Pumping Concrete
Video Session Presenter Pack
Fatalities and major injuries in construction have continued to drop in number over the past five years, however there were still 49 fatal injuries to construction workers in the year 2011/2012; the equivalent of one per week.

Contractor Members of CONSTRUCT participate in a yearly review and comparison of accident and incidents rates, including comparison against HSE published figures. The details are broken down into type of accident; age and gender of injured persons; type of injuries; occupations and what body parts were injured. This collation of information further facilitates the opportunity to consider trends or factors affecting the industry. The open sharing of information allows for companies to share experiences and learn from others.

CONSTRUCT as an organisation sets out to support our members and the wider construction industry in the Management of Health and Safety on sites and provide materials to assist in the communicating the messages of safe working and safe behaviour.

This video and support materials is one of a series of six sessions that have been created with financial funding provided by CITB. The remit was to create a suite of videos specific to the Reinforced Concrete Formwork Industry, helping organisations to provide specific messages to their workforce on the risks associated with their role and continue the downward trend in accident rates. CONSTRUCT has worked with Exemplas, our delivery partner, on all materials produced and the CONSTRUCT members have assisted by reviewing and evaluating the contents of each session.
CONSTRUCT is the trade association for those working in the Concrete Structures industry. The Concrete Structures industry is worth more than £1 billion per annum, with the projects our members deliver accounting for as much as 93% of that total spend.

As a members’ organisation, CONSTRUCT represents all the voices in our specialist sector, with a membership made up of specialist concrete frame contractors as well as their clients, suppliers, consultants and other industry bodies.

CONSTRUCT exists for the benefit of its members, positioned to directly and specifically improve the concrete frames and structures industry, to constantly evaluate and respond to industry needs, and to influence developments with speed and economy.

We are driven by four priorities, each led by a Champion within the organisation:

• Improving safety and efficiency.
• Co-ordinating views and acting in members’ interests.
• Promoting innovation in the use of concrete.
• Identifying and addressing best practice and build ability.

Our Health and Safety Charter on improving safety and efficiency includes the specific aims and objectives of:

• Eliminating accidents and injuries on construction sites.
• Advance high professional standards and excellence in the construction of In Situ RC Frames and other structures.
• Raise the profile of safety and health in the construction industry.

More information on CONSTRUCT, publications and good practice guidance and accident statistics are available at www.construct.org.uk
Session Aims and Objectives

Session Introduction

In recent years there has been increased recognition that addressing worker behaviours can positively influence the safety culture in a workplace. The move away from a ‘parent/child’ or ‘policing’ attitude towards that of mentoring has been proven to improving buy in to safety.

This ethos is applied to the “What’s your Motivation” references on the handouts and within this session presenter pack. Rather it simply being about complying with the law or Company procedures, it is about the impact a lapse of attention or attitude would have on an individual’s life. Throughout this session the aim is to provoke genuine thought about the daily grind and the reasons why safety needs to be at the top of everyone’s agenda.

Personal choice of actions and changes to behaviour towards safer working methods has been proven to create a construction industry where the workforce is motivated to work in a safe way and reduce accidents as a result.

Aims and Objectives

The aim of the session is to gain an understanding of the risks associated with concrete pumping operations and control measures which should be considered to reduce the chances of incidents occurring.

By the end of the session the attendees will have covered:

- Understand the hazards associated with concrete pumping operations.
- The importance of pre-use checks and inspections of equipment and pipelines.
- Why blockages occur and how to deal with these safely.
- The importance of effective communication between all parties involved in the pumping operation.
- PPE requirements.

For each of the videos, supporting handouts have been produced which provide a brief reminder of the keypoints covered. Ensure these are given to each delegate after the video has been shown.
Advice on Conducting the Session

This session is not intended to replace formal training; instead it should be used along with other titles in the series and support formal training by acting as a reminder of the practices that will help prevent a serious injury on-site.

Although detailed specialist knowledge is not required to facilitate the delivery of these videos, experience of the activities is preferable together with an adequate appreciation of safety matters. The following list provides some tips to help delegates get the most from the session.

Preparing for the session:

• Ideally use the session to improve or relate to something which has recently happened on your site.
• Look for ways to encourage your audience to talk about experiences they have had with incidents relating to the session topic.
• Familiarise yourself with this document and the lesson plan.
• Watch the video beforehand to ensure you know the content and when interactive sections are scheduled.
• Know what sections you are required to present and where you need to lead group discussions.
• Choose the right place to conduct the session. Avoid locations where distractions are likely and make sure you can be heard in all parts of the room.
• Try to make the training area as comfortable as possible and ensure adequate seating is available.
• Think about the right time to do the session. First thing in the morning, when there is time, and people are more likely to devote attention, is generally a good choice. End of the day talks tend to fail to hold the attention of the operatives eager to get home!
• It is recommended that class sizes do not exceed 15 to help promote as much interaction as possible.
• Check you have the materials and equipment necessary to deliver the session:
  - DVD or Internet Link and the access to the website e.g Vimeo or YouTube.
  - TV with DVD player or computer / laptop with web access.
  - Projector / screen.
  - Speakers.
  - Training or tool box talk attendance register (company specific).
  - Course specific handouts.
Advice on Conducting the Session

Conducting the session:

• Set aside enough time (30-40 minutes) to allow the session to be delivered without feeling rushed.
• Ensure the appropriate attendance register is completed by all delegates.
• Portray a positive image.
• Encourage as much interaction and participation as possible where this is indicated in the video.
• Speak clearly and loudly enough to get the message across.
• Where possible, use your own experiences to start the group discussions as delegates may feel uneasy about speaking up in front of their peers. It is your responsibility to make them feel comfortable about doing so.
• If not a lot of conversation is being generated, start people on their way by asking the question in a different way (which is why it is important to know the content of the video up front) or giving them the first answer.
• Allow enough time for questions. These sessions provide an excellent opportunity for discussions around safety and how it specifically applies on-site.
• Look for opportunities to discuss why people might work in an unsafe manner and what could motivate them to change their behaviour.

Have details of your own company procedures relevant to the session subject as this will assist you in making the session and learning more site or company specific for your attendees.

After the session:

• Give each delegate their handouts to take away with them, providing a brief reminder of the key points to remember from the video.
• Check the training attendance register has been completed by delegates. Retain and submit to the relevant person in your company.
• Take away any questions you are unsure of and report back once you have consulted a professional.
• Ask for any feedback on the session – you can send this to CONSTRUCT if relevant.
Video Overview

The theme of the video is a television news report following an incident that occurred on site while pumping concrete to a reinforced concrete frame building.

A news reporter is outside the site and the news anchor is joined in the studio by two industry representatives – a concrete pump operator and a Health & Safety officer – to discuss the most likely reasons for the incident and issues surrounding concrete pumping operations.

There are opportunities for delegate interaction throughout the video to break up the scripted content and discuss the issues raised. The discussion areas are related to the dangers of concrete pumping/pours; checks and inspections of pipelines; PPE; causes of blockages, clearing blockages and cleaning out of pipelines.

Please be aware that, in the last section of the film, the news reporter states the HSE might be involved further if the injured workers die. In fact, the HSE would certainly be involved in a detailed investigation.

The video has pause points where the audience and presenter will need to undertake group discussions on the issues covered above; after each pause point the video should be resumed at the point it was paused. The following sections of this guide identify what these discussion areas are and what information you will need to know about your own company before presenting the session.
Key Points of Interaction in Session

At specific points within the video you will be instructed to pause the film and discuss, as a group, answers to the posed questions. Please be prepared to lead the discussions and encourage the answers to come from your attending audience rather than just read the answers out yourself. Below are the questions relevant to this session along with appropriate suggested answers and additional support information which you should feedback along with the answers given by those attending the session.

**Question 1 - Ask the group to identify when incidents and accidents are most likely to occur during a day's work pumping concrete?**

Example answers –

- When the pour first commences, until the concrete is flowing smoothly.
- When blockages occur and need clearing.
- During the pour, if the pipeline moves because it is not securely fastened.
- During the cleaning out process.

Selecting and using damaged or poorly maintained pipes could further contribute to creating a higher risk of accidents or incidents occurring.

**Question 2 - How can the condition of pipes used in pipelines be checked?**

Example answers –

- Visual check to look for damage and/or wear.
- The best way is to use an ultrasonic wall thickness gauge.
- Remember do not re-use damaged pipes.

Additional information - Concrete delivery pipes are worn by the flow of the concrete through them. The speed at which they wear depends on the quality of the pipe material, the flow velocity of the concrete, the concrete pressure in the pipeline and the characteristics of the aggregates - hardness, shape etc. Pipes close to the pump are subject to a higher wear rate because the concrete pressure is greater at the beginning of the pipeline than at the discharge end.
Key Points of Interaction in Session

Question 3 - When installing a concrete delivery pipeline what should be considered and checked?

Example answers –
- Correct pipeline size – choose a pipeline size suitable for application considering the material to be pumped.
- Use pipes, bends, hoses and couplings that are suitable for pressures exerted by the pump.
- Check for damaged or worn pipes, bends, hoses and couplings and replace as necessary.
- Use clean pipes, bends, hoses, couplings and gaskets.
- Use safety pins in all couplings.
- Build a pipeline taking the shortest possible route.
- Chock the pipeline up to allow easy coupling and uncoupling.
- Ensure the coupling levers are on top and in the same orientation to allow easy coupling and uncoupling.
- Secure the pipeline adequately on horizontal and vertical runs.
- Use bends to deviate pipeline NOT hoses.

Question 4 - Why do blockages occur?

Example answers –
- Line not sufficiently grouted prior to the pour commencing.
- Too thin a grout used when grouting up.
- The mix supplied is not a pumpable mix.
- Pipeline is too small for the concrete mix.
- Hot weather – concrete starts to set in the pipeline.
- Delays in delivery – concrete starts to set in the pipeline.
- Hoses used in place of bends can contribute to blockages.
- Pipeline too long for the concrete mix.
- Dirty pipes can lead to a blockage occurring.
- Foreign bodies in the concrete mix e.g. build up from the mixer blades.
Key Points of Interaction in Session

Question 5 - What is the correct process for clearing a blockage?

DO NOT under any circumstances open or attempt to open the delivery pipeline while it is under pressure. Treat as being pressurised at all times until, the pump operator confirms otherwise.

- Stop pumping immediately.
- Reverse the pump until the pressure is released. You should not try to clear a blockage by increasing the pressure.
- Locate area of blockage, check the following:
  - Reducer (where used).
  - Bends.
  - Flexible rubber hoses.
  - Outlet of pump.
  - It is common practice to locate a blockage by gently striking the pipeline along its length to identify where the dull thud of a full pipe becomes the ring of an empty pipe. If this method is used, care should be taken not to damage the pipeline - a wooden mallet is recommended to minimise the possibility of damaging it.
- Establish an exclusion zone (move non-essential personnel out of the area) and ensure all personnel stand clear of the pipeline, especially at the discharge end.
- Ensure personnel involved in the operation wear suitable PPE*.
- Ensure an effective communications process exists between the pump operator and site personnel.
- Disconnect the delivery pipeline at the safest point near to the blockage.
- Clean out the blockage.
- Reprime and reconnect ensuring that safety pins and clips are in place.
- Recomence pumping operation to ensure blockage is clear, if not repeat the procedure as above.
- Keep site personnel clear of the delivery end of the line until a smooth flow of concrete is established.

*Additional Question – Discuss with the group the correct PPE to be worn by site personnel involved in concrete pours.

Example answers –

- Safety helmet.
- Eye protection visor or goggles.
- Hearing protection.
- High visibility clothing.
- Impervious protective gloves or gauntlets.
- Disposable overalls or boiler suit.
- Footwear incorporating steel toe caps and a steel reinforced sole (eg safety wellingtons).
- It is advisable to tape gloves and the top of boots to the suit to reduce the risk of concrete burns.
Key Points of Interaction in Session

Question 6 - What are the key safety issues to consider when cleaning out the pipeline?

Example answers -

- Must be carried out by suitably trained person under supervision.
- Use compressed air to clean out a pipeline only where there is no practical alternative.
- Remember the pipeline must be treated as pressurised at all times until the pump operator confirms otherwise.
- PPE must be worn including eye protection preferably a full face visor.
- Correct equipment available –
  1. a wash out adapter with an air entry control valve, an emergency pressure release valve and a guard to stop the sponge ball blocking the two ports,
  2. sponge wash out balls,
  3. a ball catcher attachment
  4. a compressed air supply.
- Ensure effective communications between pump operator and site personnel.
- Ensure that all personnel stand clear of the pipeline particularly at the discharge end.
- Remove all flexible hoses from the pipeline.
- The pipeline must be fully supported and secure.
- There must not be any bends in the final 15 metres of the pipeline, unless the pipeline is adequately tied down/secured.
- The end placing hoses must be removed from the pipeline and a ball catcher attached to the end pipe
- The concrete wash-out water must be collected in a suitable receptacle and recycled (using Siltbuster Concrete Washwater Treatment System or similar) or disposed of appropriately.
Information the Presenter Needs to Know About Their Own Company

The following is a suggested list of company specific information you may require to support the delivery of this session:

- Copy of your Permit to Work for Pumping Concrete Operations.
- PPE requirements.
- Competence and training requirements of those involved in operations – who will do what?
- Specific method statements and risk assessments.
- COSHH requirements.
- Washout procedures and details on how concrete washout water is to be disposed of.
- Company specific procedures for dealing with blockages.
Sources of Further Information

All Guidance listed below is subject to revision – please check the relevant website for the latest versions.

- Code of Practice for the Safe Use of Concrete Pumps BCPG 0401 - Published September 2013 – available from www.cpa.uk.net
- BS8476:2007 Code of Practice for the Safe use of concrete pumps – Published 2007 available from British Standards website
- CONSTRUCT Case Study on dealing with Concrete Wash Water - http://www.construct.org.uk/media/carey_case_study_2.pdf

Website links to related organisations and publications:

- The Concrete Society - http://www.concrete.org.uk/
- The Concrete Centre - http://www.concretecentre.com/
- British Concrete Pumping Interest Group - http://www.cpa.uk.net/about-the-british-concrete-pumping-group-bpcg/

The numbers of reported and investigated incidents involving concrete pumping operations are thankfully small in quantity, although the following are HSE Investigated incidents: