

April 2025

Position paper

Carry box requirements for shotfirer vehicles when transporting mixed loads

The mining industry transports explosives on mine sites via a means of shotfirer vehicles that are generally utes or light truck vehicles. Shotfirer vehicles are fitted with carry boxes built to the requirements of the Australian Explosive Code third edition (AEC3) to transport explosives safely and securely.

These vehicles are typically known as Category 2 vehicles (based on quantity and hazard division) as determined by the AEC3.

Mixed loads of detonators and high explosives can be transported on the same vehicle in separate carry boxes under the segregation requirements in section 7.3.2 of the AEC3.

This paper addresses the application of Section 7.3.2 to mixed loads of detonators and high explosives up to the Category 2 limit only on vehicles with carry boxes on mine sites.

The AEC3 introduced changes where the amount of class 1.1B detonators that could be transported in these specially constructed vehicles was reduced from 5000 units to 125 units, unless the vehicle was fitted with an effective means of segregation, demonstrated to prevent sympathetic detonation of incompatible explosives (an approved blast barrier).

Figure 1: Typical shot firing vehicle – carry box



Figure 2: Typical shot firing vehicle – carry box – segregation



Target audience

This position paper is intended for mine operators and people in control of shotfirer vehicles on mining operations.

Legislation requirements

Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

- Section 33 Explosives and explosive precursors.

Explosives Regulation 2024

- Section 56 Duty to comply with certain standards or codes
 - (1) A person who carries out an activity covered by a relevant standard or code must carry out the activity in accordance with the relevant standard or code.
 - (2) In this section —
carry out an activity includes agreeing or arranging for another person to carry out the activity.
- Section 58 Duty to ensure others comply with Australian Explosives Code
 - (1) A licence holder or transport supervisor must ensure that a person who is employed by, engaged by or otherwise involved in the transport of an explosive for the licence holder or transport supervisor —
 - (a) is trained in the relevant requirements of the Australian Explosives Code, and
 - (b) as far as is practicable, complies with the Australian Explosives Code.
 - (2) In this section —
transport supervisor means a person who, in accordance with an exemption under the Act or this regulation, manages or supervises the transport of explosives.

Extract from the AEC code

‘Except where otherwise approved by the Competent Authority, a person must not offer for transport, or transport, explosives of Classification Code 1.1A.’

Carry boxes - transport requirements

There are requirements in the transport of mixed loads classes of 1.1D and 1.1B as per the AEC3 requirements.

Effective means of segregation must be demonstrated to prevent sympathetic detonation of incompatible explosives (approved blast barrier) of classes 1.1B and 1.1D Hazard division explosives.

The main issue is transporting explosives in carry boxes where the segregation barrier has not been tested by the original equipment manufacturer (OEM) for safely transporting hazard division 1.1B and 1.1D explosives on mine sites.

General requirements

Carry boxes are designed to carry explosives of class divisions of either 1.1B, 1.1D, 1.4S and 1.4B. These classes determine the type of explosives to be transported.

You cannot transport in the same carry box classes of 1.1B and 1.1D together because of the risk of explosion.

Carry boxes should be fitted with a compliance plate in accordance with the AEC 3 requirements.

AEC3 requirements

Section 7.3.2 (5)

Explosives not normally permitted by section 7.3.2(3) to be transported together, may be transported on the same vehicle provided the incompatible explosives are segregated by:

- (a) an effective means of segregation demonstrated to prevent sympathetic detonation of the incompatible explosives, or
- (b) other means specifically approved by a Competent Authority for that purpose.

Sections 7.3.2(6)

Detonators of Classification Code 1.1B must not be transported on the same vehicle as other explosives except in accordance with an approved method (see section 7.3.2(5)), or under the following conditions:

- (a) the quantity of detonators does not exceed the upper Category 1 limit,
- (b) the total quantity of explosives does not exceed the upper Category 2 limit which applies for the division assigned to the load, and
- (c) detonators must be separated from other explosives by at least 2 metres, or a lesser distance where separated by sufficient means to prevent fire or explosion communicating from the detonators to the other explosives.

Section 7.3.2 (7)

Detonators of Classification Code 1.4B or 1.4S may be carried with other explosives on the same vehicle provided they are in a separate carry box or compartment from the other explosives.

Informative

Where separation distances are specified above, high explosives and detonators must be properly secured to prevent the explosives coming closer than the minimum separation distances during normal operations and during abnormal circumstances and events.

Category 2 loads refer to the quantity of high explosives between 5 kg and 250 kg or the quantity of detonators is between 126 and 5000 detonators of class 1.1B or 125 or more detonators of class 1.4B or class 1.4S. In a mixed load, where detonators and high explosives are present, the total net explosive quantity of detonators and high explosive must not exceed 250 kg providing the number of detonators does not exceed 5000 detonators.

Detonators of Classification Code 1.4B or 1.4S have been classified under the UN manual of test and criteria. This is normally done for full boxes. When detonators are removed from a package, the classification will revert back to Classification Code 1.1B since the combination has not been tested.

For the purposes of transport in shotfirer vehicles for use purposes and not commercial transport, part packages of detonators of Classification Code 1.4B or 1.4S may retain the 1.4B or 1.4S classification provided control measures under the holder's safety management system are in place to retain the equivalent performance of that classification.

Wall or barrier

If a wall or barrier (air gap) is used as a means of segregation it must be proven to prevent sympathetic detonations from blasting explosives of mixed loads of HD 1.1B and 1.1D.

This can be proven through physical testing or mathematical or computer-based simulation by a competent person.

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