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Covering 192 pages, this issue details topics from developing a Local Delivery Plan to the pitfalls of failing to plan for asbestos removal. Highlights include:

James Ritchie – The Association for Project Safety

Dr Roberta Blackman-Woods MP and Kate Green MP

Adam Dodgshon – Principal Consultant, Planning and Advisory Service

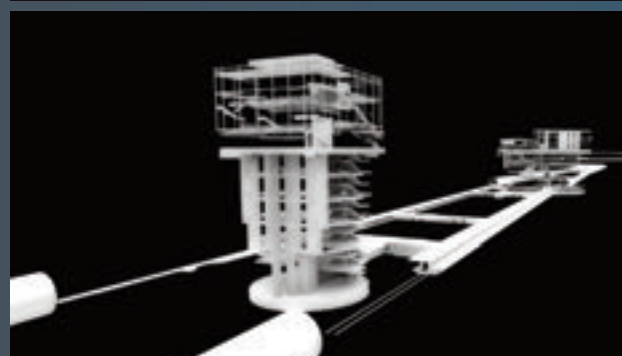
A New Model for Affordable Housing

Stacey Temprell at Saint-Gobain tells us how a collaborative student-designed project became one of the first of its kind – designed to some of the world's most stringent design codes



BIM: What can a manufacturer bring?

British Gypsum discuss how using online tools can enable specifiers to excel in a BIM world



SPECIAL FEATURE: BIM the Crossrail way

Malcolm Taylor of Crossrail Ltd explains what BIM means to Europe's largest construction project



BIM: Simplicity and opportunity

Clearbox outline how BIM is transforming the global design, engineering and construction market

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Inspiring Safe Construction

What is a twelve percent productivity increase worth to your project, along with 30 percent reductions in insurance premiums, around 30-70 percent reductions in undesired incidents, and significantly reduced operating costs for your company?

The behavioural approaches used to achieve these proven real world results have been implemented over the past five decades in a wide variety of work settings. In the UK, the HSE funded two construction research projects at UMIST in the late 1980's and early 1990's. The team dedicated to working on these projects included Professor Dominic Cooper (the author), Dr Tim Marsh, Robin Phillips, and others. The first sought to identify if a behavioural approach would work, and the second focused on industry implementations. Although both projects were successful, they highlighted the importance of people's commitment to making the process work for them.

As a young Sapper in the Royal Engineers, and later as an Advanced Scaffolder, the author knows the construction industry is very dangerous; the potential for an incident is always high as the environment changes hour by hour.

Like an army of ants, there are different trade people on site every day, undertaking different activities, with different materials, using different equipment according to a complex building program within a tightly specified time-schedule. People need to know what to expect from others around them, and know they can be relied on to work safely all of the time.

The opportunities for things to go wrong are immense. The key to success is for everyone

on site to be engaged in a common purpose to control and improve safety. Everyone needs to identify and fix bottlenecks, and challenge unsafe behaviours within a mutually trusting and supportive atmosphere.

Equally applicable to safety, productivity, quality, environment, and waste management, the purpose of a behavioural approach is to reduce the number of incidents. These can be triggered by 'unwanted' behaviours, poor management controls, or hazards present in the environment; sometimes all three interact. If for example, a shuttering tie-bar is stuck in 'super-strength' concrete, and an unauthorised person uses an acetylene torch found lying around to cut it off while at a height, it could easily fall, hitting the building lower down and bouncing to breach any controlled access zones, and hit a member of the public. Not only could someone die, but this would cause project delays until the immediate aftermath was dealt with. Subsequent regulator investigations, court cases and fines, and increased insurance premiums would impact profits and competitive advantage.

Based on a true incident, the insertion of shuttering tied-rods in super-strength concrete without a protective barrier; the availability for use of an unsecured acetylene torch; and the cutting of the tie-rod at height without securing it, are all examples of unwanted behaviours.

Incident pyramids, such as that shown, illustrate that most incidents have a relatively mild impact, and that critical impacts are relatively infrequent events. It is a matter of chance, however, whether a mild impact event may have been more serious, as the severity of outcome cannot be controlled in the same way as the inputs at the base.



Preventative opportunities arise, therefore, from restricting unwanted behaviours, eliminating hazards, and tightening management controls at the base of the pyramid. By simultaneously focusing on all three, the possibility of a critical impact event is significantly reduced, while greatly improving performance and efficiencies.

Importantly, people's behavioural choices accounted for around 56% of all potential serious injuries and fatalities (SIFs), with poor management controls (e.g. job planning, poor quality rules & procedures), and physical hazards accounting for the remainder. Construction safety research shows that the bulk of activities involved in serious injuries and fatalities are:

- Working at Height
- Dropped Objects
- Mobile Machinery/Equipment
- Excavations
- Driving (Cars/Trucks)
- Electrical Lockout/Tag-out
- Use of Tools
- Chemical Exposure
- Tripping Hazards
- Chemical Handling

Behavioural Safety helps to proactively eliminate such injuries by focusing on people's behaviour.

Although there are a variety of behavioural approaches available, IDEAL processes all share the following components:

- Identifying unwanted behaviours
- Developing observation checklists
- Educating everyone. Telling & selling to all; training observers, facilitators, and champions.
- Assessing and monitoring actual behaviour via observations.
- Limitless feedback provided on results to all: verbal, graphical and written.

In practical terms there are two types of behavioural processes: one focused on groups of people, and one focused solely on individuals. Both have merit for improving safety behaviour and reducing incidents.

Recognising safety is a social activity, processes focused on workgroups (e.g. Scaffolders, Steel Fixers, Shuttering Carpenters, etc.), harness existing social dynamics to change group norms surrounding safety. One or more trained observers embedded within each workgroup monitor the behaviour of their colleagues during a single 10-20 minute observation, once a day. Verbal feedback is provided immediately if the observer is comfortable doing so. Analyses of the total workgroup observations for the entire week are discussed at weekly workgroup meetings (e.g. Toolbox talks).

To avoid observer fatigue, colleagues rotate into that role every so often; this way everyone becomes an observer. At the same time, the observation checklists are updated to ensure a focus on relevant safety behaviours. An administrator (tradesperson) and champion (senior site manager) are also required to help drive and guide the process.

Using this approach in the Middle East, the author helped one construction project

achieve 121 million man-hours worked without a lost-time injury (out of 240 million hours worked), on the longest run, with 47,000 workers (at peak) from 64 countries. Nonetheless, with 1500 observers, it was labour intensive, although the time devoted to the project was less than 10% of the projects total lunch-break hours. For many site managers, the perceived high administrative, labour, and time costs are not worth the effort, and they desire something simpler but just as effective. This is where one-on-one, peer-to-peer observations come into their own.

Using observation cards that contain pre-determined categories of activity (e.g. Access and Egress, Mechanical Lifting Operations, Body Positioning, etc.), and discussion categories of underlying contributors (e.g. Poor Job Planning, Ineffective Leadership, Poor Communications, Insufficient Manpower, etc.), trained people observe a behaviour during their normal daily duties, twice a week or so, and provide positive, on-the-spot feedback or coaching while discussing the underlying reasons for an unwanted behaviour. Carrying a checklist is unnecessary; although the observation and discussion is recorded in a software database (e.g. PEER®) after the interaction is complete via desktop computers or handheld devices.

The value of this latter process is the speed of roll-out and execution, as training is minimal (half-day classroom, half-day site practice), the reduced administrative burden, and the rapid impact on incident rates; one European site with an 800 person workforce achieved zero incidents within two weeks!

With both types of process, the data is analysed regularly (perhaps by the safety folks), and used to highlight strengths and areas of opportunity, with the results disseminated widely on site via toolbox talks, posters, etc. The observation data is also used to facilitate any corrective and preventative actions (e.g. remove hazardous mate-

rials, etc.), and the tracking of progress. Long term data trends are used to adapt either process to ensure their sustainability.

It is not uncommon for companies to simultaneously execute both behavioural processes; the first to involve trades people in safety via the workgroup approach, and the second to involve line-managers via the peer-to-peer approach as a way of them demonstrating their safety leadership.

This helps to create a safety partnership from a combination of management's safety leadership activities, and employee engagement in the safety effort. Developing this partnership is important as safety leadership can impact people's behaviour by as much as 86%, and engaged employees are 5 times less likely to be involved in an incident. In turn, this helps to ensure safe production is the number one priority.

Conclusion

Organisations good at managing safety also tend to manage operations well – in other words, operational and safety excellence go together. Behavioural processes are known to provide a return on investment of around £1million per 100 workers, per year, from incident reductions. Strong evidence also shows productivity improvements, reductions in insurance premiums, and reduced operating costs.



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