Scaffolding inside the Pre-heater

Cyclones & Calciner
Safe Erection & Use of Scaffolding Inside the Cyclones/Calciner

- Antea Cement has contracted “JU-SM SHPKNJP” Company, Tetove – FYROM for the scaffolding activities.

- JU-SM is founded in 2000, for mounting scaffolds, with starting five years experience in Germany and now in Kosovo Albania and FYROM. It has qualified (licensed) and expert personnel.

Using exclusively “Layher Allround Scaffolding” (certified according EN ISO 9001:2008) we have a complete non-bolted system in rapid, safe, highly adaptable scaffolding construction.
Before entering the cyclone:

- Stop the kiln
- Cool down the kiln
- Cool down the pre-heater
- Open pre-heater doors
- Do all the necessary Tag and Lock Outs of the system
- Check the pre-heater from top to bottom for remaining materials
- Clean and remove dust and coating if necessary from the outside
- Check temperature and gases (O₂, CO, CH₄, H₂S and LEL)
- Issue a **Confined Space Permit** according to the work permit system
Preparation of protective platform against falling materials
Preparing the protective platform

➢ To protect workers from falling materials, a protective platform must be prepared above the working platform.
➢ Placing of metal beams inside the cyclone through maintenance holes and fixing them against moving and turning for protective platform support.
Personal Protective Equipment

Personal Protective Equipment (PPE) that must be worn when inside the cyclones:

- Helmet
- Safety shoes
- Safety glasses
- Safety harness
- Long sleeve clothes
- Safety gloves
- Dust mask
- Full body Uniform
Preparing the protective platform

- Before entering inside the cyclone, **the Permit to Work** is issued and safety measures are taken such as 24 volt lighting, temperature control, access, gasses, etc.
- Decking the platform with wooden planks.
- When preparing the protective platform the work is done only by one person and at least two persons stand by outside the entrance.
- After decking, all planks are nailed.
Dimensions of entering access, wooden planks and beams

- Dimensions of entering access; 500mm x 600mm
- Dimensions of wooden planks; 300mm x 50mm x 4000mm
- Dimensions of steel beams; 100mm x 100mm x 10mm thickness
- Steel beam’s length depends on the diameter of the cyclone
Preparing the protective platform

- Before entering, two boards are placed across the beams serving as standing platform for the first step and the safety harness is attached to a long rope tied to a steady point.
- When working inside the cyclones at least two persons are always standing by outside the entrance.
- During preparation of the protective platform, the worker is not protected from falling materials, therefore wearing proper PPEs & cleaning from the outside (with a long stick) are his only defense.
Preparing the base platform for the erection of the scaffold

• It is the same procedure as per the above protective platform.
• In this case, the workers are protected from falling materials.
• Safety harness is attached to the above door.
• The walking platform is double decked.
Scaffold Erection Supports

Supporting base plates are placed on cross double wooden planks along the beams and the base plates are nailed on the boards.
Erecting the scaffold

- Scaffold is equipped with inner vertical safe access (ladder at every level), with diagonal bracings, ledger, transom and platform.
- At the working platform the minimum width is 600mm, side protection (two guardrails) one 0.50m above the working platform, and the other at 1.0m.
- Platforms are placed above the top working level to provide protection against falling materials.
- The scaffold is secured on the cyclone wall against overturning.
Submission of scaffolding to Antea Cement.

After completion of the scaffold as erected by the contractor, the whole working zone is inspected by:

- Health and Safety department
- Production manager and/or head of kiln
- Refractory activities Responsible Person (Contractor)

If the scaffold is fulfilling the safety working conditions then a green tag is placed on it, notifying: “Scaffold is ready for Use”

When a scaffold is not finished, at the entrance a red label notifies: “Scaffold not ready for Use”
Safe use of the scaffolding

- Wooden protection platform
- Protection platform
- Guardrails
- Working platform
- Securing element against overturning
- Access from level to level
Safe use of the scaffolding

- Demolishing damaged section
- Repairing
Demolishing

- Two workers are demolishing from the scaffold, one is inside close to the access entrance and the other outside the entrance
- Demolished materials are taken out at once with plastic buckets, so there is no load left on the scaffold.
Repairing

It is the same procedure as demolishing:

- When bricks have to be replaced, or when concreting takes place done by a gunite machine, one worker stays inside and two or more outside the access entrance.

- If the maintenance work inside the cyclones lasts more than one day then every day before entering, the scaffold & platforms are checked and cleaned up from any dust or material that might have fallen in.
Dismantling the scaffolding

- Starting with the removal of the scaffold
- Following with removal of the base platform
- Then the protection platform is taken out and
- Finally the beams are withdrawn & the holes are closed.

- When dismantling the scaffold two workers are inside and two outside.

- When dismantling the platform one worker is inside and two outside. The last two wooden planks are left in for the worker to get out.

- During erection, use & dismantling of the scaffold, the workers have their safety harness put on & attached to an appropriate fixed point.
GOOD PRACTICES
GOOD PRACTICES

• USE OF CHECK LIST

• WORK INSTRUCTION

4.1. SCAFFOLDING ERECTION

4.1.1. Erect scaffolds according to applicable standards and designs.

4.1.2. Maintenance Engineers supervise each scaffold that is erected, altered, relocated or dismantled. They also determine the feasibility and safety of providing fall protection for workers who erect or dismantle scaffolding.

4.1.3. Only experienced and trained employees should perform the scaffold erection etc.

4.1.4. Do not mix scaffold components from different manufacturers unless the components fit together (modified) without force and the structural integrity is maintained.

4.1.5. Erect scaffolds on sound, rigid footing capable of carrying the maximum intended load. Do not load scaffolds and scaffold components in excess of their maximum intended load or rated capacity, whichever is less.

4.1.6. Install standard railings and toe boards on all open sides and ends of platforms more than 3 meters in height except on needle beam scaffolds and falsework.

4.1.7. Install standard railings and toe boards on all open sides and ends of platforms on scaffolds 1 - 3 meters high, having a minimum...
What are those scaffolds?

**Structural assembly from the beginning:** By sliding the wedge head over the rosette and inserting the wedge into one of the holes...

...the component is immediately secured against any possibility of shifting or dropping out. That means: safe 1-man-assembly, whatever the height.

A blow with a hammer on the wedge transforms the connection from structural assembly to force transmitting rigidity.

The flat rosette without recesses or raised edges prevents clogging with concrete, sprayed foam, dirt etc. that might otherwise hamper assembly.

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Layher®

More Possibilities. The Scaffolding System.
C₅-Cyclone
• Dimension
  - Diameter (cylinder 8500 mm and cone small diameter 4700 mm)
  - High of the cyclone C5 (cylinder, cone and chute) 19000 mm.
• Weight
  - Metal construction: 60264 kg.
  - Bricks: 75000 kg.
  - Castable: 53000 kg.
  - Anchors: 1200 kg
  - Insulation: 19000 kg.
Total weight: 208,464 kg.

C₅-Cyclone Vortex (dip tube)
• Dimension and weight
  - Diameter: 5065 mm.
  - High: 2410 mm.
  - Weight: 7617 kg.
PRE-HEATER

Calciner

• Dimension
  - Diameter of the calciner: 6000mm.
  - High of the calciner: 34000mm.

• Weight
  - Metal construction: 55680 kg.
  - Bricks: 111000kg.
  - Castable: 63000kg.
  - Anchors: 1300kg
  - Insulation: 15000kg.

Total: 245980 kg.