Adaptive safety on the construction frontline

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SUMMARY

Frontline construction labourers make performance adaptations from the safety rules and the prescribed safe work method statements (SWMS) by adopting their preferred way of working developed from their previous learned experiences. Performance adaptations are motivated by the inherent production pressures within the construction industry driving a need for efficiency, and a constantly changing working environment. There is a need to rethink how safety and safety performance outcomes are constructed on the frontline of construction.

KEYWORDS

Adaptive safety, Construction, Job and work design

Introduction

Traditional safety thinking would suggest that normative safety artefacts such as safety rules, work instructions, procedures and risk assessments are safe in and of themselves, and that adverse events are simply as a result of workers deviating from them (Woods and Hollnagel, 2006). Contrastingly, the adaptive safety literature argues that such artefacts, no matter how well intended, will inevitably be under-specified as "there will always be contextualised couplings that are unknown" (Hollnagel, 2018, p.10). In such situations, workers will draw on their learned capacities to adapt to such intractableness (Reiman et al., 2015), with safety performance outcomes, whether adverse or otherwise, being an emergent property of this construct.

However, such assertions are in need of 'reality-based' empirical investigations (Rae et al., 2020) that are "grounded in operational reality" (McDonald, 2006, p. 180) necessary to evidence and understand the underlying sociotechnical constructs and their manifestation. This study contributes to this evidence gap by empirically investigating frontline construction labourer attitudes towards those normative safety artefacts and how they interact with a range of sociotechnical constructs to influence why and how construction labourers adapt their performance if not work-to-rule.

Additionally, production pressure is a ubiquitous characteristic and constraint within the construction industry (e.g. Haslam et al., 2005; Han et al., 2014). However, how this upstreamderived constraint manifests further downstream is less well understood. This study also contributes to the literature in this regard.

Methodology

This was a qualitative study using 1:1 semi-structured interviews involving 20 frontline construction labourer participants working within the ground engineering sector of the UK construction industry. The interview transcripts were thematically coded using Nvivo14 and analysed using a reflexive thematic analysis (RTA) methodology (Braun and Clarke, 2020).

Findings

Participants acknowledged that the safety rules are intended to *"keep everyone safe"*. Although, the extent of compliance varies. For example, *"they should be followed 100%, but it is not always possible to follow them"*.

The findings revealed that there are three primary drivers motivating labourer performance adaptations, 1) the inherent production pressures within the construction industry. For example, "do anything you have to do to get the job done", 2) a constantly changing working environment. For example, "we should have used a forklift to move all these steel plates, but we [physically] couldn't get the forklift past the digger because [the gap] was very narrow", and, 3), the social dynamics shaping the relationship between labourers and their supervisors which was found to have a significant mediating effect on labourers either working-to-rule or deviating from the safety rules by adapting their performance. For example, "whenever you hear about [labourers] bending the rules in the method statement or not doing something that it [prescribes] then, yes, that is what it probably comes down to".

The findings suggest that how labourers adapt their performance is informed largely by their previous learned experience, resulting in labourers having developed a preferred way of performing a task. If the prescribed methodology mandated within the normative safety artefacts closely aligns with their preferred way of working, then the likelihood for labourer adaptions is significantly reduced. However, in protecting their preferred ways of working, that is also developed to ensure efficiency in performance, the more experienced amongst the labour crews will often take it upon themselves to 'take under their wing' the less experienced and pass on their experience and knowledge of the task. Such informal strategies also develop trust (in performance capabilities) amongst labour crews which was found to be important amongst the participants.

Linked to the extent of labourers' previous learned experience informing how they adapt, or if they instead choose to work-to-rule, the study found that a labourer's attitude to risk, in the context of rule-breaking, was closely aligned with the extent to which they were comfortable deviating from the safety rules and adapting their performance, including whether the adaptation would enhance or compromise safety. Performance adaptations that risk compromising safety was found to be a 'red line' for all participants.

Discussion and key takeaways

This study has revealed that construction labourers have developed a preferred way of working that is inextricably linked with a desire to perform tasks efficiently whilst also maintaining safety. This preferred way of working is constantly evolving as the workers' learned experience of the task evolves, meaning that they develop more and more reference points to draw upon when performing the task. It also highlights how safety can potentially be compromised amongst those labourers whose previous learned experience is immature and weak relative to other more experienced labourers who have more mature reference points to draw upon when adapting their performance and, thereby, increasing the likelihood for "positive schema transfers" (Tversky and Kahneman, 1974, p.1128).

The effect being that, with the construction project environment being a temporary and transient reality (Davies, 2017), these varying levels of learned experience transiting the construction frontline will either contribute to organisational resilience, including safety, or compromise it. As a result, safety performance outcomes, whether adverse or otherwise, emerges "through the co-evolution of sociotechnical structure and [worker] agency" (Furniss et al., 2019, p.687).

With construction contractor organisations largely blind to the manifestation of these sociotechnical constructs, there is an opportunity for the findings of this study, and the currently under-way follow-on studies, to develop operationally practical methods and tools specific to the construction industry that organisations can use to both surface and leverage these constructs. In an industry where there are consistently more work-related fatalities than any other industry (HSE, 2024), such reconceptualising of how safety is constructed on the construction frontline will provide the industry with additional means by which safety can be understood and managed.

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