Kiln Workshop Guide 2: Monolithic Linings

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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 four 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 the wrecking of Monolithic Linings in the United Kingdom. Recommendations made in the other Workshop Guides also applies to the wrecking of linings, for example isolation or PPE selection.

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.

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2. Inspections and Clean Down

Following the plant stop, an initial inspection should be carried out.

Pre-Initial Inspection Clean down

Recommendations

- A pre- inspection clean down of cyclones/ riser ducts/ bars should be undertaken using air lance/ water blasters/CARDOX.

Initial Inspection

Recommendations

- The initial inspection of all areas should be carried out from an external safe point following the cooling down period of the system.
- ONLY COMPETENT EXPERIENCED PERSONEL should used to carry out the inspection – A plant refractory "expert" should be available, 24 hours on site.

Clean down

Recommendations

- Prior to the plant stop, as much build up should be removed as practical, e.g. by manipulating process conditions.
- The clean down should be achieved by
  - ◊ Use of Air lances/ bars/ high pressure water through poke hole doors etc (i.e. remove as much build up as possible using an external method).
  - ◊ Building scaffolding access to clean down areas and undertaking cleaning.

  or
  - ◊ By provision of Boswain's chair access to clean down areas.
- Access to the kiln should be prevented when the pre-heater is being cleaned down.
- The issue of alkali burns must be addressed through risk assessments, safe working procedures and inductions

Best Practice: Access following external clean down

- A Senior Manager (Works Manager or Production Manager) should authorize the first entry into high risk areas e.g. kilns/ cyclones/riser area where there is a potential for a materials fall. This should be preferable done in writing. (see example in appendix 1).
- Consideration should be given to repeating the procedure when conditions change for example temperature, material contraction or unexpected conditions arise.

Re-inspections

Recommendations

- A re-inspection should be carried out after the clean down by a competent person.
- Further re-inspections should be carried out on a frequent basis (at least daily).

– Inspect linings and anchor integrity by
  - ◊ Inspection ports in the roof area steelwork.
  - ◊ Considering the use of Refractory "tell tale" devices.
  - ◊ Visual following access scaffold erection.

- Isolate feed pipes to cyclones.
- Insert plate blades. Best practice is the use of Pneumatic Valves.
- Erection of scaffold access to be undertaken by competent persons.
- Re-inspect regularly and whenever conditions change.

3. Wrecking of Lining

Recommendations

- Wrecking to be carried out by competent person (s).
- Scaffold platform should be suitable for wrecking operations i.e. fit for purpose regarding access to wrecking areas (i.e. no over-reaching) and with an appropriate load bearing specification.
- Wrecked material to be regularly cleared for safe access/egress and to avoid overloading of scaffold structure/integrity.
- Segregation scaffold platforms/mattress
    - ◊ close the edges.
    - ◊ profile boards to edge (Ply) and use of expandable foam and plastic sheets.
- Wrecking of areas
    - ◊ Separate access for services (hoses etc) and people.
    - ◊ Tools and equipment must be in serviceable condition, Hose and whip checks mandatory
    - ◊ Mechanical wrecking where possible
    - ◊ Minimise hand wrecking/use of vibration equipment.
    - ◊ Rotation of people wrecking – minimise exposure.
    - ◊ PPE appropriate to task and use enforced.
    - ◊ Working top down on wrecking process.
    - ◊ Wrecking team to include watcher observing any change in other areas "loose materials".
    - ◊ Isolation of wrecked areas from continuing work to allow different tasks to be carried out independently. No above working without segregation/ protection.
    - ◊ Awareness of hazards created from wrecking process – exposure of old anchors (protruding steel).
- Additional issues
    - ◊ Regular inspections.
    - ◊ Inspection/assessment after every incident (e.g. scaffold).
    - ◊ Anchors are supplied in Hessian sacks but use safe container for carrying e.g. galvanised bucket (issue is sacks often have holes in them as they have been dragged due to their weight. The anchors weigh 2 to 3 lb and poke through the sack, they can also fall out).
    - ◊ Issues raised by jack hammering of monolithics e.g. noise, dust, Hand Arm Vibration and PPE should be covered by the risk assessment and method statement.