UNIVERSITY OF CAMBRIDGE

Transforming construction: impact case study

Benefits to industry: improved communication to support health and safety aimed at those most at risk (the site operatives); better information to inform risk mitigation decision making.

Improving management and communication of health and safety risk to site operatives on UK construction projects

The challenge to industry

The construction industry is one of the largest in the UK with the sector accounting for approximately 3 million jobs. Although the industry employs 10 per cent of the UK's total employees, it accounts for 31 per cent of all fatalities (Health and Safety Executive (HSE) 2014a).

Construction is considered to be one of the most hazardous and challenging industries. Although the number of fatalities per year has improved over the last 40 years, the number of major and minor injuries reported to the HSE remains high.

Industry now faces a new challenge; the decline in fatalities has stagnated since 2008, with the total amount remaining consistently between 40 and 50 per annum.

Despite the documented risks of working in a hazardous environment, the construction workforce is proportionality one of the least skilled, most fragmented and highly transient. Very few workers are directly employed. From a commercial perspective, the industry suffers from low profit margins and its competitive nature often encourages poor working practices. These factors combine to make the management and communication of risk very challenging.

Improving communication of heath and safety

Work-related injury and illness should not be perceived as an inevitable bi-product of construction. In order to improve the management and communication of health and safety risk to construction site operatives there needs to be an evaluation of current approaches. This research provides a critical evaluation with the aim of making recommendations to industry on how to better proceed.

By bringing focus to the perspectives of site operatives on the health and safety processes already in place, this study highlights processes that should be amended or removed with a view to improving the current stagnation in fatality numbers and high volume of accidents.

Current methods of managing and communicating risk to site operatives do not work. While there are established methods to communicate identified risks, the most challenging aspect of the risk management process is ensuring that those carrying out the work understand the risk and work in the designated way to mitigate it.

The industry puts emphasis on what documentary elements are in place to mitigate and manage risk rather than address the active management of risk on site.

The case study

The construction of a £6.5 million community hub in South Wales, involving the construction of a 25m swimming pool, gym, library and community spaces, provided the live-site case study for this research. Following a 57-week programme, the project was successfully completed on time and on budget in September 2016. The project was delivered with no reportable incidents under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) and only one entry in the site accident book for a twisted ankle.

A sample of 284 operatives were selected from 10 key trades that represent the broad range of activities that occur across the whole life cycle of a construction project. These included: groundworks, steelwork, brickwork, roofing, cladding, windows, mechanical and electrical installation, partitioning, tiling and decorating. Qualitative data was collected through a review of key documentation on the case study project. Quantitative data was collected from a survey of the sample of operatives working on the case study project, which was designed to gain an understanding of their knowledge of certain processes on site. The survey was completed by 172 of the selected operatives.

Three key processes provided the focus for the study:
- Construction phase health and safety plan
- Site induction
- Risk assessment/method statement process.

The aim of the document review was not to identify the accuracy of the health and safety information included, but the extent of balance within the documents in terms of addressing people, product and procedures.

Contributing factors

Through the data collection process, several contributing factors were identified as having an impact on the operatives. This included employment status, where trade contractors with a smaller proportion of operatives directly employed had a worse contractor performance rating overall. The case study showed that the workforce were highly transient with 46 per cent of the total sample working seven days or less on the case study project. This highlights a significant issue for the site management team trying to get to know the workforce and instill a positive safety culture. Forty six per cent of the total sample had a low skill base, defined as having no formal qualification above NVQ Level 2.

Weaknesses in key processes

The Construction Phase Health and Safety Plan was produced by the case study project's most senior operational manager and the 48-page document was kept in the project contractor's site office. It comprised a standard template edited to suit specific conditions of the project. It is considered a key document to communicate risk to all involved on the project. However, it is not issued to trade contractors unless requested and only 25 per cent of operatives questioned knew what it was.

The site induction comprised a short site-specific induction and an online induction to be completed before attending the project. The 45-minute online induction covered more than 100 different topics leading to information overload and the inductee being required to process information they do not require. This invites selective listening and filtering leading to loss of safety-critical details and risk not being effectively communicated. Questions at the end of the online induction aim to confirm the participant's knowledge but this challenges the ability to read and deduce rather than understanding real risks specific to a role.

The case study survey revealed that 73 per cent of the sample operatives believed that inductions were there to cover the contractor should something happen rather than help the operative.

Lessons learned

The data collected showed:

- current processes and procedures ignore key contributing factors (employment status, transiency and skills base) and focus purely on generic elements related to a task
- despite being identified in earlier construction industry research as key contributing factors to construction accidents, these factors were not addressed in any of the processes or procedures on the case study project
- any project similar to the case study project will have difficulty addressing these factors due to the fragmented nature of the delivery model
- understanding these factors, together with an individual's risk profile, enables processes, procedures, and specifically tasks to be tailored to match the on-site role of individuals.

Recommendations to construction industry

Improved performance requires a fundamental shift away from the task and towards the individual.

There is a lack of research into the quality of communication, particularly within smaller organisations and projects, suggesting little awareness of how critical effective communication is in ensuring the safety of operatives on construction projects.

In measuring performance across all the trade contractors on the case study project, there is a link between employment status, transiency and skill base and the overall performance of the trade contractors on the project. These factors should be addressed as part of a risk management process.

Current methods of risk management and communication need to be reviewed with the aim of rationalising the processes to secure effective communication.

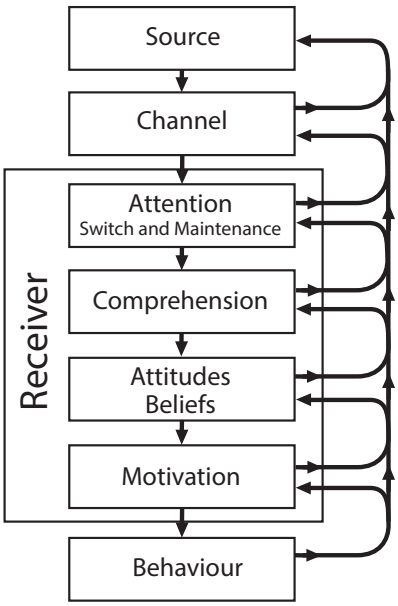
There is no significant link between key influencing factors and the health and safety documents produced. Current review processes offer very little value. As a result, the effectiveness of these procedures should be questioned.

The principal recommendation is to shift the focus of health and safety management from the task to the individual. To achieve this, the ways individuals are assessed and introduced to construction projects needs to change. Operatives should provide key information to the project contractor including employment status, skill base and training records which should allow their overall risk profile to be formed in accordance with the model at the top of the next column.

Constituting parts that combine to make an individual's combined risk profile

The industry's current reliance and emphasis on the documentary elements in place to mitigate and manage risk does not effectively support the active management of risk on site. Current processes, particularly the induction and risk assessments and method statements, should be altered to shift focus from documentary evidence to the individuals themselves.

Implementation of the Communication Human Information Processing model (C-HIP) is an effective way of monitoring how well things are not only communicated, but how they are processed by the receiver.



Communication-Human Information Processing Model, designed to review the process of communicating H&S information (Conzola & Wogalter 2001)

Mitigating risk

Improving communication and better understanding why or how operatives make mistakes on site will lead to greater awareness of health and safety issues. This information will better inform management as to appropriate action to mitigate risk. Bringing greater focus to effective communication of health and safety to operatives will support the construction industry's drive to make its sites safer and less hazardous places to work.

LAING O'ROURKE CENTRE
for CONSTRUCTION ENGINEERING
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The Laing O'Rourke Centre for Construction Engineering and Technology, in the University of Cambridge Department of Engineering, was launched in 2011 with industry partner Laing O'Rourke to fulfil a shared vision of transforming the construction industry through innovation, education and technology. The Construction Engineering Masters (CEM) degree programme is designed to shape the next generation of industry leaders and undertake innovative research projects that deliver value to industry.

Case study

This case study is based upon a Laing O'Rourke Centre for Construction Engineering and Technology Construction Engineering Masters dissertation titled: *An investigation into the management and communication of health and safety risk to site operatives on a UK construction project* (2016). The research is by Huw Triggs, Specialist Projects Manager at Laing O'Rourke.

Further details

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