should be amended

A stakeholder indicated there always some residual risk in designs and the content should be amended to recognise this.

Resources Regulator's response

The Regulator did not agree to amend the content as the statement without risk is prefaced by as far as reasonably practicable.

5. Section 2.4.2 include further latent and specific risks to consider

A stakeholder suggested including hose damage due to abrasion from build up around hoses. Another stakeholder suggested remove the poor example of a change management procedure.

Resources Regulator's response

The Regulator agreed and included it at point i. and removed the example in point t. in the section.

6. Section 2.6 include and modify points for the plant safety file

A stakeholder suggested including a point 'as built hosing diagrams where applicable' and changing safety category to "safety performance."

Resources Regulator's response

The Regulator agreed and included "as built hosing diagrams where applicable" at point d. and amended point h. to 'safety performance'.

7. Referring to the principles in AS4024.1 safety of machinery series of standards in section 3

A stakeholder suggested not referring to the safety principles in AS4024.1 as the standard does not adequately address issues underground.

Resources Regulator's response

The Regulator did not agree as the TRG is seeking duty holders to consider the principles not to comply with the standard. The reference has been retained in section 3.

8. Amendments in section 3.1 design hazard identification assessment and control

Stakeholders suggested not referring to Safety category in section 3.1.3.3 as they are not as useful as other safety performance systems. They also suggested removing a confusing point from section 3.1.4 human factors.

Resources Regulator's response

The Regulator did not agree to remove safety category as an option for duty holders to use along with performance levels and safety integrity levels. The Regulator agreed to remove confusing point b. and point v. 'includes accessible users when help is needed' in section 3.1.4 human factors.

9. Amendments to section 3.2 design information

Several stakeholders suggested in section 3.2.3 that reference to AS4041 is not required, flow rates included were relevant and new point be included 'hose diameter where this is critical to correct operation of the circuit'. Stakeholders also suggested including proof tests in section 3.2.6 Hose assembly and piping diagrams can be found in multiple documents in section 3.2.4.

Resources Regulator's response

The Regulator agreed to these suggestions and reference to AS4041 was removed in this section point c. was amended to 'flow rated where relevant' and point 'e. hose diameters where this is critical to correct operation of the circuit' was included. The Regulator agreed and included 'including proof tests to maintain integrity of safety critical functions' in point b of section 3.2.6 and included documentation in section 3.2.4.

10. Amendments to section 3.3 fluid power system design

Stakeholders suggested:

1. in section3.3 clarifying elastomeric sealing,
2. in section 3.3.5 clarifying proper safety factors in section 3.3.1, clarifying cleanliness ratings for filtration
3. in section 3.3.8 clarifying sufficient marking and identification.

Resources Regulator's response

The Regulator agreed to clarify all 3 issues in the TRG

11. Amendments section 3.4 components (other than hose assemblies)

Stakeholders suggested including DIN EN 1804-3 Hydraulic control systems in section 3.4.4 valves as it provides good guidance on valve safety.

Resources Regulator's response

The Regulator agreed to include DIN EN 1804 – 3 in section 3.4.4 of the TRG.

12. Amendments section 3.5 fluid power control circuits

Stakeholders suggested:

1. in 3.5 that control systems did not need to return to safe state if they failed
2. in section 3.5.1 notes to minimise back pressure a separate drain lines
3. in section 3.5.2 Filters in return lines should have a bypass check valve, to avoid high pressures when the filters are clogged
4. section 3.5.3 needed clarification
5. in table 4 that in some underground situations directional controls are not able to be used.

Resources Regulator's response

The Regulator believes it is important for control systems to return the system to a safe state and did not amend section 3.5.

The Regulator agrees that separate drain lines will minimise excessive return pressure and amended section 3.5.1. The Regulator also agreed that in section 3.5.2 that designers should consider putting bypass check valves in return lines. The Regulator provided clarification in section 3.5.3 by providing an example. The Regulator has recommended in the TRG that direction of movement for manual controls should be clearly identified and labelled.

13. Amendments section 3.7.1 hose selection

Stakeholders suggested:

1. In 3.71 move the reference to ISO8030/8031 as it is not relevant to this section and that the reference move to ISO 6805 and the relevant issues are covered ISO18752 already referred to
2. in 3.7.1.5 including EN853/EN854/EN856/EN857/ ISO6945 or max 1.0g after 2000 cycles with 50N for abrasion resistance
3. in 3.7.1.7 that hose assembly diffusion devices should be fire resistant.
4. in 3.7.1.8 provide a formulae for kinetic loading of whip restraints
5. in 3.7.1.9 specifically refer to coal mine explosive atmospheres when discussing fire resistance

Resources Regulator's response

The Regulator accepted suggestions 1 to 3 and made relevant amendments. The Regulator did not agree with suggestion 4 as it is the designers obligation to calculate the kinetic load. The Regulator

did not accept suggestion 5 as there are explosive atmospheres in non-coal mines as well and the TRG is for all mining operations.

14. Amendments section 3.7.2 factors impacting hose service life

Stakeholders suggested;

1. in 3.7.2.2 include another point at g. Insufficient bleeding of air completely out of the system before full pressurization
2. in 3.7.2.3 include points about replacement periods and exceptions
3. in 7.2.2.4 include a figure that shows storage timeframes

Resources Regulator's response

The Regulator accepted suggestions 1 and 2 and made relevant amendment to the TRG. The Regulator did not agree to include a diagram in suggestion 3 as it did not add value to the TRG and did not clarify that 8 years is the maximum life of the hose unless the manufacturer recommended another timeframe.

15. Amendments section 3.7.4 identification marking on hose assemblies

A stakeholder suggested the opening paragraph required clarification

Resources Regulator's response

The Regulator agreed and has provided clarification and moved the paragraph to the end of the section.

16. Amendments section 3.7.5 hose ends

Stakeholders suggested using criteria from IOS 228 parts 1 and 2 for tolerances and designations

Resources Regulator's response

The Regulator agreed and referred to them in the section

17. Section 7.1.4 safe work with fluid power systems

A stakeholder suggested moving the section to Appendix M

Resources Regulator's response

The Regulator did not agree as it sits within the TRG and Appendix M supplements the section and has retained it within the TRG.

18. Amendments section 7.6.2 hose inspections

Stakeholders suggested:

1. including leakage from hose end fitting as part of damage
2. in 7.6.2.4 include when replacing hose assemblies follow the manufacturers specifications

Resources Regulator's response

The Regulator agreed and included the amendments

19. Appendix E Table 1 fitting failure

A stakeholders suggested including leakage in the fitting failure part of Table 1 of Appendix E.

Resources Regulator's response

The Regulator agreed to include leakage in Table 1 of Appendix E.

20. Hose end adaptor rating diagram appendix H

A stakeholder suggested deleting the table in appendix H on Hose end adaptor maximum allowable working pressure based on 4:1 design factor as it is not useful.

Resources Regulator's response

The Regulator does not agree and will retain the table in Appendix H as it has been extracted from MDG 41 for use as an example only.

21. Tolerance ratings and staple stainless steel hardness in Appendix L

Several stakeholders suggested using the ISO 286.1: Geometric product specifications (GPS) – ISO code system for tolerance on linear sizes – Basis of tolerances, deviations and fits tolerance ratings for the tables in Appendix L as they are globally accepted. It was also suggested that staple stainless-steel hardness for staple lock fittings in section 4 be Rc23

Resources Regulator's response

The Regulator agrees that the ISO tolerance ratings are more contemporary and has amended them accordingly. The Regulator did not agree to change the steel hardness rating for staple lock fittings

22. General editorial issues

Several stakeholders identified a number of improvements on editorial flow, grammar and spelling throughout the TRG.

Resources Regulator's response

The Regulator agreed to the suggestions when it improved the readability and flow of the TRG or corrected an error.