



**Trade &
Investment**
Mine Safety

GUIDELINES

MDG 6001

**Guideline for the Permanent
Filling and Capping of Surface
Entries to Coal Seams**

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**Produced by Mine Safety Operations
NSW Trade & Investment**

516 High St, Maitland NSW 2320

PO Box 344, Hunter Region Mail Centre NSW 2310

Ph: 02 4931 6666

Fax: 02 4931 6790

Web: www.dpi.nsw.gov.au/minerals/safety

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1. FOREWORD

The potential hazards associated with abandoned shafts or other surface coal seam connections, which have not been filled correctly, are well known. Reference to the hazards associated with mining operations which may accidentally hole into the workings connected to these old abandoned shafts was made in the Judicial inquiry in the November 1996 Gretley Colliery accident.

Recommendation 35 of the Gretley inquiry was that:-

A new Section 121(1) (c) of the Coal Mines Regulation Act, 1982 be added to as follows:-

“If required by the district inspector such shafts and entrances shall be permanently sealed”.

This requirement was added and is now found as Section 92 (1) of the Coal Mine Health & Safety Act, 2002.

In order to comply with the provisions of permanent sealing of such entries, a guideline was required for standards to be described.

This guideline is designed to be used to describe the minimum requirements to safely perform the task of sealing entries to the point where they can be considered permanently sealed.

2. SCOPE

This document is intended to apply to the process of permanent sealing of all surface entries to coal seams other than the sealing of boreholes used for exploration or the proving of coal seams. EDG No1 & No2 cover the sealing of exploratory boreholes.

The surface to seam entries covered by this guideline include a) Shafts, b) Adits, c) Cross Measures Drifts d) Gas Drainage Wells or Large Diameter Boreholes.

3. DEFINITIONS

Act – means Coal Mine Health & Safety Act, 2002., as amended

Adit - A direct entry to a coal seam exposed at the surface either by seam outcrop or by the high wall of an Opencut or excavation.

Drift - A sloping entry from surface which is driven at an incline to intersect the coal seam.

EDG means Environmental Design Guidelines issued by the Department.

Engineer – means a structural or civil engineer whose qualifications satisfy the Australian Institute of Engineers

Gas Drainage Well - Boreholes of large diameter driven from the surface for the purpose of venting seam gasses.

Large Diameter Boreholes - A borehole in excess of 200 mm diameter for the purpose of Gas Drainage Wells or to be utilised as surface access for services such as electricity, water or road ballast.

Shaft - A vertical entry to a seam or seams.

4. GENERAL

Section 92 (1) of the Coal Mine Health & Safety Act, 2002, as amended requires

The operator of a mine must:

(a) cause every shaft or outlet at a mine, when it ceases to be used, to be securely fenced off as soon as practicable and to be fully sealed or filled in a manner approved by the Chief Inspector, or provided with an enclosure, barrier, plug or seal approved by the Chief Inspector, within 30 days after the mine ceases to be used, and

(b) cause the seal, fill, enclosure, barrier or plug to be properly maintained, and

(c) before abandoning the mine, cause every shaft or outlet at the mine to be fully sealed or filled in a manner approved by the Chief Inspector, or provided with an enclosure, barrier, plug or seal approved by the Chief Inspector.

Before commencing to seal any surface entry to an underground coal mine, a detailed risk assessment should be undertaken. This risk assessment should identify the hazards and controls needed to protect persons and environment during the process. The additional hazards associated with old entries, entries that have been temporarily sealed or capped and procedures to breach or remove these temporary seals or caps should be given special consideration in the risk assessment.

A detailed procedure should be drawn up and applied during the sealing process including adequate supervision.

The mine outlets should be permanently sealed as soon as possible after the mine has been discontinued.

Provisions for permanent sealing of outlets should be considered in the construction of temporary seals or caps.

The hazard of noxious and flammable gas should be addressed in the procedure developed to permanently seal mine outlets.

A detailed plan for the permanently sealing must be drawn up and submitted to the Chief Inspector before sealing commences.

Design for bulkheads or barricades must have engineering certification to ensure they are applicable for the loads to which they may be subjected.

As constructed drawings are to be submitted to the Chief Inspector after the permanent sealing has been completed.

The position of the seals should be surveyed and recorded on the Mine Record Tracing.

5. ADIT FILLING AND CAPPING

All bulkheads and bulkhead seals are to be designed by an engineer.

A substantial bulkhead should be constructed not less than 20 metres from the surface entry point.

A minimum depth of cover of 15 metres of solid strata should be present at the bulkhead site.

The engineer should inspect each site prior to designing the bulkheads.

The design of the bulkhead should take into account any possible fretting of the adit perimeter.

Any man-made structures or fittings in the adit, which can be safely removed, should be removed.

The void from the bulkhead to the adit entrance should be carefully and uniformly filled with particular attention being paid to completely filling the adit profile so as to allow no voids.

The fill material should be such that it will maintain its integrity over time.

The surrounding strata at the entrance to the adit should be made secure and incapable of being weakened by weathering and spalling to expose the adit beyond the lip of the solid rock.

A bulkhead seal should be erected at the entrance to the adit.

Where possible, the adit bulkhead and surrounds should be completely covered by mounding earth over the area.

The engineer is to certify in writing that the bulkheads were completed in compliance with the original design or redraw and recertify any alterations to the original design.

As constructed drawings are to be supplied to the Chief Inspector for attachment to the abandonment file for that mine.

A plaque is to be placed on the portal bulkhead with the name of the colliery, adit name and date of sealing inscribed on it. If the portal bulkhead is to be covered, the plaque is to remain in a clearly visible position.

6. DRIFT FILLING AND CAPPING

All bulkheads and bulkhead seals are to be designed by an engineer.

A bulkhead should be constructed at a point in the drift, which has at least 15m of solid rock strata cover over the roof of the drift.

The engineer should inspect the proposed site of the bulkhead construction prior to designing the bulkhead.

The design of the bulkhead should take into account any possible fretting of the drift perimeter.

Where there is a possibility of fretting of the strata surrounding the bulkhead, the bulkhead design should include provision for strata reinforcement to prevent any reduction of the strength of the bulkhead.

The inbye bulkhead may be designed to permit the passage of water but must prevent the flow of any gas from the workings.

Where the bulkhead is designed with allowance for water passage, the fill material outbye of the bulkhead should be unable to be affected by water to the extent of it becoming fluid or capable of flowing when wet.

Any man-made structures or fittings in the drift, which can be safely removed, should be removed.

The void from the inbye bulkhead to the drift entrance should be carefully and uniformly filled. Particular attention should be paid to completely filling the drift profile.

The fill material should be such that it will maintain its integrity over time.

At the portal mouth, a substantial bulkhead seal should be erected which will prevent the ingress of water or the ability of any gas to escape.

The final void behind the portal bulkhead should be stowed completely to the roof.

The engineer must certify in writing that the bulkhead was constructed in compliance with the original design or redraw and rectify any alterations to the original design.

As constructed drawings are to be supplied to the Chief Inspector for attachment to the abandonment file for that mine.

A plaque should be placed on the portal bulkhead with the name of the colliery, drift name and date of sealing.

The surface bulkhead and the portal surrounds may be completely covered by mounding earth over the area.

Where the surface bulkhead is covered the plaque should remain visible.

7. SHAFT FILLING AND CAPPING

The area around the shaft should be fully enclosed by a man-proof security fence prior to shaft filling commences or the shaft is exposed for filling.

All bulkheads and shaft caps are to be designed by an engineer.

Where seam inserts are still accessible substantial bulkheads should be constructed to prevent fill material from flowing into the mine workings.

Where insert bulkheads are installed, provision should be made to permit the passage of water from one side of barrier to the other. This is to reduce the requirement for design against substantial hydraulic head.

The engineer should certify that the bulkheads were constructed to the specified design.

Where seam inserts are inaccessible, material should be used to fill the shaft to a level above the seam insert such that should the material below the insert move, the insert will remain completely sealed to prevent any material flowing into the insert.

The level of hard rock fill above inserts should be confirmed by plumbing of the shaft.

Suitable fill material should be used to fill the remainder of the shaft.

All fill material to be used in the filling of the shaft shall be agreed to by the Chief Inspector prior to use.

Where surface demolition material is used for shaft fill, it should be crushed and broken to a suitable size to avoid wedging in the shaft.

Where the shaft contains water or maybe subject to water inflow, the filling should be such that the material will remain in place in the event of the workings being holed, dewatered, an earthquake or such event occurring. The use of a concrete plug at each insert should be considered.

A full-time competent supervisor should be appointed to oversee filling operations as they are taking place.

Where possible, fill material should be introduced centrally into the shaft.

A water spray should be used at all times when fill is being placed into the shaft.

The surface capping of the shaft should be founded on rockhead. Where this is not possible the engineer should take this into account when designing the surface capping.

Excavation of surface soil down to rockhead to allow the surface capping to be installed should be done after the shaft is filled to this point.

The shaft collar should be removed down to rockhead.

The engineer should inspect the site prior to designing of the surface capping.

The shaft capping should be designed using a design loading and uniformly distributed load of at least 7kPa.

The design of the shaft capping structure should neglect any support given by the shaft fill material.

The design of the surface capping should take into account any possible fretting of material at the shaft perimeter.

The engineer should certify in writing that the completion of the capping was in accordance with the approved design.

All steel reinforcement used in the surface capping structure should have a minimum of 100mm of concrete cover.

Provision should be made in the surface capping to allow for topping up of fill with additional fill if necessary.

The shaft collar should be engraved with the mine and shaft name and date sealed.

Where practicable the shaft capping should be left uncovered.

Where the shaft capping is covered, the cover material should be left at surrounding ground level and a plaque fixed to a suitable concrete footing should display the sealing details.

As constructed drawings of shaft capping and shaft fill details are to be supplied to the Chief Inspector for inclusion in the abandonment file for that mine.

8. SEALING GAS DRAINAGE WELLS OR LARGE DIAMETER BOREHOLES

EDG No. 1 should be used as a guide for the sealing of the boreholes.

The boreholes should be totally sealed with a suitable material, which will properly seal the borehole to prevent the likelihood of gas escaping or the ingress of water into current or future workings.

Where the depth of the borehole is in excess of 200 metres, the sealing should be carried out in stages.

Where the borehole is open at the bottom a suitable packer should be used.

Care should be taken in sealing Gas Drainage Holes that no naked flames are allowed near the hole until sealing is complete.

The final position of the borehole should be surveyed and recorded on the Mine Record Tracing.

A Statutory Declaration should be supplied to the Chief Inspector that the borehole has been properly sealed together with details of the sealing as required in EDG No. 1.