Imperial College London

Health and Safety Matters

June 2014

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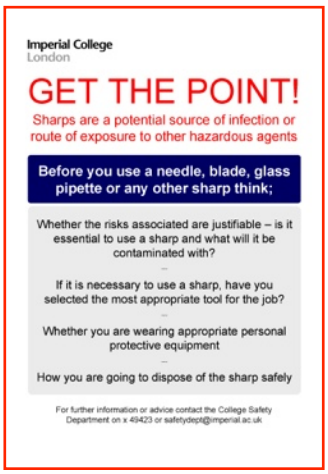
SHARPS INJURIES...Are we still getting the point?



The 'Get the Point' awareness poster, first issued in 2004

About ten years ago the Safety Department did a sharps awareness campaign with our *'Get the Point'* poster. You can still see this poster throughout the College. Is it time to have a look at sharps injuries again? Did our campaign make an impact on the amount of sharps injuries we have every academic year? We looked at all injuries cause by a 'sharp', which includes needles, scalpels, microtome cutting blades, broken glass and tools in workshops. Figure 1 below, shows a ten year trend for total accidents and also accident rates (per 1000 laboratory-based staff and students). A dip can be observed in the graph immediately following the last campaign, which then levels off and appears to rise again to the current level where we stand today. It could be concluded that there was some initial impact but this has receded over time.

Is it just students who get sharps injuries?
No, 58% of the injuries are to students (UG 35% and PG 23%) - this still means staff are contributing 42% of the total. Injuries to undergraduates represent the larger proportion of the total student injuries. Inexperience? Numerically, there are more of them, so this could account for it to some degree.

How many injuries do we get each academic year?
On average we have 45 sharps injuries every academic year. With still three months to go of this academic year we already have 61 injuries (Figure 2). Needlestick injuries are a large proportion of all sharps accidents, however we have seen an increase in serious injuries (requiring hospital treatment...and RIDDOR reportable in the case of students) caused by broken glass in the laboratory. This year, we have also seen a number of injuries caused by the sharp edges of material specimens being worked on.

Any trends over the course of a typical academic year?
The graph is not shown here, but again, taken over a ten year period, we see some peaks in November and February-March, with a dip in April before another peak in May. This corresponds with the start of new staff and students at the beginning of the academic year, the start of lab projects in February-March with the Easter holidays causing a dip, before the rise again in May when students start their final year projects. However, these dips and peaks are not hugely pronounced, so we need to be wary of differentiating real observations from random effects.

What about near misses?
Yes, we get those reported too. Reports of scalpel blades being left in lab coat pockets have been received on a number of occasions recently.

Time for a new awareness campaign?
Yes, the Safety Department will start a new campaign sometime this year. It is always difficult thinking of innovative ways to raise awareness. We are giving some thought to a sharps 'e-booklet', but if you have any suggestions on how to communicate the message, we would like to hear from you.

In the meantime, you can help by reminding students and staff of the risk of all types of sharps, provide training and supervision and substituting sharps for safer alternatives where possible.

Figure 1

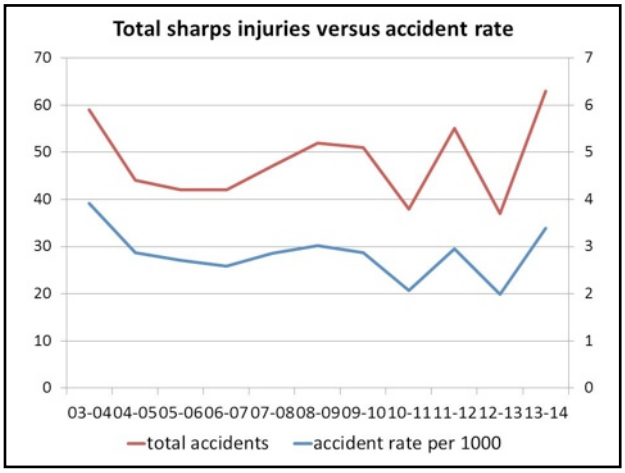
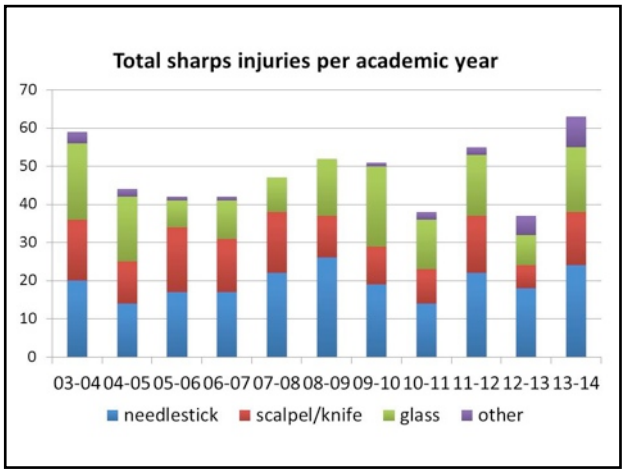


Figure 2



LEGIONNAIRE'S DISEASE - IS YOUR WATER SYSTEM SAFE?

Steve Greenwood, Faculty Safety Manager for Engineering, who has past experience in the water industry, looks at the risk of legionella bacteria in relation to departmental equipment

These were the headlines of Newsweek magazine back in 1976. Over two hundred people attending an American Legion convention in Philadelphia had contracted a previously undetected type of pneumonia, which left thirty four people dead before the outbreak was over. This mystery infection caused great concern, and was subsequently named "Legionnaire's Disease". Its source was eventually identified as the hotel air conditioning system, with the vehicle of infection being a contaminated aerosol of water. It was realised that this was probably not the first manifestation, and pathology tests proved that cases had gone unnoticed elsewhere at least as far back as 1947.

In the UK, there have been a number of notable outbreaks – in 1985, Stafford District Hospital's air conditioning system infected one hundred and seventy five people, killing twenty eight, but the one that brought the disease to people's attention was the 1988 BBC outbreak in central London (forty three cases, two deaths). In 1989, Imperial College itself was implicated in a local outbreak, although not identified as the source. Despite investigations, prosecutions and readily available guidance from the HSE, outbreaks continued – one at a Council Arts Centre in Barrow in Furness in 2002 led to 180 cases and seven deaths, and although acquitted of corporate manslaughter, the Design Services Manager was personally fined £15,000 for failing in her duties under the Health and Safety at Work Act. There is no vaccine, and outbreaks still occur regularly throughout the world.

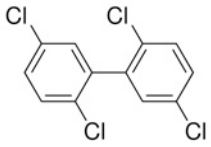
You might be mistaken in thinking that it only concerns those departments like Estates Facilities who manage building services. There are, however, numerous other water systems, equipment and apparatus around the College that are owned by Departments, and local managers and supervisors will be responsible for ensuring they are safely operated and maintained. Some examples include water jet cutters and pressure washers, scrubber systems, water storage tanks and flumes, and even deliberate research into strains of Legionella bacteria. They are not just found in cooling towers, spa pools, fountains and showers - since they exist at low levels in natural water sources, including reservoirs, they can be introduced into any water system through the incoming mains water, and low level chlorination does not necessarily kill them. If the conditions are right, they will multiply. Below about 20°c they are dormant, and above around 50°c they begin to die, but between these temperatures, they present a risk. If people inhale water droplets from any fine mist containing active bacteria, they could contract the disease. Although the majority are not likely to be susceptible, certain groups, like older male smokers, or people with existing respiratory problems, are particularly vulnerable.

So, if you are the responsible person, what do you need to do? Because legionella bacteria are a "hazardous substance", potential sources of risk must be identified, evaluated and documented, and any methods of prevention or control included. Where the risks are insignificant, then simple procedures that maintain the general water hygiene such as cleaning and refiling with fresh water are going to be all that is required. But, if the conditions for growth are favourable, or sprays and aerosols are created, then the risk assessment should be specific to the water system or systems, and formal documented procedures will need to be put in place. These could include regular microbiological and water quality tests, cleaning and disinfection regimes, and the maintaining of log books to ensure the procedures are followed and up to date.

If you are concerned, and want to know more about how you can ensure both that your water system is safe and you are complying with the legislation, then speak to your local faculty, campus or departmental safety officer, or the Safety Department. Further reading: HSE guidance document L8: Legionnaires' disease -The control of legionella bacteria in water systems

Polychlorinated biphenyls

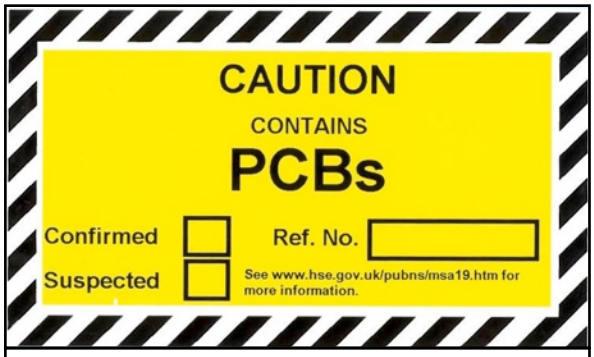
The problem with PCBs



Polychlorinated biphenyls (PCBs) are a group of man-made chemicals developed in the 1920s which were widely used as electrical insulators. They were used as filling liquids in a range of electrical equipment and were valued for their chemical stability and resistance to fire. Subsequently, PCBs were found to have both health and environmental impacts – people working with PCBs were at risk of developing chloracne, problems with liver function and a link with cancer was suspected. Toxic effects were reported in wildlife. As a result, an international agreement was signed in 1986 to ban most uses of PCBs. Despite this, trace amounts can still be measured in animals, fish and soils and oceans around the world.

In 2000 the *Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations* were enacted. The Regulations require the disposal or decontamination of all "contaminated equipment" containing PCBs as soon as possible. Unsurprisingly, given the nature of these substances, PCBs must be disposed as hazardous waste. It is an offence to hold "contaminated equipment" which is defined as equipment containing five litres or more of any substance with a PCB concentration greater than 50 parts per million (ppm). The exception to this is transformers containing PCB oil at concentrations of no more than 500ppm, which can be retained till the end of their useful life. All contaminated equipment must be suitably labelled and must be registered with the Environment Agency. Estates Facilities will eventually hold a central register on behalf of the College.

Equipment including components containing PCBs which are part of a larger piece of equipment where neither the component nor the larger equipment is classed as contaminated equipment can be kept until the end of its useful life.



Example of a label for identifying equipment containing PCBs. These will be available from the Energy & Environment Manager

Recently, the College received a notice from the EA advising that we had contravened the above Regulations by disposing of PCBs which should have been registered with them. The EA learned of this transgression via the periodic waste returns that the College hazardous waste contractors are obliged to submit to them. Whilst there was no suggestion that we had intentionally failed to comply with the Regulations, the EA have advised that we should carry out an audit to establish whether we have further holdings which should be registered and if necessary, disposed of. A College-wide audit is currently being planned, though at present, it has not been decided what shape or form this audit might take.

In advance of any audit being carried out, if you have electrical equipment manufactured before 1986 which you suspect may contain PCBs please contact Sara Muir, Head of Energy and Environment – s.muir@imperial.ac.uk to discuss the appropriate course of action.

Equipment most frequently found to contain PCBs
(Source: Environment Agency)

- electrical transformers
- power factor capacitors
- heat transfer equipment
- pole-mounted transformers
- process heating equipment
- high temperature hydraulic systems
- electrical resistors
- bushings and other high voltage equipment
- fluorescent light ballasts
- hospital diagnostic equipment
- vacuum pumps

News Snippets

Farewell.....

Ian Gillett, College Safety Director retired on 31 May after 24 years in the post. Numerous tributes to Ian have already taken place and a well attended farewell 'bash' took place on 28 May. An interview with Ian can be found on the College and Campus News page: http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_7-5-2014-10-26-56 and also on the Staff Development pages as part of the Safety Training Newsletter: http://www3.imperial.ac.uk/staffdevelopment/safety/june2014

Brian Robertson, College Radiation Protection Manager, also left the Safety Department in May to take up a post at Exeter University.

We wish both former members of staff well for the future.

Lone Working Policy & CoP

The College Lone Working Policy has now been amended and is supported by a new Code of Practice: *The Safe Management of Lone Working.*

The Policy has been slimmed down to describe what needs to be achieved and the supporting Code of Practice contains the detail on how to meet those requirements. One of the main features of the CoP is the introduction of a central College online consent form for requesting approval to lone work, though it has been largely left to Faculties as to how they chose to apply the requirement for consent. This is in recognition of the fact that Faculties already have local rules and procedures in place for lone working and that these rules vary across the Faculties. Bringing them in line has proven difficult. A new Lone Working web page has been set up on the Safety Department website and there is a button located on this page that launches the online form (in a similar fashion to how *Salus*, the incident reporting form is launched: http://www3.imperial.ac.uk/safety/subjects/loneworking

The Lone Working 'button' that launches the online consent form

A CHASE Notice (College Health & Safety Essentials) to inform Heads of Department and other key staff was circulated on 19 June. It is envisaged that the Lone Working CoP will be monitored for efficacy in the first year after launch, though it has not been decided exactly how this might be measured as yet.

Imperial Festival

The Safety Department have been working with the College Events team to improve the quality of risk assessments relating to Imperial Festival demonstrations and also the timeliness of submission for review and sign-off. A de-brief took place following the recent Festival that included a review of the Festival Operational document and a discussion about the introduction of a new template that records an overview of each activity and can include a risk assessment where required. Many activities associated with the Festival are innocuous, but some do throw up some safety concerns that require managing. A timely submission of documentation in a standard, easily understandable format should smooth the process and permit the event to go ahead safely and successfully.

Staff Survey 2014.....are we safe?

A number of presentations have been scheduled for June to discuss the full results of the 2014 Staff Survey. However, 93% of staff reported feeling confident that the College takes the necessary steps to ensure safety in the workplace (source: Reporter, Issue 273).

Coming soon.....maybe

We have long wanted to be able to produce some sensible written guidance on what liquid waste is deemed permissible for us to discharge down laboratory sinks. Sara Muir, College Energy & Environment Manager, has commenced working with a company called WSP to conduct some surveys to determine which areas of the College may require Trade Effluent Discharge Consents (where they do not already exist). As part of this exercise, we envisage that we may have the opportunity to re-engage Thames Water on this subject with a view to getting a clearer picture on what they might expect from university premises in terms of what we can and cannot discharge. We may therefore be able to re-visit the possibility of producing some guidance for laboratory workers.

FREEZER STORAGE

Managing the risks associated with research samples

What are the risks with regard to the failure of the power supply to a laboratory freezer or a bank of freezers? In terms of health and safety, the most obvious thing that springs to mind is leakage of thawed samples. Many research groups store biological material at -80ºC and if there is an infectious element associated with this, then the opportunity is there for loss of containment - either resulting in contamination inside the refrigerator or the laboratory floor as well, in the event that it gets out. The same could be said of radioactive substances or hazardous chemicals if the samples constitute such materials. It has the potential to result in a messy and complicated clean-up job, though if the samples are stored in some form of robust secondary containment, then this will drastically reduce the risk of loss of containment.

Though this newsletter focuses on matters concerning health and safety, this subject cannot be totally divorced from other important matters such as the threat to business continuity and property damage or loss - the latter of which the College insurers take great interest in. In addition, good all-round risk management measures can address all three areas of concern.

Research samples are often accrued over many years and are of significant value to the research group. Loss can be costly in financial and reputational terms and in respect to delays to research projects. Zurich Municipal (the current College insurers) estimate that claims for replacement typically fall within the £50,000 to £300,000 range.

What can go wrong?

- *Electrical power failure to the building or floor*
- *Accidental switching off of the local power supply*
- *Mechanical fault to the freezer*
- *Failure to properly shut the freezer door*

What can be done to manage the risk?

- ***Freezer audit** - Know where your freezers are, what they contain, what existing precautions are in place and potential exposures where they are located.*
- ***Containment** - Make sure all primary sample receptacles are well sealed and are stored within leakproof secondary containers wherever possible.*
- ***Clearly label samples** - it may not prevent leakage or loss of viability, but it may make the clean-up easier if the finder knows what they are dealing with.*
- ***Temperature monitoring** - Consider fitting temperature monitoring devices that have remote signalling to all key freezers....and make sure that such devices are not dependent on the same power source as the freezers unless there is a reliable back-up source.*
- ***Hard wiring or plug protection** - hard wire the freezer directly into the power supply via a switched fused spur - the freezer could still be switched off but it removes the possibility of it being accidentally unplugged. A plastic cover that fits over the socket offers a similar solution.*
- ***Warning notices** - provide warning notices regarding switching of the power supply near sockets...and if necessary, near the power supplies for critical equipment.*
- ***Back-up freezer** - provide back-up freezer(s)*
- ***Splitting samples** - spilt vital samples between more than one freezer*
- ***Power back-up** - a dedicated diesel back-up generator will significantly increase the likelihood that the freezers will have power at all times. However, this is a costly and more difficult option. A suitable location would need to be found for any generator and it would require a testing an maintenance regime to be in place.*
- ***CO_2 cylinder back-up** - this solution is not uncommon in the College and will maintain the required temperature for a period of time in the event of a power failure.*
- ***Emergency back-up provider** - consider a third party company who can provide off-site freezers in the event of an emergency. When assessing such providers, ensure that capacity, security, access and back-up facilities are all considered before selecting them.*

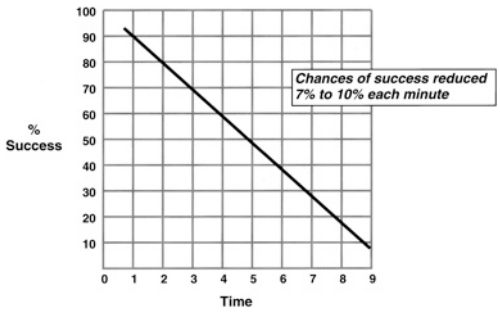
This article is an adaptation of the Zurich Municipal advice note: *Ultracold freezer storage - Risk management guide for research materials*. This advice note is available in pdf format from the Safety Department and the College Insurance Manager

Introducing Defibrillators Across the College

Automatic External Defibrillators (AED) are being installed across the majority of Imperial College Campuses this summer. Defibrillation is the only effective treatment for sudden cardiac arrest (SCA) which can arise form a number of causes which are mostly unknown to the casualty at the time of the event. AEDs are sophisticated, reliable, safe, computerised devices that deliver electric shocks to victims of cardiac arrest when the ECG rhythm is one that is likely to respond to a shock. Simplicity of operation is a key feature - controls are kept to a minimum, voice and visual prompts guide rescuers. Modern AEDs are suitable for use by both lay rescuers and healthcare professionals.

AED's are increasingly located in public spaces such as train and underground stations, airports, shopping centres and sports facilities. Many communities across the country have an AED located in an accessible place.

Acting quickly when someone is in cardiac arrest is crucially important. There are around 30,000 out-of-hospital cardiac arrests in the UK every year and 95 per cent of people who have SCA die within minutes. For every minute treatment is delayed survival decreases by approx. 10 per cent and without a defibrillator the chances of survival are 5-6% with CPR. The use of an AED on a person who has suffered a sudden cardiac arrest can increase their chance of survival by up to 40%.



Source: Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation Aug. 22nd. 2000

A recent Resus Council (UK) review of AED usage indicates the outcome is much better when AED is available immediately as part of an "on site" strategy compared to "first responder" (paramedic police etc.), primarily due to the speed of response. The factors which contribute are: the likelihood of a shockable cardiac rhythm, the cardiac arrest was more likely to have been witnessed, younger population involved, CPR was started more quickly and AED pads were applied more quickly.

The London Ambulance Service (who advised on our strategy) launched an accreditation scheme in 2013. The College will be seeking to become accredited by making training available to members of staff, locating AED in prominent locations and by recording equipment checks of weekly. Training is being introduced into the curriculum (see Page 8). The Resus Council indicates that an AED can be used safely and effectively without previous training and the use of an AED should not be restricted to trained rescuers. However, training should be encouraged to help improve the time to shock delivery and correct pad placement. The Resus Council training video is available to loan from OH https://www.resus.org.uk/pages/aed.pdf

Further information on the roll out of the defibrillators will be communicated via First aid Coordinators and Building Managers.

FREQUENTLY ASKED QUESTION

FAQ

What standards exist for flammables storage cabinets?

In Issue 25 of *Health & Safety Matters* we looked at the quantities of flammable solvents that can reasonably be stored in a laboratory. In this issue, we consider the types of cabinet available for storage of flammable liquids.

The storage of flammable liquids in laboratories is covered by the supporting guidance to DSEAR Regulation 6: *Elimination or reduction of risks from dangerous substances*. The construction principles for fire-resisting cupboards are as follows:

- the materials used must be capable of providing the required fire resistance (e.g. 30 mins integrity) and reaction to fire (i.e. minimal risk).
- the joints should be free of openings or gaps.
- the lid or doors should be close-fitting against the frame such that there is a nominal overlap between the door and the frame in the closed position.
- the supports and fastenings should be of a material with a melting point greater than 750°C.

These are the minimum basic performance requirements and equate to the 'single skin' metal cabinets commonly seen in College laboratories. However there are more demanding standards, including BS EN 14470-1 *Fire safety storage cabinets. Safety storage cabinets for flammable liquids* (2004). These go beyond the minimum standard but are not considered to be a legal requirement in the UK. However, such cabinets with enhanced fire performance can make for a more robust risk assessment and demonstrate that the measures being taken are sufficient to reduce the risks so far as is reasonably practicable.....particularly in circumstances where the recommended maxima (in terms of quantity of flammables stored) is exceeded.

BS EN 14470 cabinets include features such as self-closing doors, connections for an exhaust air system and the insulated bodywork offers up to 90 minutes fire resistance. On the downside, they are expensive. They also tend to be heavy and bulky, though some have castors. However, it is recommended that they are considered as a first option, particularly as part of new laboratory builds or refurbishment or where a large solvent inventory is anticipated.

Safety Training

The safety training programme has continued to grow over the years, but there is a need to review what core areas the Learning and Development Centre takes responsibility for and what should be devolved to Faculties and departments. The LDC cannot deliver all safety related training centrally and this must be supplemented by relevant local training and departments budgeting for safety. The LDC is currently planning the 2014/15 programme, trying to secure venues and checking the availability of trainers. We are hoping to update the safety training web pages with a "go live" date from mid August 2014. You can imagine the scale of the operation but we will have most things in place before the start of term. However, we are in transition as a result of changes involving senior staff members. We are looking at revamping the course webpage so that it is more accessible and user friendly.

The LDC has requested an increased safety training budget but it is important to note that the request for increased resources also reflects additional workload and costs. We have currently reached administrative capacity with two administrators moving on. We will not offer any more classes during the current 2013/14 programme but will be recruiting replacement staff.

The College will provide increased access to Automated External Defibrillators (AED) in the future and will be part of the Defibrillation Accreditation Scheme sponsored by London Ambulance Service (LAS). The LAS have delivered some stand alone AED classes at Hammersmith and South Kensington Campuses. Stuart Marshall of Marlin Training has incorporated AED to First Aid at Work (FAW), Emergency First Aid at Work (EFAW) and First Aid Refresher training. In order, to achieve greater flexibility, the College have moved away from Ofqual and will work with Marlin Training and the First Aid Industry Board to offer certification. Stuart Marshall has informed us that Marlin Training will now be VAT registered and this will mean a 20% increase in total cost to approximately £48,000.

Swagelok have further advised LDC that the cost of Pressure Fitting Installation Training, supplying tooling, tube fittings, instructor and courier transport mean that they have to make an adjustment which will increase total costs to approximately £20,000. The Jardine Report highlighted risk assessment for those engaged in experimental and fieldwork. The LDC is increasing its focus on machine safety and off-site safety management.

With Ian Gillett's retirement there will be resource implications for the LDC in meeting future needs. There will be a "knowledge gap" in the short term which may be bridged by continuing to work with Ian while at the same time developing in-house capability. The LDC has developed E-learning I*ntroduction to Laser Safety* with his assistance to meet learning objectives but there is a need for further testing and there are deployment issues to resolve. E-learning can be applied to other foundation courses like Biological Foundation Safety Training and could incorporate COSHH. The LDC intends to work with the Safety Department and other stakeholders in developing this further. There is some scope for re-alignment, for example**,** with courses like Asbestos Awareness led by Adams Environmental, Occupational Health and Estates as a logical step forward.

The LDC has been in contact with the NEBOSH examining board to take leadership of the National General Certificate (NGC) as main contact for the College and to complete the necessary documentation to maintain accreditation. The LDC with the co-operation of the trainers is using Blackboard Learn to complement class sessions and will run a 2 week intensive summer 2014 course and shorten the overall programme duration. It is planned to run the standard one day a week NEBOSH NGC from March to June 2015.

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