

# Kiln Workshop Guide 1: Maintenance

Published May 2008

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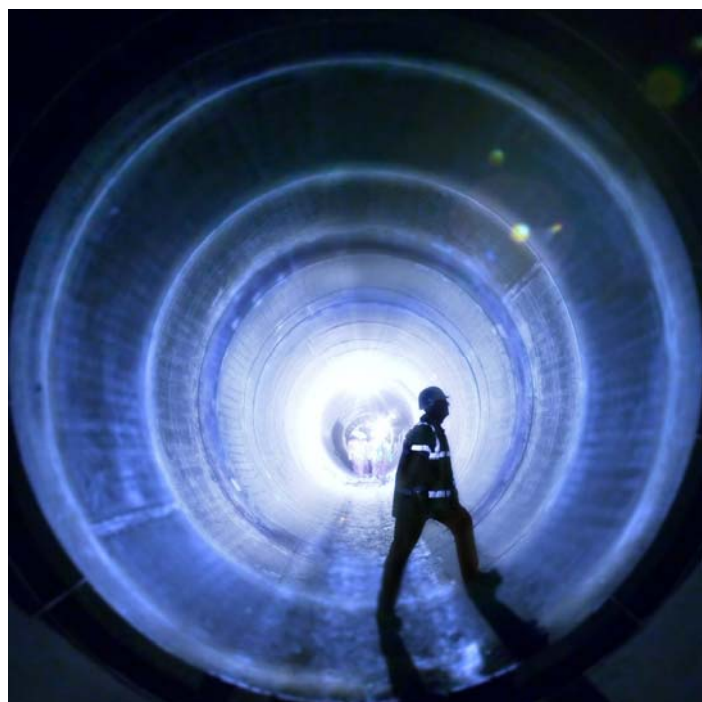
## 1. Background

Workshops were held on “*Planned and unplanned maintenance on kilns and pre-heaters*” and a number of priorities were addressed by experts drawn from the cement, contracting and refractory industries.

Recommendations relating to these priorities have been published in 4 Kiln Workshop Guides. These are Maintenance, Monolithic Linings, Bricking Rigs and PPE.

This document concentrates on a relatively narrow set of health and safety priorities specific to Kiln Maintenance in the United Kingdom. The recommendations made should be considered as part of an 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.



## 2. Control & Supervision

### Co-ordination and Communication

#### Recommendations

- Appoint a Shutdown Manager / Planner who should be the “one man in charge”.
- All supervisory roles / responsibilities should be made known to all. A matrix should be published to this effect and circulated.
- Site safety inductions MUST be carried out before work commences. These should be consistent with the level of work being carried out. The inductions should be available in the necessary language e.g. Polish, French, German, Eastern European AND / OR a competent interpreter/ translator provided. Best Practice would be to use a dedicated room for this, with a maximum limit of 15, Safety Passports should be checked at this stage and there should be no entry to the site without proof of competency. (Any random testing such as alcohol/drugs could be done at this stage).
- Morale – Senior Managers should be visible ‘*on the job*’, at least daily and housekeeping standards must be maintained. ‘*Incentives*’ might be considered that include a small token/gift for exceptional safety practice.
- Contracts should be awarded in good time to allow contractors to plan properly and be involved in the decision making process, as early as possible. (Contractors suggest that contracts should be awarded at least three months before work commences).
- Contractors must be informed of any changes to the job schedule. This applies to changes that occur before the job commences and to any revised “on the job” time estimates.
- Constructive and courteous feedback should be provided to contractors.

### Meetings

#### Recommendations

- A collective pre-shutdown meeting should be held with all contractor “leading hands”. This should be followed up with weekly review meetings to discuss shutdown progress that include all contractor supervisors.
- A daily supervisors meeting should be held to decide the work schedule/critical path etc and this should include appropriate contractor supervisors. The daily update should include safety, progress against plan and photographs. Examples of good safety practice should be included.
- An overall progress chart should be made

#### **Bad Practice examples: Co-ordination and communication;**

- Contractors arrive for work to be told shutdown has been cancelled.
- Contractors were not told they had been awarded the contract ( or haven’t been awarded the contract).
- Contractors were not involved at the planning stage and this caused conflicts between different groups of contractors trying to work in the kiln e.g. scaffolders.

available in an appropriate location. This should be updated following meetings.

- A daily progress update should be published for all involved and this should be pasted on notice boards and contractor cabins.
- A post shut down meeting should be held with contractors to ensure the capture of any useful experience/good practice for use at the next shut down.

## Risk assessments / Method Statements

### 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 must be kept clear during and after the task.

#### **Best Practice examples: Risk assessment;**

- Best Practice has established that remote control wrecking equipment should be used.

## 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; they 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 foreign 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.

#### **Best Practice examples: Supervision.**

- Staggered supervision is the best practice 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) .

## Emergency procedures

### Recommendations

- These should be briefed and understood at the induction stage, for example the chain of communication. Site plans should be issued with contact numbers and procedures etc.
- 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.

## Housekeeping

'A clean plant is a safe plant'.

### Recommendations

- 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 .
- 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.
- An inspection scheme should be in place and a reporting scheme should be in place with the means of closing out actions.
- Keep welfare facilities clean.

#### **Best Practice examples: Housekeeping.**

- Best Practice is to have a policy of no hoses or leads on the ground.

#### **BLI operates best practice.**

Principles -:

- New plant established as a new standard to be maintained.
- Workforce have high housekeeping expectations.
- Cleanliness is management driven.
- Resources have been dedicated to keeping the plant tidy.
- Organisation.
- Dedicated cleaning team.
- Specific budget.
- Bad areas now stand out and workforce have low tolerance of these.
- Site is cleaned up as job progresses.
- Pre, during and Post-job inspections are carried out.
- Disposal planned well
- Commitment 'to put things right'

### **3. Construction (Design and Management) Regulations**

It is very difficult to give precise guidance on this area of legislation as each job is judged on its individual merits. However, 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 principal contractor/ sub contractor / client/ CDM coordinator / designer?

### **4. Contractors**

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.

#### **Competency, Passports and Inductions**

##### **Recommendations**

- At tender level i.e. at the award of contract, the contractor should be required to provide proof of Competency ( legal requirement for CDM sites).
- Identification and proof of competency should be confirmed at the site induction.
- Inductions must be undertaken consistently.

- Passports must be administered fairly and consistently. Passports should be challenged more often.

### **Bad Practice examples: Competency, passports and inductions;**

- Contractors complain that time pressure means “*safety is sometimes forgotten by the cement company*” or safety inductions are not carried out “*we’ll do it later*”.
- Contractors complain that passports are not administered fairly “*a blind eye turned towards foreign labour*”.

### **Working hours**

#### **Recommendations**

- Companies should state acceptable working hour levels to contractors at the tender stage.
- Previous hours worked should be checked on entry to site. Refer the contractor to the Working Time Directive. Spot checks should be carried out on the job as appropriate.

### **Equipment**

#### **Recommendations**

- 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 will identify lighting needs and adequate equipment must be made available.

### **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 shall 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.

### **Issues for contractors**

The following recommendations and opportunities for improvement are offered to contractors.

#### **Recommendations**

- Form policies on alcohol and drugs.

#### **Opportunities for Improvement**

- Adherence to site rules - wear PPE and follow speed limits.
- Keep sufficient back up equipment and resources.
- Maintain technical expertise, particularly on material performance.
- Ensure consistent workforce ability, training and expertise.

## 5. Isolation

### 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.

### Confined space

#### Recommendations

- Always undertake an assessment to determine whether the Confined Spaces Regulations apply. If so implement an appropriate Permit to Work system.

### 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.
- See **Kiln Guide 2 Monolithic Lining: Section 2: Inspection and Clean Down** for recommendations on inspections, removing build ups and protection from falling material.
- 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.

## 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.

## 6. 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 etc. No exception to this should be tolerated.
- Only ‘Fit for Purpose’ mobile plant should be used. The issue of overheating should be considered e.g. Brokk hydraulics, skid steer design e.g. bucket, ROPS/FOPS. Lighting. Inspect all vehicles at least every shift. Special attention should be paid to hire vehicles.
- Additional signage should be considered for shutdowns that is realistic and appropriate.

### **Best Practice examples: Tools equipment and plant;**

- Anti whiplash to be used for all air bagging and gunning hoses.
- Catalytic converters to be used.

## 7. Other

Care needs to be taken when plant is in operation near to where kiln maintenance is taking place (for example, one kiln live, one undergoing repair; where there will be hazards posed by temperature and potential blockages etc).

### Recommendations

- Adequate assessments of the above must be included in the pre - job risk assessment and Job Plan. Issues should be addressed at the tender stage.

#### Disclaimer

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## General

Although there will be considerable time pressure to finish the repair, the focus must be on completing the job safely.

### Recommendations

- All procedures to be followed as if a planned repair was taking place e.g. cool down and warm up, drop ball testing etc.
- Time should be taken to '*plan the unplanned stops*'. As for planned stops; risk assessments, procedures and supervision provisions must be put in place and progress meetings must be held.
- The volume of work to be undertaken must be considered and resources allocated accordingly. Ensure enough competent personnel are present for procedures to be followed. (This may mean some down time and call outs).

## Residual Material

Most unplanned kiln outages are on a “ crash stop” basis.

### Recommendations

- See **Section 5 Isolation—Environment and Kiln Guide 2: Monolithic Linings**. In particular the recommendations on inspections, clean downs and isolation should be followed.
- Be aware of all residual material / conditions and carry out a thorough and extensive assessment before opening and authorisation signed by the Works Manager or Deputy before entering the kiln.

## Coating in the Kiln

### Inspection

#### Recommendations

- Parties to the inspection should include the kiln supervisor and contract company.
- There should be repeat inspections to assess changes over time.

- The inspection and report should be documented.
- Competent persons should be used to carry out risk assessments of the kiln coating.
- Be aware that changes in fuels and different/new circumstances can make the coating behave in a different manner to that anticipated by experience.

### Coating

#### Recommendations

- Coating to be removed from the kiln to affect repairs at all times, for small repairs including up to and beyond the repair area. (Note Lafarge, in a limited number of circumstances where the repair area is small, allow working under the coating if signed off by the Works Manager).
- Consider automated coating removal in all areas; i.e. “hydraulic breaker” in kiln, and riser. This potentially removes/reduces the risk of Hand Arm Vibration, manual handling and struck by falling material injuries.

## Access and Egress

### Recommendations

- Access & Egress in/out of areas – Should be risk assessed as for planned tasks. There should be careful attention to housekeeping.
- Access & Egress to get material to work area – as above.
- Clearing of areas for access – as above. There should be an ongoing assessment and review of work areas, as per company procedures.

## Other

### Recommendations

- Manual handling – consider in context of the access/egress issues above. Undertake risk assessments and follow procedures.



- Lay down area – consider a suitable safe area for materials etc. Consider location of fire points, hydrants etc when choosing this area.
- Use of air operated equipment – as a general rule vibrating and air operated equipment should be fit for purpose and assessed in line with the PUWER regulations.



**Automated wrecking by robot**

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