EDDY DE COSTER – HEAD OF THE TECHNICAL FACILITIES DEPARTMENT, UZ LEUVEN UNIVERSITY HOSPITAL, BELGIUM

A risk management culture that works

Eddy De Coster provides an insight into managing risk to ensure a safe environment for hospital patients and staff, at all times. The UZ Leuven university hospital is the first in Belgium to achieve Joint Commission International accreditation, which recognises best practice in quality and patient safety.

UZ Leuven is the largest university hospital in Belgium with 1,500 hospital beds and a revenue of US$1200 million. The hospital is part of KULeuven, the Catholic university of Leuven, in the Dutch speaking part of Belgium in Western Europe. The technical facilities department is staffed with 250 employees and has an average turnover of $36 million for maintenance costs and more than $60 million for construction development and renovation, per year.

In 2003, the department initiated a plan to reduce the hospital campus from four sites to two, which included the main plant, the health science campus Gasthuisberg, and the rehabilitation plant in Pellenberg.

The aim was to reduce the duration of hospital stay, but also to deploy more ambulatory care. Having built a network of hospitals in Belgium, working together with UZ Leuven, high acuity patients with serious medical issues now come to Leuven, while patients with less severe care requirements remain in the local hospitals. This has increased the complexity of patient care and the technical requirements to support patients' needs. The plan also demanded full integration of the research and development and educational sections of the medical faculty on the Gasthuisberg campus.

An aerial view of UZ Leuven hospital.

It took around four years to start the construction of the first building and the plans included a distinct area for education, research and development, hospital and ambulatory care. We now have more than 300,000 m² of hospital buildings and around 200,000 m² of education and research buildings.

Eddy De Coster

Since 2012, Eddy De Coster has been the president of Zorg.tech Belgium (former VTDV) (The Association for Technical Services in Health Care Institutions) with almost 350 members employed in diverse areas of healthcare including hospitals, institutions for care of the elderly, nursing homes and mental health care. Eddy De Coster joined UZ Leuven in 1986, where he led new projects and new housing estate. He went on to become the head of technical services – responsible for the management, maintenance and renewal of the buildings, infrastructure and equipment for the university hospitals, and overseeing a department of more than 200 employees – including more than 25 engineers. He initially studied Electro-mechanical Engineering at the University of Ghent, in 1978, and went on to complete a post-graduate qualification in Management of Business Administration at KUL (University Leuven) in 1982.

Patient safety

At UZ Leuven, we are proud to be the first JCI (Joint Commission International) accredited hospital in Belgium (awarded since 2010 with the last survey undertaken in 2016.) The goal of the JCI accreditation scheme is to identify, measure and give recognition to best practice in quality and patient safety.

For the technical services the most important issues are safety and security of energy, medical equipment, clean air, fire safety and infection prevention.

So, what do we do at UZ Leuven to reduce the safety risks of technical installations and technical activities? Firstly, the people working in and for the technical department are the most important link in the chain when ensuring a safe environment. Therefore, we have trained our technical personnel using a ten-point programme, comprising the following:

- Keep *technical areas tidy*, always close the door.
- Prevent *risk of falling*, keep corridors free of ceiling panels, loose cables, etc.
- Keep the working environment organised and clean; avoid spreading of *dust and debris* in the hospital.
- Restrict *access to the construction site* for unauthorised people; take care of signs.
- Request a *ceiling permission* when the ceiling will be opened for more than one day.
- Request *a fire permission* when grinding, welding, flame cutting, burning off of paint, etc (except in workshops)
- What to do *in case of fire*?
- Be recognisable, wear your *badge and uniform*, register yourself at the services.
- Keep *dangerous tools and products* away from children and other vulnerable patients. Keep your work cart locked.
- In doubt, *ask for advice* of your supervisor.

This work has been in progress for ten years and, today, our staff fully understand how to make the risk assessments required for a hospital. This includes risks originating from maintenance control, as well as risks relating to the construction works, during work conducted by our own staff, as well as tasks performed by contractors relating to renovation, building and technical equipment.

Energy security and safety

With regards to energy management, the technical facilities team have planned for high redundancy and high reliability. This is combined with a keen focus on sustainability and energy efficiency.

The health science campus Gasthuisberg has a consumption of:

- 64,300,000 kWh of electricity (the equivalent of 15,000 residences)
- 82,000,000 kWh of gas for heating (the equivalent of 3,600 residences)
- 333,000 m³ of water (the equivalent of 3,300 residences)

In relation to energy continuity, the most important energy source that must be secured is electricity. There is a double network operating on 10,000 V. The hospital has a "normal" distribution network, feeding from the external energy distributor, and a second "emergency" network. When an incident occurs with the external distribution, power is switched to the emergency network and a set of four diesel generators take over within 15 seconds, providing electricity for the most mission critical patient areas.

In normal conditions, the hospital has a peak use of 12 MW and, in emergency conditions, it can supply a maximum of 4 x 2 MW. For the most essential uses, the hospital has a distributed network of UPS (uninterruptable power supply) systems to support the lighting and medical equipment in the operating theatres, for example. These backup systems are tested every month. However, once a year, a live test is also performed by asking the energy supplier to cut power to the hospital for five minutes.

The Ambulant Centre with its interior, right, and waiting area, below.

Heating

For heating, the hospital uses a centralised boilerroom with four boilers (with a total of 40 MW heating capacity). To secure this, we have mixed-burners which can work on oil and gas.

Gases

Medical gases, like compressed air and oxygen, are crucial for life support of some patients. Medical gases are regulated by pharmaceutical laws in Belgium and in Europe, and there is a long list of stringent rules that have to be followed. The most important rules are to ensure the right gas is supplied and to receive delivery from three separate sources – always under hygienic conditions.

Mother & Child unit and entry hall.

Water

Although Belgium has an extensive network of water supply, the challenge is to ensure water is delivered to the patient at the optimum quality. Water is very important for haemodialysis and sterilisation. For these applications, water is treated by reverse osmosis, so that the quality of the water is guaranteed.

For drinking water, the law is very strict. In our hospital, only patients with reduced immunity get water in bottles – the rest comes from external supply. To ensure sufficient water supply at all times, the hospital has a reservoir controlled by the external supplier, and the supply comes into the site in three separate ways. All the new water pipes for both cold and hot water are insulated so the temperature is correct, measured and alarmed. Water tests are performed every month at 100 points, chosen by experts.

Air quality

For operating theatres and cleanrooms for pharmaceutical use, clean air is ensured through filtration, guaranteeing the quality of the air. Particle counting is performed every year on air samples, to ensure that the quantity of particles do not exceed the acceptable maximum.

Electricity plant and below, installation.

Data and voice

All essential technical installations and equipment are integrated with a digital information system. A variety of parameters are analysed, and an alarm will alert the nursing team of any patient issues. Other technical and fire alarms are also sent to the technical services department. Staff are available 24 hours a day, 7 days a week to respond to these alarms. There is a highly skilled technician based on site, 24/7, to implement the first necessary actions, then technicians from all disciplines can be contacted at home, via alarms, to call them into the hospital to provide onsite support.

Managing serious incidents

A hospital incident management system (HIMS) ensures we are fully equipped to deal with any potential incident.
We have analysed a wide variety of risks – not only technical risks, but also a shortage of nurses or pharmaceutical products, as well as severe weather events etc.

Firstly, we establish preventive measures to avoid incidents from occurring. This includes preventive maintenance on all equipment, and ensuring we stock the most essential spare parts in our own technical store located at the hospital.

If an incident does occur, it is vital to have procedures to instruct people on what they need to do in an emergency situation. We have developed

comprehensive emergency procedures and store them in a digital system called 'MUZLIDOC'. This system offers the ability to have the procedures approved by several stakeholders. After a designated period, all of these stakeholders are required to review the procedures. We also believe that it is not enough to simply have these in place – it is important to continue to train staff on these procedures, as such events occur rarely.

If an incident escalates, there is an option to switch to the state of "disaster management". This may include the evacuation, isolation or relocation of patients to other locations within our hospital. This is an option of last resort and we hope that we never have to utilise these plans.

Building risks

We have, so far, addressed the technical risks, but there are also special risks associated with the building process of hospitals. As we all know, considerable construction work is undertaken in hospitals to keep buildings and equipment up to date for our patients' care. The most important issues to be addressed are infection risks, arising from dust and water.

We approach this by determining the risk index, before commencing with a study of the work or the search for a contractor. The contractor must demonstrate full knowledge of the methods required to minimise any inconvenience for the patients during the works, especially noise, vibration and circulation of dust etc.

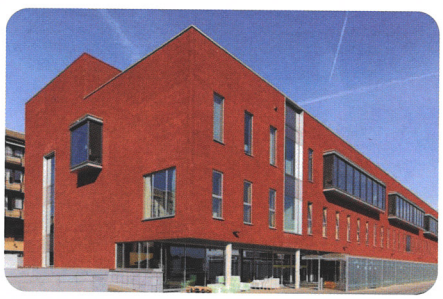
The risk index from 1 to 4 is based on a decision table that primarily rates the risk for infection of the patient. The second parameter is the type of work to be performed, ranging from simply opening a ceiling for inspection, to the demolition of a concrete wall. Based on the index, we have to take measures to ensure there is no dust in the patient environment. We close doors, make temporary walls in wood (not plastic) and consider how to transport the materials from and to the construction site.

We have a strict system of signage on every entrance door of the construction site, listing the point of contact for information and action. All contractors must have a badge with the name of their organisation. But, most important, is that all installations must be fully checked by the contractor, the engineering bureau if necessary, the official inspection agency, and the engineer from the hospital's technical services department. If all of these stakeholders have given their approval, a hospital engineer will give the go-ahead for patients to be treated in this area.

We have a culture of reporting near-accidents (however small they might be). By analysing all of these reports, we succeed in preventing real accidents. The hospital recently started a 'Last Minute Risk Analysis' (LMRA) to enable and encourage our staff to think ahead and be optimally prepared for any safety concern related to a task.

Conclusion

In this article, I have provided an overview of how the technical service in the University Hospital of Leuven (Belgium) deals with risks from technical installations and buildings. While it is a challenging task to completely eradicate accidents, it is important that those who are responsible can rest in the knowledge that they have done everything possible to prevent incidents from occurring. All those working in the technical service department at UZ Leuven are committed to ensuring there are no negative consequences arising from our operations and to safeguarding the wellbeing of patients at all times. IFHE



Critical hospital and Mother & Child unit.