



Department of Consumer  
and Employment Protection  
Government of Western Australia

Resources Safety 

# Mines Safety Bulletin No. 76

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Subject: Use of explosive mortar devices for bringing down rockpass or drawpoint hang-ups

**This bulletin is issued as a result of information derived from the initial investigation of a mining fatality in Western Australia. The information is advisory and general in nature, and should not be interpreted as a warning regarding the use of any particular proprietary device or an indicator of any specific failure in the case of the fatality that gives rise to this bulletin.**

The type of device referred to in this bulletin resembles a military mortar in that it consists of a base plate containing a propelling charge, and a tube-barrel, which can be used to fire a finned projectile containing a high-explosive (booster-type) charge with an impact fuse detonator. In the mining application, the propelling charge is of the pyrotechnic or 'black-powder' type, fired remotely using a shock-tube igniter or an electric 'match'.

The unit would be set up and aimed at a target hang-up. The projectile would be fired at the hang-up by detonating the propelling charge. Upon striking the hang-up, the high-explosive charge is fired by the impact fuse device and, hopefully, brings down the hang-up.

It is of crucial importance in attempting to bring down a hang-up by any means that the operation is carried out in a safe fashion and is as free from hazard as may be practicable, given the dangers inherent in the nature of the task and in any use of explosive energy. The results of any failure are, obviously, likely to be serious injury or death and, consequently, precautionary measures to ensure operator safety need to be of the highest quality and rigorously enforced.

Careful consideration needs to be given to the method(s) to be employed to attempt to bring down a hang-up in any given circumstances. Particular methods may not be capable of being safely employed under particular conditions and the method needs to be selected in the light of the circumstances prevailing.

In the use of the type of mortar device covered by this bulletin, a number of special precautions are necessary.

- Only persons specifically trained in the use of mortar devices should be permitted to use them.
- Training should encompass all safety rules and warnings issued by the manufacturer of the device, as well as the normal methodology for the use of the device and any specific instructions for its use in particular circumstances.
- Discard criteria for the apparatus making up the device itself should be included and emphasised in the training program.
- Prior to use, the equipment must be thoroughly inspected. This would include an examination for damage to the barrel and a check for any built-up material inside the barrel, for example from rust or deposits from previous firings that may cause an obstruction.

- The propelling charge and its initiator must be inserted into the base plate of the device with care and sufficient length of lead wire or nonel shock-tube must be provided to ensure that ignition of the device can be carried out from a safe distance. This distance may well depend on the physical nature and configuration of the area where the device is deployed, and will certainly depend on the size of the high-explosive charge to be used.
- The launch tube or barrel of the device must be fixed to the base plate using a locking pin.
- The entire assembly must be firmly supported at the appropriate firing angle at the launch site and it must be assured that the device cannot slip during firing, particularly due to the reaction thrust during the projectile launching process.
- Any accessories provided by the manufacturer for the safe operation of the device must be employed according to the manufacturer's instructions. This particularly applies to the use of a specially designed 'pusher' plate between the fins of the projectile and the propelling charge to allow the thrust generated by the propelling charge to impinge fully on the projectile.
- The impact detonator fuse unit must be prepared exactly in accordance with the manufacturer's instructions and care must be exercised in its insertion into the projectile. Of particular importance is the use of the correct type and size of impact fuse device and detonator.
- Only high-explosive cast booster charges of the correct size should be used to arm the projectile. The booster cartridge should not protrude significantly from the end of the projectile.
- The projectile must be carefully loaded (with the pusher plate in position) into the launch-tube or barrel.
- **UNDER NO CIRCUMSTANCES SHOULD AN ARMED PROJECTILE BE FORCED OR HAMMERED INTO THE LAUNCH TUBE.**
- Initiation of the propelling charge should take place from a safe distance and the blast area must be barricaded and/or guarded to prevent inadvertent entry.
- Any unnecessary explosives and accessories must be cleared from the firing area prior to initiation of the propelling charge.
- Blasting fumes and dust must be allowed to clear before re-entry to examine the results of the use of the device.
- Any failure of either the propelling charge or the high-explosive charge must be treated as a misfire.
- Following a successful application of the device, both the launch-tube barrel and the base plate must be checked for damage by either the explosives employed or by falling rock dislodged from the hang-up.
- **IF THE LAUNCH TUBE BARREL IS DAMAGED OR DENTED SUCH THAT A NEW (UNARMED) PROJECTILE CANNOT BE FREELY INSERTED AND PASSED THROUGH THE FULL LENGTH OF THE TUBE, IT MUST BE DISCARDED AND REPLACED BY A NEW TUBE PRIOR TO RE-USE OF THE UNIT.**

Where a launching device has been successfully employed to bring down a hang-up, it must be recognised that damage can be sustained to the barrel and/or the base plate. Careful examination must be undertaken to ensure that no blast or falling-rock damage has taken place and particularly that the launch tube has not suffered any dents or distortion that may impede the free passage of a projectile.

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