



EXEMPLARY SAFETY PROGRAMME FOR MAINTENANCE AT HERACLES VOLOS PLANT

(Commended case in the European Good-Practice Awards - a European Campaign on Safe Maintenance, 2010/2011)

1. Case metadata

▪ **Country/ies of origin:**

Greece

▪ **Year of publication by agency:**

2010

▪ **Sector:**

23.51 - Manufacture of cement

▪ **Keywords:**

Case studies (24401C); Good practice (24361C); Maintenance (21401C); Construction safety (18241E), Training materials (10961C), Safety policies and procedures (20201D), Safety systems (20321D), Safety programs (20241D)

2. Organisations involved

HERACLES General Cement Company, member of LAFARGE group

3. Description of the case

3.1. Introduction

Heracles General Cement Company, a member of Lafarge Group, is the largest cement production company in Greece. It operates three cement plants, in Volos, Halkis and Milaki, with a total production capacity of 9.6 million tons of cement per year. The company declares that Health and Safety is a core value and priority for every operation. The Health and Safety Policy of Heracles aims to reach zero safety incidents and to join the “best in class” industrial companies. With systematic and persistent efforts, every year since 2006, Heracles has targeted an injury frequency rate reduction. The employee lost time injury frequency rate, defined as the number of lost time injury per million hours worked, was 1.03 for the year 2009, compared to 1.89 in 2008, which means an improvement of 45.5%. The severity rate is low, of 0.09.

Due to the nature and size of cement production process, maintenance is contributing strongly to the overall performance of a plant (financial, quality, safety, environment etc). Besides daily maintenance activities (inspections, emergencies, preventive works), the production stops in each plant at least once a year, so that scheduled extensive maintenance work can be performed, mainly in the kiln area, in order to ensure reliable operation of the line for the following year. This is known as kiln shut-down for maintenance reasons or major overhaul. This is a very critical operation of the plant, with increased demands in terms of safety, as a lot of people (both employees and contractors) are involved in many tasks of different nature (production, mechanical, electrical) within the limitations of time and budget. For example, in the 39 days of the Shutdown for Maintenance works at the Rotary Kiln 1, there were approximately 100 employees and 160 contractors involved - all working simultaneously at maintenance works at the area of Kiln1.



3.2. Aims

The aim was to organize all the works during the shut-down for maintenance reasons or major overhaul in an exemplary way in terms of safety. For this purpose, a structured integrated approach to maintenance was applied, based on three main pillars.

- Mobilization and delegation of safety duties to line management and commitment of all maintenance workers to safety.
- Implementation of standards and good practice for each maintenance task
- Constant follow up, check of implementation and corrective actions.

3.3. What was done, and how?

Volos Plant launched an “Exemplary Safety Program for Maintenance Works in the Rotary Kiln 1”, which is a pilot program for all maintenance works made during the annual shutdown.

The first pillar of the programme had two aspects:

- mobilization and delegation of safety duties to line management and
- commitment of all maintenance workers to safety..

“Safety teams” responsible for 13 key safety issues were appointed. Each team had two issue owners, who were part of the line management but not working in the health and safety department. In this way responsibility and care for safety issues were cascaded progressively to more and more people who were thus actively engaged in safety.

The key safety issues selected reflect main safety priorities. They were the following:

- general organization of safe maintenance,
- personal protective equipment,
- electrical energy isolation,
- work at height,
- mobile equipment,
- safety discussions (“Pairno Thessi”);
- Health and Safety inspections,
- housekeeping,
- safety plans – risk assessment,
- near-misses reporting,
- contractors’ assessment,
- start-up,
- awards and sanctioning policy.

During the preparation period, the 26 safety team leaders cascaded procedures and rules related to their safety issue of responsibility:

- they specified the basic rules of their topic, as well as the follow-up process;
- they prepared training material to train the targeted workforce;
- they explained the key points and expectations related to each safety issue to the key staff, through a presentation and handouts;
- all employees and contractors were then briefed - they received a *booklet with the handouts* (see figure 1) for the 13 safety issues and pledged their commitment to the project by

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committing to observing all the rules and safety procedures during their work: in this way the principles were cascaded to all the people involved in the maintenance works.



Figure 1 - Booklet

The second pillar is the implementation of standards and good practice for each maintenance task. Based on it, issue owners established efficient and innovative procedures and systems for each task during the shutdown, in order to ensure safe work behaviours. The most important procedures and systems established for key safety issues are:

3.3.1 General organization of safe maintenance

- Plant Management Team had the overall responsibility for the program.
- A safety expectation letter was distributed to the key staff from each supervisor to their respective subordinates describing clearly the responsibilities and expectations for each person. A weekly follow up meeting was held to check the progress with regard to these targets.
- A weekly two-hour Health and Safety Steering Committee meeting for follow-up and necessary corrective actions.
- Safety Mobilization Log: common electronic file to register all scheduled actions, pending issues, responsible persons, dates etc.
- Assessment at the end of the General Shutdown.

3.3.2 Personal protective equipment (PPE)

- Use of mandatory PPE and sanction policy for employees and contractors.
- Briefings and targeted inspections on use of PPE.

3.3.3 Electrical energy isolation

- *A new checklist for electrical energy isolation:* a common and systematic approach to eliminate the risk of incidents that may arise from the unexpected activation, start-up or release of electrical energy when performing tasks was compiled and then used during inspections to check that all steps of the procedure are followed.

3.3.4 Work at height (WAH)

- Basic rules for use of scaffolding during maintenance works were compiled and communicated.
- Work at Height procedures were checked through a simplified checklist.

3.3.5 Mobile equipment

- New procedure for mobile equipment: A safety pass was required for any contractor vehicle entering the plant. Each contractor filled in a form describing the task they would carry out, the period during which the vehicle would be operating inside the plant, while

submitting the necessary certificates (Such as copies of driving license, operator license etc). The safety pass is issued after validation by the Human Resources department. This safety pass is then placed on a visible place inside the vehicle.

- Parking plan for vehicles and trucks in the area of the shutdown. It was communicated to all people involved at the gate and respective signs were prepared.
- Mobile equipment control and checks were made by the team using a special checklist.

3.3.6 Safety discussions among employees – PAIRNO THESSI

- The program “Παίρω Θέση” (I get involved - Pairno Thessi) comprises a very useful tool to improve safety behaviours. It consists of **one to one safety discussions**, through which unsafe behaviours can be identified as well as good practice during work and thus enhance employee involvement and interest in safety, encouraging safe behaviours and eliminating unsafe choices.
- This way, continuous improvement can be achieved employees can be mobilized towards safe work while exposure to hazards decreases significantly.
- During the General Shutdown for Maintenance, all employees were involved in these safety discussions focusing on different aspects of safety and engaging in safety issues. To encourage safety discussions:
 - The best one each week was highlighted and communicated;
 - At the end of the General Shutdown the most qualitative one was awarded.

3.3.7 Health and safety inspections (HSI)

- A structured Health and Safety Inspection System focusing on workplaces and tasks of the shutdown was established.
- Correction of findings which can be immediately fixed.
- Health and Safety Inspections schedule monitoring and follow up of the corrective actions.

3.3.8 Housekeeping

- Implementation of new ideas for housekeeping coming from people involved, such as:
 - Bags for waste disposal next to each crew.
 - Isolation of the work area with rope and hook instead of riband which can be easily torn.
 - Timely use of cranes to lift material and take down scrap from the preheater tower.
- Daily checks for housekeeping.
- Temporary stoppage of works whenever and wherever tidiness was required.
- Works were commissioned and contractors were paid only on the condition that the respective place was clean and tidy.

3.3.9 Safety plans - risk assessment

- Safety plans for the five main General Shutdown tasks (Rotary Kiln 1 shell replacement, ESP fan replacement, Kiln 1 refractory replacement, Cooler refractory replacement, Preheater refractory replacement) and risk assessment for seventeen major tasks of the shutdown. Each of these were filled in by the contractor before the beginning of the works and then submitted and approved by the company.
- Familiarization of the contractors with the prerequisites set by the company with regard to use of certified equipment and regular inspection of tools.
- Active involvement and mobilization of supervisors in risk assessment.

3.4.0 Near misses reporting

- Stoppage of all works for two hours in order to present and discuss with employees and contractors the near misses that had been reported.

3.4.1 CONTRACTORS' ASSESSMENT

- Assessment of the seven main contractors involved in the General Shutdown.
- Contractors were briefed in advance of the maintenance works on safety issues as well as housekeeping.
- Inspection in the workplace to fill in the checklist for contractors assessment.

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- Weekly meeting with contractor representative to discuss the necessary corrective actions.

3.4.2 START-UP

- A useful tool with all necessary checks and grouping of equipment was established
- Controls of the operation of equipment were carried out by the control room until the day of start-up.

3.4.3 AWARDS & SANCTIONING POLICY

- Specific rules for reward and sanction policy before the beginning of the General Shutdown for Maintenance. All positive and negative remarks were registered.
- Individual and group awards to employees and contractors for implementation of good practices and exemplary behaviour in terms of safety upon completion of the Shutdown for Maintenance.
- Sanctions during the General Shutdown for Maintenance in case of violation of rules that had been established and communicated in advance.

The third pillar consists in constant follow up, check of implementation and corrective actions.

This means that during the maintenance works, the teams checked that the safety rules were followed, facilitating their implementation, monitoring any problems and taking immediate action when necessary. The teams:

- participated in the maintenance activities with their normal duties;
- were responsible for demonstrating leadership in their area of responsibility;
- monitored the safety performance and implementation of maintenance work,
- proposed corrective actions in case of violations and facilitated the implementation of the safety rules;
- collected and processed data related to their topic of responsibility, having feedback meetings and reporting to the Kiln 1 Shutdown Safety Steering Committee on a weekly basis.

Upon completion of the maintenance works the teams:

- prepared the final report per topic, assessing the performance and gathering important findings and using the data gathered;
- prepared suitable action plans per topic for future use.

Best teams of employees and contractors were rewarded for their performance by the top management.

3.4. What was achieved?

3.4.1 Absolute priority to safety

The safety policy of the company 'Priority to safety over all other parameters (time, cost)' was confirmed and required for all works involving employees and contractors:

- At all stages of the maintenance adequate preparation and risk assessment were carried out.
- Many works were interrupted to ensure implementation of safety standards, demonstrating that safety is the first priority.
- Sanctioning and rewards (groups and individuals) enhanced the message "safety first": there were made 24 positive oral notifications, 10 negative oral notifications, 13 days off for 13 contractors' employees and 1 fine to contractor; there were granted 5 rewards for best performers in terms of safety (to both contractors and company employees),
- It was implemented a systematic Contractors' Assessment in terms of safety: seven contractors were assessed.



3.4.2 Engagement and commitment:

An integrated approach was established, promoting the active involvement and collaboration between management and employees as well as contractors, while enhancing safety leadership from top management.

The commitment of the 26 safety team leaders was very high, demonstrating high accountability and leadership in their safety topics. All the groups involved showed enthusiasm and were focused and highly mobilized. There was high visibility on a daily basis of the line managers and safety groups in the area of the maintenance works and their care for safety issues was evident.

The safety expectations letter and the weekly meetings had very good results. The feedback was very positive, engaging people, contributing to safety awareness as well to team building.

Staff involvement in health and safety issues has increased.

3.4.3 Excellence in safety:

Risks were reduced for all employees and contractors involved in the maintenance works. Safe behaviours were established, as well as the safest way for performing each task.

A system for safe work has been put in place and standardized.

The safety performance improved in all aspects with measurable results. During the 39 days of the General Shutdown there were noted the following outcomes:

- Incidents: 0 Lost Time Incidents, 0 Medical Incidents, 1 First Aid Incident.
- Use of Personal Protective Equipment: 39 reports (positive, regarding use of all the necessary special Personal Protective Equipment and negative for other).
- Safe work at height: 74 findings and immediate corrective actions.
- Electrical Energy Isolation: 39 jobs checked.
- Mobile Equipment: 50 vehicles inspected.
- Safety Discussions: 268 performed (98% of target).
- Health and safety Inspections: 18 Inspections performed (100% of target), 97 findings and respective corrective actions (98% implemented).
- Housekeeping: 100% implementation of findings.
- Safety Plans and Risk Assessment: 5 Safety Plans and 17 risk assessments performed (100% of target).
- Near Misses reporting: 13 Near Misses and 37 Unsafe Conditions were reported. Understanding of the importance of reporting near misses and unsafe conditions as a way to identify and reduce risks. Very positive feedback from the interruption of works to communicate Near Misses to all employees and contractors.
- Smooth start up and preheating without any stoppage leading to starting of production according to the schedule with safety

3.4.4 Sustainable benefits

The program leads to a permanent benefit to safety efficiency and improvement, as it establishes a best practice for all maintenance works carried out.

Findings from the final report per topic (prepared by the teams) gave insight to progress as well as to areas of improvement per topic. The company thus gained the necessary information for the compilation of a suitable action plan; specific proposals were made and corrective actions in all safety issues are already in progress.

The exemplary mobilization during this pilot program was considered by the staff involved as a useful experience for the future: tools for all future maintenance works are developed.

This good practice has been extended to all activities in the plant of Volos and is shared with other sites of Heracles General Cement Company.

It has been developed a safety culture in all people involved in maintenance works, raising the awareness in safety issues.



3.5. Success factors

The main success factors in achieving the exemplary maintenance program in terms of safety have been:

- strong involvement of all line managers in safety; accountability development and responsibility of line management over safety;
- strong collaboration between management, employees and contractors
- mobilization of all staff and contractors with regards to safety issues and commitment to safety procedures;
- establishment of clear safety procedures and innovative tools;
- rules and procedures shared in advance with all staff involved;
- confirmation of the absolute priority attributed to safety in practice.

3.6. Further information

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3.7. Transferability

This good practice can be applied in other sectors and other countries very well, allowing the adaptation to different situations and organizational structures as long as there strong collaboration between management, employees and contractors, as well as mobilization and active involvement of all company's staff and contractors personnel.

4. References, resources:

Information provided by the organisation in the framework of the Good Practice Award Competition 2010/2011