Standard Operating Procedure

Explosive Power Tools

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1. PURPOSE

The purpose of this procedure is to describe requirements and to manage the hazards and risks associated with the management of work using explosive powered tools at the Dawson West Mine.

2. SCOPE

This procedure is applicable to all persons at the Dawson West Mine including employees, contractors and visitors.

3. DEFINITIONS

Authorised Person	A person who has the required competencies and who has been appointed by the Site Senior Executive to carry out a designated scope of duties.
CMSHA	Queensland Coal Mine Safety and Health Act (1999).
CMSHR	Queensland Coal Mine Safety and Health Regulation (2017).
CMW	Coal Mine Worker.
Competent Person	A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly a specified task.
EPT	Explosive Powered Tool.
HSET	Health, Safety, Environment and Training.
JHA	Job Hazard Analysis.
mm	Millimetres.
MPA	Megapascal Pressure Unit.
OEM	Original Equipment Manufacturer.
PPE	Personal Protective Equipment.
RPEQ	Registered Professional Engineer of Queensland.
SHMS	Safety and Health Management System.
SSE	Site Senior Executive.
Take 5	Personal Risk Assessment.

4. PROCEDURE

4.1. Explosive-Powered Tool Definition

EPT means a tool or device whereby a stud, pin, dowel, screw, rivet, spike or other object is driven against, into or through a substance by means of an explosive.

4.2. Restrictions on the use of Explosive Powered Tools

EPTs are considered a RESTRICTED ITEM due to the number and severity of incidents which have occurred throughout relevant industries in relation to explosive powered tools.

EPTs are not to be brought onto the mine without a written proposal outlining the purpose and conditions of use, which has been approved by the SSE or designated representative.

The SSE or designated representative shall review the risk assessment and approve the conditions for use under this procedure. This shall include checking the competency and licence of the operator and authorising them to use EPTs.

4.3. Inspection of Tools

The authorised operators of EPTs shall ensure these are kept in good working order and maintained according to the OEM instructions.

The authorised operators shall inspect an EPT immediately before use to ensure it is fully operational and free from any defect.

EPTs shall be cleaned each day after use.

Where defects are noted, the EPT is to be tagged out of service and sent to the OEM's authorised agent for repairs.

4.4. Personal Protective Equipment (PPE)

PPE shall be worn within the identified exclusion zone including hearing protection and safety glasses.

This PPE is to be worn whenever the EPT is loaded.

4.5. Isolation and Signposting of Exclusion Zone

Only the authorised operator and assistants should be permitted inside the exclusion zone for the EPT. Other persons should keep well away unless authorised to be there by the person in control.

To protect persons from being struck in these circumstances, the operator shall barricade and sign the exclusion zone identified in the JHA.

The work area shall be inspected and assessed prior to work commencement for hazards.

At all points of entry to the place where the tool is being used, or exclusion zones in adjacent rooms, etc., a caution sign shall be prominently displayed.

Figure 1 : Example Caution Sign

4.6. Loading of the EPT

The operator shall ensure the EPT is kept in an unloaded state except:

- at the place where it is intended to be used and immediately before use; and
- when it cannot be unloaded due to mechanical failure.

If the EPT has been loaded but not put into immediate operation, the charge and fastener are both to be removed.

4.7. Fasteners and Charges

Fastener

A fastener is a hardware device that mechanically joins or affixes two or more objects together. In general, fasteners are used to create non-permanent joints; that is, joints that can be removed or dismantled without damaging the joining components.

Charges (Cartridges)

Cartridge manufacturers recommend certain cartridges for certain applications. Because recommendations cannot cover every possibility, testing may be required with unfamiliar base materials. Cartridges come in .22, .25, and .27-calibre sizes. Larger calibres hold more powder, which drives the fastener in further—or into harder base materials. In addition, all three calibres are available with different levels of powder charge. For some tools, there may be as many as six different powder charges available. Some manufacturers produce tools that use a long-case version of the .22-calibre cartridge. It is critical that operators understand cartridge selection and cartridge identification

The operator shall ensure only those types of fasteners and charges recommended by the EPT manufacturer for a tool, or those providing the same level of safety and performance are used.

Cartridges used in explosive powered tools:

- should be of no greater strength than is specifically necessary for the job;
- should not be of such strength so the whole of the projectile may pass through the substance on which the tool is being use, unless backed by material capable of fully absorbing the projectile energy; and
- must not be used in an EPT unless such explosive charge is marked both top and bottom in colours according to the scale shown at the end of this section, to show the relative charge strengths.

Cartridges for explosive powered tools must be kept and transported in locked metal containers:

- marked “powder-actuated “fastening tool cartridges”;
- opened only for the placing in and removing of cartridges;
- with the key kept by the operator; and
- not contain anything but cartridges colour coded as shown in Table 1.

Table 1 : Cartridge Colours for Explosive Powered Tools

Colour	Strength	Number
Brown	Minimum	1
Green	Weak	2
Yellow	Medium	3
Red	Strong	4
Purple	Very Strong	5
White	Especially Strong	6
Black	Maximum	7

The use of maximum strength (black) cartridges are not permitted.

4.8. Working Environment

The operator must check the working area and be satisfied the working environment does not present a hazard. The operator is to check:

- particles on work surfaces are clear of any material which may fly off during fastening;
- pipes or electrical wiring are not concealed within the material at the point of fastening;
- there is no presence of any explosive or flammable gas, dust or vapour, or a compressed atmosphere; and
- there is no excessive heat, capable of causing unintentional explosion of the EPT charge.

4.9. Concrete Structures

When firing into concrete materials with an EPT, the operator is to seek advice from an RPEQ Civil or Structural Engineer regarding the suitability and placing of fasteners, where the concrete structure is of a pre-stressed or post-tensioned type. Due to the risk of disintegration of materials, fasteners shall not be driven into concrete or similar material:

- nearer than 75mm to an edge;
- nearer than 75mm to another fastening;
- where the thickness of the material is less than 100mm;
- nearer than 150mm to where another fastener has failed to penetrate or damaged the surrounding base material (spalling); and
- EPTs are not fired through fixtures which have existing holes (alignment).

4.10. Steel Structures

Where fixings are made of steel with a higher strength than common grades of structural steel (above grade 350), advice needs to be obtained from a RPEQ Civil or structural engineer.

Fasteners shall not be driven into steel:

- nearer than 13mm to the edge;
- nearer than 25mm to another fastener;
- nearer than 100mm to a heat affected zone; or
- into thickness less than 4mm.

4.11. Unstable Base Material

Some materials are considered to be unsuitable as base materials for the use of EPT. The following rules shall be applied:

- do not fire fasteners into brittle materials which are liable to shatter (cast iron, glazed tiles, slate, fired clay bricks or concrete with a compressive strength greater than 60 MPA);
- do not drive fasteners into areas of steel which may have become too hard as a by-product of welding or flame cutting;
- do not drive fasteners into masonry joints;
- do not use EPTs to secure timbers to a timber base material (use nailing gun); and
- do not use EPTs on soft materials (concrete less than 10 MPA, plaster board, etc.).

4.12. Misfires

In the event of a misfire, the operator shall:

- follow the EPT OEM procedure for misfire;
- after ten seconds delay, release the EPT from its depressed condition;
- release the EPT from the work surface without changing the direction in which it is pointing;
- remove the charge and store it safely for later disposal;
- any misfired charges shall not be used again;
- misfired charges shall be secured in appropriate storage container (e.g. metal); and
- if more than one misfire occurs from one batch, the batch is to be removed from service, returned to the supplier and the supervisor notified.

4.13. Lead Exposure

When using EPTs in areas with poor ventilation:

- consider alternative fastening methods such as gas-powered systems;
- wear protective clothing such as gloves and coveralls;
- wash hands with soap and water before breaks, eating, drinking or smoking and do not chew gum; and
- never take contaminated work clothes home.

4.14. Maintenance

EPTs in regular use should be cleaned daily. The cartridge magazine port, cartridge chamber and piston sleeve should be wiped clean but never be oiled.

Tools used intermittently should be cleaned after firing. All parts of the tool exposed to detonation gases from the cartridge should be cleaned and lightly oiled according to the manufacturer's instructions.

EPTs shall be dismantled and examined for defects weekly, by an authorised operator.

EPTs shall be returned to the manufacturer or authorised agent each year for a complete overhaul and re-certification.

5. ROLES AND RESPONSIBILITIES

SSE	Shall review and approve this procedure.
HSET Superintendent	Shall ensure that all provisions of this procedure are implemented, and that compliance is achieved.
Managers/Superintendents	Shall be responsible for their area of operations and the implementation and application of this procedure; Provide adequate training, information, structure and supervision to ensure that this procedure is implemented; Carry-out a periodic review of activities to ensure the appropriate application and understanding of this procedure; and Ensure immediate and appropriate steps are taken to investigate and rectify any risks to health and safety arising from these activities.
Supervisors	Ensure all CMWs are familiar with, have access to and comply with the requirements set out in this procedure.
All CMWs (including visitors and contactor)	Shall comply with the requirements of this procedure.

6. REFERENCES

- AS 1319-1994 (R2018) Safety signs for the occupational environment
- AS/NZS 1873.1:2003 Powder-actuated (PA) hand-held fastening tools Selection, operation and maintenance
- AS/NZS 3100:2017 Approval and test specification – General requirements for electrical equipment
- Coal Mining Safety and Health Act 1999 (Qld)
- Coal Mining Safety and Health Regulation 2017

7. REVIEW

This document shall be reviewed as follows:

- when there is a change of method and/or technology and/or legal or other requirement that may affect the accuracy of this document;
- when operational changes occur that effect the currency of the document;
- when there has been a significant event to which this document was relevant; and
- as a result of relevant audit findings.

8. AMENDMENTS

Version	Date	Description	Document Controller
01		Initial draft	
02		Risk workshop cross-section	
03		Review and formatting	
04		Review and formatting	