

Let's move on to our subject of today, *safety and security*.

Ladies and gentlemen,
It was Shakespeare who wrote:

"Out of this nettle danger, we pluck this flower, safety".

William Shakespeare wrote this at the end of the sixteenth century, and the history play from which this quotation is taken – the first part of Henry the Fourth – was set almost two centuries earlier. Regicide (or King killing) and rebellion were some of the dangers in those days, and they feature in many a Shakespeare play. Peril was seen everywhere, as when he wrote: "T'is dangerous to take a cold, to sleep, to drink". These are the words preceding my earlier quotation on safety.

Now, in 2014, many of these dangers have been overcome. A cold is no longer life threatening, our drinking water is the safest on the planet, and we are fairly safe in our beds at night.

But if we look back at 1842, the year of our foundation, we see a different picture. Then, a lot of the inventions and discoveries that keep us safe today – from penicillin to firewalls – were still to be conceived. A lot has been achieved since. Let's take a look at a few highlights.

Here we see Professor Martinus Beijerinck in his lab in 1921. He is known as the father of virology. This is the branch of science that helps to keep us safe from epidemics such as measles and small pox. And small pox, by the way, is the virus responsible for the largest number of human deaths. Unfortunately, what we discover for the benefit of mankind will often also be used against humans.

In the domain of biology, we have become increasingly aware of the threat of bioterrorism. So much so, that our fear of 'dual use' is now interfering with scientific research. More than once, scientific findings have been held back or were temporarily suppressed because of it. The threat of bioterrorism has thus fuelled the debate on scientific freedom versus public safety, a debate I can only approve of.

Let's look at the subject of water safety and flood defence. Here we see we our alumnus Johan van Veen who we honour as the spiritual father of our world-famous Delta Works. However, already a generation earlier, civil engineer Jo Thijsse laid the foundations for our modern hydraulic research. At that time, plans were being made to build the Afsluitdijk to close off the Zuiderzee. In 1927, Thijsse erected a hydrodynamic laboratory in the basement of the Civil Engineering building, then situated on the Oostplantsoen. Jo Thijsse believed in a scientific, rather than an intuitive approach towards hydraulic engineering. In his book on the Zuiderzeewerken, he wrote:

"People talk about an engineer's instinct as the key to finding the right way through this unknown territory, but actually such instinct, if it does exist, is an accumulation of experiences. If anything completely new presents itself, with which no previous experience has been gained, even the best engineer's 'instinct' will fail."

In the more recent past, it was Professor Ben Ale (he is here today) who championed chemical safety. Unfortunately, when he retired, he had to conclude that after more than thirty years, our national chemical safety still leaves a lot to be desired.

Evidently, there is more than enough work left for his successor, Professor Pieter van Gelder, who will be giving the keynote lecture at today's celebration of our foundation day.

Take a subject such as water. We have made a lot of headway in our battle against the water. I venture to say Delft has an excellent international reputation in this area. But ever new and more complex water challenges present themselves. You could argue that water is our enemy number one, if you look at the staggering number of people dying each year in water-related disasters and through water-borne diseases.

Not only have we contributed considerably to safety and security over the years. This was already at the heart of our foundation: King Willem II who founded our university in 1842, needed engineers for the building of roads, bridges, dams and canals. These were needed to keep our country safe from floods, but also to keep it well-defended. In other words, to keep both water and enemy at bay.

If we look at this from today's perspective, that means both safety and security. By Safety we mean the protection from unintentional dangers. These are dangers caused by natural disasters, or by unintentional human behaviour, such as human error or technical failures.

And by *Security* we mean protection from the threats caused by intentional human behaviour, such as crime, fraud and terrorism.

As we have such a strong historical link with both safety and security, we could argue that it is appropriate that much of our research should be related those fields. In fact, as you will hear this afternoon, a lot of what we do nowadays does have a link with safety and/or security. Just look at this overview of groups that are involved in safety and security research at Delft University of Technology. Such a broad range of expertise is unique in the Netherlands. For example, we are the only Dutch university where water safety and aviation safety are researched and taught.

New eras bring new threats. Nowadays, cybercrime is a significant new threat. And cyber security plays a role in almost all other safety and security subjects. Many of us will remember the movie "War Games" from the eighties. Though this was fiction, in 2012 hackers showed that they could easily access the control system for this friendly sluice in Veere. In this case to prove that these systems should be better protected, but a malicious user would have had another goal.

And then there is the human factor. Ben Ale, whom I mentioned just now, was always fascinated by the human factor and he liked to quote science fiction author Robert Heinlein, who wrote: *"Never underestimate the power of human stupidity"*. If you want to see human stupidity at work, look at our recent New Year's Eve celebrations: fireworks with the impact of grenades and bombs led to the loss of eyes, hands and even one life again.

Individual research groups, even the excellent ones, can no longer meet all of today's complex challenges. Therefore we have brought together all our relevant research and educational activities in a special TU Delft Institute for Safety and Security. Here we can learn from one another in the areas of risk assessment methodologies & governance models, leading to mutual inspiration and cross-fertilisation of ideas. It will enhance the impact of our joint expertise and help us to tackle cascading disasters such as the event in Fukushima, where knowledge from more than one domain is needed; in this case both water and nuclear safety.

More cooperation will also increase the visibility of what we do in these fields at our university. High-visibility is an important factor in both safety and security. And, as I don't have to explain to those of you who received our official invitation high-visibility is an important factor in both safety and security.

This newly formed institute will also help us in joining forces in the region. Together with Leiden University and Erasmus University in Rotterdam we have set up a Centre for Safety and Security. Here we can combine our own expertise with that of our colleagues. Leiden for example has a chair in terrorism and counter-terrorism, and in Rotterdam they have experts in criminology. Safety and Security is also high on the agenda of our regional development agency InnovationQuarter (perhaps better known to you under its former name ROM) and in our neighbouring city The Hague under the umbrella the Hague Security Delta. With all these initiatives, we want to create a safety and security consortium, just like our Medical Delta consortium for the health sector. In such a Safety and Security Delta we can then develop and transfer new knowledge, and we can ensure that this knowledge is applied in products and systems that make the world safer and stimulate economic growth.

Ladies and gentlemen,

I promised to talk on the subject of a safe and secure university. That is first and foremost, a university working on safety and security topics. As I showed we have been doing so for the past 172 years, and we will continue doing so for many years to come.

I am confident that through these efforts we have helped saving many lives.

However, we can only continue to do so, if we as an institution are secure in our own future. So how can we secure there will be a Delft University of Technology in, say, another hundred years? I think that the issue of *quality* is central to this. Only if we continue to provide top quality education and engage in top quality research, can we justify our right of existence.

In the last couple of years we have done a number of things to maintain or even improve that quality. Let me name a few of them.

Benchmarking is an essential quality tool. We have recently carried out a benchmarking survey with our colleagues in Zurich and Aachen. We compared the quality of our master theses and it turned out, that the quality was very comparable. This, it must be said, despite the fact that the universities in Zurich and Aachen are much richer than we are.

We have also set up a graduate school for our PhD students, to make sure that they receive the high-quality doctoral education they deserve. We want them not only to take part in excellent research, but also help them to develop essential skills for a career inside or outside the academic world.

I also see it as our responsibility that we enable our scientific staff to perform at their very best. In the past, the Dutch academic climate seemed to have been more concerned with quantity than quality. Researchers felt under pressure to publish, because funding depended more on the number of publications than on their quality. And other important factors, such as teaching quality, were sometimes overlooked. We have taken several steps to rectify this. We have introduced a new funding allocation model in the university that should alleviate the publication pressure. At the same time, we have renewed our focus on high-quality teaching. All those involved in teaching should be in the possession of a University Teaching Qualification or be assessed to teach at a comparable level. Thus, we hope to have created an environment where our scientific staff feels safe to excel in what they are good at.

However, let these remarks not give you the impression that our research or education was only so-so. As I said, we have to maintain or even improve the quality that is already there.

I would like to give you a few examples related to today's topic.

- Frank Guldenmund obtained his doctoral degree with honours in 2010 with his thesis on "Understanding and exploring safety culture". He still pursues the subject of safety culture as a researcher at Delft University of Technology.
- His colleague Neelke Doorn received a prestigious Veni grant for her research into the ethics of flood risk management. According to her, flood risk management is not just an engineering issue, but also an ethical one. With scarce resources, safety in one area can come at the expense of safety in other areas. How can we distribute such safety risks fairly?
- Professor Michel van Eeten is a leading researcher in cyber security. One of his projects deals with the safety reputation of internet service providers. If we can measure this reputation, users will be better informed of what providers undertake to guarantee security.
- Patient safety is another research area we excel in, with subjects ranging from operating room safety procedures to instruments for minimally invasive surgery. A lot of research in this field is led by professor Jenny Dankelman (is she here today?).

Ladies and gentlemen, I have talked to you about our safety and security research, and a research environment in which scientific staff feel safe to produce their best output.

However, in order to secure the future of our university for another 172 years, we need to address another form of safety: our physical safety here on campus.

Luckily, we have excellent connections with our local emergency services and we hold regular safety drills on campus. In that respect, we are also beholden to our voluntary emergency response officers (BHV) and our Safety Health and Environment Support Staff.

But we also set the standard as far as lab safety is concerned. A unique Safety Report System was developed and tested here in Delft. The idea behind the system is that a researcher can obtain a kind of "work permit" for an experiment he would like to undertake by submitting a safety plan. In 2009, the system was awarded the European Good Practice Award for Healthy Workplaces. Since then, the system has developed into a complete lab safety tool, called the Servant, and is now in use well beyond the boundaries of our campus. As we speak, negotiations are under way to export the Servant tool to British universities as well (you can look at it in the foyer later on).

Ladies and gentlemen, I am about to give the floor to Pieter van Gelder for his keynote address. But before that I would like to travel back in time again with you. I started today in the time of Henry the Fourth in fifteenth century England. Let me put things into perspective with another quotation, this time from the late American president Eisenhower, who said: "If you want total security, go to prison. There you're fed, clothed, given medical care and so on. The only thing lacking... is freedom."