

WORK HEALTH AND SAFETY (MINES AND PETROLEUM SITES) REGULATION 2022

Registration of Canopies of Continuous Miners Design Order 2022

I, **Garvin Burns**, Chief Inspector, with the delegated authority of the Secretary, Regional NSW, pursuant to section 187(5) of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2022, make the following Order.

Dated this 29th day of August 2022

Garvin Burns
Chief Inspector
Regional NSW

1. Name of Order

This Order is the *Registration of Canopies of Continuous Miners Design Order 2022*.

2. Commencement

This Order commences on the day it is published in the NSW Government Gazette.

3. Interpretation

In this Order:

AS is a reference to Australian Standards.

AS/NZS is a reference to Australian/New Zealand Standards.

canopy means a canopy on a continuous miner used in underground coal mines.

canopy roof means the plate-work and any associated bracing commonly utilised to provide protection above the driver's enclosure.

lateral means the side edge of the canopy roof, usually located at 90 degrees to the centreline running from the head to the tail of the continuous miner.

longitudinal means the lengthways edge of the canopy roof, usually located parallel to the centreline.

support includes the support legs and any associated steel work, other than the canopy roof, which interconnects the support legs.

support leg means the vertical or near vertical member connecting the continuous miner chassis or driver's enclosure to the canopy roof.

4. Revocation

The *Registration of Canopies of Continuous Miners Design Order 2018* published in the NSW Government Gazette No.144 of 21 December 2018 at pages 10071-10074 is revoked.

5. Design requirements

5.1. Except as provided in paragraphs 5.2 and 5.9, all canopies used in underground coal mines must be designed to meet the design requirements of paragraphs 5.3, 5.5 – 5.8.

5.2. Where a design does not fully comply with the requirements in paragraph 5.1, the designer must specify the published technical standards or the engineering principles used to identify controls, in accordance with the hierarchy of risk control measures in Part 3.1 of the Work Health and Safety Regulation 2017, that have been incorporated in the design to achieve at least an equivalent level of safety as the requirements of paragraph 5.1.

5.3. General:

- (a) all canopies on continuous miners used in underground coal mines must be designed and tested in accordance with this Order.
- (b) without limiting paragraph 5.2, all canopies on continuous miners used in underground coal mines must be designed in accordance with the relevant parts of the following standards, as amended from time to time:
 - (i) AS/NZS 1554.1:2014 Structural steel welding- Welding of steel structures
 - (ii) AS 3990-1993 Mechanical equipment- Steelwork
 - (iii) AS 4100-2020 Steel structures.

5.4. Notes (informative):

- (a) in the event of the canopy being subjected to a fall of roof which exceeds the elastic limit of the canopy design, then the canopy should be designed such that the yielding should be progressive and limited to the extent that the driver can safely remain within the operator compartment i.e. 1000mm minimum headroom space remains between the seat and canopy roof. Consideration should be given to suspending the driver's seat from the underside of the canopy roof.
- (b) the canopy design should consider access into the operator compartment and the driver's visibility in all directions, particularly to

the driver's front and rear and as far as is reasonably practicable, to the sides.

- (c) the design of the canopy roof and seat should consider that when the driver leans slightly to the right, as is customary by many drivers, the driver's head remains underneath the canopy roof.

5.5. Canopy design:

- (a) the canopy roof should be attached to the support legs by either bolted or welded connections.
- (b) the base of the canopy support legs must be securely bolted or welded to the main frame of the continuous miner or driver enclosure.
- (c) the canopy roof must be designed by utilising a substantial one-piece solid plate devoid of uneven structural protrusions above the roofline (including cable support structures).

5.6. Design loads:

- (a) the protective canopy must be designed to have a minimum structural capacity to support elastically a static uniform load of 8.2 tonnes or a force equivalent to a static load of 105 kilopascals distributed uniformly over the greatest plan view area of the canopy roof.
- (b) the protective canopy must be designed to have a minimum structural capacity to support elastically a static uniform load of 2 tonnes applied horizontally to the edge of the canopy roof. The horizontal loading must be applied in both the longitudinal and lateral directions separately.
- (c) larger test loads should be considered by the applicant where appropriate for conditions where canopy is to be used.

5.7. Materials:

All main load-bearing components used in the construction of protective canopies must be in accordance with AS 4100-2020 or AS 3990-1993.

5.8. Welding:

All welding must comply with Category SP welds as set out in AS/NZS 1554.1:2014.

5.9. If the design of a canopy that is registered under Part 5.3 of the Work Health and Safety Regulation 2017 is altered and the alteration may affect health or safety:

- (a) the altered parts of the canopy must be designed to comply with the design requirements in paragraphs 5.1 – 5.3 and 5.5 – 5.8 of this Order

- (b) an assessment must be undertaken, and documented, by the designer to assess the impact that the design alteration has on unaltered parts of the canopy.
- (c) where the assessment undertaken in paragraph 5.9(b) shows there has been a reduction in the effectiveness of existing control measures of any other parts of the canopy, that is, there has been a detrimental effect on health and safety caused by the alteration, these parts must comply with the design requirements in paragraphs 5.1 – 5.2 of this Order.
- (d) any parts of the canopy which are not affected by the alteration must continue to comply with the design requirements of the design order that was in effect on the date that the registration for the design of the canopy was granted.

6. Testing and performance requirements

6.1. Except as provided in paragraph 6.6, all canopies used in underground coal mines must be tested and meet the relevant performance requirements specified in paragraphs 6.2 – 6.5.

6.2. Loading method:

- (a) when testing in the vertical plane, an acceptable method of test provides for the test load to be distributed within the middle ninth of the roof's plan view area.
- (b) when testing in the horizontal plane, an acceptable method of test provides for the test load to be distributed along the middle third of the longitudinal and middle third of the lateral edge of the roof separately.

6.3. Test method:

- (a) all testing must be carried out with the canopy fully extended, unless stated otherwise.
- (b) a dial indicator or other suitable measuring instrument with an accuracy of 0.01 of a millimetre shall be used for measurement of the maximum deflection and the residual deflection, caused by the application of the test load. The dial indicator or other suitable measuring instrument shall have a current calibration certificate at time of use issued by:
 - (i) a laboratory in Australia that is accredited by the National Association of Testing Authorities Australia (NATA) for performing the test; or
 - (ii) where a NATA-accredited laboratory is not available, a suitably qualified and experienced independent facility having regard to test

equipment, equipment calibration, quality processes, work methods, past test experience and independent technical verification.

- (c) apply vertical test load (per paragraph 5.7) to middle ninth plan view area i.e. to one third span of width and length:
- (i) for fixed type canopy apply preload of between 300-500 kg to remove slack from joints, set dial indicator or other suitable measuring instrument as per paragraph 6.3 (b) to zero then apply test load. Record deflection "A" under the test load and the residual deflection "B" on removal of the test load. "B" divided by "A" gives the residual deflection to maximum deflection ratio.
Note: it may be necessary to repeat this test or other tests in order to further eliminate any initial movement in pinned or bolted connections.
 - (ii) for canopies initially supported by hydraulic cylinders, measure pressure and load at hydraulic cylinders when the full test load is applied, then increase test load until the cylinders yield, record yield pressure and load. Ensure that pressure relief system reseats when load is reduced i.e. reload a second time.
 - (iii) if the yield testing of the hydraulics requires a load which is beyond the elastic limit of the canopy, then separate bench testing of the hydraulics may be required.
 - (iv) with canopy lowered to its minimum height and oil removed from the support cylinders i.e. canopy resting on its mechanical stops apply test load as per paragraph 6.3(c)(i).
Note: this test is only applicable for canopies with hydraulic height adjustment where the support cylinders are required to elastically support the test load without pressure relief occurring.
- (d) re-extend canopy to maximum height and apply horizontal test load (per paragraph 5.7) along the middle one third of the canopy edge directing the load away from the centreline of the machine. Apply the preload and record deflection measurements as in paragraph 6.3 (c)(i).
- (e) repeat test 4 (per paragraph 6.3(d) but with the load applied towards the centreline of the machine. This test is only necessary if there is a significant difference in the strength of the canopy supports between the two directions. Apply the preload and record deflection measurements as in paragraph 6.3(c)(i).
- (f) apply horizontal test load along the middle one third of the canopy edge directing the load from the rear to the front of the machine. Apply the preload and record deflection measurements as in 6.3(c)(i).
- (g) for canopies fitted with rear hydraulic cylinders, the cylinder must not be the component that stops any upward movement that may occur i.e. a mechanical stop should prevent over extension of the canopy.

- (h) repeat test 6 (per paragraph 6.3(f)) but with the load applied directed from the front to the back of the machine. This test is only necessary if there is a significant difference in the strength of the canopy supports between the two directions. Apply the preload and record deflection measurements as in paragraph 6.3(c)(i).

6.4. Canopy performance:

When tested in accordance with the test method in paragraph 6.3, the residual deflection "B" must be less than 10% of the maximum deflection "A" measured with the load applied. That is: $(B/A) \times 100\%$ is less than 10%.

6.5. Welded joints:

All welded joints must be non-destructively examined in accordance with AS/NZS 1554.1:2014.

- 6.6. If the design of a canopy that is registered under Part 5.3 of the Work Health and Safety Regulation 2017 is altered, and the alteration may affect health or safety, the altered parts of the canopy, including those parts that may have been redesigned due to detrimental effects identified in the assessment undertaken in paragraph 5.9(b), must be tested and meet the performance requirements in paragraphs 6.1 – 6.5 of this Order.

- 6.7. Any parts of the canopy which are not affected by the alteration must continue to comply with the performance requirements of the design order that was in effect on the date that the registration for the design of the canopy was granted.

7. Determination of applications for registration of design made before commencement of this Order

If an application for the registration of design of a canopy made in accordance with clause 250 of the Work Health and Safety Regulation 2017 to which the standards specified in the *Registration of Canopies on Continuous Miners Design Order 2018* applies is made before the commencement of this Order, and the application has not been finally determined before that commencement, the application is to be determined as if this Order had not commenced.