

HEALTHY WORKPLACE

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**A EUROPEAN CAMPAIGN
ON SAFE MAINTENANCE**

EUROPEAN GOOD PRACTICE AWARDS



European Agency
for Safety and Health
at Work



Healthy Workplaces



**2010
2011**



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Introduction

Maintenance is a generic term for a variety of tasks carried out in many different sectors and all kinds of working environments. Maintenance activities include inspection, testing, measurement, fault detection, adjustment, repair, replacement of parts, servicing, lubrication and cleaning.

The wide range of maintenance activities includes daily maintenance of office buildings, e.g. maintenance of electrical installations (plugs, cables and switches) and air-conditioning systems, but it also covers working in car repair shops, servicing and lubrication of machinery in food manufacturing, and maintaining glasshouses (hothouses) in the horticultural sector. Maintenance may involve working in confined spaces and working at height, using dangerous substances or working in places where hazardous chemicals are present, or exposure to asbestos during the maintenance of industrial installations and buildings.

Maintenance is critical to ensure continuous productivity, maintain the quality of production and retain a company's competitiveness, but regular maintenance is also essential to keep equipment, machines and the work environment safe and reliable. Lack of maintenance or inadequate maintenance can lead to dangerous situations, accidents and health problems.

Maintenance is a high-risk activity. Some of the hazards result from the nature of the work, such as working alongside a running process and in close contact with machinery, or when non-routine tasks are performed in challenging conditions and under time pressure. Maintenance work is increasingly outsourced and working with contractors is a complicating factor in terms of safety and health at work.

Maintenance is carried out in all sectors and all workplaces. Therefore, maintenance workers are likely to be exposed to a variety of different hazards, including physical, chemical and biological hazards, and psychosocial risk factors. Maintenance is also associated with a high risk of all kinds of accidents.

By analysing EUROSTAT data based on the ESAW (European statistics on accidents at work) methodology, accidents related to maintenance operations could be identified across occupations and industry sectors, in various European countries. Within the variable 'working processes', used to classify the causes and circumstances of accidents, subcategories that are related to maintenance operations were identified. By comparing the number of accidents related to these types of work with the total, it can be estimated that around 15–20% (depending on the country) workplace accidents and around 10–15% of all fatal accidents were related to maintenance. The scientific literature also indicates that most of these accidents occur during corrective maintenance activities.

Healthy Workplaces – a European Campaign on Safe Maintenance

The European Agency for Safety and Health at Work (EU-OSHA) has run European Campaigns since 2000, targeting the most common risks and the most vulnerable sectors of activity, associated with high accident rates and high exposure to occupational hazards. The theme of the Europe-wide Healthy Workplaces Campaign for 2010-11 is Safe Maintenance. Over these two years the campaign, which is coordinated by EU-OSHA and its partners in the 27 EU Member States, is supporting a wide range of activities at the national and European level, to promote Safe Maintenance.

The EU-OSHA campaign has two main messages. First, that maintenance is essential to keep the working environment safe and reliable – lack of maintenance or inadequate maintenance can cause serious accidents or health problems. Second, maintenance itself is a high-risk activity and it has to be performed in a safe way, with appropriate protection of maintenance workers and other people present in the workplace.

With the campaign, EU-OSHA wants to raise awareness of the importance of maintenance for workers' safety and health and of the risks associated with maintenance. At the same time it wants to encourage employers to consider health and safety aspects in maintenance. The Agency is focusing on communicating the general principles of Safe Maintenance, and its importance for eliminating workplace hazards and providing safer and healthier workplaces. The ultimate aim, of course, is to help reduce the numbers of people who are being hurt or experiencing ill health as a result of their work.

Recognising good practice

As part of the European Campaign 2010–11 on Safe Maintenance, EU-OSHA organised the European Good Practice Awards Competition (the tenth such competition), aiming to identify examples of good practice in the management of occupational safety and health during maintenance. The awards recognise organisations that have made an outstanding and innovative contribution to Safe Maintenance. Through the competition EU-OSHA promotes good practice solutions at the workplace and shares information about good practice across Europe. Forty entries from 22 Member States and Turkey were received, including organisations of all sizes and from a wide variety of industrial sectors.

An evaluation panel – the Good Practice Awards Jury including representatives of the four interest groups of the EU-OSHA Board and an expert in the subject, validated and assessed the national examples submitted, and selected a small number of award winners and commended examples.

What the Good Practice Awards Jury was looking for

In selecting the examples, the Jury was looking for solutions that:

- are relevant to the theme of Safe Maintenance;
- are aimed at the workplace;
- tackle risks at source;
- improve working conditions in general;
- promote a structured, risk management based approach to maintenance;
- demonstrate successful implementation and real improvements;
- show effective participation and involvement of the workforce and their representatives;
- show that account was taken of the diversity of the workforce;
- are sustainable over time;
- go beyond simple compliance with all relevant legislative requirements;
- are potentially transferable to other workplaces, including those in other Member States, and to SMEs;
- are current, i.e. the example should be recent or not widely publicised;
- show that activities such as providing information and training, or increasing awareness about occupational risks, were part of a wider risk management approach.

Good practice examples could not be developed solely for commercial profit. This related particularly to products, tools or services that are or could be marketed.

The winning and commended entries

The examples presented in this booklet were entries in the Good Practice Awards Competition 2010–11 run by the European Agency for Safety and Health at Work as part of its European Campaign on Safe Maintenance. The short summaries in the booklet present the eight winning entries and 15 commended entries in the competition, describing the measures taken and the results achieved.

The entries came from a wide variety of organisations. Examples ranged from participatory development of safe work routines for firefighters to solutions for maintaining and repairing horticultural glasshouses safely and efficiently to implementing a comprehensive approach to maintenance during the design of a maintenance depot for metro trains. In all these cases employees or their representatives were involved in identifying problems and developing solutions. This was seen as an important success factor.

Every workplace is different; therefore, solutions have to be developed to match the specific problems and needs of that particular workplace based on an adequate risk assessment. However, the ideas and concepts presented in this booklet can be adapted across industry sectors and Member States and in organisations of different types and sizes.

The summaries will be available on the EU-OSHA website later in 2011 in all Community languages and linked to detailed descriptions in English.

More information

The EU-OSHA website: <http://osha.europa.eu> contains a wealth of information on workplace safety and health in all European Community languages.

Information on Safe Maintenance can be found at <http://osha.europa.eu/en/topics/maintenance> and on the European Campaign on Safe Maintenance at <http://osha.europa.eu/en/campaigns/hw2010/>. All EU-OSHA publications can be downloaded free of charge from the website.

Acknowledgements

The Agency would like to thank its network of focal points in Member States and Turkey (competent authorities, or bodies nominated by them, responsible for occupational health and safety) for assessing and nominating examples for the Good Practice Awards. The competition would not have been possible without their assistance.

The Agency also thanks the Good Practice Awards Jury for their input: the chair, Dr Lothar Lissner from Kooperationsstelle Hamburg IFE GmbH and the Jury members, Jesús Alvarez from the European Commission – DG Employment, Social Affairs and Equal Opportunities, Willy Imbrechts from the Federal Public Service Employment Labour and Social Dialogue, Belgium, Viktor Kempa, from the European Trade Union Institute for Research, Education and Health and Safety, and Hendrik de Lange, from FEB-VBO, representing employees' organisations.

Many EU-OSHA staff members contributed to the Good Practice Awards procedures, including Maria Lvova, Berta Lejarza, Birgit Müller, Lorenzo Munar, Sarah Copsey, Michaela Seifert, Dietmar Elsler and many others.

Last but not least, many thanks to all organisations that participated in the Good Practice Awards Competition 2010–11, with special thanks to those that feature in this publication.

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European Agency for Safety and Health at Work (EU-OSHA)*

A European Campaign on Safe Maintenance

AWARDED				
Title	Country	Company	Sector	Issue
Using technology and organisation to achieve safer maintenance	Austria	voestalpine Hytronics GmbH and voestalpine Weichensysteme GmbH	Production of raw iron, steel and ferro alloys – subcategory production of rail products Production of other electrical equipment and instruments	Overall new concept of prevention measures regarding maintenance
Coordinating repair and maintenance with the client	Spain	Protón Electrónica SLU	Repair of electronic equipment	Repair and maintenance of electrical and electronic equipment
Proactive and reactive interventions to improve maintenance safety	Malta	Actavis Ltd	Manufacture of basic pharmaceutical products and pharmaceutical preparations	Improving maintenance safety
Healthy firefighters	Sweden	Skellefteå Räddningstjänst	Fire service activities	Participatory development of safe work routines
Management of preventive and corrective maintenance	Portugal	Sonae	Retail trade in supermarkets and hypermarkets	Safe repair and maintenance of workplaces and work equipment
Maintaining and repairing horticultural glasshouses safely and efficiently	The Netherlands	GHT - Glass Handling Technic Vof	Horticulture	Maintaining horticultural glasshouses
Competent maintenance teams	United Kingdom	Tarmac West Region	Mining and quarrying manufacture of concrete products for construction purposes	Safe Maintenance through the development of core competences
Comprehensive approach to maintenance starting from the design of the work area	Belgium	STIB-MIVB	Support activities for transportation	Building and running a maintenance depot that guarantees a maximum of safety and staff wellbeing

COMMEDED				
Title	Country	Company	Sector	Issue
Development of employer regulations to ensure Safe Maintenance	Hungary	General Motors Powertrain – Magyarország Kft.	Manufacture of motor vehicles	Regulation of maintenance operations
Asymmetrical fibreglass ladder for maintenance of refrigeration systems	Germany	Carrier Kältetechnik GmbH	Repair and installation of machinery and equipment	Safe working on refrigeration systems
'More Support' programme for Safe Maintenance of a power plant	Italy	Enel Produzione SpA	Electric power generation, transmission and distribution	Safety in business process, training on job
Preventive Maintenance Protocol in a construction company's central machinery pool	Spain	Dragados S.A.	Construction	Machinery maintenance safety
Risk Assessments and preventive measures to reduce risks in maintenance	Ireland	PepsiCo Ireland	Manufacture of soft drinks; production of mineral waters and other bottled waters	Cross functional Safety Action Teams.(SAT)
Safety in conservation works of the Convent of Christ in Tomar	Portugal	44Engenharia e Coordenação de Segurança, Lda.	Conservation of buildings	Safety in maintenance works and conservation
Innovative scaffolding construction for safe working at an incinerator	The Netherlands	Twence Afval en Energie BV	Waste treatment	Safe scaffolding for boiler
Safety for everyone	Slovenia	Otis Lift d.o.o.	Manufacture of lifting and handling equipment	Launch of a project that aimed at gradual building a complete safety system and
Autonomous Maintenance	United Kingdom	Britvic Soft Drinks	Manufacture of soft drinks; production of mineral waters and other bottled waters	Development of a Palletiser Maintenance Board
Exemplary Safety Programme for Maintenance Works in Heracles Volos Plant	Greece	HERACLES General Cement Company, a member of Lafarge	Manufacture of cement	Annual Maintenance Works
Elimination of occupational accidents for contractors' personnel	Greece	Titan Cement-Hellenic Petroleum & Halyvourgiki	Manufacture of cement Manufacture of basic metals Manufacture of refined petroleum products	Organisation of training to educate the owners of contracting companies in managing health and safety at work

A European Campaign on Safe Maintenance

COMMEDED				
Title	Country	Company	Sector	Issue
An integrated approach to bridge differences in safety culture	Belgium	SPIE Belgium	Manufacture of refined petroleum products	Maintenance contracting
Overall safety management of maintenance work	Finland	Finnsementti Oy, Lappeenranta Cement Works	Manufacture of cement	Decreasing the number of accidents
A common training model for occupational safety orientation	Finland	UPM-Kymmene Oyj- Ruukki Oyj & ABB Oy	Manufacturing Manufacture of pulp, paper and paper products; Manufacture of basic metals and fabricated metal products Manufacture of machinery and equipment	Occupational safety training
Reducing risks during maintenance and repair of ships in dry docks	France	SEMCAR	Repair and maintenance of ships and boats	Integrating safety, health and working conditions in the planning of a dry dock for ship repair



1. USING TECHNOLOGY AND ORGANISATION TO ACHIEVE SAFER MAINTENANCE

VOESTALPINE HYTRONICS GMBH AND VOESTALPINE WEICHENSYSTEME GMBH

Production of raw iron, steel and ferro alloys (subgroup railway industry)

Production of hydraulic and electrical equipment and instruments

Alpinestraße 1

8740 Zeltweg - Austria

<http://www.voestalpine.com/vaee/en.htm>

The issue

Voestalpine Weichensysteme GmbH is an iron and steel processing company and voestalpine Hytronics GmbH produces hydraulic and electronic systems for turnouts. Between the two companies there are 20 employees working in the in-house maintenance department (electricians and mechanics) who are involved in extensive proactive and reactive maintenance operations; in addition, about 50 external companies are contracted for maintenance, inspection and repair services.

In a joint effort by the companies' health and safety officers, occupational health department and the maintenance department (head of the department, employees and safety representatives) the activities and operations were evaluated and potential weak points and unsafe actions/conditions were identified.

- Measures to improve safety when working with contractors
- A specific programme for the education of the safety representatives was carried out together with AUVA (the Austrian Accident Insurance Company).

The results achieved

These measures have improved the safety of maintenance workers at the companies. Since the measures were implemented there have not been any accidents, dangerous situations or near-accidents in the relevant areas. Savings of time and costs were also realised, and there has been enhanced employee satisfaction as well as reduced stress levels for the staff.

The action taken

Based on the evaluation described above, prevention and safety measures were introduced and/or revised in a comprehensive way. The measures implemented include, among others:

- Protection during work on the roofs was improved by installing fall prevention systems on the company buildings
- Safety while working at height was improved by substituting ladders and racks with a telescopic hoisting platform
- Electronic data management was introduced for maintenance/ checks and deficiency management
- Maintenance-free wet cartridge filter systems were introduced to improve protection against dust/welding fumes
- An optimal extraction and filter system was installed to protect against dust/welding fumes
- Hazardous chemicals were substituted with less hazardous ones, and workers were trained in the safe handling of chemicals
- Optimisation of personal protective equipment
- To improve safety when working alone, an electronic personal emergency signal system was introduced
- The electric power supply system was modernised, especially high-voltage areas



A new wet cartridge filter was installed for cooling lubricant aerosols at ground level



An optimally adjustable extractor effectively removes dust and fumes during welding works



2. COORDINATING REPAIR AND MAINTENANCE WITH THE CLIENT

PROTÓN ELECTRÓNICA SLU

Repair of electronic equipment
 Polígono Industrial Aurrera, Parque Empresarial Inbisa, Pabellón A3
 48510 Trápaga (Vizcaya) - Spain
 www.protonelectronica.com

The issue

Protón Electrónica SLU is a micro-enterprise (seven workers) providing onsite maintenance and repair of electronic equipment. Apart from the electrical risks inherent to their job, the workers from Protón Electrónica are exposed to a great variety of risks depending on the activities or specificities of the client (small offices, steel factories, petrochemical plants, hospitals, etc.). To help prevent and control the risks, the company has set up a process to ensure the coordination of preventive measures between the company and its clients. By training its workers and investing a great deal of time in assessing risks and preventive planning prior to each onsite maintenance and repair operation, the company has obtained very satisfactory results.

The action taken

The company coordinates the repair and maintenance activities with the client even before its technical staff visit the client. The administrative staff prepares a factsheet for every single piece of equipment, including its location, using the information provided by the client. Before visiting the client, technical staff is informed about the risks, preventive measures in place, the meeting point in case of problems, the name of the prevention officer, and the specific personal protective equipment required. Before starting work, technical staff checks the information received and complete or correct it if necessary. They are expressly instructed not to start any work, or to break off such work, if they consider that there are serious risks. Once they have completed their work, the administrative department fills in the final file in electronic format to make this available for the next person who will deal with the same equipment in the following repair or maintenance activity.

The results achieved

Since it was set up in 1981, the company has only had one significant accident, in 1999, leading to sick leave (arising from a traffic accident). The accident rate is 0.

The commitment from the management to protect the health and safety of their workers, the training provided to the workers and the exhaustive company coordination procedure are considered the main success factors.

 Tlfno: 944 275 764 - 944 276 436 Fax: 944 435 491 info@protonelectronica.com	MATERIALES MALETA BASICA 01	COD: 44.13.52 Euzko Lanbidearen Erakundearen bidez
Elaborador: Ascan Iglesias Fecha: 06.10.2009	Aprobador: Angel Vidal Fecha: 05.11.2009	Ultimo Revisor: Angel Vidal Fecha:

MATERIALES						
CODIGO	SUBCACION	DESCRIPCION	FOTOS	P.	Observaciones/Usos	R.
302710001	MO1	Maleta Lona MO1 ToolPack 360.042		E L Ad J R		
3021110001	MO1	Multímetro "Fluke 87V"		E	Mod. N° Serie F189 79380031	Prex. Cal. 01.02.11
3021110002	S. Central	Multímetro "Fluke 189"		L	F189 82070195	14.06.11
3021110003	S. Multim.			Ad	F87V 97420363	06.11.10
				J	F87V 981160219	07.03.11
				R	F189 79380030	14.12.10
3021110011	MO1	Pizas Amperimétrica cc/ca "Fluke 323" 600V 1000 Ampes (Voltímetro auxiliar)		E	Mod. N° Serie F337 594790050	Prex. Cal. 21.05.12
3021210001	S. Central			L	F337 594790794	13.05.12
3021210002	S. Lateral	Termómetro "Fluke 61" Ad: RatPV.rec.		Ad	F61 84941071	24.02.13
	S. Central	Termómetro "Fluke 62c"		J	F61 84940989	17.05.13
		Par de cables med.		R	F61 84811300	En Calibr. Pre. Cal.
3021120001	MO1	Par de cables med. Rojo- Negro "Pomona 5807A" 1000V 10ampes 3C31010CA1112		E L Ad J R		
3021121001	MO1	Par Puntas de Prueba CAT III 1000 V, 10 A Fluke TP80 1000V 10 A HC		E L Ad J R	HC HC Dox paros	
3021123101	MO1	Set Puntas Test POMONA 5872		E L Ad J R		

Revised and calibrated equipment and tools



3. PROACTIVE AND REACTIVE INTERVENTIONS TO IMPROVE MAINTENANCE SAFETY

ACTAVIS LTD

Manufacture of basic pharmaceutical products and pharmaceutical preparations
BLB16 Bulebel Industrial Estate
Zejtun ZTN 3000 - Malta
www.actavis.com/en/corporate+directory/europe/malta.htm

The issue

The hazards to which maintenance workers are exposed are different from the hazards faced by machine operators. In most cases, the hazards are greater and may pose a higher risk. Therefore, separate risk assessments have to be carried out both for operating and maintaining the equipment.

The action taken

At this pharmaceutical plant, maintenance is the responsibility of a group of technical staff based in Engineering and Production. As part of the ongoing risk assessment programme at Actavis, risk assessments of preventive maintenance jobs have been carried out in order to ensure that the hazards to which maintenance personnel are exposed are adequately controlled. Corrective actions have been implemented so that maintenance jobs can be done in a safe manner.

Risk assessments for the maintenance jobs are performed by the employees who actually carry out the maintenance, once they have completed a training course on the risk assessment process.

The solutions implemented for different hazards/risks included the following areas:

- elimination of hazard
- engineering controls
- new equipment /redesign of area
- training

Following an incident investigation, a number of in-house corrective actions were implemented to improve safe operation of a capsule-filling machine, such as the installation of a guard to cover the areas where there are moving parts. Solutions were also developed following the risk assessment for the preventive maintenance of a coating

machine, including improved accessibility to the external technical areas, installation of a lifting device, a manual handling training programme, and the introduction of safe systems of work.

The results achieved

Adjustments made to the equipment minimised the risk of an accident. Following a proactive approach, a risk assessment is carried out for new tasks and new equipment to ensure that maintenance and operation can be done safely. The most important achievement is that employees are now fully aware that maintenance has to be carried out in a safe manner, resulting in a change of the safety culture.



New guards to cover area where there are moving parts



4. HEALTHY FIREFIGHTERS

SKELLEFTEÅ RÄDDNINGSTJÄNST

Fire service activities
Televägen 13
931 50 Skellefteå - Sweden
www.kommunal.se

🔍 The issue

In addition to exposure to fire, explosive substances and risks of falling or being injured by falling materials, firefighters are exposed to chemical and biological substances that could have negative health effects. Given the nature of their work, the types of substances, exposure levels and toxicity are frequently difficult to determine prior to exposure. Consequently, any contact with contaminated materials should be minimised. Improved equipment and clothing maintenance play an important part in reducing exposure to potentially harmful substances.

🔍 The action taken

The focus of this project was on the tasks performed by firefighters of the Skellefteå fire brigade between answering an alarm and the next alarm, including the cleaning, repair and maintenance of clothing and equipment, and during all educational and training activities. New routines and procedures were developed in order to avoid exposure situations and to minimise contact with contaminated material. The participation of workers, union representatives and management was essential in developing the model of risk assessment and the preventive measures. The continual

and repeated risk assessments led to the identification of additional risks of exposure to potentially harmful substances. This, in turn, led to more frequent, constructive input into the development of measures to remove or reduce exposure.

🔍 The results achieved

The project resulted in the development of a model for controlling risks related to potentially harmful substances. The model is based on continuous risk assessment and includes:

- well developed routines and processes for dealing with contaminated material
- well developed routines that include health aspects in alarms/training/education.

The use of this model has led to safer and healthier routines that are supported and used by all personnel. This has contributed to a better work climate. The routines have also contributed to more effective use of personnel and equipment. Due to the participatory approach the personnel have taken a more active and constructive role in identifying potential risks and developing preventive measures. They also have a more positive attitude to work-related health and safety issues.



Contaminated clothing is removed after an alarm



Contaminated clothing is transported separately from personnel in the vehicle



5. MANAGEMENT OF PREVENTIVE AND CORRECTIVE MAINTENANCE

SONAE

Retail trade in supermarkets and hypermarkets
Estrada Nacional 13, KM 6,78, Edifício 2.D, 5º piso
Lugar do Espido – Via Norte
4470-179 Maia - Portugal
www.sonae.pt/en

The issue

Sonae is the leading company in Portugal’s retail sector, selling both food and non-food products. The company’s activities include all store activities, from the receipt of products to their display and purchase. The company carried out a risk assessment mapping all the maintenance-related store activities to identifying activities where the risk was not acceptable.

Sonae then had to implement preventive measures to manage those risks. There was also a need for training and for raising awareness of risks among the maintenance workers.

- In order to facilitate interventions on various equipment in the stores, ‘one point lessons’ (OPL) were prepared, which are easy to interpret visually and easy to read.
- A handbook and leaflet on workplaces risks have been developed and issued to all workers.
- A competency profile for maintenance workers has been defined. In this profile, all the maintenance tasks within the company were mapped, and lists made of which technical skills are needed to carry out those tasks.
- Training courses have been developed, including a separate module on safety and health at work.

The action taken

The measures taken include, among others:

- A computer-aided maintenance (MAC) management programme has been implemented, which helps to manage all aspects of proactive and reactive maintenance.
- Work instructions have been developed, including safety rules for high-risk activities and safe use of chemicals in maintenance work.
- Procedures have been established for identifying damaged or out-of-service equipment, to prevent it being used in an unfit state.

The results achieved

The solutions found have brought considerable benefits in terms of reducing accidents at work and increasing all workers’ risk awareness. They have also resulted in a considerable decline in the insurance premiums paid by the group to cover accidents at work. After the maintenance safety project was introduced, accident premiums fell by about 31%, which translates to a saving of €1,002,760 compared to the amount paid in 2006.



Examples of ‘one point lessons’ (OPLs) on the maintenance of shopping trolleys and slicing machines respectively



6. MAINTAINING AND REPAIRING HORTICULTURAL GLASSHOUSES SAFELY AND EFFICIENTLY

GHT - GLASS HANDLING TECHNIC VOF

Horticulture

Naaldwijkseweg 5b

2291 PA Wateringen – The Netherlands

www.ghtec.nl

🔍 The issue

In recent years the horticultural glasshouse sector has undergone tremendous development. The glasshouses are higher, the drainage channels on the roofs are extremely narrow, and the dimensions of the roof glass have increased considerably. These developments have had a major influence on maintenance and repair work. One characteristic of glass is that it can break, so there is an ongoing need for maintenance and repairs. The work is associated with the risk of cuts, falls from height and physical strain.

Contributory factors to the risks are:

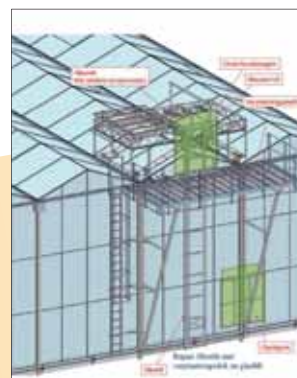
- the large dimensions of the glass (up to 3.5 m² per pane)
- the difficulty of moving on the roof because of the narrow aluminium drainage channels
- the ever-greater column height of the glasshouses (up to seven metres)
- poor accessibility in and around glasshouses.

🔍 The action taken

In 2002, a covenant was signed by the glasshouse industry, trade organisations of gardeners, growers, fitters and contractors, and insurance companies and banks involved with the industry, aimed at guaranteeing the safety and safeguarding the working conditions of glass fitters on the one hand, and carrying out maintenance more efficiently on the other hand. These parties created the Stichting CCG (Foundation for coordinating emergencies in the glasshouse horticulture sector), which has the task of checking compliance with the covenant. The Foundation approached a number of companies with extensive experience in maintaining glasshouses in order to develop a new and safe method of repairing glass roofs. A system for carrying out repairs on the outside of glass roofs was designed, the Repair Shuttle, including the maintenance vehicle, with a system for moving glass into position, and a mobile platform to move the repair vehicle from one location to another.

🔍 The results achieved

Injuries caused by falling glass are impossible when using the Repair Shuttle, while the risk of falling has been almost completely eliminated. There has also been a marked reduction in the physical effort required of the people carrying out repairs, thanks to the Shuttle, and the amount of time needed for repair work has been considerably shortened as well.



The Repair Shuttle enables repairs to be made to glasshouses safely and quickly



7. COMPETENT MAINTENANCE TEAMS

TARMAC WEST REGION

Mining and quarrying manufacture of concrete products for construction purposes
Stancombe Regional Office, Stancombe Lane
Flax Bourton, Bristol, Avon, BS48 3QD – United Kingdom
www.tarmac.co.uk

The issue

The sites of this company are made up of large quarries, numerous asphalt and concrete plants and major blast furnace slag activities. Maintenance can include the following high-risk tasks: working at height, working in confined spaces, mechanical lifting including slinging, equipment isolation and working on or near water. Competency of those employees completing the task has been a potential problem.

The action taken

This action was aimed at developing the core competencies of maintenance employees. When a maintenance employee starts with Tarmac they must go through an interview process which covers personal and technical skills. Until now, however, there has not been a review of the employee's competency levels.

A detailed role profile has been established for both maintenance section leaders and maintenance fitters. This is supported by a bi-annual evaluation of the core competencies required to fulfil those roles, focusing on three key areas: skills, knowledge and experience. A bi-annual maintenance section leaders' forum was also introduced. The content of a toolbox talk, 'safe to be a fitter', has been improved. Moreover, training plans are discussed with the individual and can be agreed based on both the company need and operator request.

During the same period a Managed Maintenance System has been introduced across all the company sites, to improve plant performance by maximising planned maintenance activities and removing the safety risks from unplanned breakdowns.

Safety, health and environment (SHE) criteria were included into key performance indicators such as dealing with

near-hits, number of safety defects identified, raised and implemented, managing statutory safety equipment inspections, setting a personal example of health and safety best practice, management and correct use of PPE, etc.

The results achieved

- Overall reduction in lost time, medical treatment and non lost time incidents
- 28% reduction in maintenance-related non lost time injuries in 2010 compared to full year 2009
- All maintenance staff now have a personal development plan
- Improvements in the quality of safety plans around maintenance activities
- A proactive and engaged maintenance section leader forum is now in place
- Improved asphalt plant availability – 63% of sites have reduced percentage time loss since 2009.



The competency assessment for each worker showed where there were gaps in safety skills



8. COMPREHENSIVE APPROACH TO MAINTENANCE STARTING FROM THE DESIGN OF THE WORK AREA

STIB-MIVB

Support activities for transportation

1000 Brussels - Belgium

www.stib.be

🔍 The issue

Before a new transport maintenance depot was built by Brussels' urban transport company, STIB, it was decided to plan it in such a way that optimal safety and staff wellbeing were guaranteed.

The major risks identified within depots (warehouse) are electrical hazards (900 V presence), the risk of accidents when using work equipment, the risk from moving vehicles and the risk of falling from height.

🔍 The action taken

At the planning stage, safety and health issues were taken into account in the design of the building and in the choice of work equipment including the latest technologies, but work processes, and organisational and individual training were also considered. The hope was to eliminate or minimise safety and health risks to the staff and ensure wellbeing at work.

The solutions include:

- Openings and outlets on the roof and on the side of buildings substantially improve lighting, ventilation and the evacuation of heat and smoke.
- Connecting corridors, an underground corridor and metal walkways allow rapid movement of staff without any risk because these areas are entirely isolated from those where 900 V is present.
- Special equipment allows quick, easy and ergonomic handling and replacement of the vehicles' front windscreens.
- Electrically hazardous areas are separated from access corridors or gateways through interlocks: in case of unlocking, the voltage is automatically cut off.

🔍 The results achieved

The comprehensive approach and consideration of all aspects of the work organisation, individuals, equipment and work environment have led to the design and construction of a metro depot which guarantees a maximum of safety and wellbeing of the staff.

Since the site opening three years ago, only 16 minor accidents have been notified on the site, at the J. Brel subway station. These have been only superficial injuries caused mainly when rising or falling, slipping on wet ground at the carriage washing facility, and also due to the mishandling of tools.

Each of these accidents has been analysed. This has led to preventive and corrective measures to avoid recurrence.



Openings and outlets on the roof and on the side of buildings substantially improve lighting



An underground corridor allows staff to move around safely without risk from high voltages



9. DEVELOPMENT OF EMPLOYER REGULATIONS TO ENSURE SAFE MAINTENANCE

GENERAL MOTORS POWERTRAIN – MAGYARORSZÁG KFT.

Manufacture of motor vehicles
9970 Szentgotthárd
Füzesi út 15., Pf.: 74. - Hungary
www.gm.com

🔍 The issue

Maintenance operations differ substantially from the operating and supervision of production equipment and from manual assembly operations as far as their frequency, complexity, working environment characteristics, ease of regulation and – last but not least – hazards are concerned. The task was to improve the safety of maintenance operations by introducing a cost-efficient method for general use in the company to regulate such operations based on risk assessment and through the training of employees.

🔍 The action taken

Regulations for the safe performance of maintenance operations were developed on the basis of risk assessments. The underlying principle of the development efforts is to perform all operations – including unique and complex tasks – in a systematic rather than an ad hoc manner. The Safe Maintenance Model of the company classifies the maintenance tasks based on their regulatory patterns and occupational safety risks involved. The slogan 'Think before you act', backed by a consciously applied method, serves as the basis for infrequent maintenance operations. A separate method was designed for infrequent high-risk maintenance tasks. Before such tasks are carried out a documented risk assessment must be conducted by the employees performing the activity, and their immediate supervisor must also be involved in this process. This includes identifying the hazards, assessing the risks, and then defining and implementing the preventive measures. The process is supported by an occupational safety guide including work

sheets and checklists, owned and used by each maintenance employee.

The professional skills of maintenance staff must be continuously improved, in line with the development of the applied technologies. In addition to professional training, maintenance workers participate in three hours worth of safety and health training every six months.

🔍 The results achieved

Since the development project was introduced, the number of minor injuries (requiring only first-aid measures and not leading to lost work days) resulting from maintenance operations has been so low that it is unsuitable for any statistical evaluation (1 injury in 2008, 1 injury in 2009, 0 injuries until August 2010).

- Number of hours worked since the last accident resulting in lost work days: ~13.02 million
- Date of the last accident resulting in lost work days: 12 January 2001



Locks

10. ASYMMETRICAL FIBREGLASS LADDER FOR THE MAINTENANCE OF REFRIGERATION SYSTEMS

CARRIER KÄLTETECHNIK GMBH

Repair and installation of machinery and equipment
Sürther Hauptstrasse 173
50 999 Köln - Germany
www.carrier-refrigeration.com

The issue

In the modern retail and wholesale trade individual refrigeration units are often joined together in longer series ('multiplex' systems), which makes access from the side difficult. The multiplex systems are usually mounted on walls, with the result that access from the back is not possible either. Important parts, among others the refrigerant and electricity, as well as pipes, cables, connections, valves, filters, etc., are therefore often situated on the top of the systems, at a height of 2–2.5 m. For maintenance and servicing purposes, the installations on the top of the refrigeration systems have to be regularly tested, cleaned and, if necessary, replaced. This work has to be carried out while the systems are in operation.

The action taken

Because of the unsatisfactory working situation and serious industrial accidents, the management of commercial refrigeration company Carrier Kältetechnik decided in February 2007 to hold an in-house, international workshop on improving health and safety at work. One result of the workshop was that it was decided to procure a new ladder for servicing work, complemented by a detailed method description for working on refrigeration systems. This new asymmetrical leaning ladder allows users to reach areas in and on the refrigeration system from the ladder without any problems and without having to adopt an ergonomically unfavourable kneeling position. A foldout standing platform offers a further ergonomic improvement for longer periods of working. This means that users do not have to stand on one rung for a long time. There is also a storage tray where service technicians can temporarily store tools within easy reach.

The results achieved

Occupational risks have been dramatically reduced. With the ladder resting directly on the refrigeration system roof, there is no need to risk bridging the gap between a stepladder and the system roof, which entails the risk of falling. The fact that the ladder is fixed in place and equipped with non-slip rubber feet minimises the sliding risk. The insulating fibreglass finish also allows the ladder to be used when working with electric current.

Since the ladder was introduced, no accidents in connection with work on refrigeration system roofs have been recorded.



Working on the refrigeration system with asymmetrical fibreglass ladder (with mounted platform and storage tray)



11. 'MORE SUPPORT' PROGRAMME FOR SAFE MAINTENANCE OF A POWER PLANT

ENEL PRODUZIONE SPA

Electric power generation, transmission and distribution
Energy Management and Generation Department
Viale Regina Margherita, 125 – 00198 Rome - Italy
www.enel.it

The issue

Enel is Italy's largest power company. Periodic maintenance of the Enel plants is a vital factor in maintaining the efficiency and safety not only of systems and machines, but also of the working environment in general.

Maintenance has a key role both in reducing losses and increasing the company's productivity as well as ensuring safer and healthier working conditions. However, it also constitutes a high-risk activity in itself which demands preventive and systematic safety management involving the client, the contractors used for different tasks and all those responsible for safety management.

Increasing numbers of external staff, new and different risk situations, work carried out in limited space and time, and the risk of interference are all critical aspects arising during these activities.

Enel has set up a safety management system bringing together all parties involved in the different stages of contracts. The planning, execution and supervision of maintenance work is carried out in compliance with coordinated and agreed safety procedures, which contributes to risk prevention and mitigation.

Focusing on the vital aspects of safety in each stage of the tendering cycle – from qualification to the final award – and increasing the effectiveness of managing, checking and controlling contractors' work improves contractors' safety performance and brings them into line with Enel's own safety standards.

The initiative has also been highly popular with contractors, as it is viewed as a useful contribution to safe working practices and on-the-job training helps to disseminate a safety culture through concrete advice and suggestions.

The action taken

Since 2009 Enel, and more specifically the Generation and Energy Management (GEM) Division, has systematically developed an effective, programme-driven and structured approach to maintenance, based on preventive risk management and effective participation and involvement of the workforce and their representatives; this initiative is known as 'More Support'.

The results achieved

Reduction of accident rates:

- 24 accidents (7 of them were serious and 2 were fatal) between 2007-2008
- 7 accidents (neither serious nor fatal) between 2009-2010
- Continuous reduction of risk factors and risk levels arising during the extraordinary maintenance of Enel power plants



On-site checks



12. PREVENTIVE MAINTENANCE PROTOCOL IN A CONSTRUCTION COMPANY'S CENTRAL MACHINERY POOL

DRAGADOS S.A.

Construction
Avenida del Camino de Santiago 50
28050 Madrid - Spain
www.dragados.com

The issue

With the aim of minimising risks associated with handling and using machinery, as well as the corresponding repair and maintenance operations in its central machinery pool, construction group Dragados improved the training provided to its workers and developed and implemented a detailed and strict maintenance plan for its working equipment and facilities.

The action taken

As part of their professional and occupational risk prevention training, workers doing maintenance on the working equipment receive necessary information on the correct way of carrying out these tasks, and on the risks and preventive measures to be taken while doing so. Each worker is given the instruction manuals for each of the machines they will be working on, as well as a set of information files divided into an initial general file of prevention rules and a second part including the specific prevention rules for each of the working equipment types. Practical training is also provided by using simulators.

The equipment and the premises are subjected to an ongoing process of revision and inspection. The protocol for preventive maintenance is elaborated taking into account:

- the maintenance specifications and recommendations related to each type of machine
- the user guide produced by the machine's manufacturer
- previous experience/accumulated knowledge based on breakdowns or faults detected in the past
- existing documentation on (good) practice/recommendations from specialised bodies/institutions.

Based on this information, an exhaustive factsheet (using a pre-established form) is written for each piece of equipment specifying all the checks to be done, at what intervals, etc.

The results achieved

In the central machinery pool efficiency is higher than expected because the protocol has brought about increases in operability, performance, efficiency and qualification of machinery and personnel. There has been a fall in work-related accidents during maintenance and repair operations, an improvement in machinery operating conditions and an improvement in the performance of the equipment due to decreased stoppage and breakdown times. It also has a significant impact on the health of the employees who work on or near the equipment during their time on the job site, although this impact is difficult to quantify.



Practical training by using simulators



13. RISK ASSESSMENTS AND PREVENTIVE MEASURES TO REDUCE RISKS IN MAINTENANCE

PEPSICO IRELAND

Manufacture of soft drinks; production of mineral waters and other bottled waters
Kilnagleary, Carrigaline, Cork - Ireland
www.pepsico.ie

The issue

Generic risk assessments at this soft drinks plant were initially carried out by a health and safety contractor. These risk assessments were not job-specific and only addressed hazards such as manual handling, fire, explosion, working from height, etc. They did not cover maintenance-related tasks.

The action taken

In 2009 it was decided to overhaul the risk assessments to ensure they were more task-specific, and to include maintenance activities. This review also included routine and non-routine maintenance work done by outside contractors. Multi-discipline Safety Action Teams (SATs) were formed to complete risk assessments on all risk tasks across the site. The SATs were set up to engage employees and to give them a sense of ownership in the risk assessment process. This was carried out by identifying frontline employees and technical staff who had key operational experience in the various areas of the plant.

Examples of maintenance corrective actions that allow jobs to be carried out more safely and efficiently include:

the installation of a lifting beam and chain block system to reduce the manual handling risks, the installation of access platforms on vessels to allow Safe Maintenance access to work at height, and the development of specific isolation procedures for equipment such as tanks/vessels, homogeniser, etc.

One of the objectives of the SATs was to identify six 'key safe behaviours' (KSB) covering also maintenance activities, to be followed while working in a particular area; these behaviours were then displayed pictorially on charts outside the area. These KSB boards are used to induct new personnel to the area and also as a prompt to auditors carrying out behaviour-based safety observations and health and safety audits.

The results achieved

The result of this initiative is that, at the time of writing, the plant had gone 19 months without a lost time accident on this site. The major cost benefit is the avoidance of lost time accidents, which mean bringing in temporary employees to cover those off sick through injury. There is also the avoidance of potential downtime in the plant while incidents/accidents are investigated.



Installed isolation valves

14. SAFETY IN THE CONSERVATION WORKS OF THE CONVENT OF CHRIST IN TOMAR

44 ENGENHARIA E COORDENAÇÃO DE SEGURANÇA, LDA.

Conservation of buildings
Av. Alfonso Costa n. 44
1900.037 Lisbon - Portugal

The issue

The challenge was how to manage safety and health under specific conditions during maintenance tasks on a conservation construction site at the Convent of Christ in Tomar, Portugal, a World Heritage Site.

Problems resulted from the fact that it was impossible to use supporting equipment or machinery on the site, which caused additional complexity and constraints during the works. A further challenge was an increased risk of falls from height in the areas where maintenance works were necessary.

The action taken

A systematic risk management plan and a detailed maintenance plan were put into place on this construction site. The planning was adapted to the characteristics and specific conditions of the work environment. The workers were adequately informed and trained about the risks and they were provided with the necessary tools and equipment. Using a holistic approach all parties working at the construction site were involved in the planning in order to make best use of the health and safety experience of all. A systematic plan to train and inform workers was established in accordance with the needs of different groups. Special emphasis was given to improving the coordination of different works. In order to give clear indications of risky areas a comprehensive system of improved signposting was installed. Wherever possible, modern scaffolding techniques were used to prevent risks of falls from height.

The results achieved

There was a significant reduction in the accident rate, and an increase in the quality of the works. The productivity of the company rose considerably and costs were reduced. All works and services were delivered in time and according to the requirements of the contract.



The red circles show the areas on the building where conservation work was carried out



Scaffolding and signposting of risky areas on the ancient historic site



15. INNOVATIVE SCAFFOLDING CONSTRUCTION FOR SAFE WORKING AT AN INCINERATOR

TWENCE AFVAL EN ENERGIE BV

Waste treatment
195 FTE, Boldershoekweg 51
7554 RT Hengelo – The Netherlands
www.twence.nl

🔍 The issue

Twence Afval en Energie BV has three incinerators for burning household and commercial non-toxic waste. Previously, scaffolding was built upwards from the waste incinerator grid, but the grid itself also had to be cleaned or repaired. For this reason, a 'hanging' scaffolding construction was devised. A consequence of this was that it could not support much weight – in some places less than 50 kg per square metre. However, in practice this was regularly exceeded, thereby increasing the danger of collapse.

🔍 The action taken

Twence decided to design an entirely new construction. This involved creating holes in the walls of the boiler into which heavy pins can be inserted. Special 'saddles' are then placed onto the pins, from where lattice girders can be hung. The lattice girders are then connected to each other to create a basic platform which hangs separately from the grid. The entire scaffolding structure is then built on this platform. Given that the attachment to the boiler wall is very stable, a

greater number of floor levels can bear heavier loads. The risk of collapse has been practically eradicated. In addition, as the basic platform hangs separately from the waste incinerator grid it is possible to carry out work on the incinerator grid and everywhere else in the boiler at the same time, in a safe and responsible manner.

The design of the new scaffolding construction is such that it can be built inside virtually every type of waste incinerator boiler.

🔍 The results achieved

The new scaffolding is a safe solution that tackles the problem at source. It is easy to construct and climb, and it also allows the work to be carried out more efficiently, almost completely eliminating the need for employees to wait for long periods to start or resume their work. This also contributes to a good working atmosphere. A feature of the development of the new scaffolding was the involvement of various parties in the maintenance chain: employees, scaffolding builders, an engineering consultancy and the project team.



A test model at the workplace



'Saddles' for the special lattice girders



16. SAFETY FOR EVERYONE

OTIS LIFT D.O.O.

Manufacture of lifting and handling equipment
 Motnica 5
 1236 Trzin - Slovenia
www.otis.com/site/sl/pages/default.aspx

The issue

Otis lift is part of a multinational company whose core business is manufacturing and selling elevators and escalators as well as maintaining its products on a regular basis. The Otis project aimed at gradually building a complete safety system and culture for all stakeholders (mainly employees, customers, subcontractors and suppliers).

The action taken

Otis implemented various measures with the ultimate goal of creating a safety culture for all. These measures included, among others:

- Raising awareness of importance of general safety: weekly text (SMS) messages are sent to every employee in the field about important safety rules and procedures. Employees in the offices receive monthly e-mails instead of texts. In addition, films about the importance of safety were shown to employees, quarterly campaigns on safety issues were carried out and memory cards in the form of checklists were developed for employees.
- Improvements in safety skills: quarterly safety training and interactive training sessions were carried out, and first aid training was also offered.
- Employees were more fully involved in the safety decision-making process, for example through quarterly meetings

on safety; regular offsite activities were organised to decrease stress (weekly sports activities).

- Field checks by managers and supervisors to verify if safety rules were correctly implemented.
- Introduction of new 'job hazard analysis' forms for different groups of employees.
- Employees were offered rewards for outstanding achievements in the field of safety; rewards are given only for team achievements.
- Suppliers are selected on the basis of safety records, among other factors.

The results achieved

The success of the project is reflected in the following facts:

- zero accident or injuries for employees and subcontractors since 2004;
- improved safety skills: employees are better trained to identify, notice and control or even eliminate hazardous conditions;
- better teamwork and communication between management and employees;
- reduced absenteeism among office workers;
- better scores on external safety audit;
- more frequent near-hit reports.



Safety for everyone



17. AUTONOMOUS MAINTENANCE

BRITVIC SOFT DRINKS

Manufacture of soft drinks; production of mineral waters and other bottled waters
Norwich (RTD) Carrow Works, King Street
Norwich, Norfolk NR1 2DD - United Kingdom
www.britvic.co.uk

🔍 The issue

When carrying out maintenance or cleaning tasks engineers had to access the palletiser using rollers, which was seen as a high risk. Britvic Soft Drinks therefore launched an autonomous maintenance project on a palletiser to try to reduce the risk.

🔍 The action taken

Roller boards were created which could be placed over the rollers when access is required. They are light enough not to present a manual handling hazard, but sturdy enough to create a platform to work from. The boards have nylon pegs which fit between the rollers to stabilise the board, and create a safer working surface for the operator.

First a prototype board was made up by an operator on the project and tested; it gave much greater stability when having to access the palletiser on areas with rollers. A metal board was then commissioned. As the prototype proved to be a success, the idea was rolled out across all palletisers in the business. This new board is to be used at all times when

accessing the roller area to prevent operators standing directly on the rollers.

The project was a structured system of machine improvement taking place over four steps. It encouraged operator involvement in machine safety, increased operator machine knowledge, and also included a deep clean step where the operators dismantle the machine under engineering supervision and clean and inspect all areas. As a part of the first step a risk assessment was carried out; it was during this procedure that any hazards were highlighted.

🔍 The results achieved

The project resulted in a simple, low-cost solution, improving working conditions. The essential element in the success of the improvement was that it was driven by operators. The solution relied on the knowledge of the operators, so hazards and improvements were validated by them. The training and supervision delivered as part of the project helps to instil a greater knowledge and understanding of the health and safety culture.



The Palletiser Maintenance Board developed at Britvic Soft Drinks



18. EXEMPLARY SAFETY PROGRAMME FOR MAINTENANCE AT HERACLES VOLOS PLANT

HERACLES GENERAL CEMENT COMPANY

Manufacture of cement

Lykovrissi, 14123, Athens - Greece

www.lafarge.gr/wps/portal/gr

The issue

At the Heracles cement company, besides daily maintenance activities, production at each plant stops at least once a year so that scheduled extensive maintenance work can be performed. This shutdown is a critical operation of the plant, with increased demands in terms of safety, as many people (both employees and contractors) are involved in many operations of a different nature (production, mechanical, electrical). In the 39 days of the shutdown for maintenance works approximately 100 employees and 160 contractors are involved.

The action taken

An exemplary safety programme for maintenance works was launched. It was a structured and integrated approach for Safe Maintenance, based on three main pillars:

- *Mobilisation and delegation of safety duties to line management and commitment of all maintenance workers to safety*

Safety teams responsible for 13 key safety issues were appointed. The issues reflected the company's main safety priorities, such as General Organisation of Safe Maintenance, Personal Protective Equipment, Electrical Energy Isolation,

Work at Height, Mobile Equipment, etc. Each team had two 'issue owners' who, during the maintenance works, ensured that the safety rules were followed, monitoring any problems and taking immediate action when necessary.

- *Implementation of standards and good practice for each maintenance task*

Issue owners established procedures and systems for each task during the shutdown in order to ensure safe work behaviour.

- *Constant follow-up, checks and corrective actions*

During the maintenance works, teams monitored and registered all the safety issues. When the work was complete, they prepared a final report, assessing the performance and gathering important findings.

The results achieved

- Strong involvement of all line managers in safety;
- Mobilisation of all staff and contractors with regard to safety issues and commitment to safety procedures;
- Establishment of clear safety procedures and innovative tools;
- Rules and procedures shared in advance with all people involved;
- Confirmation of the absolute priority attributed to safety in practice.



The new system is explained to all parties involved



19. ELIMINATION OF OCCUPATIONAL ACCIDENTS FOR CONTRACTORS' PERSONNEL

TITAN CEMENT, HELLENIC PETROLEUM & HALYVOURGIKI

Manufacture of cement, manufacture of basic metals, manufacture of refined petroleum products

Titan Cement
Halkidos 22a
11143 Athens - Greece
www.titan.gr/en

Hellenic Petroleum
8A Chimarras str.,
151 25 Maroussi - Greece
www.hellenic-petroleum.gr/
online/index.aspx

Halyvourgiki
Dragatsaniou 8
105 59 Athens - Greece
http://www.halyvourgiki.com/
english/eteria_istoria.html

The issue

Titan Cement, Hellenic Petroleum and Halyvourgiki (a manufacturer of iron and steel products) use maintenance contractors in preventive and breakdown maintenance of fixed mechanical and electrical equipment, as well as for medium-scale construction projects. They coordinated their efforts in order to improve the safety of both their own workforce and of contractors.

The action taken

Because a significant part of maintenance works is carried out by contractors three companies implemented an integrated management system for maintenance contractors' safety, consisting of the following eight stages: contractor pre-qualification, contract definition and award, contract pre-commencement, written risk assessment or detailed Health & Safety Plan by maintenance contractor, contractor's personnel training, supervision during contract implementation, contract delivery, and performance assessment of maintenance contractors on OSH. Training was developed and implemented to educate the contractors in managing health and safety at work, beyond

merely fulfilling legal obligations imposed on them. The central role of human behaviour in Safe Maintenance was highlighted. The focus was mainly on organisational issues, human behaviour and culture change, while less attention was paid to purely technical issues.

The aim was to gain consensus on safety issues, to embed the perception that safety is an integral part of the job as a whole. Interviews were held with some key contractors to identify their needs. Consequently the training material was prepared by specialised OSH managers of the client companies. The maintenance contractors contributed to the final draft of the training material.

The results achieved

The feedback was very positive, and the contractors have suggested specific issues on which they need additional training. These comments are the basis on which Titan, Hellenic Petroleum and Halyvourgiki will continue this useful initiative to form an ongoing action rather than an individual effort. The most important success factor is that the initiative was launched by the top management of the three client companies.



Maintenance work involving welding



20. AN INTEGRATED APPROACH TO BRIDGE DIFFERENCES IN SAFETY CULTURE

SPIE BELGIUM

Manufacture of refined petroleum products
Vaardijk 112
1070 Brussels - Belgium
www.spie-be.com

The issue

Mechanical maintenance is traditionally a high-risk activity with a statistically high number of accidents. In the client-contractor relationship an additional problem is the difference in safety culture. Whereas this may have been taken into account on a company level, during contract negotiations or in the formal preparations of the contract (e.g. safety plan or generic risk analysis), this is not necessarily the case when considering the individual operators of both sides.

Getting the client operator and the contractor to trust each other and to communicate effectively and smoothly on safety issues is essential to avoid incidents and accidents.

The action taken

SPIE's efforts were focused in three areas: technical issues, training and psychological issues.

• *Technical elements*

SPIE uses professional equipment that is well maintained. As required by the VCA (Safety, Health and Environment Checklist Contractors) checklist, inspections are marked on the equipment with either a colour-coded cable tie, or a small round sticker.

To allow for safe and simple identification of equipment in preparation for maintenance operations, SPIE introduced 'SPIE tags' (small metallic tags to be affixed to equipment by the supervisor during the preparation of the work, preferably in the presence of the client operator as well).

SPIE uses professional equipment that is well maintained. As required by the VCA (Safety, Health and Environment Checklist Contractors) checklist, inspections are marked on the equipment with either a colour-coded cable tie, or a small round sticker.

To allow for safe and simple identification of equipment in preparation for maintenance operations, SPIE introduced 'SPIE tags' (small metallic tags to be affixed to equipment by the supervisor during the preparation of the work, preferably in the presence of the client operator as well).

• *Training*

A three-tier training system has been developed for the SPIE personnel involved on the Total site. In 2009, training on 'last minute risk analysis' (LMRA) was given to all personnel.

• *Attitudes*

A reward system was established to reward technicians for a good performance during the audits.

The results achieved

- No lost time accidents since the start of the contract five years ago.
- A proactive prevention approach by operational staff during the preparation of maintenance interventions.
- A positive attitude by contractor regarding safety issues.
- A marked improvement over time of the results of the client safety audits.

Despite the high risk profile of the activities, SPIE Belgium and its partner on the Total Antwerp refinery won the 2009 Contractor Safety Award.





21. OVERALL SAFETY MANAGEMENT OF MAINTENANCE WORK

FINNSEMENTTI OY, LAPPEENRANTA CEMENT WORKS

*Manufacture of cement
Poikkitie 105
FI-53500 Lappeenranta – Finland
www.finnsementti.fi*

The issue

Accident statistics show that maintenance work is much more prone to risks than production work. Maintenance work is especially hazardous when carried out by an external contractor, as is often the case at Finnsementti. According to the statistics provided by the CRH Group, contractors have accidents up to five times more often than in-house staff. The main focus of this initiative was to improve all steps in maintenance work, starting from invitation to tender and contract negotiations.

The action taken

When an external company is used for maintenance and repair work, the level of safety operations of the company is determined in advance by sending a 'Contractor safety checklist' questionnaire to the contractor. Furthermore, a document entitled 'Observing safety matters when working at the factories of Finnsementti Oy' is sent to a potential contractor together with an invitation to tender. By informing contractors as early as possible about the safety requirements that have to be met when working at Finnsementti sites the company wants to ensure that any safety-induced costs (e.g. use of protective equipment, fall protection) can be taken into account when calculating a tender.

All contractor workers carrying out maintenance or other work must participate in industrial health and safety orientation arranged by Finnsementti before starting work. Since 2008, the goal has been to hold at least 12 hours of safety training per person for the company's own staff. The employees of maintenance contractors who regularly work at the factory are also invited to internal safety training sessions.

In order to identify hazards and prevent risks in maintenance work, safety observations and risk assessments are used. In order to manage risks during the maintenance work itself, a work permit system and adequate isolation and lock-off procedures have been developed.

The results achieved

The safety of maintenance work is monitored along with industrial health and safety in general. Health and safety metrics used are accident frequency and severity. Proactive metrics used are the numbers of safety observations and near-accident reports as well as the implementation of the related corrective measures. The accident figures went down in the factory after the measures were introduced. One of the main success factors of the initiative is the involvement of the whole organisation, including workers and the senior management.



Isolation point: cabinet for key(s) to locks used in isolation and place for the isolation instructions



22. A COMMON TRAINING MODEL FOR OCCUPATIONAL SAFETY ORIENTATION

UPM-KYMMENE OYJ, RUUKKI OYJ & ABB OY

Manufacturing

Eteläesplanadi 2,
FI-00130 Helsinki
www.upm.com/

Suolakivenkatu 1
FI-00810 Helsinki
www.ruukki.fi

Hiomotie 13
FI-00380 Helsinki
www.abb.fi

● The issue

Maintenance is one of the most subcontracted activities in industry. The subcontracting of maintenance can mean that many subcontracting companies are operating simultaneously on a single site. Many accidents are related to subcontracting. There are notable differences between various client and supplier companies in the standard of occupational safety practices and know-how.

UPM-Kymmene Oyj and Ruukki Oyj are two significant Finnish client companies. ABB Oy is a large maintenance industry supplier company in Finland and a subcontractor to both of these client companies. ABB Oy in turn also procures services from its own suppliers in the SME sector.

● The action taken

A consistent training model for occupational safety orientation in the shared workplace has been developed, known as the Occupational Safety Card training model.

The training model has been developed as a nationwide means for improving occupational safety in the shared workplace. The system was created because there was a need to ensure that all representatives of both client and supplier companies working in the shared workplace have the same basic knowledge

about occupational safety and health practices. This training does not replace workplace-specific orientation. In addition to companies, representatives of labour market organisations, the insurance industry and education organisations have participated in the development of this method.

Occupational Safety Card deployment is voluntary, but in practice most industrial businesses have committed themselves to the system, perhaps because the card is generally a prerequisite for a work permit. A significant success factor has been the company management's support.

● The results achieved

After the adoption of the Occupational Safety Card system, accident frequency at all three companies fell markedly, along with accident insurance premiums. (In large Finnish companies, accident frequency has a direct impact on accident insurance premiums paid.)

With a decrease in accidents, sick leave has also declined. Overlapping occupational safety training has also decreased and there is more time for proper orientation. The improvement in work flow and positive changes in the working atmosphere have had a positive effect on productivity.



Safety card ©Kari Rissa



23. REDUCING RISKS DURING MAINTENANCE AND REPAIR OF SHIPS IN DRY DOCKS

SEMCAR

Repair and maintenance of ships and boats
236, rue de Châteaugiron
35030 Rennes cedex 9 - France
www.semcar.com

● The issue

Ships require continuous maintenance and refit operations to keep them in good working order. Ship maintenance activities involve occupational risks linked to metallurgy (welding fumes, enclosed spaces, manual handling, painting with aerosols, etc.) or building and civil engineering (falls from height, traffic, handling, etc.). In addition, shipowners put pressure on maintenance technicians to keep the downtimes of the ships as low as possible to reduce lost working time. Working night and day and having to respect deadlines which affect a shipyard's reputation as much as its technical expertise means that ship repair and maintenance is extremely challenging.

● The action taken

From the very early planning stages of a new dry dock at Concarneau all stakeholders were involved to provide their expert knowledge of occupational health and safety and working conditions. The SEMCAR company, future operator of the port installations, which actually comprises 31 companies acting on the Concarneau port, worked closely with the chamber of commerce, the regional pension insurance fund of Brittany and the project manager.

In a holistic approach the following aspects were given special attention:

- control of accesses
- working on the edge of the pit: falls from height and drowning risks
- manual handling
- traffic
- first aid and fire
- maintenance of the site installations.

● The results achieved

No accident has been recorded on this site for more than three years. From some perspectives, improvements in safety issues might be seen as unproductive investments. However, the current demands on the ship repair sector in terms of quality and productivity are very high, and many workers are involved in the activities. The job requires skilled and experienced employees who are difficult to replace in case of absence. Therefore, a low absenteeism rate is an absolute must for the smooth running of a repair dock. A management aiming at improving working conditions and preventing occupational diseases and accidents is essential for the achievement of these objectives.



The dry dock at Concarneau, Brittany

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