

Customer Site Safety: Bulk Delivery

Fourth edition

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1. Scope

Deliveries of cement to customer sites occur on a frequent basis. In some instances customers may receive numerous loads on any given day. Following a series of customer site incidents, some nearly fatal, British Cement Association members are introducing a Customer Site Safety Scheme to ensure that major hazards, and in particular those relating to silo over-pressurisation, are being correctly addressed.

This document concentrates on a relatively narrow set of health and safety criteria specific to bulk cement delivery that should be considered as part of a customers overall risk assessment. Compliance with any guidance set out in this document does not absolve the user from his legal duties under the Health and Safety at Work etc Act 1974 to form his own site specific assessment of his workplaces and operations and to provide accordingly for such matters.



An over-pressurisation incident lead to the ‘launching’ of this filter housing from the top of a silo. If this had landed on anyone, they would have been killed.

2. Revitalising Health and Safety

In support of the Government's *Revitalising Health and Safety* Programme, members of the British Cement Association agreed challenging accident reduction targets with the Health and Safety Executive.

Following an initial review of hazards and accidents associated with the delivery of bulk and bagged products, the Cement Companies have identified a number of important safety issues which they believe it is reasonably practicable for all customers to control. Therefore a new scheme is being introduced to rate how effectively these issues are being addressed by individual customer sites.

- A green rating indicates that the issues have been satisfactorily controlled.
- An amber rating indicates the need to address an issue within an agreed timescale and to implement interim measures in order for deliveries to be made safely.
- A red rating indicates an issue has been identified which renders the site unsafe for delivery. This information will be used to agree an improvement plan where necessary.

3. Procedure

Within the next few months, the cement company will send a site safety assessor to your site. Before they arrive, you will need to fill in the customer questionnaire in this brochure (appendix II) and return it to the cement company. When the assessor arrives they will fill in the assessor questionnaire (appendix I). Any issues raised by the questionnaires will then be subject to further discussion between the cement company and the customer before the site is given an overall green, amber or red safety rating.

You are strongly advised to review the items listed in the assessor questionnaire (appendix I) and to correct any deficiencies before the Cement

Company assessor arrives. Your attention is drawn to issues particular to your site that have a high potential of a red safety rating or where previous failures have occurred.

1 GENERAL SITE SAFETY

Green Amber Red

Issue: Risk of trip/slip/falls where tanker driver stands or walks during delivery. This is the most common cause of injury to drivers on customer sites.

- 1.1 Is the ground even and firm?
- 1.2 Is the ground properly drained, i.e. minimal standing water?
- 1.3 Is the ground free from slip and trip hazards?

Issue: Vehicles/machinery and equipment. Being struck by a site vehicle is the third most common cause of fatal injury at work in the UK.

- 1.4 Is our driver's pedestrian-area around their tanker safely segregated from site vehicles such as forklift trucks? (unless the pedestrian area is protected by a permanent physical barrier, there should be a minimum two metre wide exclusion zone around the tanker).
- 1.5 Does the customer establish a pedestrian exclusion zone around a tipping tanker while its body is raised, to protect people in the event of the body toppling sideways?
- 1.6 If the cement tanker has to make a reversing manoeuvre, is an agreed safe system in place that excludes pedestrians from the area behind the tanker?
- 1.7 Is the site entry safe for vehicular access and egress?
- 1.8 Has the customer defined a safe pedestrian access route for our driver to collect keys and deliver paperwork?
- 1.9 Is the lighting sufficient for our driver to see where he is going and what he is doing?
- 1.10 Is there secure fencing around pits or tanks into which our driver could fall?
- 1.11 Is our driver safe from falling objects from overhead hazards (e.g. conveyor belt systems)?

Issue: Risk of explosion due to rupture of pressurised tank. A pressurised tanker can release 1600 tonnes of force instantaneously if ruptured.

- 1.12 Does the customer establish an exclusion zone around the cement tanker while it is pressurised within which no operations may take place that could cause damage to the pressure vessel (such as the use of cranes)?

Issue: Prevention of falls from height.

- 1.13 If the access to the top of tankers is required, is a guard railed fall prevention facility or similar provided?

2 CUSTOMERS SILO

Green Amber Red

Issue: Risk of manual handling injuries when laying additional hoses. Difficulties of protecting lengths of hose from damage. Difficulties of excluding other workers from the danger zone around a length of pressurised hose.

- 2.1 Can the silo inlet connection be reached by one length of hose from the tanker?
- 2.2 Is the silo inlet connection between two and a half feet (0.8m) and four feet (1.2m) above ground level and is the inlet pipe angled at 35 to 45 degrees to the vertical?

Issue: Risk of pipe failure.

- 2.3 Is all pipework between the end of the silo inlet connection and the silo firmly secured, for instance by mounting brackets?
- 2.4 Is all pipework between the end of the silo inlet connection and the silo made of steel (or suitable equivalent) and does it appear in reasonable condition?
- 2.5 Is the coupling of an appropriate type and in good condition?

Issue: Risk of over-pressurisation or overfilling.

- 2.6 Is the silo inlet connection clearly identified by a sign showing silo number and product identification?
- 2.7 Is the silo inlet connection "capped" when not in use?
- 2.8 Is the silo inlet connection "locked" when not in use or alternatively is the silo automatically shut off?
- 2.9 Is the high level detection system linked to an audible and visual warning, for each silo which can be seen and heard by the tanker driver whilst standing at their controls during delivery?
- 2.10 Are warning lamps and sirens clearly labelled to indicate the alarm condition they are displaying and the silo to which they relate?
- 2.11 Are the contents of the silo measured and is the driver informed of how much space there is left?
- 2.12 Is the Customers Pollution Prevention and Control logbook up to date? (for sites where this question is not relevant, for example construction sites, tick the green box).
- 2.13 If there is a local limit on maximum allowable pressure is it clearly displayed?
- 2.14 Is the silo free of dust emissions during delivery?

Amber sites in sections 1.1, 1.2, 1.3 must be improved to an agreed short term timescale

Amber sites in sections 2.3 and 2.4 must be improved to an agreed short term timescale

Green Amber Red

3 PRE-EXISTING PROBLEMS (VOLUNTARY)

Green Amber Red

2.15 If a silo does not have an automatic shut-off valve to prevent overfilling, does the customer instruct the driver to return excess product to the supplier if the high level alarm is triggered?

2.15 After a high level alarm has been tripped, customers sometimes ask the driver to wait on site and make a second attempt to deliver the load once a short period of production has taken place. Some BCA members do not approve of this because of the increased risk of over-pressurisation.

The increased risk factors include the following

- a. *If a high level alarm has been tripped it indicates that the customers method of silo measurement is subject to error.*
- b. *The driver is unable to calculate how much product is left in the tanker.*
- c. *The driver is unable to calculate how far above the high level detection he has filled the silo and therefore how much needs to be removed.*

3.1 If the site has a safety rating, what colour is it?

Issue: Any further observations.

3.2 Are there any further comments you wish to make?

Assessor name _____

Signature _____ Date _____

Company _____

Site _____

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Disclaimer

The BCA has prepared this document in the interests of promoting a high standard of safety awareness in its industry, with particular emphasis upon pressure system operations. Compliance with any guidance set out in this document does not absolve the user from his legal duties under the Health and Safety at Work etc Act 1974 to form his own site specific assessment of his workplaces and operations and to provide accordingly for such matters. Whilst the BCA has taken all reasonable care in preparing its guidance neither the BCA nor its members will accept any liability in relation to the guidance. Readers are reminded that legislation, official guidance and best industry practice are all subject to change over time. This document was last revised on 5th February 2008.

Green Amber Red

Overall Customer site Safety Rating

Explanation

1 SILO OVER-PRESSURISATION

For specific information refer to the HSE endorsed “Guidance to prevent Silo Over-Pressurisation of Storage Silos during Delivery of Powders in Cement, Concrete and Quarrying Industries”

1.1 Do you have a copy of the HSE endorsed “Guidance to prevent Silo Over-Pressurisation of Storage Silos during Delivery of Powders in Cement, Concrete and Quarrying Industries”?

Yes No

Silo filter

Issue: To prevent silo over-pressurisation.

1.2 Is a filter fitted to the silo which is of sufficient size to prevent pressure relief device operation throughout normal discharge operations?

1.3 Are written records of filter maintenance and inspection kept available for examination?

Pressure relief device

Issue: To mitigate silo over-pressurisation.

1.4 Is an adequately sized pressure relief device fitted to the silo?

1.5 Are written records of pressure relief device maintenance and inspection kept available for examination?

Level detection

Issue: To prevent the filter from blinding.

1.6 Do your procedures ensure sufficient space is available in your silo to receive the amount of product you order and ensure high level safety alarms are not regularly/routinely tripped during filling?

1.7 Is a high level detector/alarm fitted that can be seen from the drivers controls?

1.8 Is the high level detector/alarm fitted so that the driver has sufficient time to shut down the delivery?

1.9 Are the high level detectors and alarms fitted with a permanent power supply so that they run continuously when the batch panel is switched on?

1.9 Note: there has recently been a very serious incident where a silo was overfilled and the filter housing blown off due to the detector not being switched on.

1.10 Are written records of high level detector and alarm maintenance and inspection kept available for examination?

Automatic shut-off valves

1.11 Is an automatic shut-off valve system, that is linked to the high level alarm and a pressure sensor, fitted to the silo to prevent silo over-pressurisation and overfilling occurring?

1.11 If a silo has an inadequate pressure relief

device, inadequate filters or inadequate level detection (whether due to failings in design, maintenance or method of operation) BCA members will require the fitting of an automatic shut-off valve (or other arrangements which achieve the same protection) to control the risk of silo over-pressurisation and filter ejection.

Yes No

1.12 Where an automatic shut-off valve is fitted are written records of automatic shut-off valve maintenance and inspection kept available for examination?

 Not Applicable

2 PIPEWORK AND FITTINGS

Issue: Risk of pipe/fitting over-pressurisation leading to failure.

2.1 Is all pipe-work between the tanker hose connection point and the silo made of steel or suitable equivalent.

2.2 If a valve is fitted on the pipework into the silo; is the valve, and the pipework between the valve and the tanker connection, suitably pressure rated?

 Not Applicable

3 SAFETY PROCEDURES

Issue: Recent near miss where a driver had been authorised to commence a delivery by the batcher while a maintenance team was in a silo.

3.1 Do you operate a safe system to ensure cement cannot be delivered when maintenance work is taking place in or on the silo?

4 ROUTE TO THE SITE

4.1 Where there are height, weight, parking or any other restrictions, have you provided information on the best route to the site?

 Not Applicable

5 ANY FURTHER OBSERVATIONS

5.1 Are there any further comments you wish to make?

Customer Assessor Name _____

Position _____

Signature _____ Date _____

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