CASE STUDIES

SAFETY IN THE RESTORATION WORKS OF THE CONVENT OF CHRIST IN TOMAR (PORTUGAL)

1. Case metadata

- ***Country/ies of origin:***

Portugal

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- ***Sector:***

41.20	Construction of residential and non-residential buildings
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- ***Keywords:***

09161B	Education, OSH Information, OSH Training
11641E	Job analysis and design
18241	Construction safety
19081D	Hazard identification
21401C	Maintenance
24361C	Good practice
24401C	Case studies
39921	Manual handling
47441D	Construction accidents
57001D	Temporary workplaces
57721C	Construction sites
58681C	Places of worship
60961E	Chemical cleaning
61041E	Disinfecting
61081E	Dry cleaning

2. Organisations involved

- IGESPAR, Institute for the Management of the Architectural and Archaeological Heritage (Instituto de Gestão do Património Arquitectónico e Arqueológico), owner and party responsible for the works and the control of the budget.
- 44 Engenharia e Coordinação de Segurança Lda., construction safety coordination.
- Nova Conservação, contractor in charge of the restoration of vaults of the Convent of the Order of Christ (Convento de Cristo).

- In Situ Conservação, contractor in charge of the restoration of the front of the manueline (Portuguese late Gothic) nave.

3. Description of the case

3.1. Introduction

The Institute for the Management of the Architectural and Archaeological Heritage (IGESPAR) is a public body within the Ministry of Culture with responsibilities for the architectural and archaeological heritage in Portugal. In 2010 this Institute carried out restoration and maintenance works in the 12th-century Convent of Christ ('Convento de Cristo') in Tomar (Portugal). This monument is a monastic fortress added to the UNESCO World Heritage List in 1983.

3.2. Aims

The challenge was how to manage safety and health under specific conditions during maintenance tasks at the Convent of Christ in Tomar. These tasks were carried out by two companies simultaneously, implementing procedures both to preserve the historical elements and to create good conditions for the restoration workers, visitors and employees at the convent [picture 1].

Each company carried out a different task: one in the vaults of the cloister of the hostelry [picture 2], which lasted 120 days, and the other one on the façade of the manueline nave [picture 3] covered in a fine rib vault with abundant motifs, which lasted 90 days. These tasks involved the analysis of conservation, cleaning and treatment of the stone elements as well as fixing or replacement of items.

Picture 1. The red rectangles show the areas on the building where conservation work was carried out

Picture 2. The vaults of the cloister of the hostelry, before and after the installation of platforms

Picture 3. Scaffold during and after installation on the manueline façade

These tasks had to be done while keeping the building open for visitors and with on-going normal operation, so it was impossible to use supporting equipment or machinery on the site. This caused additional complexity and constraints during the works. A further challenge was an increased risk of falls from height in the areas where work was to be done.

Difficulties in accessing the work areas made it impossible to use equipment and machines to transport and lift the materials required for conservation, and restoration as well as for support systems and collective protection (scaffolding, panels, metal sheets and materials, etc). Therefore materials were transported manually and with pulleys. The manual process involved carrying the materials to the workplace, passing them from worker to worker or using wheelbarrows [picture 4 and 5]. Frequent breaks were introduced into the process to prevent risks arising from manual handling.

Picture 4. Offloading scaffolding outside the monument

Picture 5. Difficulties in accessing the work areas meant materials had to be moved by hand

Picture 6. The restored vaults and façade

3.3. What was achieved?

Considering the characteristics of the project, deadlines and the number of workers, the companies involved were not obliged to submit a Health and Safety Plan or give prior notification of the works (under Portuguese Decree-Law 273/2003, of 29 October). Nevertheless they drew up safety and health procedures that were validated by the safety coordinator and approved by the owner of the company. Then, the safety coordinator held a meeting with the companies to clarify issues relating to materials supply, scheduling, signposting, etc. Finally, during the works, the safety coordinator implemented a control and inspection system of safety conditions taking into account procedures and legal requirements. The safety plan took into consideration the unusual work situations and possibility of unforeseen circumstances, creating a pro-active system based on good communications with all the workers.

A systematic plan to train and inform workers was established in accordance with the needs of different groups. Two teams were set up: one in charge of carrying equipment and assembling temporary structures such as scaffolding or collective protection systems, and one involved in conservation and restoration tasks. This proved effective in increasing safety, productivity and quality, as well as reducing costs and deadlines.

A safety and health management system was put into place. This system was based on five rules:

1. Planning before starting works. A systematic safety and health management system was put in place on this construction site. It was adapted to the characteristics and specific conditions of the work environment. It took account of health and safety

regulations, detailed descriptions of work processes and related preventive measures. Descriptions of the work processes (work equipments, procedures, qualifications and responsibilities) were drawn up, interactions between different tasks were mapped, and a risk assessment was carried out before any maintenance work was started. Safe work procedures were established and details of any necessary protective equipment were given. It was verified that workers performing maintenance tasks were competent in their professional areas of responsibility. Workers were also involved in this planning.

2. Creation of a safe environment. The relevant workplaces had to be subject to the planning outlined above and not be accessible to visitors or other people. They had to be clean with good access and working conditions. Special emphasis was given to improving the coordination of the different works. In order to give clear indications of risky areas a comprehensive system of improved signposting was installed. Wherever possible, modern scaffolding techniques were used to prevent risks of falls from height.
3. Use of suitable equipment. Workers received safety and health training and were informed about the hazards related to specific jobs and about safe working procedures.
4. Work only commenced after planning. If unforeseen circumstances arose, work was stopped until the right procedure was defined.
5. Final checks. Check if the task is ended and the site is in a safe condition.

There were no accidents during the project and the work was completed to a high standard [picture 6]. The productivity of the companies involved rose considerably and costs were reduced. All works were finished in time and according to the requirements of the contract.

3.4. Success factors

The workers were adequately informed and trained about the risks and they were provided with the necessary tools and equipment. Using a holistic approach all parties working at the construction site were involved in the planning in order to make best use of the health and safety experience of all.

It was necessary that:

- Workers were aware of the importance of the safety and health aspects of the work and the companies were aware of their legal responsibilities.
- There was good collaboration between management and workers and effective and continuous communication.

3.5. Further information

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3.6. Transferability

The implementation of a safety and health management system can be transferred to any company that needs to manage complex maintenance services, particularly when these services are carried out by contractors.

4. References, resources

N/A