

European Week for Safety and Health at Work

2004

BUILDING IN SAFETY

PREVENTION OF RISKS IN CONSTRUCTION - IN PRACTICE



European Agency
for Safety and Health
at Work

Building in Safety
Prevention of risks in construction - in practice



A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (<http://europa.eu.int>).

Cataloguing data can be found at the end of this publication.

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1.



BUILDING IN SAFETY - PREVENTION OF RISKS IN CONSTRUCTION - IN PRACTICE

INTRODUCTION

Background

Throughout the EU there is a growing recognition that standards of occupational safety and health in construction have to be improved. Each year, in the original EU-15 Member States alone, about 1300 workers are killed, another 800,000 injured and countless more suffer ill health¹. The human suffering caused by accidents and ill health is distressing to all concerned, the extent of which is impossible to calculate.

Accidents and ill health also have a huge financial cost, which makes for a compelling business case for improving safety and health. The financial losses are considerable.

Although significant progress has been made in improving the industry's occupational safety and health standards over the years, the number of deaths, injuries and cases of ill health are still unacceptably high.

The causes of accidents and ill health in the industry are well known. Workers in construction are twice as likely as the average worker in other sectors to suffer from a non-fatal accident. Falling from heights, such as scaffolding, is one of the biggest problems, along with accidents involving transport, both on and off site. Dermatitis, occupational deafness, and asbestosis are among many occupational diseases that continue to cause long term suffering for many workers in the industry.

No one should need convincing that the management of safety, health and welfare in the industry should have the highest priority. Everyone, the clients who procure construction work, the architects and engineers involved in planning, as well as the construction companies and workers can all take action to improve the standards of health and safety.

Across Member States a common set of European directives aimed at preventing health and safety risks in the workplace apply. For construction work these directives not only require employers to ensure that employees are not harmed by work, but additionally, risks should be prevented by establishing a chain of responsibility linking all the parties involved. This means taking account of health and safety at the project design and planning stages, as well as during the construction phase. Therefore, legal obligations apply to persons and organisations throughout the duration of a construction project, from conception, through the construction phase and continuing with maintenance.

Annex 1 provides details of other Agency publications where further information can be found on construction work.

Sharing good practice

An important role of the Agency is to make information available to support and promote the prevention of risks in construction work. This includes stimulating the sharing of information to solve common problems.

¹ Eurostat, ESAW 1999

This publication and the Agency's website aim to show that risks in construction work can be solved in many ways. They provide real examples of how companies and organisations have made interventions and sought to reduce risks.

Each construction project is different. Therefore work practices and solutions to problems must be matched to the particular situation by carrying out an assessment of the risks for the actual construction project concerned (see Box 1). Nevertheless risks in construction work are rarely unique and solutions can be transferred across various sectors and sizes of enterprises, and Member States.

BOX 1

Risk assessment

Before good practice information is applied, an assessment of the risks present in the workplace should be carried out and reference made to relevant national legislation.

Designing out risk etc.

Good practice starts during the design phase of a project. Designers play a key role in ensuring good standards of safety and health are achieved. Good practice does not prevent designers from using their creativity, or limit their design freedom. What designers can do is to eliminate hazards where it is feasible to do so. This may be by specifying less hazardous materials (e.g. non fragile materials for roofs), or locating facilities, such as plant rooms, in areas where they can be accessed safely. Risks can be reduced if they cannot be eliminated, such as reducing the frequency of replacement or cleaning of materials at height by specifying designs that take into account maintenance requirements.

Designers can provide information on significant residual risks. This can assist the risk assessment process that is required for the construction phase, or during maintenance or demolition. A designer can therefore be an important member of the construction project team in ensuring adequate information is available to enable adequate risk assessments to be carried out.

Construction Phase

Risk assessment is a continual process, and this is especially so for a construction project. A risk assessment is a careful examination of what could cause harm to people, so that you can decide whether you have taken enough precautions or need to do more to prevent harm. The aim is to make sure that no one gets hurt or becomes ill. By eliminating a task it may be possible to eliminate a risk (for example, by using a crane to eliminate manual handling). If the work method is changed care must be taken to ensure that no other risks are caused by the changes. As the

project progresses the risk assessment should be continually reviewed to ensure it takes into account risks that may not previously have been present. Adequate planning and monitoring is therefore important. If a risk assessment is not carried out before implementing good practice information, there is a danger not only that risks may not be controlled but also that there may be a waste of resources.

The practical examples

The 12 examples of good practice on prevention of risks in construction work presented here are all award winners or commended entries in a European competition, run as part of the European Week for Safety and Health at Work 2004. The aim of this Agency initiative is to support the dissemination of good practice information about risks during construction work and promote the application of 'practical solutions' on construction projects in Member States and across Europe.

The examples come from 12 EU Member States and provide solutions to a range of different problems in the construction industry. Some examples aim to tackle risks at source through specific technical solutions, or implementing organisational measures such as monitoring and involving employees. Others provide tools to improve standards of occupational safety and health in construction.

The cases should inspire everybody involved with construction, in any capacity, about what could be achieved on their construction projects. They are not intended to be definitive or to provide detailed technical guidance. What they can do is provide guidance on systems, product development, and managing occupational safety and health, both at project level and within an enterprise. Many included the involvement of employees and their representatives to identify problems and develop solutions; this is crucial to success, as workers have firsthand experience of the work situation.

A table in Annex 2 lists the country of origin of the example, its title, whether it won an award (if not, it received a commendation from the judging panel) and the issue targeted.

What the judges were looking for:

In selecting the examples the judging panel looked for solutions that showed:

- tackling risks at source;
- real improvements;
- sustainability over time;
- good consultation between management and the workforce;
- compliance with relevant legal requirements, preferably going beyond minimum requirements; and
- possibility of transfer to other workplaces, preferably including those in other Member States and to SMEs.

Acknowledgements

The Agency would like to thank its network of focal points in Member States (competent authorities, or bodies nominated by them, responsible for occupational health and safety) for assessing and nominating good practice examples for the Agency award scheme. The competition would not have been possible without their assistance. The Agency also thanks the experts who made up the judging panel for their input. Last but not least, many thanks to the organisations who are featured in this publication for their initiative!

European Agency for Safety and Health at Work

November 2004



2.



BUILDING IN SAFETY - PREVENTION OF RISKS IN CONSTRUCTION - IN PRACTICE

PRACTICAL SOLUTIONS

2.1

A SAFETY COMPETITION IN THE CONSTRUCTION INDUSTRY USING EFFECTIVE MONITORING SYSTEMS



Going safely into the 21st century' competition

Rakennusteollisuus RT Uudenmaan piiri,
Unioninkatu 14,
00130 Helsinki,
Finland.

Tel: (358-9)12 991

Issue

Promoting the use of effective safety monitoring systems on construction sites.



'The ever changing construction site'

Problem

Monitoring safety on site is difficult. To be effective, monitoring systems have to be simple to use, take into account the need to involve workers and the changing situations on site as the project develops. Systems also should enable senior management to be kept informed, when they are absent from the site. Even when such systems are available there is often a reluctance to make use of them.

Although efficient safety management practices have been successfully implemented in many other industries, the construction sector in Finland has been less

successful in adopting them. One aspect of poor safety management has been the absence of tools for reliably monitoring occupational safety. Monitoring safety on construction sites is a particular challenge compared with permanent workplaces, as the sites and conditions change constantly.

The use of accidents as a safety indicator for a single construction site is in most cases impossible because of the lack of reliable data.

- A construction site typically lasts for only 1 year, and there are on average only about 20 workers on each site.
- Statistics indicate that only two accidents on average occur per site.
- Because of random variation, many sites have no accidents and it is not possible to say whether they are safer than other sites with four or five accidents.

Another problem with simply listing shortcomings, such as accidents, is that it may not motivate people to improve their performance. A better tool for monitoring safety would be a safety indicator, reliable and sensitive enough to indicate both the improvement and the deterioration of the safety performance. A system was needed that systematically observes site conditions, can measure safety performance, take into account the changing situations as the site develops, and provides motivation to improve performance. It also had to be simple enough for routine use by the site personnel.

Once an efficient tool had been developed to monitor occupational safety, there remained the issue of informing the industry and providing incentives for construction companies to use it.

Solution

Monitoring system

In 1992 and 1993, the Occupational Safety and Health Inspectorate of Uusimaa, in cooperation with the Finnish Institute of Occupational Health, developed a method for evaluating the occupational safety level on construction sites, the 'TR method'. It is used to measure the main risk factors of the working environment as well as the safety of the employees' working methods, with observed items scored either as 'correct' or 'not correct'. The measurement produces a risk level index, which is the percentage of the 'correct' items of all the observed items. The index may vary from 0 to 100%. By carrying out measurements on a periodic basis, performance can be measured over time. The TR method also gives indices on measured items:

- working habits;
- scaffolding;
- gangways and ladders;
- machines and equipment;
- protection against falling;
- lighting and electricity;
- order and tidiness.

The 'MVR method' was later developed for the civil engineering sector. The inspectors from the Occupational Safety and Health Inspectorate of Uusimaa supported these measurement methods when they carried out inspections of construction sites.

Important features of these methods are that they are simple, and the process is carried out with both employer and employee acting together, thereby ensuring effective cooperation.



'Correct'



'Not correct'

Promoting the use of the 'TR' and 'MVR' monitoring methods

In 1996, the Uusimaa District of the Confederation of Finnish Construction Industries suggested organising a safety competition to improve safety in the construction sector. The Occupational Safety and Health Inspectorate of Uusimaa then proposed the use of the 'TR' and 'MVR' methods as measurement tools in the competition. It was first launched in early 1997 as a three-year competition with the title 'Going safely into the 21st century'. The safety levels on the sites of the participating companies were assessed every year using the 'TR' and 'MVR' methods. Accident frequencies were also recorded for comparative purposes. An annually changing section was also introduced to allow modifications to be made in following years, if a need is identified.

The competition was relaunched at the beginning of 2001 as the 'Going safely in the 21st century' competition. This was the initiative of the Board of the Uusimaa District of the Confederation of Finnish Construction Industries. The Board, representing the senior management of the companies, found the competition's previous achievements very significant.

The annually changing section includes current themes in need of further development, such as preventing the risk of falling, scaffolding safety, lifting safety, the instruction of employees, controlling dust and dangerous substances in construction work and, in 2004, risk management at multicontractor sites.

All the major member companies of the Uusimaa District of the Confederation of Finnish Construction Industries, some of which are international construction firms, take part in the competition. With a share of almost three-

quarters of all construction work in the region, the participating companies set an example in occupational safety to the entire sector. In 2004, the participants were comprised of 20 building construction firms and 6 civil engineering firms.

Inspectors from the Occupational Safety and Health Inspectorate of Uusimaa assess 130 to 150 construction sites in the competition every year. The competition has promoted the use of safety indices in all companies. Most companies have introduced the indices at both company-level and site-level reporting. Companies now use the safety indices in setting targets and measuring results. It has therefore become an integral part of their safety management system.

The results of the competition are known to all, so every firm has the opportunity to see and to compare results between firms. Competition and comparable data give the companies a strong incentive to development. They can also exploit this potential in their management of occupational safety and health within their own companies.

Results

Safety on construction sites has drastically improved. After launching the competition, the safety level (as measured by 'TR' and 'MVR' methods) has risen significantly, from 65% to 82% in the participating companies. Previously, the safety level exceeded 75% at only one site in four. Now only one site in four among the participating companies has a safety level of less than 75%, with all the other sites exceeding this level. In 2003, the occupational safety level was assessed at 138 building construction sites. Among these, 25 sites exceeded the 90% level. This is very high by Finnish standards. In addition, there have been significant improvements in the various measured items. When 2003 is compared to 1993–1996 these improvements were:

- Protection from falling 40% fewer deficiencies
- Site order 50% fewer deficiencies
- Electricity and lighting 60% fewer deficiencies
- Use of protective equipment and risk-taking 46% fewer deficiencies

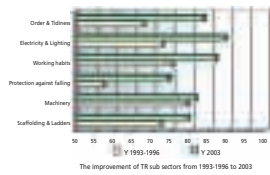
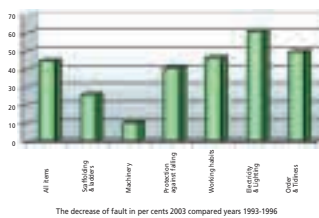
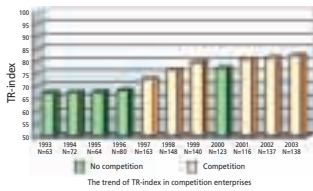
Good safety practices at the competing sites have also influenced companies outside the competition. The safety level in these companies has reached 77%.

In the past 4 years, accident frequency has fallen by 20% in the competing companies. According to a scientific study on the 'TR' method, it is estimated that, because of the competition, the competing companies have as many as 500 fewer accidents every year.



'Promotional poster for the 2004 competition'

Safety management procedures have been enhanced in various companies. The need for change, as shown by the safety indices, has resulted in the development of management techniques for subcontracting. The competition is important because it brings together the occupational safety and health authority and all the diverse partners in the construction sector, to actively promote good standards of occupational safety and health.



Comments

This is an excellent promotional campaign making effective use of an occupational safety and health monitoring system specifically designed for construction. The involvement of the workers, and its use by management to measure and compare performance is a particular good point. However, prevention of ill health in construction is also an important aspect of occupational safety and health management, which should be a priority alongside monitoring safety.

2.2

CONTROLLING THE EXPOSURE OF WORKERS TO RESPIRABLE DUST AND CRYSTALLINE SILICA FROM ROAD MILLING MACHINES

Nederlandse Frees Maatschappij BV (Freesmij)

Communicatieweg 10
3641 SE Mijdrecht
The Netherlands

Tel: (31-297) 28 26 22



Issue

Using machinery design changes to control the exposure of workers, carrying out road maintenance work, to hazardous substances.

Problem

Road maintenance often involves the removal of the road surface to enable repairs to be made. The dust generated by the road milling machines used to carry out this work is harmful to health and difficult to control.



'Road Milling'

Asphalt milling is a process for removing asphalt from a road surface by cutting down to specific depths with a milling machine. It is used to carry out repairs and to remove a road surface. The surface can be quickly removed to prepare for a new asphalt course to be laid on top. Various people are present during these activities, including the milling machine operator and other road workers who work near the machine.

The milling process produces quantities of respirable dust and crystalline silica (quartz) and Polycyclic Aromatic Hydrocarbons (PAH). Exposure to dust in general can lead to respiratory problems. The main health hazard from exposure to respirable crystalline silica is the lung disease silicosis. In addition,

long-term exposures to high levels of respirable crystalline silica can lead to an increased risk of developing cancer. Dust exposure measurements revealed that the legal limit, the Maximum Accepted Concentration (MAC), was being exceeded. The carcinogenic properties of PAHs also pose a threat to the health of road workers.



'Workers exposed to hazardous substances'

Solution

Freesmij's activities to reduce the health hazards of the milling work date back to 1994, when they began a detailed investigation on what could be done. The project involved close cooperation between the enterprise, employees and experts. Various options for reducing exposure were explored. The work was carried out in collaboration with various research institutes and Stichting Arbouw (a national health and safety foundation for the construction sector which has employer and employee representation).

Modifications were made to the milling machine, which involved mounting two high-pressure spray units in the drum chamber, supplied by a high-pressure water pump, and its use was tested. Following the tests, further changes were made to the two spray units, and the machine was retested and exposure measurements taken. The results were discussed with the machine's manufacturer, Wirtgen. The measurements showed that the use of water reduced the amount of respirable dust but had no significant effect on exposure to respirable crystalline silica. They

then tried adding a surfactant (surface tension reducer) to the water. The idea was to see if the respirable crystalline silica would bind with the water and then act in the same way as the respirable dust, but the tests with the surfactant did not produce the desired result.

At the same time difficulties were found in comparing the various test results, as different methods had been used. So during this period Stichting Arbouw also developed a standard measurement method.

Next, they decided to try an extraction system. They engaged a company with considerable experience of dust extraction in the mining industry, Bingham, to assist in designing a dust extraction system for the milling machines, and this too was tested.

Having tested the various options, they decided to organise a brainstorming meeting attended by experts from the national research institute TNO and Stichting Arbouw. They considered a range of possible methods, including spraying with water, the use of foam in the drum chamber, and filtering. None of these processes were seen as workable for the milling process, which is short in duration but requires the application of considerable physical force. They

concluded that the best option would be an extraction system, which was the solution that Freesmij was already working on, although not everyone was convinced that even this could work.

They then went back to the manufacturer of the road milling machines to get a prototype extraction unit designed for the machines. The national research institute, TNO was also involved in this initial design phase. The prototype exhaust unit was then fitted to the milling machine and it was both tested in the laboratory tested and onsite, with the involvement of Stichting Arbouw.

In the testing method the machine first milled some asphalt, during which the milled material 'clogged up' holes of various sizes. Air was blown into the milling chamber through the side in order to measure outflow velocities and compare them with the amount of air blown in and calculate the amount of air per second required to achieve negative pressure in the milling chamber.

The system then went through further modification stages, with testing following each stage. Finally, in 2001 they had a version of the system that, when tested, was capable of meeting the dust exposure standards for respirable dust and crystalline silica.

The final version involved making the milling chamber air tight and extracting the air from the chamber. It operates like a vacuum cleaner. Respirable crystalline silica cannot be emitted from the chamber because a fan maintains negative pressure in the chamber. The fan moves the extracted air containing the respirable dust and crystalline silica through a hose on the long conveyor belt.

All the front loader milling machines were fitted with the final dust extraction system, including some machines that already met the legal limits for respirable dust and crystalline silica.

Results

The development process was long and complicated, but the end result was successful. Both exposure of the machine operators and other workers in the area to respirable dust and crystalline silica has been greatly reduced by use of the extraction unit on the road milling machines. The current Maximum Accepted Concentration for respirable crystalline silica is 0.075 mg/m^3 . Using the unmodified machines, exposure measurements were between 0.02 and 0.29 mg/m^3 . This has been reduced to between 0.0019 and 0.017 mg/m^3 for the machines fitted with the exhaust system.



'Machine fitted with extraction unit'

Freemij are continuing to investigate how to make further improvements to the dust extraction process. They have had a road milling machine filter system developed, which filters the extracted respirable dust and crystalline silica in order to keep them out of the operator's breathing zone even in a head-on wind. This new development is being tested.

Comments

After the first option of elimination, the control of hazardous substances at source should always be considered as a priority, with the use of personal protective equipment the last resort, if the risk cannot be controlled by any other means. The project demonstrates what can be achieved if the user, employees, machine manufacturers and experts in occupational safety and health work together, with a commitment to finding a solution.

2.3

IMPROVING SAFETY FOR WORK AT HEIGHT BY USING READY ASSEMBLED SCAFFOLDING

Doka Schalungstechnik GmbH

Reichsstraße 23
3300 Amstetten
Austria

Tel: (43-7472)605 25 08

www.doka.com/doka/en_global/index.php



Issue

Improving safety when erecting and dismantling scaffolding.

Problem

Scaffolding is often used to create a safe working platform when working at a height. Scaffold components are fitted by hand. Workers stand on the edges and do not have any guard rails, to prevent falling. It is even more dangerous when laying and fixing the supports (planks). These tasks are repeated when the scaffolding is dismantled. There is therefore a considerable risk of workers falling from a height during this work.

Additionally, when erected the scaffold frequently does not comply with regulations. The planks or boards used are often damaged,



Scaffolding in use

too long or too short, and badly secured. Particularly critical are suspended and corner sections because problems can occur leading to inadequate support for the scaffolding. The scaffolding could collapse, or fail in some other way leading to death or serious injury for the workers using it.

Solution

Discussions were held with construction firms to identify ways to improve this situation. The result of these discussions was that if an easy-to-use, ready assembled, scaffolding system with corresponding anchorage parts and fittings was developed there would be considerable benefits. The solution should provide a safe working platform during masonry and roofing works. It should be suitable for use with prefabricated cavity walls, able to bridge openings easily and consist of as few parts as possible. In this way the number of workers at risk during the erecting and dismantling of the scaffolding would be reduced, and because it is ready assembled there would be less risk of it being unsafe, because of poor quality planks and other materials being used.

A ready assembled scaffolding system was developed:

- which consists of only two parts;
- with integrated guardrails consisting of steel grating with a foot guard;
- in sections, that a crane lifts into position;
- with extensive fittings for corner sections;
- which can be used as roof edge protection, including for work on sloping roofs;
- with a high permissible load of 300kg/m²;
- which can be easily dismantled by crane.

The scaffolding is secured to the masonry by brackets. These brackets are either 'hung' over the top of the wall (see diagram 1), or are fitted securely into existing masonry. The scaffolding is assembled on the ground and then each section is lifted onto the brackets by a crane. To dismantle the scaffolding a crane is used to lift the sections off the brackets.

In this way workers are provided with a safe working platform for work at height, or with an effective edge protection for roof work.

Results

The risk of serious accidents due to falls from heights, near-accidents and critical situations in particular are decisively reduced.

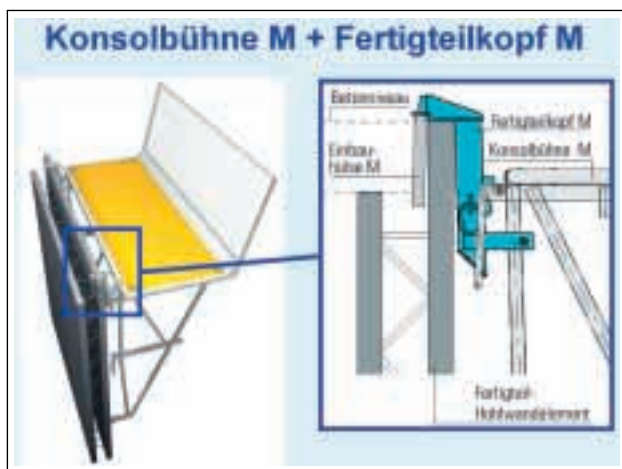


Diagram 1

Comments

As the scaffold is ready assembled, much of the work is done at ground level. This reduces the risk of falling from a height, compared to the erection of traditional scaffolding. However, workers still have to work at height when the fixings for the scaffold are fixed into the wall and the necessary precautions will need to be taken to prevent falls, such as the use of mobile access equipment, or as a last resort, personal protective equipment (fall arrest equipment). The fixings or ties that are secured into the wall to hold the scaffolding should be able to withstand any forces liable to pull them out and cause the scaffolding to collapse.

There are also other methods of providing a safe place of work when working at a height, such as using mobile access equipment and mast climbers. Whenever scaffolding, or any other equipment, is used, it must comply with Member State legislation and also be erected and dismantled safely, in accordance with relevant legislation.

2.4

REDUCING RISK DURING THE DEMOLITION OF ALUMINIUM ELECTROLYSIS TANKS



The REMAL Sp. z o.o. Repair Company

ul. Hutnicza 1 PL
62 510 Konin
Poland
Tel: (48-63)247 47 37

www.remal.pl

Issue

Improving the health and safety of workers carrying out the demolition of aluminium electrolysis tanks by mechanical means.



Old method using power hammer

Problem

Aluminium electrolysis tanks present numerous risks to the safety and health of workers engaged in demolishing them. The aluminium plant in Konin, Poland has a number of aluminium electrolysis tanks that required demolishing. Workers demolishing the bottom part of the tanks are exposed to health risks associated with the insulating lining of 13 cathode carbon blocks that contain steel bars. The existing work method involved using power hammers, which loosens the steel bars enabling them to be pulled out using a crane.

The method of work involved the use of a power hammer, with reliance on personal protective equipment.

The risks included exposure to: polycyclic aromatic hydrocarbons (PAHs), especially benzopyrene; ammonia; dust; noise; vibrations; and hot temperatures.

Many workers are exposed to multiple risks.



Old method - exposure to hazardous substances

Solution

The workers, represented by their foreman, and the manager developed a way of reducing these risks by changing the method of work, and reducing the exposure time.

The solution was the development of a hydraulic puller consisting of a frame with two supports and a moving upper beam with 2 x 100 tonne hydraulic cylinders providing the power to remove the bars. To facilitate the positioning of the puller, a stand has been designed that also enables the machine to be transported using a forklift truck. The puller is moved and positioned in a tank using an overhead crane.

Work carried out using the hydraulic pulling machine

The hydraulic pulling machine has significantly reduced the number of tasks involved in demolishing the tank bases. When the machine pulls the bars out, a large portion of the lining is crushed. All that remains to be done by the workers is to cut the ends of the bars and attach the puller rope. After three or four bars are pulled out, the remaining ones are even easier to remove, since the lining has been broken up to a very deep level. Consequently, bar removal can be done by a single worker, the machine operator, in a quarter of the time required to that when using the old work method. The reduction of the tasks associated with the tank lining crushing has led to a reduction in exposure to noise and vibrations, as well as other hazards, and a reduction in the physical effort required. Consequently, the risks to health are much lower, as illustrated by the noise, ammonia and dust concentration diagrams (diagram 1).



New method - less exposure to hazardous substances



Work carried out using the hydraulic pulling machine

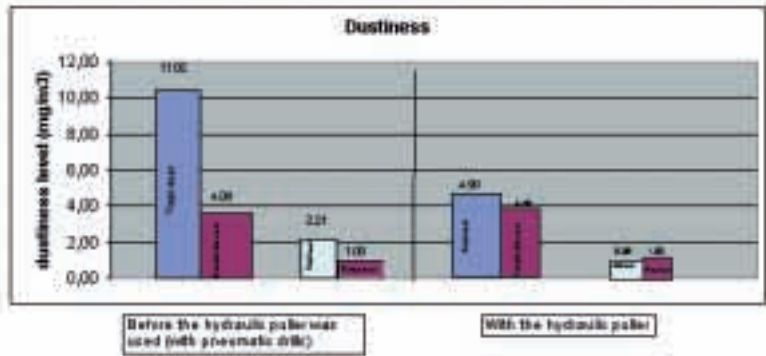


Diagram 1

Results

The implementation of the steel bar hydraulic puller allows a significant reduction of occupational risks, and decreases the possibility of occupational diseases. The improved ergonomics of this solution is another benefit, reducing the risk of musculoskeletal injury. The machine is y one person, who carries out a simple attachment procedure, and then uses the hydraulic pump controllers. This requires much less physical effort and ensures a greater physical distance between the worker and the hazardous area, since the pump assembly is positioned much further from that area using an appropriate length of hydraulic pipes. The dedicated stand that facilitates the positioning and transport of the puller also reduces any need for manual handling.

The solution makes the work safer, and more comfortable as the ergonomics have improved. There may be potential health benefits too. With some tooling adjustments, this method and machine can be used for various demolition and dismantling tasks in the construction industry where bars, beams and other elements bound to a base need to be removed.

Comments

Demolition, wherever possible, should always be carried out by mechanical means, with all persons removed from the demolition area to a safe area. This method demonstrates that even in specialist situations equipment can be developed that can considerably improve standards of health and safety.

2.5

WORK AT HEIGHT - FALL PROTECTION DURING ROOF WORK A PARTNERSHIP APPROACH BETWEEN CLIENT AND CONTRACTOR

Interbrew UK Ltd

Samlesbury Brewery
Cuerdale Lane
Samlesbury
Preston PR5 0XD
United Kingdom

Tel: (44-1772) 87 23 72

Felton Construction Ltd

Station House
24/26 Grove Street
New Ferry
Wirral
CH62 5AZ
United Kingdom

Tel: (44-151) 644 68 44



Issue

How a client and contractor working together can benefit both partners, and ensure work is carried out with good standards of health and safety.

Problem

Over a period of 30 years the asbestos cement roof of the brewery-packaging hall and warehouse owned by Interbrew UK Ltd, a brewing company, had deteriorated to the point where replacement was necessary.

The project required the complete replacement of 20,000m² of asbestos cement roof (see aerial photograph). Enabling work included the removal and replacement of internal suspended ceilings and existing electrical and mechanical equipment (e.g. air conditioning, lighting etc), structural steel alterations and the installation of fall protection/debris netting. All this work

had to be carried out while the warehouse and packaging lines remained fully staffed and in full production (24 hours a day, seven days a week). The project timescale was 18 months.



Aerial view of the work area

The project posed a number of significant construction-related safety and consumer-related safety issues:

- falls from heights of over 15 metres during internal and external high-level work.;
- falling objects onto employees and production lines below;
- control of employee exposure to asbestos;
- maintenance of product quality standards whilst packaging beer during the overhead construction work.

A solution was required that would allow the construction and consumer risks to be properly controlled without affecting production.

Solution

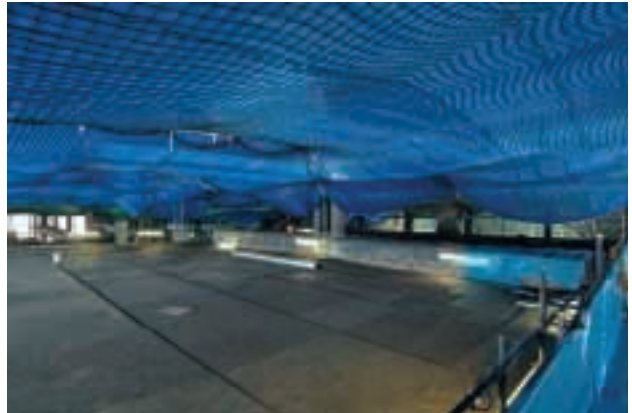
Tendering process and design stages

The contract was put out to tender and potential principal contractors were required to present their preferred solutions to the clients, Project Engineers and Safety Manager. Selection of the Principal contractor (Felton Construction Ltd) was based on the most cost-effective solution to control the health, safety and food quality risks.

Basis of safety - Use of platforms and fall protection/debris netting

The proposed solution to the health and safety risks was to provide fully decked, moveable platforms over all 'live' production areas, for use by all trades involved in the project. The platforms were rail-mounted on an extensive scaffolding system that was designed and erected around existing plant and machinery (see photograph). The platform provided a safe place of work for the high-level works including:

- removal and replacement of the suspended ceiling;
- removal and replacement of high-level mechanical and electrical services (e.g. ventilation, lighting etc);
- structural steel alterations (e.g. fitting of additional purlins);
- installation of the fall protection and debris netting for the main roof work.



Fully decked working platform

Because there was evidence of asbestos cement contamination above the suspended ceiling the platform was enclosed with plastic sheeting, thereby providing a controlled environment for the removal of the ceiling. Adequate control of asbestos was demonstrated through a regime of air monitoring. Once the suspended ceiling was removed steel work alterations were then completed followed by the installation of the fall protection and debris netting (see photograph).

After these operations were completed, the platform was then moved to its next position in the factory, to repeat the sequence again. All platform moves are fully co-ordinated with the client's production teams working below. On completion of the ceiling strip out and netting installation, the main replacement of the asbestos cement roof was started. The platform was then used as a secondary crash deck for the roofing operatives and any objects that may fall through the debris netting. On completion of the asbestos cement roof replacement the platform was then used as a safe place of work for the reinstatement of the services and a new suspended ceiling.

Safe access to the roof was provided via a designed access and materials loading scaffold (see photograph). To minimise manual



Protected production area

handling and facilitate the movement of materials to and from the point of work, a roof trolley system was designed and installed (see photograph). A safe system of work (SSOW) ensured that old roof sheets were replaced immediately with non-fragile roof sheets. This allowed the new roof sheets to be used as a safe working platform and leading edge for the removal and replacement of the next section of roof. The SSOW combined with the use of fall protection netting and the positioning of the moveable platform underneath the roof work significantly reduced the risk of injury from falls and facilitated rapid rescue should somebody fall into the netting.



Materials loading scaffold & roof trolley system



Laying of new roof sheets

The incorporation of non-fragile roof sheets, roof lights and fixed handrails into the design also reduced the risk of falls for any future maintenance and repair work on the roof.

Client – Principal contractor - Employee liaison

A project implementation group was established to ensure that all parties co-ordinated their activities to minimise risk and to ensure that employees were fully involved. The group consisted of representatives from:

- client project engineers
- principal contractor and their sub-contractors
- employee safety representatives
- managers from the warehouse and packaging departments

The group initially met weekly and then every two weeks once the work was established. This was supported by a published 'project communication strategy' which provided employees and their safety representatives with a transparent and simple route for communicating any health and safety concerns during the project.

This allowed problems (e.g. scaffolding infringing on access and egress routes) to be resolved quickly.

Results

To date there have been no lost time accidents of either client or contractor employees. There have been no incidents of persons falling into the netting during the roof work or of falling debris during the project lifetime. The use of the platform has enabled the internal enabling works to be carried out more efficiently as well as providing an extensive safe working platform and crash deck.

There have been no quality issues with the beer production as a result of contamination from the construction work. The solution allowed production to be maintained over the duration of the project. The packaging hall contains 2 bottling, 1 canning and 1 keging line. The incorporation of non-fragile roof sheets, roof lights and fixed handrails into the design has reduced the risk of falls for future maintenance and repair work thereby reducing the costs of these activities.

Comments

This example shows that when client works with a contractor significant benefits can be achieved. Not only can a project be carried out with good standards of health and safety, but the client also gets good value.

2.6

MANAGING THE HEALTH AND SAFETY OF SUBCONTRACTORS



UAB CONSTRUCTUS

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Issue

How to implement an effective health and safety plan, and in particular, use the tender stage of a contract to secure health and safety competence and good practice of contractors.

Problem

UAB Constructus is a construction project management company. They were engaged on a project to construct the new municipal centre for the city of Vilnius. This was a major project, which included the construction of a 20-storey building, two additional buildings of three and five storeys, and an underground car park. They therefore needed to plan and manage health safety from the beginning of the project to minimise the occurrence of risks during the construction phase. A major responsibility of the principal contractor of any construction project is to put in place a health and safety plan. This plan should cover: arrangements for selecting subcontractors to ensure that they are competent in health and safety; the establishment of site rules; and procedures to secure cooperation between contractors on health and safety matters.



The new municipal centre, Vilnius



Under construction

Solution

During the planning stage, experts from UAB Constructus worked with the architects to prepare the technical design for the project, so they were able to ensure that health and safety was considered during the design phase of the project.

UAB Constructus was responsible for selecting competent subcontractors, and this included ensuring that they had competence in health and safety. The first stage in this process is to set out the health and safety conditions that the contractor must meet, identifying the procedures associated with the job and ensuring that they are included in the contractor's specification. The process should cover checking the company's experience, policy, procedures, working arrangements, training and competence and supervision arrangements for health and safety. Working methods, equipment to be used and risk assessments for the actual work should be provided and discussed with the principal contractor before contracts are finalised. UAB Constructus established health and safety requirements that subcontractors had to address as part of the tendering process. The bids could then be assessed against these requirements. Contractors also had to prepare their own health and safety work plan and procedures.

Health and safety arrangements and procedures for contractors were prepared in advance and included in the contracts, as were penalty clauses for health and safety infringements. The site safety rules and procedures together with instructions for the subcontractor's staff were included as an annex to the contracts, in the form of an 'information folder'. Subcontractors were also provided with lists of chemical substance that were either not to be used on the project or their use was restricted.

In the information folder UAB Constructus included details of work hours, general information on the organisation of work (periodicity of meetings with subcontractors, provision of time schedule, handover of works, etc.) and the main contact telephone numbers in case of accidents, fire, etc. It also included safety requirements concerning work clothes, collective and personal means of safety, warning signs and posters, work places, fencing, scaffolding, main safety rules, etc.

Within their safety plans, principal contractors must establish arrangements for ensuring health and safety, including arrangements for: directing and coordinating subcontractors; ensuring that subcontractors and their staff receive information; meetings to discuss health and safety with subcontractors; checking that those on site have received relevant training; and monitoring.

The arrangements covering subcontractors established by UAB Constructus included:

- inclusion of health and safety in all the coordination activities between UAB Constructus and the subcontractors, for example in the work schedules supplied by subcontractors;
- common arrangements to control the storage and use of materials;

- arrangements for ensuring who was on site, and that only authorised personnel could enter the site;
- arrangements for the entry of visitors, including permissions, their accompaniment by a member of UAB Constructus staff and provision of personal protective equipment;
- daily health and safety discussions between contractors and the construction site manager;
- a weekly production meeting between UAB Constructus staff and representatives from each subcontractor;
- arrangements for reporting accidents and near misses, and arrangements for investigating them;
- arrangements for the provision, maintenance and safe use of equipment by subcontractors;
- arrangements for checking the safety performance of contractors on a regular basis. Any problems spotted during the inspections are raised at the weekly meetings with the contractors;
- standardised forms for making inspections and checks.



On site discussion

Results

The project was carried out in a well-planned, structured way with significant benefits for the management of occupational safety and health.

Comments

Planning is crucial in achieving good standards of safety and health. Projects will also benefit from the increased likelihood that they will be completed on time, and within budget and quality requirements. However, when putting plans into operation it is important to ensure that they do not simply result in a set of rules for workers to follow, but involve the workers in a cooperative process.

2.7

PROMOTION OF HEALTH AND SAFETY IN CONSTRUCTION BY A PARTNERSHIP PROCESS

DR - DR BYEN

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Issue

Coordinating health and safety management during a major construction project based on a partnership between the client and contractors.



Problem

Model of the new DR multimedia house 'DR BYEN'

Danmarks Radio (DR) is constructing a new multimedia house 'DR BYEN'. This is a major construction project consisting of four separate buildings to be built simultaneously on the same site. The project is expected to take approximately three million hours, and about 400 civil engineers and architects and 900 workers will contribute to the building.



Model of 'DR BYEN'

DR was concerned about the potential health and safety problems that could occur during this project. Often problems arise during construction projects because of the low priority given to health and safety. DR recognised that if insufficient attention was given to risk prevention the following could occur:

- an increased risk of accidents due to the complexity of the project and lack of attention given to risk management;
- specified technical equipment and required personal protective equipment might not be used;
- use of hazardous substances that could have been substituted by other safer substances;
- unsatisfactory training and development of workers and managers;
- inadequate welfare facilities for staff on site and a lack of coordination of workplace transport, increasing the risk of transport accidents.

Solution

The cooperative process

In order to ensure effective management of risks, DR's project organisation is based on a partnership process between client, consultants and contractors. In addition to time, finance and quality objectives there is also a focus on worker satisfaction as well as health and safety on site.



Site entrance

The partnership process supports safety work because DR has chosen to let the contractors participate in the design process. This gives contractors an opportunity to suggest alternatives that could have a positive impact on health and safety matters during the construction of DR BYEN.

Policies and targets

DR has prepared an overall working environment policy. Specific health and safety policies for risk areas have been prepared based on an initial mapping and prioritisation of working environment issues.

Targets have been set in key performance areas, such as training, attendance at safety meetings and monitoring of safe working practices. Particular attention is paid to 'near miss incidents', because these can highlight problem areas. Achievement of the targets are management responsibilities, and they are used for on-going monitoring of performance, so that corrective action can be taken if necessary.

DR's safety organisation

The project has a health and safety team, comprising of:

- Safety manger Responsible for planning, implementation of health and safety activities and coordination of health and safety.
- Safety coordinator Responsible for implementation and evaluation of facilities on the project and coordination of health and safety between the different parties.
- Quality and Responsible for planning, implementation and environment manager evaluation of quality and environmental activities, and ensuring partnership process is working effectively.
- Site coordinator Responsible for coordination and evaluation of site activities, e.g. site transport issues.



The health and safety management team reports directly to the project director, who has overall responsibility. Health and safety is given the same priority as finance, quality and environmental issues. The team act independently on site and have the necessary decision-making authority.

An 'ambassador' was also appointed, whose primary role is to maintain contact with workers on site. The 'ambassador' gets informal feedback on areas that are working well or need improvement.

The team has to establish, implement and maintain the concept of the working environment management system in DR BYEN by:

- monitoring the design to incorporate health and safety measures at this stage, so that risks are eliminated wherever possible and reduced where they cannot be eliminated;
- taking the responsibility for carrying out health and safety training;
- planning and coordinating health and safety work, for each separate building and between all four buildings;
- the establishment and maintenance of communication channels and shared facilities (canteen, washrooms, refuse and waste handling etc.).

Training

No member of staff may have access to the construction site without attending the compulsory safety course established by DR. The course takes two hours and includes a presentation of policies, objectives and targets and 13 safety instructions (risk areas). Staff must pass a written examination. The purpose of the course is to focus on health and safety issues. The aim is to ensure that everyone is aware of the importance and significance of their contribution as individual workers to high health and safety standards on site.

DR also carries out a number of other safety training courses, leading to competence in first aid, safe systems of work, use of fall arrest equipment, risk assessment, etc.

Promoting healthy and safe working

The promotion of a healthy and safe working environment is initiated during the design process by e.g.:

- choosing materials and methods that take account of health and safety during construction;
- identifying areas where precautions must be taken during construction in relation to ergonomics and the use of chemical substances among others.



Health and Safety coordination meeting

The contractors participate in the design work, and are able to take action if the design methods or materials have implications for health and safety during construction.

DR imposes a number of requirements for the contractor's health and safety management system, such as the specification of organisation and systems that are made to reduce work-related accidents and the instruction and training of staff.

Construction activities are coordinated between the contractors and other key players. Planning is carried out to ensure that there is a rolling programme of construction activities. Planning aims to remove obstacles so that everything is in place before the start of construction, including health and safety matters such as technical equipment, substitution of chemicals, workplace assessments, ergonomics, etc.

DR leads health and safety coordination meetings and carries out weekly inspections on site, together with the contractors. The inspection process is organised to cover the examination of 15 key areas, or 'focus areas'. These include issues such as access arrangements, control of hazardous substances and general order and tidiness. Each 'focus area' is assessed on a 3-point scale of 'OK', 'should be improved' and 'unacceptable'.

Communication

DR uses a number of different forms of communication to suit the recipients concerned, for example, minutes of



meetings, newsletters, the site newspaper, notice boards, staff satisfaction surveys. DR also runs continuous campaigns in relation to specific precautions to be taken at risk areas on site, for example, the use of cranes, heavy lifting, electrical works, and winter precautions.

Results

The effect of the partnership process on the working environment is that individual members of staff are very satisfied with the health and safety on the site. Members of staff said that DR BYEN is a healthy workplace where everyone helps, respects and takes responsibility for each other.



In addition to a good working environment the partnership process has ensured that: the complex should be completed on time; financial budgets will be complied with; and the complex will meet quality requirements.

Figures 1 and 2 show the results of a satisfaction survey into development and welfare, and health and safety on site, respectively.

Figure 1

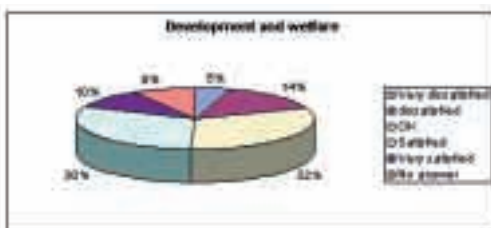
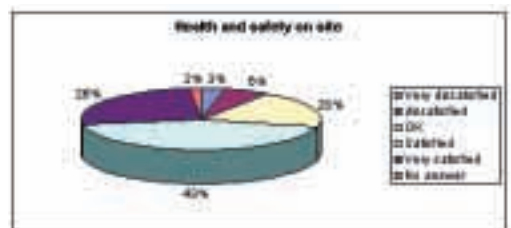


Figure 2



DR has managed to get the contractors to report near-miss incidents to an extent that greatly exceeds expectations. There are about four times as many near-miss incidents as accidents, which provides more data to analyse. This analysis of near-miss incidents has been valuable to the preventive work, and has in many cases minimised the risk of serious accidents on site.

After approximately 800,000 working hours, the frequency of accidents is below the average in the Danish construction industry, a total of 19 minor accidents in two years.

Comments

Experience from previous building and civil engineering works has shown that it is possible to reduce the frequency of accidents if the client who procures the construction work makes targeted and visible health and safety efforts.

Although this project is not unique in ensuring cooperation between all key players, it is an excellent example of what can be achieved when a client integrates health and safety throughout all the construction phases: from design and planning through to construction and eventually into operational use. Not only did DR attain good value, as the project should be completed on time, within budget and meeting quality requirements, they also achieved good standards of health and safety.

2.8

MANAGING SAFETY IN ROAD CONSTRUCTION FROM THE CLIENT'S PERSPECTIVE

Instituto das Estradas de Portugal (Portuguese Road Institute)

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Issue

Development and implementation of a worker safety management system for new road construction projects.

Problem

Road construction is a potentially hazardous occupation involving different phases and parties. An analysis of accident records showed that the main hazards included falls and being hit by objects, with most accidents occurring in the morning and mainly on viaducts and bridges. A system was needed that ensured effective health and safety coordination of contractors during road construction while at the same time covering project planning and construction work. In particular it was essential that this system:

- provide a common safety framework for all parties involved in a road construction project;



Bridge under construction

- systematically establish the health and safety obligations and responsibilities of each party;
- require contractors to have health and safety systems in place that comply with IEPs own management system;
- incorporate an effective monitoring system;
- promote a safety culture within the organisation and with contractors;
- be integrated with other management activities such as quality assurance and cost-effectiveness.



Use of fall arrest equipment, before edge protection is in place.

Solution

The Portuguese Road Institute (IEP) established a health and safety department to coordinate its health and safety management activities in all construction projects initiated. In addition, safety experts were employed in each project management department and the technical support department. The role of the health and safety department is to:

- provide technical support to other departments;
- prepare policies and procedures;
- prepare training and information resources and coordinate the provision of training;
- liaise and coordinate with external organisations;
- carry out safety audits during the design and construction phases;

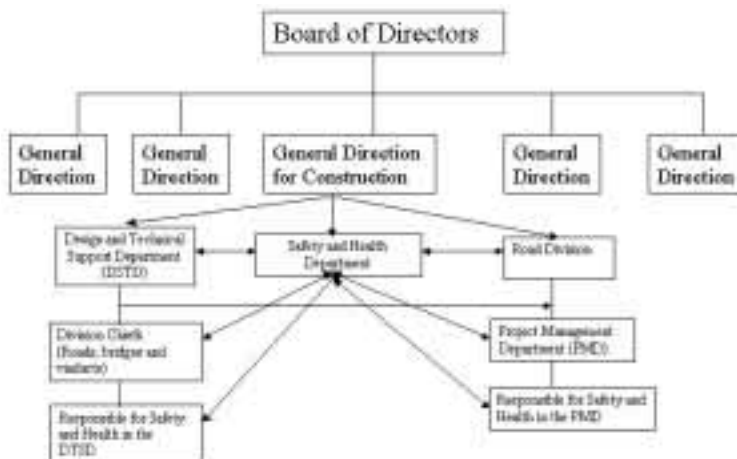
- prepare regular reports;
- support the board of directors.

To back-up the introduction of the management system, the health and safety department prepared a comprehensive health and safety manual. They engaged the support of an external expert from the Technical Institute of Portugal, and during the development phase they held a series of meetings with the board of directors, and heads of departments to ensure their commitment and ownership to the system and procedures being developed.

The manual specifies all the key health and safety management areas, including: statement of overall policy and commitment; safety management structure, and safety responsibilities of different post holders; health and safety specifications for tendering organisations, including designers, main contractors and subcontractors. It also contains specifications for all of the elements to be covered in safety plans and documentation and specifications for monitoring and making health and safety reports.

The implementation of the system has involved two elements. All new projects must comply with all aspects of the system, and with all the procedures in the manual. Regarding those projects already running, the system has been applied retrospectively as far as possible, with all of the existing contractors being asked to update their safety plans accordingly.

Part of the implementation and the promotion of the system involve training for all IEPs own employees and the different participants in the construction process.



Integration of health and safety into the organisation structure of the construction area of IEP

Results

- Accident rates were reduced by 30–40%.
- The seriousness of accidents and the number of days of absence were reduced.

Structure of the reference model of the Safety and Health Plan (SHP)

SAFETY AND HEALTH PLAN (SHP)	
1. INTRODUCTION	1.1 Organization of SHP
	1.2 Adaptation / complement of SHP
	1.3 Identification of archives
	1.4 Changes in SHP
	1.5 Delivery of SHP
	1.6 Organizational chart and Job Descriptions
	1.7 Control of Signatures and rubrics
2. DESCRIPTION	2.1 Safety and Health at Work Policy
	2.2 Definition of targets
	2.3 Action Principles
	2.4 Prior Notice and Immigrant Workers Declarations
	2.5 Applicable Regulations
	2.6 Work Timetable
	2.7 Control of Subcontractors and related chain of subcontracts
	2.8 Accidents insurance
3. CHARACTERIZATION OF THE WORKS	3.1 Main characteristics of the work
	3.2 Bill of Quantities
	3.3 Local Conditions
	3.4 Planning
	3.5 Plan and Chronogram of the workmanship
	3.6 List of works with special risks
	3.7 List of materials with special risks
	3.8 Work phases
	3.9 Construction procedures and methods
4. ACTION TO PREVENT RISKS	4.1 Construction site design
	4.2 Access, Circulation and road-signs Plan
	4.3 Control of support equipment
	4.4 Collective protection Plans
	4.5 Control of materials and equipment reception

	4.6	Plans and Registration of monitoring and Prevention
	4.7	Registration of non-compliances and corrective/preventive actions
	4.8	Identification and health control of the workers
	4.9	Protection of Individuals Plan
	4.10	Training and Information of the workers
	4.11	Registration of accidents and indices Plan
	4.12	Visitors Plan
	4.13	Emergency Plan
	4.14	Excavations Plan
	4.15	Plan of execution of piles
	4.16	Plan for forms and placing concrete
	4.17	Plan for setting metal structures
	4.18	Plans for pre-stress application
	4.19	Plans for assemble, use and disassemble of scaffolds
	4.20	...
5. MONITORING AND FOLLOW-UP	5.1	Monthly supervising
	5.2	Committee for Safety and Health at the work site
	5.3	Internal audit

Comments

This is a good example of a safety management system that should be used by organisations that are running construction projects that involve their own staff and various contractors, and in order to comply with legislation.

An important part of the development of the management system was the internal consultation process with the different departments in the organisation.

2.9

IMPROVEMENT OF SAFETY WHEN CARRYING OUT WORK AT HEIGHT



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Issue

Minimising risk factors when working at height.

Problem

Arcers is a major construction company in Latvia. Falls from heights are the most common cause of deaths and injuries in construction work, and the company were concerned that in 2002 there had been two accidents, involving work at height on construction sites where they were working. The causes of these accidents were carefully investigated and they concluded that they needed to take urgent action to introduce the necessary measures to prevent risks from working at height. They were concerned that they did not have systematic arrangements for health and safety. Some of the problems included: lack of structures and organisation to ensure safety; lack of defined safety procedures; no universal requirement for staff to receive training on health and safety; and poor procedures for the selection and use of personal protective equipment (PPE). In short, they had a reactive rather than a preventive approach to safety.

Solution

Following consultation with employees, the company brought in outside experts to assist them in carrying out a detailed analysis of the problems and recommend solutions. An action plan was developed and the first step was to establish an effective system within the company for health and safety. The major organisational steps included establishing:

- a health and safety unit;
- a 'leading mechanical' unit;

- a system and programme for risk audits and analysis and planning of preventive measures and their implementation, with clear responsibilities for action established. The audits are carried out by safety specialists
- training for all supervisors and those with health and safety management responsibilities;
- safety training for all employees, specific to their job and tasks they perform;
- systematic risk assessment methods and documentation;
- methods for consulting workers;
- definitions of health and safety responsibilities in job descriptions;
- written procedures and instructions;
- documentation, for example, to log training, to log permission to carry out certain work etc;
- a purchasing policy for protective equipment;
- a systematic health surveillance system.

Within this process they paid particular attention to minimising the risks of falls when working at height. They analysed in detail the falls that had occurred within the company and consulted other information and guidance about the causes of falls in construction work and their prevention and then introduced various additional measures within the new system that they had established, including:

- documenting where work at heights is necessary, what are the risks and which workers are involved;
- procedures and documentation to ensure that all scaffolding, ladders etc. are inspected;
- standardised forms for use when making inspections of working conditions and work equipment, for example, inspections of scaffolding;
- an approved list of personal protective equipment;
- a system and procedures to ensure that suppliers of rented equipment provide suitable and safe equipment;
- a system of cooperation between the safety unit and central purchasing to ensure the suitability of personal protective equipment prior to purchase;
- establishing permission to work at height, based on prior health surveillance and training and establishing a system so that supervisors can ensure that only authorised persons carry out work at height;
- procedures for work at heights and the use of personal protective equipment and establishing the role of supervisors who are responsible for overseeing work at height. Ensuring that the procedures are assessed and revised if necessary;

- procedures, arrangements and a safe system of work for mobile elevating work platforms, and training for operators;
- safety matters, including the prevention of falls from height, routinely discussed in production meetings.

Results

During the period from the year 2003 until June 2004, there were no accidents concerning the use of cranes. Safety inspections show that in addition, employees are following the established procedures and using personal protective equipment effectively.

Comments

Reactive monitoring, such as accident analysis, should always be complimented by an active monitoring system such as the auditing system used in this example. Accident analysis can identify areas in need of attention, and this example shows that when this happens, it enables comprehensive action to be taken to improve matters. The whole construction process should be planned to minimise the risk of falls. Planning work to minimise the need to work at height, and adding purpose-made guard rails, can reduce the risk, or finally, providing harnesses if the risk is still present.

2.10

ACHIEVING EMPLOYEE PARTICIPATION IN
HEALTH AND SAFETY MANAGEMENT SYSTEMS**A. Frauenrath Bauunternehmen GmbH
and Frauenrath Works Council**

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Germany

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www.inqa.de
www.inqa.de/themen/bauwirtschaft_frauenrath.cfm
www.af2010.de

**Issue**

Introducing practical measures to promote worker participation and motivation in occupational safety and health matters. The process included improving corporate communication and cooperation, in conjunction with external agencies.

Problem

Frauenrath is a medium-sized general building contractor, with a multi-skilled workforce, that recognises the importance of ensuring that employees play an active role in the health and safety management system, as employee participation is an essential requirement of an effective management system. For Frauenrath, an active staff development policy is also an important part of recruiting and retaining suitably skilled staff in a difficult labour market. The company decided that they wanted to establish a 'discussion culture' and promote staff participation and competence in health and safety together with other concrete efforts to improve working conditions. The challenge was to establish an effective and practical method to achieve these aims.

Solution**Including health and safety in quality manage initiatives**

Good communication, employee participation and skills development were already enshrined in Frauenrath's general corporate policy and the aim was

develop this aspect of their corporate policy in terms of occupational safety and health. They decided to do this by incorporating a specific project for 'people-oriented working conditions and business organisation' into their 'Initiative Neue Qualität der Arbeit' (INQA), (New Quality at Work Initiative).

Organising the project

The project was named AF2010 and the overall objective was to promote active participation among employees and to upgrade their skills through continuing training. The project was driven by a cooperative approach between the company and the works council, and the involvement of additional external experts. An event was organised to launch the project in which all project partners participated, and employees, family and their friends were invited.

Analysing the problems

They decided that the first step was to analyse the current situation to determine the existing problems with communication, information flows and participation and also to see what was working well and provided opportunities to build on. They organised workshops of staff drawn from the various departments and divisions to discuss in more depth the problems and solutions. The workshops covered three main themes: communication/information; managerial methods/deadlines and time pressures; and motivation/training. They were interested not only in identifying hazards in the various departments, but also conflicts.

Following the workshops, four small troubleshooting groups, or analysis teams, were used to analyse the causes of the problems identified by the workshops and propose solutions. In addition, the occupational health and safety analysis team carried out a survey of the offices and building sites. Initially 100 measures were proposed by the analyses teams were then evaluated for their feasibility, efficiency and time requirements. It was found that many could be implemented immediately but that others required further refinement and planning.

The function of the analysis team is to coordinate discussion. Each group has a facilitator who has attended a three-day training course about their role. This training includes how to address conflicts on building sites, how to lead discussion, dissect problems, address solutions and summarise the results of group discussions.

A process coordination team, consisting of the managing director, head of personnel and a senior works council representative provide support to the facilitators and work groups. They involve departmental representatives, quality controllers and spokespersons from individual project teams as necessary. The process coordination team takes the decisions about which measures to implement and how to implement them, communicating these decisions to employees.

The discussion processes may result in the need to form an ad hoc working group either to work on a specific issue in the short-term or long-term.

Weekly construction site meetings and safety briefings

One of the ideas to improve employee participation in occupational health and safety emerging from the workshops was the introduction of weekly meetings between foremen and their teams on construction sites. The workshops revealed that regularly scheduled, mandatory meetings on health and safety (of around 15 minutes) would be a useful addition to existing team discussions and present an opportunity to implement some of the goals and measures defined by the project. The meetings follow a structured process and include looking back over the previous week, looking forward to the next week and planning for issues that will arise. The aim is that the weekly discussions should provide all employees with a chance to air their own ideas and suggestions and that they act as 'think-tanks'.

These weekly training sessions are supplemented by short safety briefings carried out on a needs basis to discuss specific proposals. The briefings are organised so that employees actively participate through the use of discussion questions and a flipchart to record the results. This method can be used to get employee opinions on specific proposals and to provide instruction about risk prevention issues. The idea is that the briefings should be short and carried out on site and guidelines have been developed for running the briefings.

Training

A large number of the measures identified to improve communication and employee involvement in health and safety concerned instruction and training needs. Skilled construction workers, team leaders and construction supervisors are provided with training to develop personal and occupational skills, including training in negotiating, communication skills, conflict management and time management.

Example of specific health and safety issue addressed- work gloves

Using the consultation and participation methods that had been developed, workers on three construction sites tested special work gloves to see if they were an improvement on the conventional leather ones being used as these had been found not to give adequate protection when wet from chromate in cement. It was decided to switch to the nitril gloves, which are significantly more expensive, so the safety meetings were also used to inform and instruct employees about their use and caring for them.

Results

The project is being sustained through cooperation between management and the works council, the communication process has become routine and has received positive feed-back from employees. The company believe that their policy of employee involvement is helping to keep the company economically viable in a highly competitive field as well as contributing to the motivation of staff and their job satisfaction.

The company have taken steps to share the project results with others: they have used the project to develop a model that can be used by others in the construction industry. The model demonstrates how to upgrade business organisation and working conditions, to promote employee participation and to develop the personal skills of all staff.

Within the company, a new working group has been established to develop an active strategy on health promotion.

Comments

Although involving employees should be a standard part of good health and safety practice, it is not always easy to achieve this satisfactorily in the construction sector. This case demonstrates that with commitment, and by making available adequate time and resources, cooperation with employees can be achieved, to the benefit of all concerned. A participative approach between the company and the works council was a critical factor in the successful outcome, as was cooperation with outside experts. An important part of the project was the integration of health and safety into the company's overall staff development policy and activities.

2.11

INTRODUCING AN INTEGRATED SAFETY MANAGEMENT SYSTEM

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Issue

Introducing a safety management system in a large civil engineering and plant construction company.

Problem

ŽS Brno were concerned about accident levels and the high level of staff turnover. The company wanted to introduce a safety management system to prevent risks, and at the same time improve the quality of working life and workers' perception of the company.

Solution

The solution was to revitalise health and safety through a management system integrated into other management areas and setting this within an overall company philosophy and commitment to safety and health.

Key elements contributing to the success of this initiative

- Commitment of top management
- Integrating key management areas of occupational safety, the company's quality control system and environmental control
- Consultation with workers and managers

- Cooperation with competent outside experts and authorities
- Regular monitoring and review of policies and procedures
- Training, information and publicity about the new system for staff and managers
- Information for clients
- Setting objectives within a policy of continual improvement
- Extension of the policy and the company's safety philosophy to its contractors.
- Inclusion of 'health at work' initiatives
- Using the European activities on construction in 2004 as a focus for activity
- Incorporation of the whole approach into 'a healthy company' philosophy and programme
- Promotion of the company's activities

Top management involvement and integrated management

Senior management instigated the whole initiative. It builds on previous management initiatives, including achievement of OHSAS 18001, and improvements in safety and health have now been made an integral part of top management actions.

Consultation

Staff views are obtained in a number of ways, including during training sessions, during workplace inspections by the company safety technicians and during the regular reviews and monitoring processes. Health and safety is included in the annual meeting between management and staff from all the company's centres and is discussed in the regular meetings of centre managers.

Examples of changes following consultation

- New caravans for building sites
- Improved heating and air conditioning in offices and workshops
- Improvements to canteen facilities
- Purchasing policy for protective equipment
- Revised system for purchase and maintenance of ladders

Setting objectives

Each year health and safety objectives are set for the following year, backed up by the necessary resources, on the basis of consultation with staff and managers. Specific programmes are set to implement the objectives with specific members of staff given responsibility for the implementation.

Health at work

Broader 'health at work' initiatives have included: healthy diet options in the canteen and subsidised hot meals for construction site workers; and an influenza immunisation programme.

Using the European Week for Safety and Health at Work

The company used the European week campaign on safety in construction in various ways to support its own activities on safety. It was used as a springboard for initiating the company's programme, as a means of motivating and involving staff and as a source of reliable information and publicity materials.

Promotion

The company has found it useful to make public its actions on health and safety and incorporate them into its marketing activities, for example at trade fairs, in its own promotional materials and on its website. Its activities have resulted in coverage in the regional press and television. The company is interested in sharing its practices with other companies as well as using its safety performance to improve its own public image.

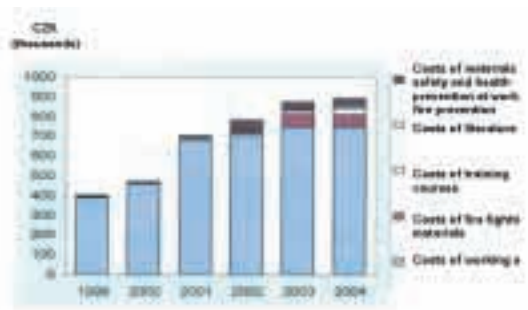
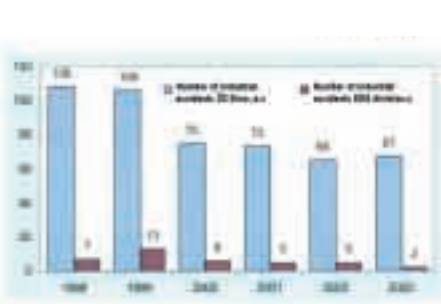
Results

The new management has resulted in a number of benefits, including:

- a reduction in accidents;
- a reduction in sick leave;
- improved worker satisfaction, particularly regarding improvements in work equipment and raised worker awareness about the importance of health and safety;
- good publicity for the company and enhancement of its public image.

Comments

A typical example of the kind of management system needed to effectively comply with EU regulations, which has been integrated with other management areas. Involvement of staff and worker representatives is a key component in the success of such systems. The company has been active in sharing the results of its achievements, which also helps the company to promote a positive image.



2.12

THE SILENT BOOK - PICTORIAL INFORMATION AND PROMOTIONAL MATERIALS



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www.ncc.se

Issue

The provision of health and safety information in a simple, non-verbal format.

Problem

NCC is a major construction and property development company. NCC also provides construction materials. NCC Construction Sverige is the largest company within the group and is well aware that the sector suffers from higher than average accident rates and needs to manage health and safety effectively. They already had a well-established central health and safety unit to coordinate health and safety and work-environment issues across all the companies and business units in the group in Sweden. The unit covers risk prevention, ill health prevention and rehabilitation, and aims to improve organisation and performance in all these areas. The central unit works actively with work-environment engineers, human resources staff and rehabilitation coordinators at the regional and business unit levels.

The aim of the central health and safety unit is to promote continual improvement to NCC's health and safety performance. Part of health and safety management is the provision of information and instructions to staff about risks and their prevention. NCC wanted to improve this part of its health and safety management system, particularly to provide information about the common causes of accidents. But they found that there was a lack of simple, yet clear information available for this purpose, particularly as they were interested in using pictorial information.

Solution

NCC formed a working group to develop their own information materials for workers. The group decided to develop a picture book presenting different

hazardous work situations - the Silent Book - containing pictures of what not to do and what to do.

They created an NCC cartoon character, called Trygge. This character is used in other health and safety areas, including information and training materials.

The decision of what to include was partly based on NCC's accident statistics and records, in which each work-related accident contains a description of how the accident happened. If the same thing had happened several times, the work process involved was included in the Silent Book.

When the Silent Book was completed, it was distributed to all the company's employees in Sweden. They also sent copies to their operations in other countries, for distribution to employees. As the booklet was pictorial, there were no translation problems and it could be used directly in other countries in which this multinational company operates. Copies are also issued to all construction sites where NCC is operating. The materials and the character are useful for inclusion in slide presentations etc. NCC uses such presentations in health and safety training courses and in meetings, particularly as a basis of discussion.





Results

NCC has received positive staff feedback about the Silent Book. Employees report that it is fun to browse through and that its use stimulates interesting discussions about hazardous work processes and prevention.

NCC's work-related accident rate has declined over a ten-year period. NCC's management and its central health and unit are convinced that, the Silent Book has played an important part of NCC's overall policy and actions to promote health and safety improvements.

People from outside of the company have also used the booklet. For example, 1,000 copies were sent to the International Federation of Building and Wood Workers (IFBWW) at their request. NCC has also supplied copies to Swedish construction schools, and they distribute copies to foreign visitors, including a group of visitors from China.

Comments

The Silent Book forms part of NCC's overall and comprehensive occupational safety and health management system. It is just one part of their activities to train and inform about health and safety, and to motivate and promote good health and safety performance. The Silent Book is an excellent way of providing information to everyone, including those that do not speak the language of the country they live in, and for anyone who cannot read with confidence.

ANNEX 1. SOURCES OF FURTHER INFORMATION



Further information on occupational safety and health and construction work is available from the Agency's European week 2004 website <http://osha.eu.int/ew2004/> where the full text of all Agency publications can be downloaded free of charge. Additional information on risk prevention in construction work is available through the Agency's website at: http://europe.osha.eu.int/good_practice/sector/construction/

These sources are being continually updated.

Agency Publications

Report

Achieving better safety and health in construction

Magazine

Magazine 7: Actions to improve safety and health in construction
TE-AA-04-007-XX-C

Factsheets

Factsheets provide concise information on a range of issues and are available in all the 20 official Community languages (11 for factsheet 15).

Forum

Improving safety and health in construction: the need for action during procurement, design and planning, construction and maintenance

Campaign material

European Week for Safety and Health at Work 2004

- Facts 15: Accident prevention in the construction sector
TE-35-01-287-XX-D
- Facts 48: Health and safety on small construction sites
TE-59-04-451-XX-C
- Facts 49: Safe roofwork
TE-59-04-459-XX-C
- Facts 50: Management of noise in construction
TE-57-04-847-XX-C
- Facts 51: Asbestos in construction
TE-57-04-855-XX-C
- Facts 55: Achieving better safety and health in construction
TE-59-04-144-XX-C

The Agency has produced an information pack consisting of posters, leaflets, fact sheets and post cards to promote the week and its theme 'Building in Safety', available at <http://osha.eu.int/ew2004/>

Additional information on other Agency publications is available at the Agency website <http://agency.osha.eu.int/publications/>

ANNEX 2. OVERVIEW OF PRACTICAL EXAMPLES

COUNTRY	AWARD	TITLE	TASK/ WORKPLACE	ISSUE	MAIN INTERVENTION
Austria	Y	Improving safety for work at height by using ready assembled scaffolding	Construction and maintenance	Working at height	Product -new design of scaffolding
Czech Rep.		Introducing an integrated safety management system	Plant construction and installation	Risk management	Introduction of an integrated company safety management system
Denmark	Y	Promotion of health and safety in construction by a partnership process	Construction site	Cooperation between client, project manager and contractors	Partnership approach, including involving contractors in the design phase, common policies, procedures, training and targets as well as sanctions
Finland	Y	A safety competition in the construction industry using effective monitoring systems	General construction	Making systematic and regular site safety inspections that provide objective results for monitoring.	A common weekly inspection, monitoring and feedback tool and promotion of the system through a safety competition
Germany		Achieving employee participation in health and safety management systems	Medium-sized construction company	Involving employees	Integrated programme to involve workers covering regular meetings, briefings, on-going training, selection of equipment etc.
Latvia		Improvement of safety when carrying out work at height	Building, erection of glass constructions	Working at heights	Management system, including auditing, improved systems of work, procedures, equipment and training
Lithuania		Managing the health and safety of subcontractors	General construction	Working with contractors	Establishment of a management system and common procedures
Netherlands	Y	Controlling the exposure of workers to respirable dust and crystalline silica from road milling machines	Road construction/maintenance	Exposure to respirable dust and quartz from road milling machines	Modifications to the machines to extract the contaminated air.

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COUNTRY	AWARD	TITLE	TASK/ WORKPLACE	ISSUE	MAIN INTERVENTION
Poland		Reducing risks during the demolition of aluminium electrolysis tanks	Demolition and maintenance tasks using pneumatic drills	Exposure to noise, vibration, heavy manual work and dangerous substances	Use of a hydraulic 'puller' for safer removal of fixed metal bars etc.
Portugal		Managing safety in road construction from the client's perspective	Road construction	Project safety management and coordination	Client's integrated management system for staff and clients
Sweden	Y	The Silent Book – pictorial information and promotional material	General construction and maintenance	Providing information to workers with problems understanding the written language	Pictorial training and information resources
UK		Work at height – fall protection during roof work a partnership approach between client and contractor	Replacement of cement roofing	Working at height and removal of asbestos. Risks to workers and the public	Removable, enclosed platforms and fall protection/ debris netting

European Agency for Safety and Health at Work

Building in Safety - Prevention of risks in construction - in practice

Luxembourg: Office for Official Publications of the European Communities

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In order to encourage improvements, especially in the working environment, as regards the protection to the safety and health of workers as provided for in the Treaty and successive action programmes concerning health and safety at the workplace, the aim of the Agency shall be to provide the Community bodies, the Member States and those involved in the field with the technical, scientific and economic information of use in the field of safety and health at work.

European Week for Safety and Health at Work
<http://ew2004.osha.eu.int>



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