

# CONCEPTUAL ARGUMENT ABOUT DRIFT INTO FAILURE MASKED BY WORK PRESSURES ON CONSTRUCTION SITES IN SOUTH AFRICA

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A 'drift into failure' is a gradual decline in safe work procedures (SWPs). The decline in SWPs is driven by workplace factors, which include safety violations on construction sites. This paper conceptually argues against work pressures that lead to safety violations. The argument is based on the premise that violations move construction practices incrementally towards the edge of safety boundaries. The reported research in this paper followed an inductive. A semi-structured instrument was used to collect data from face-to-face interviews conducted in a province in South Africa. The interviewees were twenty-five construction professionals with on-site experiences. The analysed textual data revealed that safety violations were embedded in site operations. The results also reveal that unsafe procedures existed as part of regular work routines in South African construction. The underlying causes of the violations mentioned by the interviewees included: intoxication, fatigue, negligence, work pressures and the refusal to adhere to SWPs. The most cited cause was work pressures that required operatives to increase productivity at the expense of safety. It was apparent that work pressures mask the normalisation of safety violations that drives the drift into failure. The conceptual argument reinforces the idea that persistent work pressures with which site operatives contend during construction drive a drift into failure. Therefore, contractors must implement practical measures that will limit drift to unsafe procedures. A measure that is at the centre of the matter is the need to discourage cutting corners in favour of increased production rates while ensuring that work pressure is not excessive on site.

Keywords: compliance, drift into failure, safety, site work, violations

## BACKGROUND

The management of health, safety and well-being (HSW) is not exempted from the dynamic nature of the human mind despite the goal of eradicating harm. The human contributions to accidents and the potential for resilience are well reported (Reason, 2008; Hollnagel, Woods and Leveson, 2006). The proliferation of an unintentional course of events is shaped by what people do. What people do either trigger an accidental flow of events or alter a regular flow of SWP. The management of HSW, then, depends on the control of work processes (for instance, through the flow of information and materials in construction) to avoid unintended events that could harm people.

The control of activities in a workplace that is always in a state of change and modification is not an easy task. Rasmussen (1997) says that the control of activities

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to ensure safety through a prescriptive approach is only useful in a static setting where instruction and procedure are based on task analysis. In contrast, regulations and procedures for work in complex systems are always incomplete, and frontline operatives must sometimes deviate from the work as imagined (WAI). The deviations might be required by conditions that were not anticipated by the writers of an SWP. Such conditions would make frontline workers develop 'workarounds' to get the job done. Other deviations result in workers taking shortcuts to either reduce workload or improve productivity (Dekker, 2011). Deviations, which are a violation of SWP, start a slow drift into failure with multiple steps that occur over an extended period (Dekker, 2011; Stoop, 2018). The extended period is called the 'incubation period' (Rasmussen, 1997; Stoop, 2018). Each step in the period is usually negligible, so it goes unnoticed, in the absence of a significant event, until it is too late. Deviations from work routine thus occur in the face of increasing competitive pressure and resource scarcity. For example, Dekker (2011) and other scholars say that regular people, who come to work each day to do a regular job, could deviate from SWPs because of work pressures.

In this paper, the 'drift into failure' theory is used to make a conceptual argument that work pressures encourage safety violations on South African construction sites where fatalities are continuously recorded (Emuze, van Eeden and Geminiani, 2015; 2017; News24, 2019). The 'drift into failure' theory refers to a gradual decline into a tragedy compelled by environmental pressure, rapidly changing technology and social processes that normalise increasing exposure to safety risk (Dekker, 2011). For instance, the issues relating to work-as-imagined versus work-as-done (WAI/WAD) and the need to balance rules with situational realities could be explained by stating that drift into failure had occurred in the case of an accident because preventing hazardous activities requires rules, procedures and standards to specify safe ways of operating (Stoop, 2018).

The discussion of theory in this section is followed by an explanation of the research method used to collect the primary data. The results, as presented, reinforce the perception that safety violations occur on different sites in South Africa (Emuze, 2018). In a discussion of work pressures, the case is made for employing the preventive measures advocated in practical drift theory. The preventive measures are outlined in conclusion to this paper.

## **RESEARCH METHOD**

An inductive approach (qualitative research) was used for this study. Qualitative research is a broad term for a range of methods that vary in terms of focus and assumptions about the nature of knowledge (Astalin, 2013). The method is characterised by a stated aim, which relates to understanding aspects of social life and, in general, its techniques generate data in the form of words rather than numbers for analysis. In essence, phenomenological, qualitative research was conducted to gain a better understanding of the safety violations embedded in the routine work of site operatives. The goal of phenomenological research is to describe a lived experience of a phenomenon such as safety violation. The primary data were collected from construction sites. The use of a qualitative, interpretive approach assisted the study in the sense that the collection of data was based on the social and contextual beliefs of the participants. The research conformed to the idea that carrying out a qualitative study places the observer in the context of the phenomenon being observed (Denzin and Lincoln, 2008) which, in this case, was various construction sites.

The research involved interpretive practices based on interviews and field notes (Denzin and Lincoln, 2008). The interviews were conducted using a semi-structured guide that elicited information from construction professionals. For this study, the primary question was: How do safety violations become embedded in the work of artisans and their supervisors on a construction site? The secondary questions used to explore the phenomenon were grouped under the themes shown in Table 1.

*Table 1: Themes and related questions used to collect primary data*

Theme	Questions used to compile each theme
Understanding health and safety violations by supervisors on a construction site.	<p>How would you describe H&amp;S on site?</p> <p>What would you describe as the main factor causing accidents in construction?</p> <p>What do you understand by the term safety violations?</p> <p>Why do supervisors violate safety rules?</p> <p>What is the role of supervisors regarding H&amp;S?</p> <p>What do you understand about working conditions on sites?</p>
Understanding health and safety violations by artisans on a construction site.	<p>How would you describe the attitude of artisans towards accidents?</p> <p>Would you say safety violations lead to accidents?</p> <p>What impact do accidents have on work output produced by artisans?</p> <p>What would you suggest should be done to encourage artisans and supervisors to mitigate the causes of accidents on site?</p> <p>Do workload and pressure influence the extent of safety violations on sites?</p> <p>What sort of interventions should be undertaken by supervisors to make sure artisans adhere to safety rules?</p> <p>What are the common accidents caused by site operatives in your workplace?</p>
Adherence to and compliance with safety regulations	<p>Is H&amp;S legislation and regulation promoted on your site?</p> <p>How often are education and training provided on your site?</p> <p>Do you have motivating programmes for H&amp;S compliance?</p> <p>How committed is management to making sure site operatives comply with H&amp;S regulations?</p> <p>How do you address non-compliance?</p>

All the interviews were conducted face-to-face, and they were all tape-recorded and transcribed. The purposively selected interviewees were identified through their involvement in on-going projects in 2018. Although 30 people were approached, only 25 interviewees (with 20 males and 5 females) participated in the study. The number of interview data was acceptable for analysis, as suggested by Yin (2013). The sample included 18 interviewees working for contractors on site, while three worked for consultants, and four of them worked for public entities (clients). The interviewees included site managers, site agents, general foremen, safety officers, building inspectors, project managers, artisans and general workers. Of the interviewees, 21 had more than five years' work experience in the construction

industry, while 16 of them had tertiary, built environment qualifications as their highest degrees or diplomas.

A team of research assistants was used to collect data from several construction sites in the Chris Hani District Municipality area, in the Eastern Cape Province of South Africa to promote stronger substantiation of feedback to the research questions. The use of three field workers to collect data using the same instrument improved the credibility of the findings (Huberman and Miles, 2002). The nature of the data guided the thematic analysis of the data. The analysed data indicated the extent of safety violations based on the lived experiences of the interviewees. The interpretation of the data based on lived experiences provided a better understanding of the main issues related to the research topic (Huberman and Miles, 2002).

## **FINDINGS AND INTERPRETATIONS**

In this section, the findings based on the perceptions of the interviewees have been interpreted. The focus of the themes outlined below was on responses to safety violations committed by site operatives (artisans and their supervisors). The section thus provides the basis for the subsequent discussion on a drift into failure.

Theme 1: Understanding H&S violations by supervisors on construction sites

In response to the questions under Theme 1, the interviewees described the causes of safety violations that they have encountered on their sites. The following comment by an H&S officer was insightful:

The main factor that causes accidents on site is when both employer and the employees do not follow or rather neglect the health and safety rules and regulations. Deliberately neglecting set safety procedures endangers every personnel on site. Other factors may be taking shortcuts when doing an assigned job. Shortcuts that are taken on the job are no shortcuts; they are merely increasing the risk of injury or, worse, death...

The interviewees, in general, concurred that overlooking safety precautions on a construction site could lead to unfortunate events. For example, a safety manager noted that either fatigue or intoxication was a significant cause of accidents recorded by site operatives on construction sites. Other causes mentioned by the interviewees included negligence, unidentified hazards in the workplace and human error.

In addition, most of the safety professionals that were interviewed regarded safety violations to be acts or omissions that compromised safe working conditions and procedures in contravention of relevant policies and regulations. The textual data also showed that supervisors tended to violate construction H&S rules to increase production. The push for higher levels of production led to situations where they would cut corners and endanger people to achieve handover dates. In most cases, the rules were violated when work was conducted under pressure as a result of poor planning. An H&S officer stated that supervisors tend to deliver a high level of production output without taking the HSW implications of the pace of work into consideration.

When the interviewees were asked about the H&S role of supervisors, three site managers were of the view that supervisors must inform workers of dangerous situations and shortcomings in the workplace to ensure that a safe working environment is provided. One manager indicated that continuous monitoring is essential to assess whether construction is proceeding in a safe environment. The idea from this site manager correlated with that of another interviewee (also a site

manager) who contended that the role of supervisors is to inspect workplaces and direct workers to ensure that people and materials/property are safe at all times. In response to the question of what the interviewees understood about working conditions on construction sites, five of them reasoned that the working conditions on sites with records of injuries and accidents were often risky. It is notable that a site agent believed that every worker should be entitled to a safe working environment where they are not subjected to working in severely cold or scorching conditions.

#### Theme 2: Understanding H&S violations by artisans on construction sites

The focus of the questions under Theme 2, listed in Table 1, was on artisans. Some of the interviewees were of the view that artisans generally ignore safety and always claim that they know what they are doing because of their years of experience. The reference to years of experience as an excuse to deviate from SWPs represents an inappropriate state of mind or way of thinking. A safety manager with ten years' work experience suggested that all accidents involving artisans are caused by non-compliance with the H&S plan because of pressure and deadlines to complete the jobs. The other ninety per cent of the respondents agreed that the perception that safety violations by artisans were causing accidents was an accurate reflection of what was happening on site.

Although one site engineer perceived that artisans were generally pro-active towards accident prevention, the tendency of artisans to ignore SWP when under pressure to increase production is always a concern. In support of this perception, another site manager believed that H&S was not a concern for artisans and stated: 'it seems that, as long as production is done, the rest does not matter, and this complicates the role of the supervisor.' Overall, the interviewees agreed that workload and work pressure influenced the extent of safety violations on sites. The first interviewee was of the view that, to some extent, the main reason for safety violations was improper planning of construction operations, which leads to abnormal workload and pressure. An interviewee with ten years' experience in the industry also confirmed that supervisors were under pressure from contractors to meet specific deadlines which, in turn, put pressure on the workers. The gravity of the influence of work pressure on safety was emphasised by the following verbatim responses to the question: 'Do workload and pressure influence the extent of safety violations on sites?':

Yes, arrogance and carelessness are causing work pressures to produce more, thus violating safety rules.

Yes, it is common to experience violations when the work is behind schedule as some safety compliance takes time, which the contractor may not have.

Tight deadlines create a perfect environment for accidents. Unsafe acts and fewer safety checks often accompany it.

A lot, because supervisors and artisans are violating safety measure due to taking shortcuts and leaving materials recklessly.

Yes, they do. If workers are overworked, and they are tired, they tend to take shortcuts and shortcuts at the workplace are a safety violation, which may lead to accidents/incidents.

It was evident from the above quotes and other transcribed data that the interviewees agreed that work pressure leads to safety violations in construction. The interviewees also agreed that accidents have a devastating effect on the progress of construction work. Thus, workload and pressure lead to safety violations that beget accidents which, according to the interviewees, include falling from scaffolding, cuts and bruises, trips and falls, and being struck by bricks while doing brick 'tossing' between

workers. To curb these accidents, most of the interviewees suggested that wearing the required personal protective equipment (PPE), maintaining a high standard of housekeeping, and monitoring construction activities should not be compromised. Furthermore, the interviewees suggested that site operatives should not compromise the purpose of toolbox talks and early warning signs. A few interviewees also mentioned increased awareness and training.

Concerning interventions that should be implemented to ensure that artisans abide by safety rules, the interviewees perceive that supervisors should ensure that SWP training is conducted to reinforce the implementation of method statements for every activity on site. They also suggested that the daily safe task instruction (DSTI) should be provided to support compliance-based safety.

### Theme 3: Adherence to compliance and safety regulations

As shown in Table 1, Theme 3 was based on questions that addressed how greater compliance could discourage safety violations. One interviewee suggested that safety agents carry out bi-weekly audits with the help of a safety officer who is resident on site. Another interviewee suggested daily inspections, safety file updates and toolbox talks as ways of promoting compliance. However, most interviewees appeared to be unsure of what could be done to deter safety violations on their sites. Eight of the interviewees mentioned that they had programmes that encouraged and motivated workers to be safety compliant. For example, a safety manager alluded to an H&S monthly reward system that was used in his organisation to motivate workers. However, ten interviewees noted that their companies did not have such a system. Seven interviewees were undecided in their responses to the questions. The seven interviewees neither confirmed nor refuted the existence of a programme that encouraged compliance with safety procedures in their firms.

Regarding the frequency of training provided on site and who does the training, most of the interviewees said that it was done weekly. The interviewees considered on-going education and training to be a reliable way of preventing safety violations. In particular, a site manager argued that continuous education and training is necessary because employee turnover is very high in the industry where supervisors are often responsible for on-site training. Apart from supervisors, safety officers also provide the required training on specific sites. Some of the interviewees confirmed that safety officers could train workers because contractors employ them on a full-time basis.

## DISCUSSION

The results in the previous section are relevant to all project role-players in South African construction. Concerned managers and operatives should consider: 'why do people in the frontline of construction take shortcuts and put themselves at risk?' The above results indict supervisors who put immense pressures on artisans to complete tasks. The findings confirm the perceptions of safety professionals from different industrial sectors. In particular, in response to a similar question posed to 66 safety professionals in different industrial sectors, Carrillo (2013) determined that human nature, leadership and culture, production/financial pressures, and operational/management systems constitute the reasons why people take shortcuts and put themselves at risk. These factors are inter-related as they influence production pressures, which have been highlighted as a leading cause of unsafe acts and human failures (errors and violations) in construction (Alper and Karsh, 2009; Lingard *et al.*, 2016). The four factors identified by Carrillo (2013) also drive a drift into failure in the workplace. It is notable that the drift is not caused by the evil tendencies of people

to cause accidents (Dekker, 2011; Stoop, 2018). Instead, the drift is a natural phenomenon that affects all types of adaptive systems, including the construction process where supervisors and artisans are critical role-players.

Drift into failure, which is also known as 'practical drift' (Snook, 2000; Rasmussen, 1997), is a theory that provides direction for activities that could address the unpredictable nature of workplace practices that results in accidents. The reporting of industrial accidents, both in empirical sources and in mainstream media, often mentions one form of violation or another. It might be difficult to accept (especially on a construction site) that managers and workers are always modifying their actions according to the perception of what is required to get the job done. Deviations from SWPs are a pathway to loss of control in the workplace. In addition, injuries and fatalities on an industrial worksite are the results of the loss of control of physical processes that can harm people and damage properties (Rasmussen, 1997). Many scholars, such as Hollnagel *et al.*, (2006), attest to the notion that rules and procedures are an attempt to uphold consistency that keeps workers safe. However, this notion is only valid to the point where the human mind shifts to a new perception of what is required in the workplace (Carrillo, 2013).

The mind shift is influenced by competing priorities and constraints that affect socio-technical systems, such as: what is achievable in the construction process? When a construction system, for instance, is subjected to multiple pressures, the acceptable boundary for safe performance can move over time in response to different events. The movement is a feature of adaptive systems. The drift into failure theory is a metaphor that characterises adaptive systems. The theory explains why people work as they do, what they believe is essential for safety, and which pressures can incrementally erode safety (Marsden, 2018). The theory points to the idea that safety is a problem of control, which incorporates underlying dynamics that slowly lead to accidents (Dekker, 2011; Marsden, 2018).

The underlying dynamics of safety as a problem of control are illustrated in Figure 1. The main feature of the figure is the space of possibilities formed by three constraints (Rasmussen, 1997). The figure shows three scenarios. In the first scenario, management pressurises workers to perform work efficiently to avoid economic failure (1 of 3 in Figure 1). In this case, Marsden (2018) says that the competitive environment forces managers to focus on short-term financial success that guarantees business survival, rather than on long-term imperatives such as safety. In the next scene where workers expend the least effort, the possibility of bankruptcy for an organisation is real (2 of 3 in Figure 1). When both economic and unacceptable workload pressures push work to migrate towards the limits of safe performance (3 of 3 in Figure 1), the system gradually drifts into practical failure, and the result is an accident caused by unsafe acts (violations and errors) and conditions (Marsden, 2018; Rasmussen, 1997). The normalisation of violation accelerates the drift into failure in the illustration.

Dekker (2011) and the interviewees in the previous section mentioned that safety violations are perpetrated by workers who take shortcuts either to reduce workload or to improve productivity. Over time, safety violations become normalised as routines (Reason, 2008; Stoop, 2018). The normalisation of violations leads to a steady disengagement of practice from SWPs as WAI changes to WAD (Snook, 2000). Therefore, attention to violations and the tendency to normalise them in construction should be addressed because “maintaining safety outcomes may be preceded by as

many procedural deviations ...” (Dekker, 2004: 133). Attention to violations is required because work pressure drives the drift away from the safety margins because of the need for a faster rate of work completion. Some firms do not view violations as a shortcoming; instead, they view them as an indication of the increased motivation of the operatives. Such views should be discouraged on construction sites.

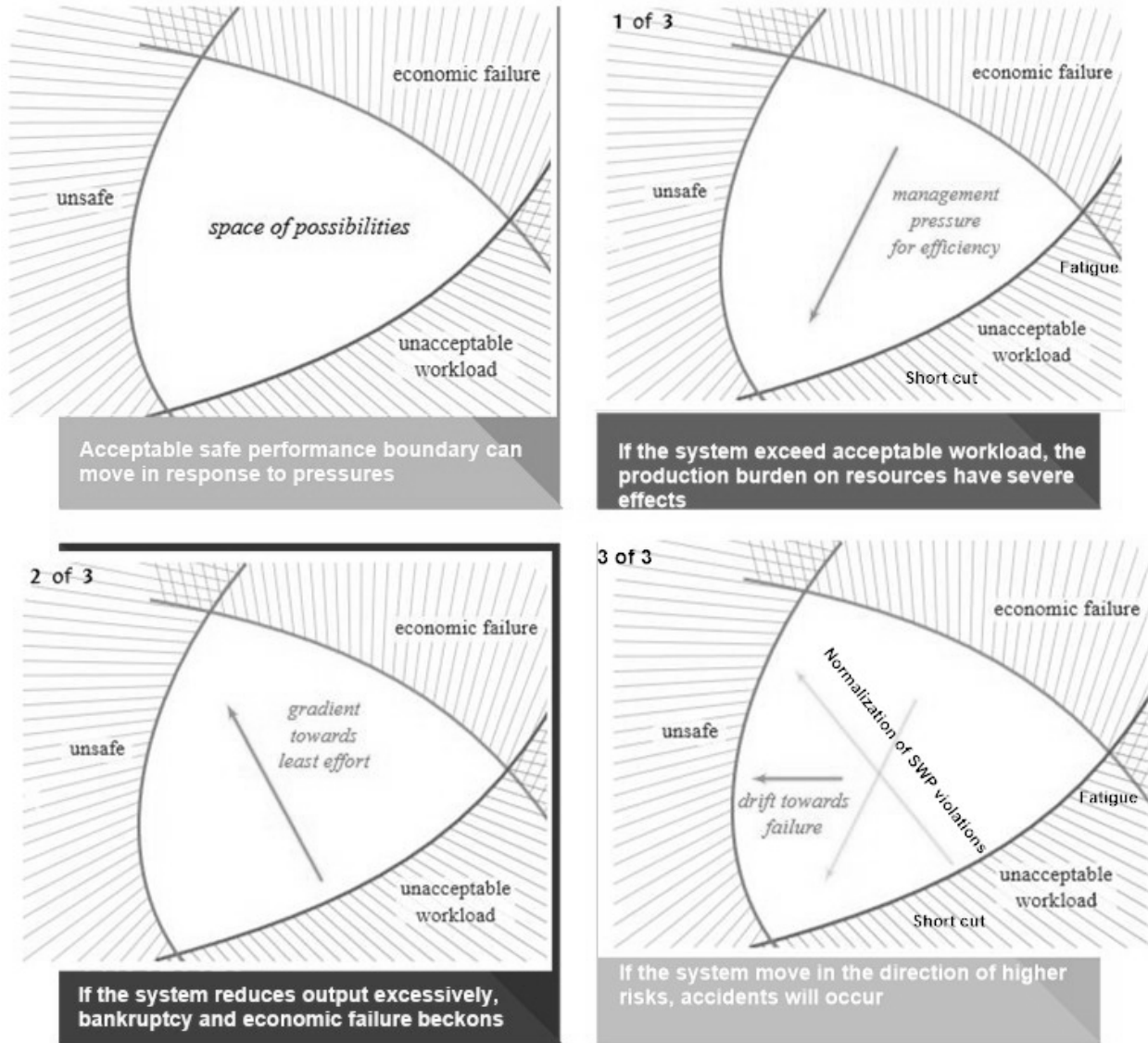


Figure 1: Illustrated space of possibilities concerning drift into safety failure (Adapted from Rasmussen, 1997; Marsden, 2018)

## CONCLUDING REMARKS

Safety violations and errors are the principal constituents of human failure. These constituents are the mechanisms by which people contribute to accidents in various industries. The reported research confirms in this paper that site operatives perpetrate safety violations in South African construction. Fatigue, substance abuse (intoxication), negligence, unidentified hazards (or ignorance about hazards), and work pressure were mentioned as the factors causing site operatives to perpetrate safety violations. The interviewees reiterated the detrimental effect of work pressure that supervisors exert on artisans and general workers on sites. The view of the interviewees supports the proposition of Rasmussen’s migration model (Figure 1), which shows that small compromises and adaptations can accumulate over time



(referred to as the incubation period) to create situations that erode safety. The conceptual argument is that, if there were no countermeasures to the normalisation of SWP violations, safe systems would drift towards practical failure, i.e. accidents.

The factors that contribute to drift into failure, combined with the normalisation of safety violations, are related to work pressure. Work pressures that override HSW concerns result in incremental tolerance for shortcuts that lead to improved productivity in the short term. The shortcuts also lead to the bypassing of safety barriers during periods of high workload. In sum, site operatives must be aware of, and avoid, these factors with the support of management on a project. Contractors also must discourage cutting corners on their project sites. Apart from discouraging cutting corners, contractors have to implement practical measures that give safety an active voice on a site to limit drift towards unsafe procedures. Managers and supervisors must stay alert to repeated failure on site to address the normalisation of SWP violations. The alertness of site management should flag and stop mixed (contradictory) safety messages and empower workers to report deviations from SWPs. The empowerment of site operatives should encourage a just culture that allows everyone to report hazards and near misses that could have resulted in the loss of control. Prevention of loss of control will limit injuries and fatalities on sites.

It is, however, important to highlight a limitation of this argument because safety violations are only one component of the practical drift towards accidents. There are other components of drift into failure. All the components of drift into failure can alter perceptions of risk, priorities, decision-making and actions in an organisation. Therefore, there is significant scope for addressing the theory in the context of operations management in construction.

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