

## Prosecutions

### £100k Fine over Forklift Death

**Two companies have been fined a total of £100,000 following the death of a maintenance worker who fell from the forks of a forklift truck at a Macclesfield factory.**

Martin Denton, 60, was being lifted in a metal container, known as a stillage, on 10 June 2006 when it slipped off and he fell approximately four metres to the concrete floor below. The father-of-three from Rotherham died in hospital later that day from head injuries.

Millennium Rubber International Ltd and United Crane Services Ltd were both prosecuted by the Health and Safety Executive (HSE) following the incident at Millennium Rubber's factory at Nab Works, Long Lane, Pott Shrigley.

Chester Crown Court was told United Crane Services had been hired to repair an overhead crane at the factory but had allowed Mr Denton to be lifted in a container designed for materials rather than people.

The HSE investigation found that it had been standard practice for Millennium Rubber to use containers and pallets on forklift trucks to lift workers, despite neither being designed, nor safe, for that purpose.

Millennium Rubber, which produces rubber surfaces for running tracks and children's playgrounds, admitted two breaches of the Health and Safety at Work etc Act 1974 by putting workers' safety at risk. It was fined £90,000 and ordered to pay £21,411 in prosecution costs in a sentencing hearing at Warrington Crown Court on 9 December 2011.

United Crane Services, of Claywheels Lane in Sheffield, also pleaded guilty to one breach of the same act for failing to ensure the safety of its employee, Mr Denton. It was fined £10,000 with costs of £5,000.

HSE Principal Inspector Tanya Stewart added:

"Mr Denton died because neither company followed basic health and safety procedures for working at height. He should never have been expected to stand in a metal stillage, balanced dangerously on the forks of a forklift truck.

"The companies simply did not consider the risks Mr Denton might face if he carried out the repair work to the overhead crane in this way. They should have made sure a safe system for the work was in place before allowing him to start.

**"It's disgraceful that the practice of lifting workers on forklift trucks had taken place on many other occasions. Sadly, it was therefore almost inevitable that someone would be seriously injured or killed."**

### **£10k Fine for Company in Hand Crush Case**

A manufacturing firm has been sentenced after a worker's hand was crushed in a metal press at a St Helens factory.

Barry Kelleher lost his little finger and part of the palm on his right hand as a result of the incident at Crane Building Services and Utilities. The 47-year-old from Leigh also needed two skin grafting operations.

The owner of the factory, Crane Ltd, was prosecuted by the Health and Safety Executive (HSE) after an investigation found the machine could still be operated when a workers' hand was underneath the mould.

**Knowsley Magistrates' Court in Huyton was told the machine had been installed at the factory on Delta Road in St Helens in 1967, but had not been upgraded to comply with modern health and safety laws.**

Mr Kelleher does not remember the incident on 19 January 2011, which occurred while he was using the press to mould metal parts, used by the gas industry.

However, the HSE investigation concluded that the most likely explanation is that he inadvertently pressed the foot pedal on the machine while his hand was under the mould.

Crane Ltd pleaded guilty to a breach of the Provision and Use of Work Equipment Regulations 1998 by failing to prevent workers from being able to access the dangerous parts of the machine while it was operating.

The company, of West Road in Ipswich, was fined £10,000 and ordered to pay £4,560 in prosecution costs on 9 December 2011.

### **Bus Company in Court after Apprentice's Ordeal**

One of South Yorkshire's main bus operators has been sentenced for safety breaches after a teenage apprentice was trapped under a 14 tonne bus when its air suspension failed.

Ben Burgin, who was then 17, needed restorative plastic surgery to his nose and eye socket following the incident at Stagecoach Yorkshire's garage in Wakefield Road, Barnsley, on 7 September 2009.

**Barnsley Magistrates' Court heard Mr Burgin, from Penistone, was working alongside an experienced fitter to correct a braking fault on a bus fitted with an air suspension system. Rather than moving the bus over an inspection pit, they attempted to fix the fault with the bus still on the garage floor.**

Mr Burgin slid beneath the bus near the front passenger wheel and was making adjustments when the air suspension failed suddenly and the bus dropped on him, badly injuring his face. He was freed when another worker rushed to help and they were able to raise the bus sufficiently to get him out.

The incident was investigated by the Health and Safety Executive (HSE) which brought the prosecution against the operator's owners, Yorkshire Traction Company Ltd of Stockport, Cheshire.

The company, of Dawbank, Stockport, pleaded guilty to two offences under the Health and Safety at Work etc Act 1974 and was fined a total of £15,000 and ordered to pay £8,473 in costs.

After the hearing, HSE Inspector Steve Kay, who investigated, said, "Thankfully Ben has been able to return to work but he had a painful recovery after suffering a totally needless ordeal.

**"When employing young people, it is crucial that firms take particular account of their obvious lack of experience and lack of awareness of risks.**

"The risks involved when working on buses and coaches with air suspension systems are well known in the motor industry. The latest guidance has warnings about never going underneath unless the buses are properly supported. There have been incidents in the past, including deaths, when air suspension systems have failed catastrophically while someone was underneath.

"Yorkshire Traction fell well below a reasonable standard. It failed to take basic precautions such as looking at all the risks involved and specifying a safe system of work for their employees, including close supervision.

"Young people are more vulnerable. The purpose of assessing the risks they may encounter is not to produce paperwork but to protect them as best you are able."

### **Fire Engulfed Workers in Dig Incident**

**A company and its manager have been fined after two workers were engulfed in a fireball when they cut through a live 1,000 volt electrical cable at an industrial unit in Telford.**

The Health and Safety Executive (HSE) prosecuted Birmingham firm RVB Investments UK Ltd and manager Clifford Leigh following the incident on 10 August 2010.

Telford Magistrates' Court heard RVB Investments' employees Eamonn Osborne, 53, and David Rawlins, 46, had been told to find an underground water leak at an empty industrial unit owned by the company at Halesfield 5, Telford.

Mr Leigh instructed them to dig at a spot outside the unit. Using an electrical drill, they drilled nearly 40cm into the ground until they hit a live 1,000 volt cable.

They were engulfed in a fireball and suffered burns to their hands, arms and faces. Both were airlifted to hospital and Mr Osborne was so seriously injured that for the first few days, doctors believed he might not survive.

The court heard the estimated power of the fireball was equivalent to 4.3 million watts of energy.

**The heat was so intense that part of the electrical breaker's metal tool was vaporised and a 500 amp fuse was blown in a nearby electrical substation.**

HSE's investigation into the incident found that RVB Investments had not assessed the risks involved, devised a safe system of work or obtained site plans of the area, checked whether there were any electrical cables underground or used safe digging methods. The two men had also received no training about the dangers arising from underground services.

The court also heard that in issuing instructions to the two men, Clifford Leigh had a duty to take reasonable care for their safety. Despite being aware of the guidance which details how to dig safely near underground services, he failed to ensure that proper precautions had been taken before telling them to start work.

RVB Investments UK Ltd, of Hurst Street, Birmingham, pleaded guilty to breaching Section 2(1) of the Health and Safety at Work etc Act 1974. The company was fined £10,000 and ordered to pay £4,420 costs.

Clifford Leigh, of Longbridge Lane, Birmingham, pleaded guilty to breaching Section 7(a) of the Health and Safety at Work etc Act 1974 and was fined £2,000 and ordered to pay £1,000 costs.

Speaking after the hearing, HSE principal inspector Nic Rigby said: "...Companies must take measures to protect workers who are digging into the ground, where gas and electricity services may be found.

**"They must obtain site plans from service providers, use a cable avoidance tool to scan and check what is actually under the surface, and ensure that workers are properly trained and digging is carried out safely.**

"All employees, such as Clifford Leigh, have a responsibility to ensure that they take reasonable care for the safety of their fellow employees when making decisions about how work should be carried out.

"RVB Investments UK Ltd and Clifford Leigh failed to do this and as a result two men were seriously injured in an avoidable incident that could easily have been fatal."

### **Companies Fined after Worker Breaks Back in Fall**

Anson Packaging Ltd and Cambs Compressor Engineering Ltd, two companies based in Ely, have been fined a total of £68,030 with £37,743.72 costs after a 24-year-old worker broke his back in a fall from a roof void.

Anthony Strong, a pipe fitter employed by subcontractor Cambs Compressor Engineering Ltd at the time, was tasked to install pipe work required for the installation of a moulding machine at Anson Packaging's premises at Elean Business Park, Sutton, on 29 October 2008.

Part of the pipe work installation was taking place in the roof void above a suspended ceiling, a distance of 6.5 metres to the factory floor, and required that Mr Strong and a co-worker use a crawl board to travel from the protected walkways in the roof to the place where the pipe work was to be installed. Both men had harnesses but they were unable to use them effectively due to a lack of suitable attachment points in the roof void. At times both men had to detach themselves completely to move across the void to the work position.

Mr Strong was using the crawl board between beams in the roof void to traverse to his working position when he fell to the floor, suffering fractures to his spine, skull and ribs.

**An investigation by the Health and Safety Executive (HSE) found that, despite the fact that some measures were taken to assess risk and some work at height equipment was provided prior to the work being carried out, both Anson Packaging and its subcontractor Cambs Compressor Engineering had failed to ensure that Mr Strong and his co-worker were competent to undertake work at height and given appropriate equipment and a safe system of work.**

The two companies appeared at Cambridge Crown Court recently. Anson Packaging has admitted breaching Section 3(1) of the Health and Safety at Work etc. Act 1974.

Cambs Compressor Engineering admitted breaching Section 2(1) of the Health & Safety at Work etc. Act 1974 and Regulation 5 of the Work at Height Regulations 2005.

Anson Packaging was fined £50,015.00 with £29,291.09 costs, while Cambs Compressor Engineering was fined £18,015 with £8,452.63 costs.

HSE Inspector Gavin Bull said, "Falls from height are one of the most common, yet preventable, causes of injury at work. In 2008/2009, more than 4,000 major injuries were caused by falls from height at work.

"In this case a man suffered serious personal injuries because work at height was not properly planned.

**"Both companies had a duty to ensure that work at height undertaken by their own employees, or on their behalf by staff employed by subcontractors, was properly managed with safe systems of work agreed and implemented.**

**"Although some work equipment was provided to the 2 workers to enable them to undertake the work at height it was not suitable for the particular roof space and the workers were not trained in its correct use."**

### News

#### **Calls for more Action to Prevent Work-Related Cancer**

Strong intervention on reducing exposure limits relating to occupational carcinogens and increasing compliance in the workplace could prevent nearly 8500 cases of cancer over the next 50 years, according to an HSE expert.

Presenting the findings of new research published in the British Journal of Cancer to the HSE board last week, Dr Lesley Rushton said even modest intervention by the HSE, involving a light reduction in exposure limits, could prevent more than 2,000 cancers by 2060.

Pointing out that the research is not new evidence but about established and probable risks, Dr Rushton said the percentage of cancers attributable to occupational carcinogens is 5.3%, which translates to approximately 8,000 fatalities a year and around 13,500 new cases a year.

While work exposure is not as big a causative factor as smoking and diet, the study reports that the total number of cancer cases attributable to occupational exposure is estimated as 11,494 (7,832 in men and 3662 in women), representing 3.7% of all cancers (excluding non-melanoma skin cancers). Significantly, more men develop cancer from work exposure than alcohol consumption.

The main occupational causes of lung cancer are asbestos, as well as silica, diesel-engine exhausts and mineral oils, while shift work is cited as a major occupational cause of breast cancer among women. Dr Rushton added that there are 16 carcinogens associated with construction, and 14 agents account for 85.7 per cent of current cancers attributed to the workplace.

Following the presentation, HSE board member Hugh Robertson said the research confirmed the need to take action, adding: "It's about changing behaviour – ensuring that all those 'under the arches' workplaces improve compliance."

HSE chair Judith Hackitt said further research is needed to help the regulator determine what it needs to do to shape its intervention strategy for the next three to five years.

Following the publication of the study, there were calls for a greater focus on occupational exposure to carcinogens from several stakeholders. Welcoming the research, the British Occupational Hygiene Society said: "All of these (work-related) cancers could have been prevented through better recognition of the risks within occupations, and BOHS believes that with appropriate focused efforts almost all occupational cancers could ultimately be prevented.

"This goal would take time to achieve because there is a very long lag between workers first being exposed to carcinogens and any disease being diagnosed, but if we do not act now then the present death toll will continue."

### Use of Mobile Phone 'Expert XP-Ex-1' in Potentially Explosive Atmospheres

The HSE has issued a safety notice in response to a European Commission (DG Enterprise and Industry) requirement that Member States prohibit the placing on the market and withdrawal from the market of mobile phone 'Expert XP-Ex-1' manufactured by Intrinsic Safety specialists, Netherlands. This mobile phone does not meet the essential safety requirements for equipment of Category 2: it can produce hazardous sparks in case of faults and therefore does not meet the requirements of the intrinsic safety protection mode as required.

Following safeguard action approved by the EC under the ATEX Directive (Directive 94/9/EC) in respect of a mobile phone 'Expert XP-Ex-1', the Commission considers that this mobile phone fails to comply with the essential health and safety requirements referred to in Article 3 of the Directive 94/9/EC and set out in Annex 2.

The European Commission has now required Member States to prohibit the placing on the market of mobile phone 'Expert XP-Ex-1' as compliant with the ATEX Directive.

This mobile phone must not be used where products complying with the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 (as amended) are required.

This problem was first identified by the German authorities who have already taken measures prohibiting the placing on the market and withdrawal from the market/retailers of this mobile phone in Germany.

#### Action required

##### *Suppliers*

UK suppliers should immediately cease the supply of the phone.

##### *Users*

Avoid using the phone in potentially explosive atmospheres.

#### Relevant legal provisions:

- Health and Safety at Work etc Act (1974)
- ATEX Directive (Directive 94/9/EC)
- Management of Health and Safety at Work Regulations (1999)
- Provision and Use of Work Equipment Regulations (1998).

### Employers 'Unconvinced' by Fit Notes?

The introduction of the 'fit note' to replace the 'sick note' has provided the nudge needed for managers to open up important conversations with their staff and discuss the best way to help get individuals back to work, according to research from the Chartered Institute of Personnel and Development.

New findings from the CIPD/Simplyhealth Absence Management survey reveal that more than half of employers (52%) agree that the introduction of the fit note has enabled line managers to prompt conversations about absence and health issues with their staff.

Just under a third of the organisations (31%) questioned in the CIPD/Simplyhealth survey agreed that the fit note helps line managers to manage absence more effectively. The vast majority of employers (87%) have used the fit note in their organisations, however its use was less common in smaller businesses of less than 50 employees (54%).

The survey also suggests that employers remain unconvinced that the fit note has yet had much impact in helping to reduce levels of employee sickness absence. Just one in ten respondents (11%) said the fit note had reduced absence in their organisation. The same number of employers said they believe the fit note is being used effectively by GPs.

Dr Jill Miller, CIPD Adviser, said: "Our research reveals the value fit notes can have in promoting good quality conversations between managers and their employees, which has a positive impact on the management of absence. However, the survey suggests the fit note has yet to have a real impact on reducing absence levels. This is perhaps not surprising considering the culture change needed by GPs, employers and employees to ensure that a phased return-to-work is more frequently regarded as a positive and integral part of employees' rehabilitation and recovery.

"We are seeing some positive reviews of the fit note from GPs, but employers do not share such a warm view at present. GPs and employers need to work from the same page, promoting what is best for the individual employee's health and well-being, but also what makes sense for the business.

"Employees too need to be more forthcoming and willing to enter these discussions. Policy makers, however, should not be discouraged as it may well take five years or so before the fit note is consistently used effectively and viewed more favourably by GPs, employers and employees, to support early and lasting returns to work."

Gill Phipps, HR spokesperson for Simplyhealth, added: "We and the CIPD are keen to hear the Government's response to the recommendations from the recent Sickness Absence Review. Helping people get back into work following illness or prolonged sickness absence is beneficial for both the employee and the employer. Quality support and training are vital for initiatives to properly embed and become successful within our organisations."

## Reports

### Offshore Statistics 2010/2011

This report contains details of offshore accidents, dangerous occurrences and ill health reported to HSE from 1 April 2010 to 31 March 2011, with summarised data back to 1995/96 for comparison.

The main points are as follows:

- no fatalities arising from offshore work activities regulated by HSE were reported in 2010/11 for a fourth successive year
- 42 major injuries were reported, compared to 50 in 2009/10 and 30 in 2008/09
- the major injury rate per 100,000 workers fell from last year's figure of 188 to 152 returning to the levels last seen in 2007/08. The combined fatal and major injury rate is the same as the major injury rate
- 107 'over-3-day' injuries were reported, a reduction of 3 compared to the previous year. The over-3-day injury rate decreased from 413.6 per 100,000 workers to 386.8 – a decrease of 6.5% compared to 2009/10. This is 70.1% lower than the peak of 1,293 in 1995/96
- 430 dangerous occurrences were reported, compared to 434 in 2009/10, a decrease of 4. This is 43.7% less than the peak of 764 in 2000/01
- the estimated offshore workforce was 27,660 compared to 26,598 in 2009/10 - an increase of 4%
- the 'maintenance/construction' work process environment continued to produce the highest number of 'all injuries' this year, followed by 'deck operations'. 'Maintenance/construction' produced the most 'major' injuries followed by 'Production' activities
- 'struck by moving objects' produced the most injuries in a single category followed by 'injuries from handling, lifting or carrying', 'slips, trips and falls', and 'falls from height'. These four categories account for 83% of all injuries. Injuries from slips, trips and falls, including falls from height, account for 38.1% of all major injuries. Approximately three quarters of major injuries were to limbs
- the ratio of over-3-day to major injuries increased by 15.9% in 2010/11 to 2.55. This reflects the reduction in the proportion of major injuries among the total of all reportable injuries compared to the previous year and continues the overall downward trend in reportable injuries over the last five years
- this year the three-year rolling average of injury rate for combined fatal and major injuries fell compared to last year and continued the overall downward trend over the past 10 years. The three-year rolling average rate for over-3-day injuries continued to decline.

### Air Transport Sector – Case Study

**Salus Aware** – although you may not be in the air transport industry, the following case study highlights good practice that could be utilised across many other industries and applications – please read on .....

A case study has been highlighted by the HSE for providing an example of good practice to reduce the manual handling risks (pull forces) present when unravelling fuel hoses prior to refuelling aircraft.

#### *The Manual Handling Risk*

Employees engaged in aircraft refuelling operations are required to manually remove the refuelling hose from the rear of the fuelling truck. The refuelling hose is generally pulled a distance of eight metres but in some circumstances can be pulled a distance in excess of 15 metres. Employees would remove the hose nozzle from the fuelling vehicle and place the nozzle and hose over their shoulder and walk forwards to the hose's destination and unravel the hose from its wheel.

ExxonMobil, via a Manual Handling Risk Assessment process, identified concerns regarding the pulling forces required to unravel the fuel hoses from the vehicle particularly when the 'sagging' unravelled hose makes contact with the concrete floor increasing the friction and therefore the pulling force required to extend the hose. As the hose is pulled out more of the hose makes contact with the concrete and therefore the forces required to pull the hose continues to rise.

ExxonMobil recognised that the forces required to pull the hose may be beyond the pulling force capabilities of some employees and therefore may represent a risk of musculoskeletal injury. Furthermore it was recognised that employees were leaning forwards in order to overcome the forces required to unravel the hose therefore possibly increasing the slipping potential particularly in cold weather periods. This activity will take place during hours of darkness so therefore employees may be unable to identify potential slip hazards.

#### *The solution*

ExxonMobil reduced the forces required to unravel the hose. This involved wrapping hard, low-friction plastic around the hose in a helical manner so that when the hose makes contact with the floor there is less friction and consequently the forces required to drag the hose are reduced. The helical wrapping was cut into 2m lengths, so that parts that wore could be replaced without having to replace the whole hose length of wrapping. The colour of the wrapping was also specifically manufactured to enhance the visibility whilst in use on the apron, this allowed other airside users both in vehicles and on foot to identify where the hose had been laid and as such avoid both a tripping hazard and from being driven over.

ExxonMobil contacted the HSE and sought their opinion on this musculoskeletal injury risk reduction measure. As a result HSE's research laboratories (The Health and Safety Laboratory) measured the forces required to pull the hoses both with and without the plastic wrapping.

The forces to pull the hose without the plastic wrapping were so high and still increasing that measurements were not taken once 17 meters had been unreeled.

The Manual Handling Operations Regulations (MHOR) establish a clear hierarchy of measures which are to:

- avoid hazardous manual handling so far as is reasonably practical
- make a suitable and sufficient assessment of any hazardous manual handling operations that cannot be avoided
- reduce the risk of injury from those operations as far as is reasonably practical
- therefore by attaching the plastic wrapping to the refuelling hoses the forces required to perform the refuelling operation is substantially reduced and therefore the physical demands on the employees are substantially reduced.

Other advantages of wrapping the refuelling hose

- due to the reduction in the force required to unravel the hose from the reel operatives' postures were improved when performing the task (ie not leaning forward to overcome the force required)
- reduced potential for slipping in cold weather conditions due to the improved posture
- less biomechanical and physiological demands on the worker over the working day due to the reduction in force requirements
- wear and tear on the hose is reduced as it is not in direct contact with the ground, without the wrapping the hoses have to be cut and shortened where key wear points are identified
- the time taken to carry out the operation is also likely to be reduced.

The cost to wrap a refuelling hose is as little as £120 per hose.

The HSE note that this intervention is a reasonably practical control measure for reducing the risk of manual handling injury when refuelling aircraft and would encourage the industry to adopt a similar approach.

## Guidance

### Dust and Explosions in Factories

The risk of a dust explosion occurring in a factory is not as remote a possibility as people might think. A dust explosion requires only three things: air, combustible dust and a source of ignition such as an electrical spark or hot surface.

Many companies are potentially at risk. This is because combustible dusts are present in many manufacturing environments. Wood shavings, carbon dust, flour, grain, custard powder, sugar, coffee, tea, animal feed, plastic and aluminium dust are just some examples of highly combustible dusts. The problem is when these combustible dusts are left to gather on hot surfaces in a workplace, such as on an overheated electric motor or fan. This can cause smouldering fires to occur, or can cause an explosion when the dust is kicked up, for example, by a person opening a nearby window.

Dust explosions can have catastrophic consequences because the initial shock wave resulting from the explosion kicks up more dust, which triggers a chain reaction through the plant, often resulting in mass destruction of equipment and buildings, as well as causing possible death or injury to employees.

Therefore, as potential sources of ignition, all electrical equipment installed in these areas, including mixers, filling hoppers, conveyor systems, mills, silos, dust extraction plant, kilns and drying systems, need to be adequately protected and designed to operate under these conditions. Directors, company owners, plant managers and maintenance engineers, in fact anyone who is responsible for the health and safety of employees or for sourcing electrical equipment for hazardous areas – needs to be fully aware of the risks of dust explosions, the European Directives and standards relating to electrical equipment installed in hazardous areas and the measures that can be taken to eliminate the risk of dust explosions occurring. Therefore, the European Directive for hazardous equipment 94/9/EC pointed out that this was valid in the same way for dust explosion-protected equipment as well as for gas hazardous areas.

Owners of new equipment are governed by the compulsory European directive 1999/92/EC, implemented in the UK as the 'Dangerous Substances and Explosive Atmospheres Regulations 2002' (DSEAR). From 2006, this directive also includes 'old' as well as 'new' equipment. In summary, owners are required to identify the risks of explosion; implement explosion protection measures such as avoiding sources of ignition (secondary explosion protection); define zones in areas at risk from dust explosions; create an explosion protection document; use suitable production equipment; and to create a test plan.

On 1 June 2012 a new series of standards will come into force, one of the main protection types for production equipment at risk from dust explosions in accordance with ATEX Directive 94/9/EC is the protection by enclosures type 'tD' as given in IEC 61241-1.

This protection type is where the electrical production equipment is equipped with an enclosure to prevent the penetration of dust and where measures to limit the surface temperature have been implemented. On 7 July 2010, the new standard IEC 60079-31:2009 "Equipment – dust ignition protection by enclosures "t" comes into effect and will supersede the standard EN 61241-1:2004 on 1st October 2012.

Hazardous areas for explosive dust atmospheres are classified into three Zones: 20, 21 and 22. Zone 20 is an area in which an explosive atmosphere in the form of a cloud of combustible dust in the air is present continuously, or for long periods or frequently.

Zone 21 is an area in which an explosive atmosphere in the form of a cloud of combustible dust in the air is likely to occur in normal operation occasionally.

Zone 22 is an area in which an explosive atmosphere in the form of a cloud made up of combustible dust in the air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

For the equipment to be used in explosive dust atmospheres, the sub-grouping system as known from the sub-grouping system for explosive gas atmospheres is now also implemented for explosive dust atmospheres. Electrical equipment of Group III is sub-divided according to the nature of the explosive dust atmosphere for which it is intended.

Group III sub-divisions:

IIIA: combustible flyings.

IIIB: non-conductive dust.

IIIC: conductive dust.

The equipment protection level (EPL), which is the level of protection assigned to equipment based on its likelihood of becoming a source of ignition and distinguishing the differences between explosive gas atmospheres, explosive dust atmospheres, and the explosive atmospheres in mines susceptible to firedamp, is now also implemented for explosive gas and for explosive dust atmospheres (details can be found in the standard EN 60079-0).

When can dust explode?

A dust explosion requires three ingredients: air, combustible dust and a source of ignition. Combustible dust-air mixtures have different ignition temperatures. The surface temperature of the equipment in areas where there is a risk of dust explosions is allowed to reach two-thirds of the minimum ignition temperature of the surrounding dust-air mixture. With a 5mm thick layer of dust, this surface temperature must be at least 75°K below the minimum ignition temperature of the dust (glow temperature).

It is therefore the equipment owner's responsibility to ensure that the cleaning and maintenance intervals of installed equipment with a dust explosion risk are scheduled so that no dust layers thicker than 5mm are allowed to form. At higher dust deposits, the minimum ignition (glow) temperature of the dust is reduced significantly.

The goal of the current European Directives is to protect operating plants from dust explosions and to prevent damage or personal injury. The explosion protection measures are divided into 'Owner' and 'Manufacturer' Directives. Again, the objective is to implement all necessary measures to ensure that explosion-protected products can only be operated if they do not pose any danger to health and safety and provided that they are correctly assembled, installed, maintained and used for their intended purpose.