



Mineral Products Association

Kiln Shutdown

Planned Maintenance

Kiln Shutdown Planned Maintenance

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1. Background

This document makes recommendations for kiln shutdowns, based on recent experience and incidents. It concentrates on a set of health and safety priorities specific to Kiln Maintenance in the United Kingdom.

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.

In addition, users should have regard to any procedures set down in Environmental Management Systems related to the management of emissions to air, water and land during kiln shutdowns.



2. CDM Regulations

Construction Work Definition

“construction work” means the carrying out of any building, civil engineering or engineering construction work and includes—

- (a) the construction, alteration, conversion, fitting out, commissioning, renovation, repair, upkeep, redecoration or other maintenance (including cleaning which involves the use of water or an abrasive at high pressure, or the use of corrosive or toxic substances), de-commissioning, demolition or dismantling of a structure;
- (b) the preparation for an intended structure, including site clearance, exploration, investigation (but not site survey) and excavation (but not pre-construction archaeological investigations), and the clearance or preparation of the site or structure for use or occupation at its conclusion;
- (c) the assembly on site of prefabricated elements to form a structure or the disassembly on site of the prefabricated elements which, immediately before such disassembly, formed a structure;
- (d) the removal of a structure, or of any product or waste resulting from demolition or dismantling of a structure, or from disassembly of prefabricated elements which immediately before such disassembly formed such a structure;

It is very difficult to give precise guidance on the Construction (Design and Management) 2015 Regulations, as each project is judged on its individual merits. The Approved Code of Practice has been withdrawn.;

Do the CDM Regulations apply?

The following recommendations should be considered.

Recommendations

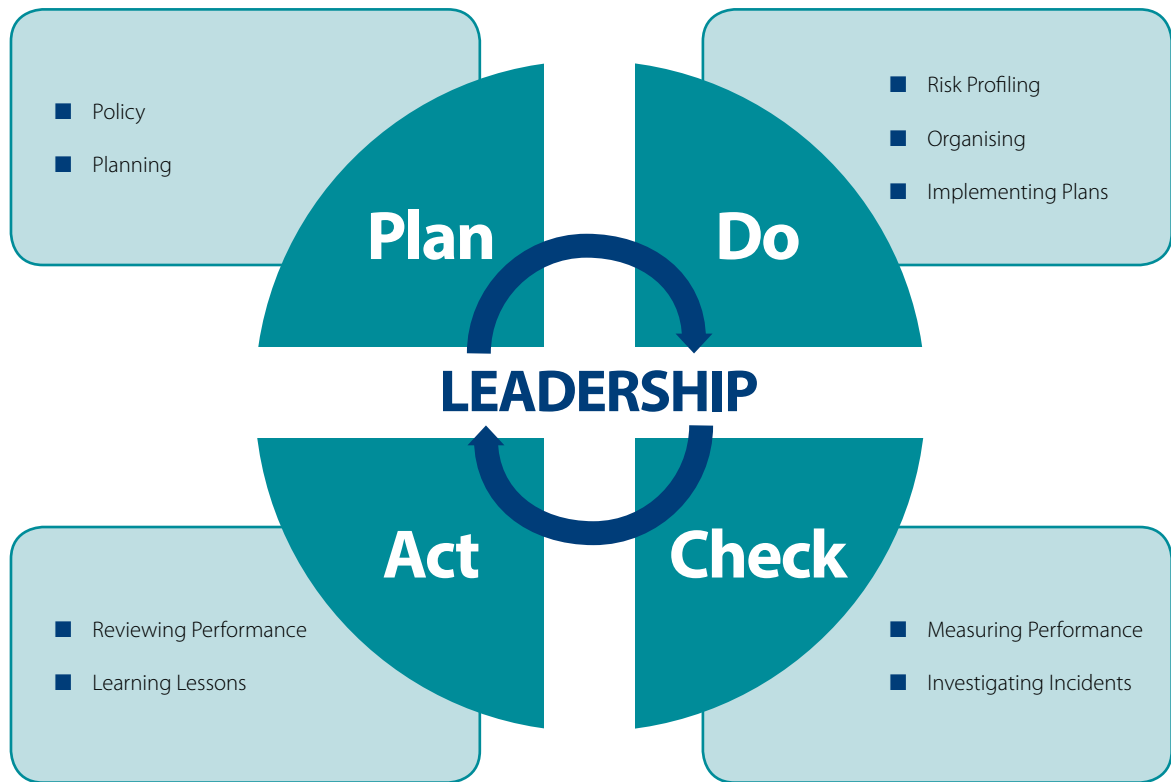
- Assess all tasks in advance of shutdown for CDM categorisation or not.
- Pay extreme detail to the responsibilities in all roles. Take expert opinion, if needed, for clarification.
- Allow adequate time to do this .
- Issues to potentially cover -:
 - Definition of site
 - Timescales
 - Practicalities v's restrictions
 - Who is the Client, Designer/Principal Designer, the Principal Contractor/Contractor.

If the CDM Regulations apply

Projects should be managed and structured accordingly. Where appropriate HSE (or HSENI in Northern Ireland) should be notified using Form F10.



3. Planning



The norm is;

- Plan up to a year in advance
- Dedicated Shutdown Planner & Facilities
- Cover scope of work, including key H&S requirements (e.g. confined space emergency preparedness)
- Involving all departments concerned (e.g. Projects/Operations/Maintenance and contractors).
- Contracts awarded in good time to allow contractors to plan properly and be involved in the decision-making process, as early as possible.

Defining the Shutdown Scope;

Task List Development:

- Develop list of all tasks to be undertaken identifying safety critical work
- Major tasks will be identified for individual detailed scope
- Ensure all shutdown improvements highlighted at the previous kiln shutdown 'post mortem' are included in task list
- Ensure all safety related RCA actions are included in the task list

- Arrange bi-weekly cross functional meetings to discuss task list and agree actions

Develop Scopes of Work:

- Develop scopes of work for all major tasks to highlight routine and non-routine work
- Use Scopes to select sub contractors with correct competencies
- Use Scopes to help to develop the safe working procedure

Safe Working procedures

- Review and update all safe entry procedures for confined space working
- Review and update all confined space entry risk assessments
- Highlight any amended procedures

Safe Working procedures

- Specific issues must be addressed by risk assessment / method statements e.g. confined spaces, WAH/falls (suspension trauma), evacuation, lighting, scaffold, loss of pressure on bricking rig etc.

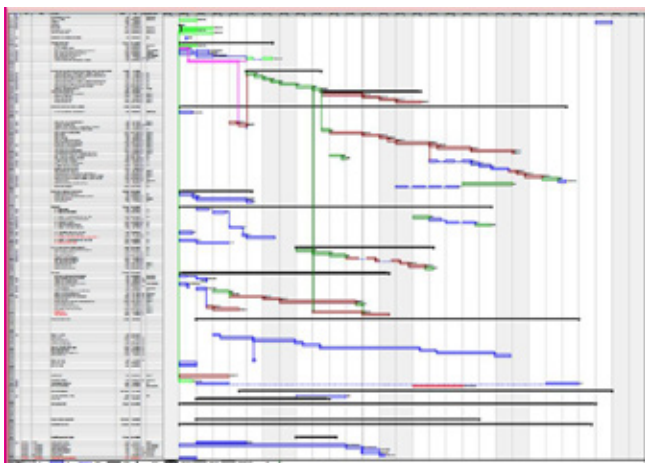
Good Practice examples: Lean Production Techniques

- Lean production techniques do not just make the shutdown run more efficiently, they can also potentially identify the bottlenecks/problems that can effect safety.
- SMED helped improve safety during the Rugby works shutdown. The result was the installation of an alimak lift, external robot wrecking, increased storage and ultimately a safer working environment.

Detailed Planning;

Project Plan Development:

- Formulate the project plan to define work areas which require careful coordination due to task confliction
- Ensure adequate time is allocated to tasks



Task Supervision

- Assign supervisors to all tasks & develop supervisor task plan - communicate plan to all
- Ensure everybody knows, who is responsible for which task

Early Contractor Engagement

- Invite contractors/sub contractors to regular site meetings to communicate and coordinate task detail
- Involve contractors/sub contractors in detailed planning discussions / meetings
- Involve all teams, including contractors/sub contractors , in the critical path meeting so all fully understand where their work interacts with the other teams – all aware of each others interactions from day one

- Arrange site meetings with contractors/sub contractors to discuss the “construction phase plan” so they are aware of our expectations, this also gives them the opportunity to raise any queries or concerns they may have
- Work with contractors to develop individual competency assessments - right people right places
- Task supervisors to complete Contractor Clearance Certificates for all tasks which verifies that the risk assessment and method statements are adequate and competencies aligned



The ‘first five days’ -

- Develop a ‘first five days’ plan to focus on getting the shutdown underway safely from the start
- Gives task supervisors a clear understanding of where they need to focus their efforts

Health & Welfare

Health

Recommendations

‘Introduce’ health to contractors e.g. through healthier meals, advice on health issues e.g. short presentations on Testicular cancer, Respiratory diseases, Stress and fatigue, etc.

COSHH

- COSHH assessments must be carried out and Safety datasheets obtained.
- Control measures must be put in place to protect both employees and contractors.
- ‘Go looking for trouble’ e.g. dust emissions during wrecking and waste disposal or fumes during welding operations.
- Carry out inspections to ensure contractors are following safety datasheets e.g. with respect to installing/wrecking refractories.

- How effective is their dust control when refractories are sawn to shape?
- Address known problem areas such as waste chutes (e.g. try fitting a fog cannon at the bottom of chutes/trapdoors at top of chute). Specify the use of Bobcats with enclosed cabs and HEPA filtration

Chromate: Information from Germany suggests that where there is high chrome steel, in the presence of oxygen and volatile alkalis, chromate deposits can be formed that can migrate into the kiln bricks etc. Chromate has been found at cyclone dip tubes, kiln outlet segments, kiln heads, kiln inlet chutes, burners, cyclone walls and other areas.

The possible presence of chromate salts need to be considered as part of the COSHH assessment for the shutdown project and any wastes handled appropriately.

Refractory Ceramic Fibre: Guidance on the handling and disposal of refractory ceramic fibre arising from (ceramic) kiln maintenance has been published by the British Ceramic Confederation and circulated to MPA Cement members. HSE has also issued guidance to inspectors on the same subject.

At the European level, Refractory Ceramic Fibre is on the Registry of Intention of the European Chemicals Agency for potential listing as a Substance of Very High Concern, which would ultimately lead to restrictions being placed on its use.

Consequently, companies need to thoroughly examine the safety datasheets for the materials that they are using so that they can be handled and disposed of correctly (and consider whether there are safer substitutes). The SDS should also carry the REACH registration number and information on use/exposure limits etc.

HAWS & Noise

Assess the risks from noise and vibration and take action to eliminate or significantly reduce the noise and vibration exposure that produces those risks.

Provide your employees with hearing protection if you cannot reduce the noise exposure enough by using other methods.

Ensure that the legal limits on noise and vibration exposure are not exceeded; and take appropriate action if the exposure action values are exceeded;

Provide your employees with information, instruction and training on health risks and the actions you are taking to control those risks.

Carry out health surveillance where there is a risk to health.

Consult with employees on your proposals to control risk and to provide health surveillance

Keep health records for employees under health surveillance.

Review and update your risk assessment regularly; and if anything changes that is likely to change exposure levels.

Drugs & Alcohol

Contracting companies are beginning to be asked to pre-test their employees, prior to arrival on site. This ensures that contractors are 'clean' before they arrive.

Welfare facilities

Recommendations

- Suitable & sufficient facilities should be provided for all persons at work.
 - Sanitary conveniences
 - Washing facilities including showers & the provision of soap & towels.
 - Drinking water
 - Accommodation for clothing
 - Facilities for changing clothing
 - Facilities for rest and to eat meals
- Effective arrangements should be in place to ensure all such facilities are kept clean & properly maintained including refrigerators where food is kept. Inspection of these facilities should be included in the site workplace inspections.
- The Workplace (Health, Safety and Welfare) Regulations set out the specific requirements with which an employer must comply. It is the sites decision who does this but this should be agreed and documented at the tender stage.

Working Hours

Recommendations

- Companies should state acceptable working hour levels to contractors at the tender stage.



4. Risk Management

Assess the risks, identify what could cause harm in the workplace, who it could harm and how, and what you will do to manage the risk

Decide what the priorities are and identify the biggest risks.

Recommendations

- Competent Person(s) must assess and validate all method statements/ risk assessments for all operations. This should extend to those prepared by contractors which should be checked prior to the start of shutdown (or as modified as the shutdown progresses).
- There should be ongoing assessment, review and updating as necessary, for example when conditions or job plans change.
- Dynamic risk assessment methodology (for example STOP or "Take 5" etc) should be used to address " real time" issues.
- Working practice, risk assessments and work instructions must identify that work areas should be kept clear during and after the task.
- Ensure that the real issues/control measures are not lost in overly complex risk assessments. Focus on the significant hazards.

Confined Spaces

Recommendations

- Always undertake an assessment to determine whether the Confined Spaces Regulations apply. If so implement an appropriate Permit to Work system. (Confined Spaces etc should be identified at the planning stage, Do not overlook work in adjacent areas, for example welding, that might influence the designation).
- To manage who's where on a simple visual basis, use boards with names on and consider pre-printing boards
- Depending on arrangements, ensure rescue team training is kept up to date and recovery plans have been practiced.



Falls from Height

Avoid work at height where it is reasonably practicable to do so; where work at height cannot be avoided, prevent falls using either an existing place of work that is already safe or the right type of equipment. Where the risk cannot be eliminated, minimise the distance and consequences of a fall, by using the right type of equipment.

Flooring: Falls through flooring have caused injury and fatality in the cement and minerals industry.

There are generally three scenarios: the operative who is repairing the flooring/working in the vicinity falls through a hole as they move around the work area, the operative falls through the hole as they replace the flooring, a bypasser who is taking a shortcut, falls through the hole.

[BBC News Report](#)

[Fall into unguarded opening](#)

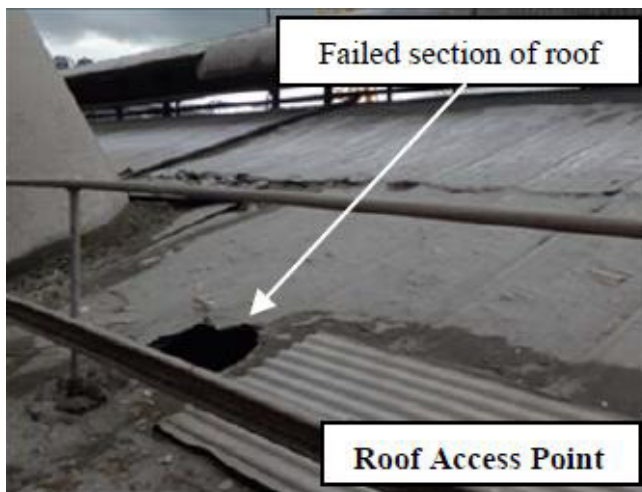
Good Practice examples: Tunstead

All confined spaces are checked prior to start of works.

Confined Space Boards are positioned at the entry point to each confined space. No entry is allowed until the board is completed (Permit, Risk Assessment & Method statement attached) and 'green'. (The board in the photo is 'red'). Individuals must have a confined spaces tag which they attach to the board, before entry. This is to keep a record of who is in the confined space and also assists with audits.

Roof Falls: An engineer used a stairway and gained unauthorised access to the adjacent kiln building roof, having passed over or through a handrail. Tragically the additional weight of the engineer caused a section of the roof to give way and he fell to ground some 18 metres below; he died at the scene despite efforts to revive him. It is believed he had intended to take photographs of the lifting operations.

Alert: Fatal Roof fall



Scaffolding: Incidents involving scaffolding have occurred over the years including a fatality. Advice can be found in the [MPA Cement Pre-Heater Tower Guidelines](#).

Ageing Plant/Conditions etc: An operator was killed when the silo roof he was working on collapsed. Recommendations were made on structural inspections, silo operation and examinations to identify hazards etc.

These recommendations might also be relevant particularly if access to/through older/less frequented areas of the plant is necessary during the shutdown [Fatalgram: Silo Roof](#)

- Don't overlook the risks to emergency services attending incidents– they will be unfamiliar with plant layout

Fatalgram: Fall into Hot Material

Recommendations

- Ensure a safe system of work is followed
- Use competent people and ensure that they are trained in the safe system of work.
- Provide fall arrest equipment and ensure that it is used
- Provide adequate supervision and undertake regular inspections
- Exclude passersby: Erect Barriers/ Guarding and Signage

Isolation

Isolation failures have resulted in multiple fatalities in the UK mineral industry. Isolation procedures and equipment should form a particular focus during shutdowns.

An [MPA isolation audit](#) has been released. In particular ensure isolation is actually achievable. Some surprises have included isolators that can be locked off in the 'on' position and isolators that are broken internally such that they are still live, even though they are in the off position. Ensure procedures are being followed.

LOTOTO

Recommendations

- A system must be in place that is understood by all who use it. Best practice is a "one man one lock" system

Physical

Recommendations

- A system must be in place that is understood by all who use it e.g. electronic, or paper Permit to Work system. This is to address actual physical problems such as "stored energy", hydraulic, pneumatic etc.

Multi-discipline / Boundaries

Recommendations

- Consider in detail the interaction between different persons/ groups for example those involved in welding and those involved in relining activities. Consider also the physical boundaries – e.g. kiln / cooler, feed system / mill etc.

Working Environment (temperature/dust/ isolation/ozone)

Recommendations

- Ensure area is safe to enter e.g. cleaned down/ acceptable atmosphere etc.
- Temperature must be safe as per site rules.
- Descaling (noise, dust and fumes) should be subject to risk assessment and safe working procedures

Kiln turning / test running

Recommendations

- A safe working procedure and isolation must be in place for all instances of test running, both off and on line. These must be understood by all involved.

- There should be radio communication between involved parties. Banksmen must be in position for certain operations e.g. kiln turning or cooler running.
- Hotmeal blockages may be more likely during kiln start up and appropriate measures should be taken. Examples include restricting access to the kiln line (cyclone tower, head, cooler and clinker conveyor) during heating, starting and stabilization of the kiln, planning for cleaning activities to finish before the kiln fires up, warning signage (that could include pop up warnings on supervisor screens etc), alarms, mandatory exit when alarm sounds.

Working above including Hot work

Recommendations

- There should be no working overhead, unless unavoidable. If overhead working is necessary then provision must be made to protect those below e.g. the erection of a protection scaffold, barriers, fume protection, welding flash, fire precautions etc.

Vee belts

A number of recent finger amputations have been caused by the movement of the vee belt pulling fingers into pulley even though machinery has been electrically isolated.

“The isolation and immobilisation of equipment process needs to be understood and carried out by all personnel. In addition to the obvious locking off and checking for dead the electrical drive systems, any systems where there is an additional hazard identified, should be removed and isolated. In this case the vee-belt tension released”.

Alert: Vee Belt.

Lifts & Lifting

Elevators: “a 34-year old contract laborer with 6 months of experience was killed at a cement operation when attempting to access an elevator in the finish mill. When the victim opened the elevator door on the fourth floor landing, he stepped into the elevator shaft and fell approximately 51 feet to the top of the elevator car located on the ground floor”. [Fatalgram](#)

In a UK incident, a landing door fell 40 metres after it was ripped off. It was believed that a refractory car may have put something out of alignment.

- Ensure statutory inspections are up to date and any routine maintenance is carried out, prior to the shutdown commencing.
- Ensure elevators /alimak lifts etc are regularly inspected for damage during the shutdown period.
- Encourage the reporting of any damage or faults.

Lifting: Major lifts are generally well planned, where incidents have occurred they have tended to be the smaller less well planned lifts.

Recommendations

- Ensure smaller lifts are covered by risk assessments/lifting plans
- Ensure lifting equipment is only operated by appointed persons with the necessary licences and training
- Ensure the lifting assessment has been signed off by the appropriate person
- Ensure the lifting equipment is suitable and sufficient (CE marked, proposed use falls within SWL marking, satisfactory for terrain and area of use, employees and safety reps consulted, in good condition and statutory examinations are up to date) .
- Ensure scaffolding poles are lifted/slung in an approved manner.

News: Fatal Lifting Incident

Good Practice examples: Cauldon

During the shutdown at Cauldon Cement works, maintenance is carried out to the cyclones, chutes, pipes and flaps within the pre-heater tower. Previously, the material was caught by blanks inserted into the pipework before the demolition process started. Once the process was complete, the blanks were removed and any blockages and waste material removed from the meal chutes and flaps prior to restarting the plant. This could require the meal chutes and flaps to be removed which required the use of lifting equipment, slinging and rigging.

Cauldon eliminated the lifting risk and reduced the manual handling/falling material/ dust exposure risks by installing a new hinge system that enables a section of feed pipe to be remove - not only was the work carried out more safely, it was also carried out more efficiently.

A trolley that utilised a hydraulic ram and pumps, was used to lift the flap sections and allow them to be rolled out of the way of the cyclones and any material dropping down from the cyclones.

Once the chutes and flaps were moved, a purpose built hopper was installed at the bottom of the meal chutes. The hopper directed material into a wheeled skip which was used to catch and then remove the waste.



Wrong Person/Wrong Place

A number of incidents and near misses can be loosely classified as wrong person—wrong place. Whilst there are other lessons to be learned from these incidents, if the person hadn't been in the area then the incident/near miss would not have happened.

Recommendations

- Segregate work areas/Restrict Access and keep 'unnecessary' people away from danger areas
- Exclude passersby: Erect Barriers/ Guarding and Signage
- It is recommended that robust methods are used to restrict/control access to work areas
- Move away from red and white barrier tape to more robust gateways
- Ensure inductions provide familiarisation with the work area and its hazards/escape routes etc.
- Monitor new employees closely
- Separate pedestrians and vehicles. - provide dedicated walkways, safe crossing points, barriers.
- Fit visibility aids and proximity detection, where appropriate



Control Access to Site/ Work area

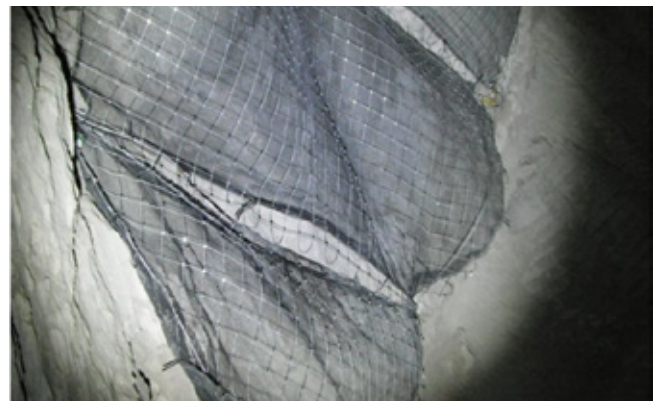
Falling Materials

The potential for/and history of serious incidents related to falling materials, dictates that workers should be adequately protected.

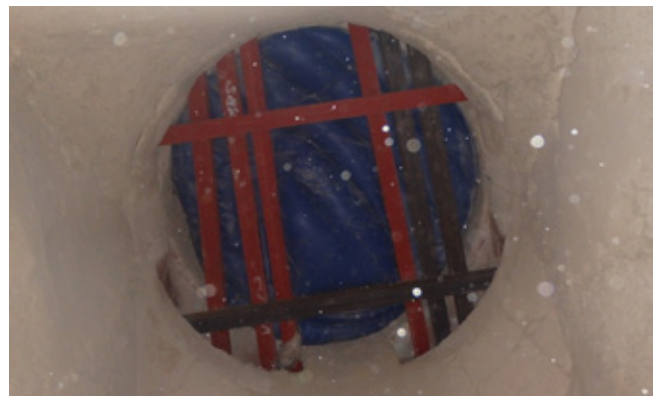
A recent fatalgram has been circulated about an employee was killed by falling material whilst rappelling inside a conditioning tower .

Fatalgram: Conditioning Tower fatality

Nets designs have improved and airbags are being used to trap falling material - netting recently prevented a serious incident.



Netting

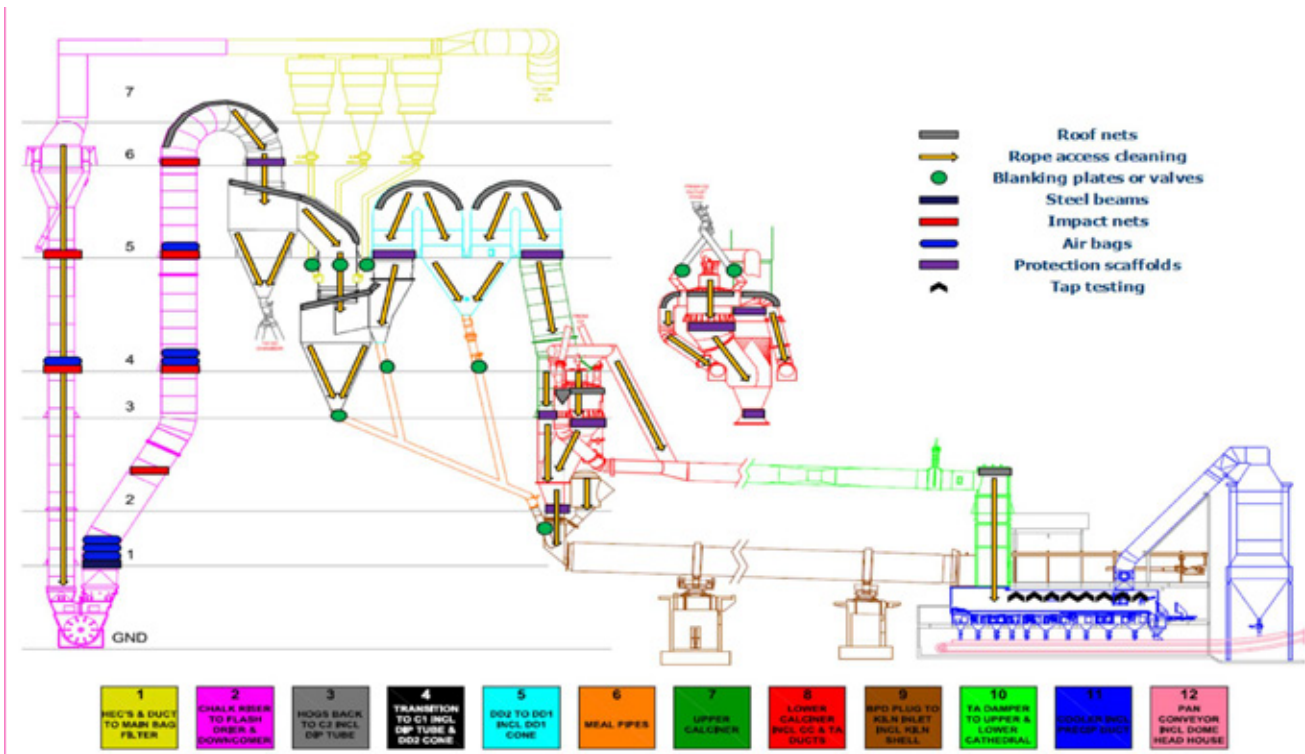


Airbags

Drones are being used on some sites for inspection purposes before entry/access takes place.

Robust clean down processes should be in place with steeplejacks. Netting systems should be put in place for cyclones. There should be a structured way of putting scaffolding in, for example, top down with protection and different levels.

Advice on scaffolding is contained in the [MPA Cement Pre-Heater Tower Guidelines](#).



Netting, Air Bags & Rope Access

Companies should be continually looking for new ways of working that eliminate or reduce risk.

During previous overhauls at Cemex's Rugby Works, risks from initial access/refractory wrecking had been mitigated by safe systems of work (SSOW), detailed rope access cleaning, manual tap testing, netting and air bag solutions. However, further improvements were required.

CEMEX site engineers collaborated with an Irish company to design and manufacture a robotic wrecking arm. The robotic wrecking arm can be installed and remotely operated from outside the cyclone, removing build-up and tap testing before any individual gains access.

Good Practice examples: Rugby

Installation of a remote robot wrecking arm has allowed the refractory wrecking to be carried out more efficiently, saving time and resources.

Additionally, the risks of being struck by falling materials/falls from height/confined space working in a dusty environment/HAVs from the use of Jackhammers/complex scaffolding have been eliminated.

The workforce were directly involved in finding the solution.



4.2 Tools, Equipment and Plant

Recommendations

- All equipment must be fit for purpose and meet current legislation under LOLER, PUWER and be PAT tested, where appropriate. No exception to this should be tolerated.
- Only 'Fit for Purpose' mobile plant should be used. Issues to consider include overheating, ROPS/FOPS, lighting etc. Inspect all vehicles at least every shift. Special attention should be paid to hire vehicles.
- Agree at the tender stage "who supplies what". All equipment used must be fit for purpose and meet LOLER, PUWER and be PAT tested where appropriate, e.g. bricking rigs, monolithic equipment etc.
- Risk assessments should identify lighting needs and adequate equipment must be made available.
- Additional signage should be considered for shutdowns if appropriate.

Angle Grinders: Misuse of angle grinders has caused a number of serious incidents within the minerals industry. Online training is being prepared.

Alert: Angle Grinder Kick Back

4.3 Housekeeping

'A clean plant is a safe plant.'

Recommendations

- Set high health and safety expectations from the start
- Ensure that work areas are in good condition before the contractors arrive
- Ensure house keeping is a focus during inspections and supervision
- Tasks will not be deemed complete until either all scrap & spillage is cleaned up or the area has been isolated and arrangements made to clear the area.
- Materials should be removed as wrecking progresses.
- Facilitate the clean up e.g. by provision of suitably placed waste chutes and use dust suppression.
- Repair or redesign plant/equipment that causes spillage.
- Allocate responsibility for disposal of pallets and packaging (include all groups involved in shut down operations).
- Keep access to the work area clear .
- 'Make it easy to do the right thing', equipment and facilities should always be available to clean up and dispose of waste.

- All wastes generated should be disposed of in the correct environmental storage facility.

4.4 Walkways & Stairs etc

Plan to reduce slips, trips and falls. Check the conditions of shutdown work areas and access routes before the shutdown and undertake remedial work where necessary. Maintain standards through the shutdown for example through inspections and encouraging the reporting of defects/near hits etc and taking prompt action to rectify any defects.

Recommendations

- Check that lighting is suitable and sufficient (but avoid any glare over stair treads)
- Provide emergency lighting, where necessary
- Check the condition of any hi-visibility paint and re-paint if necessary
- Check that walkways/stair treads etc have not been contaminated with liquids/dust etc
- Cleaning methods and equipment must be suitable for the type of surface being treated
- Procedures should be in place for clearing snow/ice/ standing water etc.
- Enforce rules e.g. handrails must be used, (people are more likely to use handrails if they are wearing gloves), footwear must be in good condition, no rushing.

Walkways:

Recommendations

- Walkways should be constructed of nonslip material e.g. grating
- Items must not be stored on walkways even for short periods
- Properly plan pedestrian traffic routes and avoid overcrowding
- Consideration should be given to the position of site services such as power points/compressed air points so that it is not necessary for cables or air hoses to trail across walkways
- Where the use of power tools or hoses is required, efforts should be made to keep walkways clear, such as routing cables over or under walkways.

Stairways/Changes in level:

The Health and Safety Laboratory undertook research into stair falls and identified a number of factors that increased the likelihood of falls occurring. These include stair design, user age, user familiarity (lack of), footwear, conditions, lighting, use of handrails, behaviour and obstacles.

Long straight flights of stairs increase the likelihood of a fall - it's believed users are lulled into a false sense of security and reduced attention, there may also be a greater distance before any fall is arrested. The bottom/top three steps are where falls are more likely to occur - it is thought that users are looking for the way ahead.

Recommendations (for shutdown work areas)

- If stairways are replaced/repared etc make sure they meet the appropriate standard (steepness of stairs/ riser height/ tread width/ consistent dimensions etc all play a role in the likelihood of falls occurring)
- Maintain stairways in good condition.
- Single steps are an increased hazard, avoid or use a colour contrast.
- Check the condition of hand rails and stair treads (in particular look for worn tread noses)
- Consider how materials, tools and equipment etc will be brought to the work area, avoid carrying up stairs if possible (carrying items is commonly linked with falls on stairs – this decreases the chance of recovering from a loss of balance because the hands are not free to grab onto a handrail. The item may be bulky and obstruct the view of the stairway. The carriage of the item may also alter the balance of the stairway user which may lead to a fall. There is also the possibility that the item carried could fall through the handrails).



S Hooks for keeping cables clear of walkways

- Where there is a change in level/slope provide improved lighting and consider using high visibility paint/handrails.

4.5 Reinstating Plant - Commissioning

- Reinststate plant back to "safe to operate" condition
- Ensure process confirmation on safety interlocks

5. Organisation

In particular, aim to: Involve workers and communicate, so that everyone is clear on what is needed and can discuss issues - develop positive attitudes and behaviours

Provide adequate resources, including competent advice where needed

Leadership & Culture

Recommendations

- Leaders should take positive steps to address human factors issues and to encourage safe behaviour. They need to recognise that the prevailing health and safety culture is a major influence in shaping people's safety-related behaviour
- Make the necessary resources available to successfully implement plans. These include human resources and specialised skills, organisational infrastructure, technology and financial resources
- Senior managers have a lead role in ensuring managers/supervisors do not work excessive hours.
- Leaders should be seen onsite/involved in tours.
- There should be a focussed programme of VFL/ safety conversations in place.
- Senior managers should be visible 'on the job' on a daily basis.

Contractors take their lead from the way they are received/inducted by the site, the behaviour and adherence to safety rules by site employees, the conditions of the site (in particular the area where they are expected to work), the facilities they are provided with and the manner in which they are treated.

Competence

Recommendations

- Competency levels agreed and confirmed before shutdown (ensure that those providing top-level scrutiny have sufficient expertise to judge the importance of emerging health and safety issues and integrate those with other business decisions).
- Contractor employee competency and training proof asked for on site by site basis. Ideally with the capability of verifying competence in 'real time' e.g. through QR code and card reader/mobile app.
- Strictly control who comes onto site: Pedestrian entry could be through a turnstile where credentials are checked and vehicle entrance through a locked gate. Areas can be fenced to prevent unauthorised access (compatible with emergency escape routes/access for emergency services etc)

- Longer term, develop the competence of individuals through experience and training, with managers providing coaching and specialist advice, sought as required.
- Results of progress reviews etc should be fed into future training plans - this helps with continuous improvement and avoids complacency

Managers

- Keep any documentation proportionate to the complexity of the risks concerned. Keep it to the minimum needed for effectiveness and efficiency
- Agree realistic timescales for implementation of any plans with your workforce

Good Practice examples: Avetta

- **Avetta registered contractors used**
- **Competency levels agreed before contractors allowed on site**
- **Individual competence/certificates/training records etc available in real time**

- Ensure all concerned are clear on their role and responsibilities, and understand the steps they need to take to meet the objectives. Clearly communicate who is responsible, accountable and competent to undertake specific tasks
- Demonstrate your commitment to delivery at all levels within the organisation, using a variety of communication channels to engage your workforce in implementation. This can be through visible behaviour, written material and face-to-face discussions
- Keep people informed of progress and maintain a focus in the key risks and issues. Use review meetings (or make use of existing internal forums) as a basis for helping to make further improvements
- Measure progress of implementation against clear milestones or performance indicators and make necessary adjustments if there is early evidence that requirements are not being met
- Recognise contributions and safe behaviours that help create or reinforce positive attitudes and behaviours
- Do your arrangements give you the assurance that workers and contractors are following workplace precautions and risk controls?
- Make full use of expertise available on safety committees and other forums (where these are in place) to deliver

Worker consultation and involvement

- Involve and consult workers and representatives throughout any implementation, by ensuring you have systems in place that allow workers to raise concerns and make suggestions, eg staff suggestion schemes, online communities, committees etc
- Make sure you consider all feedback, take action or provide a prompt response

Inductions

Recommendations

- Carry out safety inductions for all employees and contractors to ensure all personnel working on the shutdown are aware of the main hazards and are clear on the expectations of them
- Develop the safety inductions specific to the work activities. Ensure that they are strictly carried out.
- Test understanding and ensure that tests are not completed 'too quickly'
- General induction information is increasingly being put online for completion prior to attending the site. Onsite inductions can check understanding and cover specific risks, what's 'going on' on site and emergency arrangements.
- Consider if a daily induction might be appropriate for the task that's being completed that day.
- 'Show Them', consider using short video clips of the site to demonstrate hazards etc e.g. from Go Pros/Drone footage. ('Virtual reality', is increasingly affordable and remains to be explored).
- An additional CDM induction might be necessary
- Hours worked should be picked up at the induction stage, with education provided on fatigue.
- Other inductions (e.g. annual company)/ passports etc should be up to date and if necessary a card carried.
- Inductions should be carried out in the appropriate language AND/OR a competent interpreter/translator provided .
- Emergency plans should be briefed at the induction stage, (e.g. site plans should be issued with contact numbers and procedures etc).

Control and Supervision

Supervision is an extremely important aspect in the safe operation of kiln relining.

Recommendations

- Supervisors, including contractor's supervisors, must be competent and trained—there should be dedicated training prior to the shutdown.
- Supervisors should have knowledge of the jobs being undertaken, the duties being carried out and have proof of this competency.
- Jobs should have 24 hour on site supervision to the above standard. Supervisors should be nominated and their appointment made known.
- The use of any non-English speaking labour should be identified at tender level and the supervision provided should be bi-lingual to the necessary level.
- Consider allocating sub-area responsibility, if this is justified by the size of the repair. For example, the precipitator could be allocated to the appropriate engineer along with responsibility for progress and communication.
- Consider staggered supervision for handovers and continuity. This ensures that the new shift are properly informed of any issues that have arisen in the previous shift. (Take into account appropriate rest periods for supervisors and days off if shutdown occurs over an extended period) .
- Each contractor should have a designated supervisor
- There should be a daily task H&S compliance monitoring program (led by the H&S committee).
- Housekeeping and PPE standards should be defined and monitored.
- The 'worst jobs' are often undertaken by the least skilled. They still however, need to be competent to undertake the task.

Training

- Ensure the competence of individuals is developed through experience and training, managers should provide coaching and specialist advice should be sought as required
- Use the results of progress reviews to feed into future training plans - this helps with continuous improvement and avoids complacency

6. Measuring Performance

Checking that risks are being managed is a vital step. It gives confidence that enough is being done to keep on top of health and safety and may show how things could be done better in the future.

Checking involves setting up an effective monitoring system, backed up with sensible performance measures.

Monitoring needs to add value and should not just be a tick box exercise. Good-quality monitoring will not just identify problems but will help provide understanding as to what caused them and the changes that are necessary to put things right.

Good Practice examples: Compliance monitoring programme

- One site has introduced a daily task health and safety compliance monitoring programme, utilising members of the health and safety committee.
- They identify the criteria/topics for interactions and ask the questions.
- Additionally, Union reps carry out task inspections etc.

Monitoring requires time and effort. So appropriate resources need to be allocated and staff may need to be trained, ahead of time (e.g. in root cause analysis).

Monitoring needs to be timely and will have most impact if it is reported back to key decision makers (unless there's a board-level commitment in advance, that monitoring results can be acted upon, then efforts to collect information could be wasted.)

Active monitoring includes:

- Monitoring the design, development, installation and operation of management arrangements.
- Daily audits of employees and contractors - measure performance against specific criteria, reviewed at the daily shutdown meeting
- Measure performance against specific criteria, reviewed at the daily shutdown meeting.
- Routine inspections of premises, plant and equipment (including housekeeping).
- Near Hits
- Safety Meetings (e.g. participation)
- Overall employee/contractor engagement
- Health surveillance

Good Practice examples: Inspection & Rules

- Daily recorded task inspection program implemented focusing on key mandatory requirements/topics. (performance monitored year - year to identify best and worst performing teams)
- H&S Rules program introduced to drive good behaviours and make people accountable for breaking rules.

- Planned function check regimes for key pieces of plant
- Training is taking place as planned
- Number of Visible Felt Leadership interventions
- Behavioural observation

Reactive methods include:

- investigating accidents and incidents
- monitoring cases of ill health and sickness absence records
- Hazard reports/complaints

Reactive methods should also be used to capture good practice



7. Reviewing Performance/Learning Lessons

Review performance to determine whether the essential health and safety principles - effective leadership and management, competence, worker consultation and involvement - have been embedded in the organisation. This will also identify whether your system is effective in managing risk and protecting people.

Review Performance and Take Action

Recommendations

- Learn from accidents and incidents, ill-health data, near hit reporting, errors and relevant experience, including from other organisations
- Learn from inspections, compliance monitoring, Visible Felt Leadership interventions, safety tours etc.
- Share information internally (Toolbox Talks/face to face feedback at daily shutdown meetings) and externally with others.
- Seek '360°' feedback from Contractors
- Learn the 'good lessons' too, What went right and Why?
- Revisit plans, policy documents/ risk assessments to see if they need updating — develop an action list for the next shutdown highlighting improvements/opportunities for improvement

Organisational learning

Organisational learning is a key aspect of health and safety management. If reporting and follow-up systems are not fit for purpose, for example if a blame culture acts as a disincentive to reporting near misses, then valuable knowledge will be lost.

If the root causes of precursor events are not identified and communicated throughout the organisation, this makes a recurrence more likely.

Barriers within an organisation - where different departments operate in 'silos' - inhibit organisational learning. Take steps to avoid the loss of corporate memory.

Human factors

Leaders and managers need to be aware of the people-related, cultural and organisational issues that may prevent lessons from being learned effectively in their organisations.

Key actions in learning lessons effectively

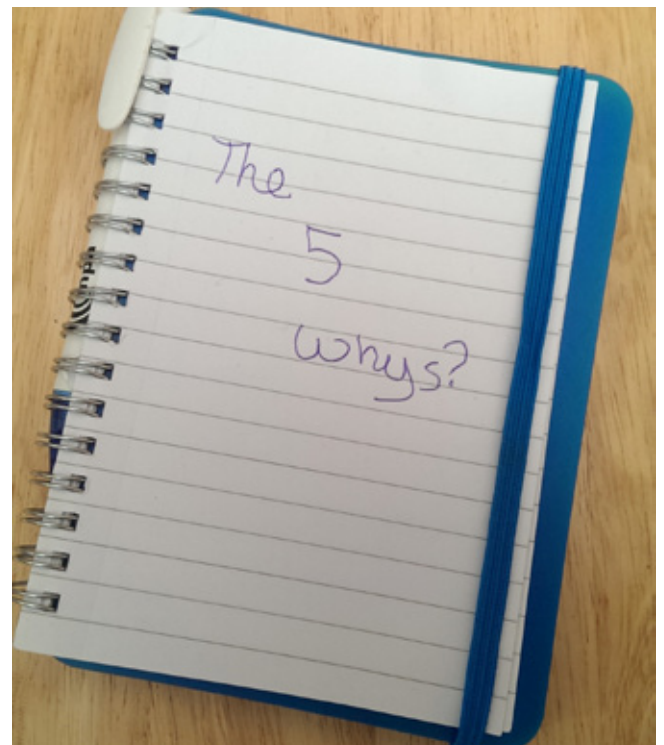
Recommendations

Leaders & Managers

- Should demonstrate that safety is a core value, through their actions
- Promote a questioning attitude. Make sure that they are not only receiving 'filtered good news' - they should welcome feedback and constructive challenge.
- Resolve ineffective procedures that result in 'workarounds' or violations of procedures
- Are clear about the risk profile
- Make sure that workers understand the risks that are being controlled
- Must avoid complacency - take responsibility by keeping their knowledge and capability up to date

Worker consultation and involvement

- Discuss plans with workers or their representatives
- Avoid overburdening workers with initiatives
- Involve workers in organisational change



8. Communication & Engagement

Communications & Engagement

The norm is generally along the lines of

- Pre shutdown contractor meetings, agreeing expectations, requirements, task scopes, task interactions etc.
- All contractor companies on the works will be asked to put forward a supervisor and designated point of contact.
- Daily meetings held for shutdown team and major contractor supervisors to communicate the previous 24 hour safety performance and notify of any tasks which could create a hazard (crane movements etc)
- Regular daily visits throughout the day will be carried out by the project engineer (principal contractor) to discuss site matters etc.
- Tool Box Talks carried out on a regular basis and in response to particular incidents.
- Regular progress meetings with representatives from each contractor companies.
- Review / close out safety actions

- SHE advisor and third party inspections
- Site Foremen Safety Briefing, every Monday and Friday – 6 in total
- Safety Toolbox Talks/Safety Posters/VFL Site Walks/Daily Management Meetings
- Pre shutdown meetings with contractor supervisors
- Daily meeting with key contractors/ Weekly (or more frequent) safety meetings in shutdown with contractor supervisors.
- Pre-shutdown engagement program (altogether - one team) /Daily briefings and updates/Weekly reviews
- People are visual learners. A short video clip or a simple photograph will be remembered far longer than a management powerpoint (typically only 10% of which will be remembered after a week).
- Documentation on health and safety should be functional and concise, with the emphasis on its effectiveness rather than sheer volume of paperwork. (ensure that the focus does not become the process of the system itself rather than actually controlling risks).
- Rewards/Recognition for 'good' behaviour e.g. Friday breakfast, warm soup, high street vouchers etc

At Cemex, supervisors, employees, contractors and contracting companies can all nominate someone who has done a good job

- Incident Free Safety Lunch
- Tarmac card: A corner removed each time a (minor) transgression is witnessed. If four corners have been removed the person is removed from site. This gives an opportunity to realign a persons thinking before disciplinary action is necessary.
- Provide occupational health advice/stations for contractors e.g. testicular/prostate cancer, respiratory health This not only helps 'educate' the contractor, its also assists engagement.



Some ideas

- Take more photos/ video clips/ use Go pros on helmets. Use the clips for future inductions/learning opportunities.
- Good quality safety conversations by Senior Management
- Continue to invite senior management to show presence during the shutdown
- Involve others in safety visits e.g. contractors, the H&S Committee, MPA Peer Review etc.





essential materials
sustainable solutions

Mineral Products Association

38-44 Gillingham Street
London SW1V 1HU

Tel 020 7963 8000
Fax 020 7963 8001
info@mineralproducts.org
www.mineralproducts.org

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