Trade union mobilisation for safer construction machinery

Every year construction workers lose their lives in accidents involving machinery. Many of these accidents could have been prevented if the design of this machinery had taken better account of users' opinions. A German expert in standardisation, who is a former building worker, has recently managed to convince the European institutions to amend two technical standards in order to improve the safety of construction machinery.

Rolf Gehring

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In the construction sector, progress on the issues of safety and ergonomics has been very slow. Badlydesigned machines on building sites are often the cause of serious accidents. Image: \odot Belga



"Everything that technology allows us to do must be done." This paradigm, which was in vogue during the first half of the 20th century, marked the golden age of technological euphoria and faith in progress. Whereas knowledge, technology and social life formed a single entity in ancient societies, the "Baconian"1 period gave rise to a kind of dualism between the world of knowledge and technology on the one hand, and the social life of individuals on the other. In the 19th century, the concept of progress was linked with a positivist view of science that regarded technological development as the way to build the future. Belief in the possibility of the future and in science/ technology as the ideal way formed the backdrop to the "technological command" mentioned above.

 This refers to the English scientist and philosopher Francis Bacon (1561-1626). He is regarded as the father of modern empiricism.
The German philosopher Leibniz (1646-1716) developed the concept of monad, an immaterial and indivisible entity ensuring the cohesion and unity of the body with which it is associated. For Leibniz, the smallest piece of matter was a world in miniature. The frenetic development of industry confirmed the hopes placed in increasing know-how as the main driver of knowledge building, and announced an age of technological euphoria. Knowledge and technology were at the time judged to be neutral in moral terms, and regarded as a world in itself. Technology was seen as a Leibnizian² monad. The technologist's task was not to meet the demands of practical life that would prove useful for that purpose, but to find ways of allowing the "blessing of technology" to be expressed. In this context, the technologist represented neutral and proven know-how, which could not be challenged.

Generations of technologists have been trained along these lines. The image that many engineers have of themselves, namely as individuals above the fray, has led to a somewhat elitist attitude among technologists towards their contemporaries, of which they have often made no secret. It was the American sociologist William Ogburn who defended, in this context, the "cultural lag" theory that social changes occur some time after technological developments.

From the building site to the world of experts

Rudi Clemens sees things differently. He worked for 40 years in the building sector operating construction machinery. He then became an approved site manager where he was in charge of the economic and safety coordination of staff and equipment on building

sites. He is currently still a safety manager with the building firm Frauenrath in Heinsberg (a German town on the Dutch border).

For Rudi Clemens, "technology is constantly developing; each new machine is better than the last one, because that's what the customer demands. This is the case, for example, in the automotive sector. However, in the field of safety, we are using standards that are based on criteria set years ago. It is widely acknowledged that these standards are several years behind the current state of the art. It's simply a question of price, like the manufacturers say. But the customer puts pressure on us for every cent."

For a number of years the safety manager has been gathering information, from the internet or specialist journals, on workplace accidents involving construction machinery. These accidents have been caused by the equipment itself, the organisation of work or human errors by machinery operators. This is how he discovered in particular that there are serious design faults in terms of the health and safety of the equipment used. He has compiled photographs of serious accidents involving passers-by and workers, and has studied the circumstances of these accidents. By analysing these, he has come to understand that poor visibility in the majority of earth-moving machinery is a decisive factor: "You often hear people say: I can't see anything behind. That's precisely the heart of the problem. But there are also blind spots on the right side of backhoe loaders, because of the lifting arm, and to the front, particularly for wheel loaders due to the scoop. And ultimately, this poor visibility in terms of the operator seeing what is happening around his machine regularly causes serious, and sometimes fatal, accidents."

He has identified another example of a design fault in quick hitches: "The quick hitches fitted to excavators have become the norm in just a few years. They allow the operator to attach six or eight different accessories, using a hydraulic locking mechanism, without having to leave the cab. But what happens if the operator makes a mistake and does not correctly attach the accessory? It can fall and crush a person, as actually happens fairly often. Given the stressful conditions under which machinery operators work nowadays, mistakes are human and cannot be ruled out. The European Machinery Directive, however,

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requires any foreseeable incorrect operation to be precluded. In Switzerland, for example, only new machinery that does not compromise safety in the event of an operating error has been permitted since January 2016. This requirement will apply to all quick hitches from 2020."

As an expert, Rudi Clemens is responsible for checking the construction machinery on behalf of the contractor. The excavators and other large machinery under his control are kept in service for no more than five years. They are then replaced. Safety is a priority when machinery is being purchased, and missing safety equipment is also ordered. Thanks to these measures, serious workplace accidents have become a thing of the past for the Frauenrath company. But Rudi also draws attention to two other problem areas: the organisation of building sites and the level of the European Commission supported this qualification.

"Qualifications are also a disaster area. Movement around sites is total anarchy. That's what an expert said before a court in a case involving an excavator that caused a fatal accident 40 years ago. Since then, nothing has changed", he complains.

Petitions and technical standards

His professional work and his involvement as an active trade unionist within the IG BAU – the German construction union - prompted Rudi to also raise the issue at a political level. After contacting several prevention and standardisation bodies, he turned to politicians and parliaments with a view, in particular, to improving monitoring of the area behind machinery.

Following two petitions to the European Parliament, he finally got the European Commission to issue a formal objection to standard EN 474 setting out the technical requirements with regard to the field of vision of operators of earth-moving machinery. As the field of vision requirements laid down by the standard are insufficient to guarantee that machinery designed and constructed in accordance with this standard can be used without risk to people, manufacturers must, since 28 January 2015, conduct a risk assessment³. In this context, they must check the visibility conditions of their machines and design them so that they longer as a consequence.

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Pierre Picart, French Ministry of Labour

can be used without risk to the operator or third parties.

Most of the competent committees of initiative. The standard is deemed insufficient in terms of meeting the corresponding requirements of the Machinery Directive.

However, according to Rudi Clemens, other elements of construction machinery are also designed for the sole purpose of their technological application and neglect the needs of the individuals using them. That is why he submitted a second petition to the European Parliament.

This petition concerns access by workers to the cab of earth-moving machinery. The current standards provide for the first step to be placed 70 cm from the ground. Rudi Clemens believes that this height is not ergonomic and poses a risk to the operator's health. He recommends that this be reduced to 40 cm.

Following the petition by the German worker, the European Commission invited the European Committee for Standardization (CEN) to re-examine the two standards with a view to the height of the first step being set in accordance with ergonomic principles and the installation of retractable steps being recommended⁴.

These petitions provide us with another example of the way in which social demands can influence technological design. In this regard, it is to be congratulated that the new version of the Machinery Directive affords greater importance to ergonomics because, as a result of demographic change, the population is ageing and working lives are becoming

3. Commission Implementing Decision (EU) 2015/27 of 7 January 2015 on the publication with a restriction in the Official Journal of the European Union of the reference of standard EN 474-1:2006+A4:2013 on Earthmoving machinery under Directive 2006/42/EC of the European Parliament and of the Council. 4. European Parliament -Committee on Petitions, Petition 0728/2012 by Rudi Clemens (German), on technical and ergonomic standards for earth-moving machinery, 30 January 2013.

Design of machinery and continued use

Pierre Picart is also interested in the issue of design. Throughout his career as an engineer, he has not only designed technology, but also monitored and assessed its implementation, and studied it from every possible angle. Pierre Picart is now an expert advising the French Ministry of Labour. He leads projects to improve the ergonomics and safety of machinery. He regards the issue of the development and design of technology as a social process.

"Technological development must not lead to hasty solutions that are in stark conflict with the procedures instinctively used by workers. We need to take account of behaviours, and sometimes monitor transition phases, so that new technologies can be properly taken on board. A site experiment allows us to assess the actual conditions of use of this equipment", says Pierre Picart.

Construction machinery perfectly illustrates the relationship between technological processes and work tools. Even more so than many fixed machines, mobile construction machines are tools whose ergonomics and general design have a direct impact on the health and safety of workers.

Pierre Picart explains this as follows: "The design of machinery must therefore allow the oldest workers to remain in employment and good health, both in manufacturing companies and on building sites. The addition of functions to machinery must lead to a reduction in repetitive and constraining tasks throughout the machinery's lifecycle, which therefore means from the construction or assembly phases to disassembly, not forgetting maintenance or repair. This involves taking account of proposals - whether from manufacturing workers and foremen, maintenance technicians or design engineers - to arrive at a consensus that is favourable to everyone. We go to great lengths to encourage the regular involvement of users as well as site visits in order to improve the ergonomics of machinery."

While it is true that the period of generalised technological euphoria is far behind us and that we have become more critical in our assessment of the possible negative effects of a technique or technology, this choices for the US administration in order to determine, in advance, the negative effects of using technology. In Europe, it was not until the 1970s that this debate began. But there was still a long way to go before a point

<u>A partnership</u> <u>between employers</u> <u>and workers for safer</u> <u>machinery</u>

In 2015 the European Federation of Building and Woodworkers (EFBWW) and the European Construction Industry Federation (FIEC) set up a working group responsible for examining the problems associated with the design and use of construction machinery.

The working group brings together those involved on the ground in the construction sector, both workers and employers. Together with Pierre Picart, an expert adviser to the French Ministry of Labour, and Stefano Boy from the European Trade Union Institute, the working group has been fortified by two outside experts who are accompanying the discussions. Without, however, ignoring European standard EN 474, this working group has refused to become involved in the long process of revising this standard and has instead turned to the Committee for European Construction Equipment (CECE) to look at possible solutions together. This collaboration has led to a joint social partnership project supported by the European Commission. In addition to the three organisations already mentioned, IndustriAll is also supporting the project. As a result, the employees of manufacturers are also represented in the discussions.

Problems specific to construction machinery will be tackled in workshops on monitoring the area behind machinery, general ergonomics of construction machinery, use of quick hitches on excavators, general safety, and also issues relating to the qualification of users and the organisation of work.

It is planned that the conclusions of these workshops will be documented in guides to be distributed to both manufacturing companies and operating companies. The objective is to improve communication between manufacturers and users and to explain to engineers working on behalf of manufacturers the conditions under which the technology that they develop is used. Another objective is to better explain to users the best practices for using the equipment and the necessary organisation of work.

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period has, despite everything, left traces in our societies and their structures. The most striking products of that era are the standardisation bodies, which remain the preserve of circles of engineers and designers who meet to try and find solutions. While this offers a historical legacy, it also results in a structure that is difficult to modernise.

One interesting point to note in this context: William Ogburn, who was mentioned at the beginning of this article, was himself in fact involved in the early relativisation of naïve technophilia. In the 1960s, he led programmes assessing technological choices for the US administration in order to determine, in advance, the negative effects of using technology. In Europe, it was not until the 1970s that this debate began. But there was still a long way to go before a point of view prevailed that allowed us to formulate an appropriate approach to technological development for the future.

Technological design is an interlinked process, combining the social aspect with technology. Our social traditions, but also our social demands for tomorrow, are both obstacles and drivers in terms of technological requirements. Only the coordinated involvement of the various stakeholders (designers, manufacturers, users, maintenance operatives, etc.) will allow the various technological and social requirements and expectations to be appropriately integrated within the development process. The European social partnership for construction machinery project (see box) could therefore become one of the components of social technological design.