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Emergency Planning in New Zealand's Road and Civil Construction Sector: A Rapid Review of Effectiveness in Injury Mitigation

Author: Melbin Matthew

Email: melbin157@gmail.com

ORCID: https://orcid.org/0009-0002-2798-7952

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Abstract

Emergency situations in road and civil construction can arise quickly, with serious results for workers and the public if response systems are inadequate. Road and civil construction is one of New Zealand's high-risk sectors, defined by complex worksites, live traffic interactions, heavy plant and equipment, and exposure to various environmental hazards. Although emergency planning is a mandatory requirement under New Zealand's health and safety system, its effectiveness in reducing workplace injury rates within the road and civil construction sector has been inadequately explored. This rapid review synthesises academic literature, regulatory guidelines, and industry reports to evaluate how emergency planning is structured, implemented, and put into practice, and to determine its impact on injury reduction.

A rapid review methodology was adopted due to the applied focus of the research and the short project timeframe of 12 weeks. Literature was identified through targeted searches of academic databases, Google Scholar, and New Zealand government and industry resources. The selection of studies was guided by PRISMA guidelines, with screening and inclusion based on preset criteria relevant to emergency planning in road and civil construction.

The findings show that emergency planning is well recognized as a mandatory requirement of the occupational health and safety system but is inconsistently implemented in practice. Emergency plans are commonly treated as a compliance-based requirement, with limited site-specific modifications and poor integration into broader safety management systems for construction. Generic planning methods, irregular drills, unclear roles and responsibilities, and organizational and human factors were identified as significant barriers to effective emergency planning. The literature indicates that effective emergency planning is very important in reducing injury rates by promoting timely response, prevention of further injury, and coordinated action.

This review shows that emergency planning works best when it is treated as an active, site-specific safety measure. It is most effective is effective when built into everyday work practices, rather than existing mainly as a compliance document. Improving integration, adaptive capacity, and regular testing of emergency plans provides opportunities to enhance injury reduction within New Zealand's road and civil construction sector and identifies critical areas for future evidence-based research.

Introduction

The construction sector is repeatedly identified as one of the most hazardous sectors in New Zealand, with high fatality rates compared to other industries and a significant number of work-related injuries occurring in this sector (steph, 2024). In spite of current regulatory frameworks and established safety management, the construction industry continues to experience a burden of workplace accidents, injuries, and fatalities. While employment in the construction sector increased significantly during the early 2000s, the industry has started to show an increase in harm rates, accounting for a significant proportion of occupational injuries and fatalities (Samsudin, 2023). Over time, New Zealand's work-related injury rate has exceeded those of other countries, showing consistent challenges for managing risk in high-hazard industries such as construction (steph, 2024). These trends show the importance of evaluating the effectiveness of emergency planning in sectors where the results of failure are severe.

Road and civil construction as a high-risk sector

Road and civil construction projects are considered high-risk environments because the work is often carried out across large geographical areas in temporary and continuously changing work environments. In these settings workers are exposed to live traffic, heavy mobile plant equipment, and multiple contractors. The constantly changing nature of workplaces, combined with tight deadlines

and work pressures, increases the likelihood of emergency situations (WorkSafe New Zealand., 2022). Occurrences such as collisions between workers and machinery, fire, medical emergencies, unauthorized vehicle entry in work zones, excavation collapse, and natural disasters like floods or earthquakes may occur in the road and civil construction workplaces. If any such events occur, the efficiency of emergency planning and response directly influences the severity of the consequences (Tang et al., 2023). These incidents have the potential for serious injury or fatality, affecting workers, site visitors, and the general public. In this context, emergency preparedness is an essential factor for mitigating or reducing the consequences of the event.

Regulatory context for emergency planning in New Zealand

Emergency planning is a key requirement of New Zealand's health and safety system and is required by the Health and Safety at Work Act 2015 (Health and Safety at Work Act 2015 No 70 (as at 23 December 2023), Public Act Contents – New Zealand Legislation, n.d.). Regulatory guidance from WorkSafe New Zealand additionally strengthens emergency planning as a fundamental requirement in high-risk workplaces, including construction. This guidance highlights requirements related to emergency evacuation, emergency communication, first aid, and coordination with emergency services (WorkSafe New Zealand, 2025b). This regulatory requirement helps to manage situations where hazards cannot always be eliminated. In these cases, effective emergency preparedness can reduce the impact of incidents by controlling injury severity and preventing secondary harm. The occupational health and safety system in New Zealand has been strongly influenced by the Robens model. This gives importance to performance-based regulation and employer responsibility rather than regulatory rules (Reveley & Singleton, 2018).

Later revisions, including the Health and Safety at Work Act 2015, intended to strengthen duties and promote a more proactive approach to safety, particularly in high-risk industries (Peace, 2024). Emergency planning functions within a performance-based regulatory framework, requiring organizations to develop plans that are proportionate to risk and relevant to their operational environment. In New Zealand, emergency preparedness is also controlled by the Civil Defence Emergency Management Act 2002, which focuses on the four key phases of reduction, readiness, response, and recovery (Federici et al., 2021). Because New Zealand is exposed to earthquakes and severe weather, strong emergency planning is very essential in high-risk sectors such as road and civil construction.

Gaps in emergency planning practice and evidence

Despite strong regulatory importance, a frequent issue in both New Zealand and international construction safety literature is the trend to consider emergency planning as a compliance-driven requirement rather than a practically incorporated safety control (Samsudin, 2023). To satisfy the legal requirements, organizations may develop detailed emergency plans; however, these documents may have limited influence on day-to-day operations at the site or real-time decision-making at the time of emergencies. This "paper compliance" can create a misleading appearance of compliance without actually enhancing safety at the workplace (Cambon et al., 2006). If the emergency plans are generic, outdated, or insufficiently tested, their capability to mitigate risk during emergency situations is limited (WorkSafe New Zealand, 2025b).

The construction sector's project-oriented structure, temporary workforce, and presence of multiple contractors further complicate effective emergency planning. The differences between planned work and actual work are well documented, with workers often adjusting procedures to meet site requirements (Hollnagel, 2018). If emergency plans are not properly integrated with actual site practices or regularly practiced, they may not be fully understood or may be irregularly applied during emergency situations, potentially increasing the likelihood of delayed response and inadequate coordination (Hollnagel, 2012). These problems are particularly significant in road construction, where risk and site conditions change rapidly.

The construction safety research often highlights hazard identification, risk assessment, and preventive controls; relatively less attention has been given to emergency planning as an active contributor to injury prevention. Emergency preparedness is frequently discussed as part of general safety management or assessed after incidents. It is less often considered as a proactive measure to reduce harm in changing, high-risk environments (Samsudin, 2023). Evidence relating to emergency planning in New Zealand's road and civil construction sector is spread out across academic literature, regulatory guidance, and industry reports. This makes it difficult for practitioners and policymakers to make clear conclusions about its effectiveness in practice.

This study was conducted within a 12-week timeframe, which limited the scope of data collection. To manage this limitation, a rapid review methodology was adopted as a practical approach to summarize existing evidence within the limited time frame. Rapid reviews apply structured methods while refining the search and analysis processes, making them particularly suitable for applied health and safety research (Affengruber et al., 2020).

This review was conducted to combine and critically examine fragmented New Zealand evidence on emergency planning in road and civil construction. Despite its status as a regulatory requirement, the effectiveness of emergency planning in reducing injury severity remains unclear.

In this context, this rapid review addresses the following research question:

> How effective is emergency planning in New Zealand's road and civil construction sector in reducing workplace injury rates?

Effectiveness is defined as how emergency planning supports preparedness and response and reduces injury severity during emergency situations. By combining evidence from construction safety literature, regulatory guidelines, and industry practice, this review focuses on clarifying how emergency planning is structured and implemented within the road and civil construction industry and on identifying the possibilities to improve its function as an active safety control in one of the highest-risk industries in New Zealand.

Methods

The methodology outlines the systematic process that will be used to examine the effectiveness of emergency planning in reducing workplace injury rates within New Zealand's road and civil construction sector. This approach will include a clearly defined set of review questions, a search strategy, a list of keywords, and inclusion and exclusion criteria to ensure the quality and reliability of the review. Study selection followed PRISMA 2020 guidelines, and findings were synthesised using a thematic analysis approach.

Review questions

To thoroughly address the primary research question, the following specific review questions will guide the literature search and analysis:

1. What types of emergency situations are most commonly identified in road construction environments?
   a) The types of emergency events most frequently reported in road construction.
   b) The main factors contributing to the severity of these emergency situations.
2. How is emergency planning analysed in construction safety literature, regulatory standards, and industry practice?
   a) Regulatory and industry framing of emergency planning
   b) Generic versus site-specific emergency planning
3. What factors affect the effectiveness of emergency preparedness and response in road construction works?
   a) Organizational factors affecting emergency preparedness.
   b) Operational and human factors affecting the effectiveness of emergency response.
   c) How emergency planning is included within construction safety management systems.
4. What limitations and gaps are existed in current emergency planning and response practices in road construction?
   a) Common problems or failures that occur during emergency situations.
   b) Issues that make it difficult to test, review, or improve emergency plans.

Study design and search strategy

This study utilized a rapid review methodology to integrate existing evidence on emergency planning in road construction. A systematic search strategy is developed and executed across multiple academic databases and institutional websites to identify relevant literature.

Rapid reviews follow systematic principles while standardizing search and data extraction processes to provide timely, practice-relevant findings. The searches were carried out on multiple sources of evidence such as reports, studies, and guidelines related to emergency planning, occupational safety, road construction, construction safety, emergency preparedness, emergency response, incident management, and disaster management. It shows the combined influence of research and practice on emergency planning in road construction, with a clearly defined focus on the New Zealand context where possible. This approach was appropriate for the applied health and safety focus of the study, the absence of primary data collection, and the aim of guiding road construction safety practice and policy.

Searches were conducted through the library portal of Te Herenga Waka-Victoria University of Wellington, with additional searches in Google Scholar to locate grey literature and publications not indexed in academic databases related to emergency planning in road and civil construction. Scopus was used in a specific manner to identify key construction safety and engineering journals, while Google Scholar provided broader coverage among multidisciplinary and applied sources, including grey literature.

Moreover, New Zealand government guidelines and construction industry websites were used to identify legislation, regulatory guidance, industry reports, and policy documents related to emergency planning and occupational health and safety. This information was added to the review to ensure complete representation of both academic research and practice-based evidence specific to the New Zealand setting.

Searches combined keywords with Boolean operators to broaden the search and filter the results. The search strategy was recorded, including keyword combinations, date limits, and used filters, to improve transparency and consistency. At the beginning the searches were conducted without date restrictions to identify foundational literature; however, thereafter, filtering was applied to focus on relevance and manage high volume, with a primary focus on sources published from 2000 to 2025. A total of 40 studies were included in the rapid review, highlighting the wide distribution of emergency planning evidence across academic, regulatory, and industry sources relevant to New Zealand road and civil construction.

Key words

The following keywords and their synonyms were utilized in the search method, combined using Boolean operators.

Table 1. Search concepts and key words

Search concept	Key words
Emergency planning:	“emergency planning” OR “emergency preparedness” OR “emergency response” OR “disaster management” OR “contingency plan” OR “crisis management”
Construction sector:	“construction industry” OR “road construction” OR “civil construction” OR “highway construction” OR “infrastructure projects” OR “work zone”
New Zealand context:	“New Zealand” OR “Aotearoa” OR “NZ”
Effectiveness and evaluation:	“effectiveness” OR “evaluation” OR “impact” OR “prevention” OR “mitigation”

Inclusion and exclusion criteria

The identified literature was screened through the following methods to ensure that only relevant materials were selected for the review. Clear inclusion and exclusion criteria were necessary for selecting relevant and high-quality articles (Page et al., 2021).

Inclusion criteria

- Studies published between 2000 and 2025 are only considered, focusing on recent developments in emergency preparedness and safety practices within the construction sector.

- Content appropriate to the road and civil construction sector.
- Studies, reports, and guidelines focusing on emergency planning or preparedness.
- Studies analysing workplace injury rates or safety outcomes as a primary or secondary outcome.
- Research carried out in New Zealand or with direct relevance to the New Zealand context.
- English language publications.
- Quantitative, qualitative, and mixed-methods studies, as well as systematic reviews and governmental/industry reports.

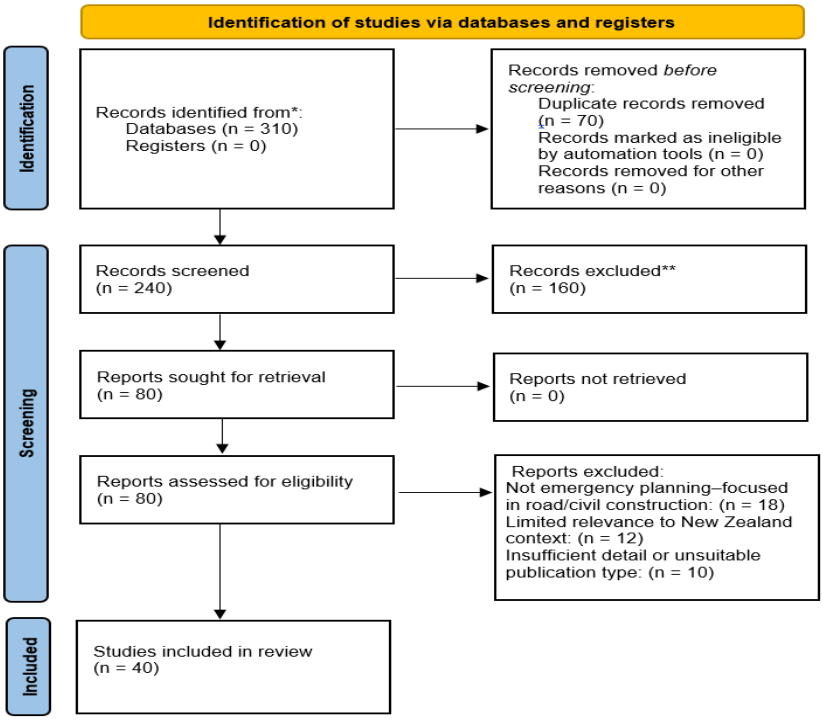
Exclusion criteria

- Studies not directly related to emergency planning or preparedness.
- Research focused on general construction safety, with limited consideration of emergency planning.
- Studies from sectors other than road and civil construction, unless they provide highly applicable findings directly relevant to the question.
- Editorials, conference abstracts without full papers, opinion pieces, and unpublished research.
- Publications in languages other than English.
- Case reports and case-control studies that do not offer a broader understanding into effectiveness.

This strict approach to inclusion and exclusion ensures that the identified literature directly addresses the research question. The review focuses on the effectiveness of emergency planning in reducing workplace injuries within New Zealand's road construction sector.

The literature selection process followed PRISMA 2020 guidelines to ensure transparency and consistency in identifying relevant literature (Page et al., 2021). The final set of studies was included in the rapid review, and the identification, screening, and inclusion process is summarised in the PRISMA flow diagram (Figure 1).

Figure 1. PRISMA 2020 flow diagram of the literature selection process for emergency planning in New Zealand's road and civil construction sector.



Data were extracted from academic databases, Google Scholar, and New Zealand government and industry sources. After duplicates were removed, titles and abstracts were screened to identify literature relevant to emergency planning in road and civil construction. Articles were then assessed using predefined inclusion and exclusion criteria, with full-text studies where they did not focus on emergency planning in road or civil construction, were not relevant to the New Zealand context, or lacked sufficient detail for inclusion.

Data synthesis

The included studies were combined using the thematic analysis method to identify recurring themes related to emergency planning effectiveness, implementation, and integration within road and civil construction.

Results

Overview of findings

Thematic analysis of the reviewed literature identified several recurring themes related to emergency planning in road and civil construction. The findings of this rapid review show that emergency planning is considered an important component of health and safety management in New Zealand's road and civil construction industry, even though the implementation part is still inconsistent. Academic literature, regulatory guidelines, and industry documentation often show emergency planning as a compliance-based requirement. Limited evidence shows the integration of emergency planning into everyday construction activities (Samsudin, 2023; WorkSafe New Zealand, 2025b). Although a range of emergency risks and influencing factors were identified, emergency planning practices were the main factor affecting preparedness and response capability in road construction.

Emergency situations determining emergency planning in road construction

The reviewed literature shows the construction sector in New Zealand is often characterized as a high-risk work environment, where emergency situations are common and often severe, leading to occupational injuries and fatalities (Lilley et al., 2021). Most common emergencies include collisions between workers and mobile plants, fires, hazardous substance releases, medical emergencies, excavation collapses, natural disasters, unstable ground conditions, and extreme weather conditions (WorkSafe New Zealand, 2025b). These situations may often lead to serious injury or fatalities due to the interaction between live traffic, heavy machinery, and temporary or immediate changes of site conditions (Adekunle et al., 2024; WorkSafe New Zealand, 2022).

Many sources show that the severity of emergency situations is influenced by a combination of environmental and operational factors, such as traffic speed and volume, range of separation between workers and vehicles, visibility, driver or operator behaviour, and the nature of the work site (Samsudin, 2023). In the New Zealand setting, natural hazards such as earthquakes and other natural disasters are other common concerns that might increase the emergency risk and affect the response arrangements (Samsudin, 2023). All of these findings show the conditions in which emergency planning operates and highlight the importance of readiness in responding to serious events in road construction.

Regulatory and industry frameworks for emergency planning

The literature reviewed highlights emergency planning as a mandatory requirement of workplace health and safety management within New Zealand's regulatory framework (WorkSafe New Zealand, 2025b). Regulatory guidance mandates that organizations should identify potential emergency situations and develop documented procedures for evacuation, emergency communication, first aid and emergency equipment arrangements, and communication with emergency services (WorkSafe New Zealand, 2025b). This framework makes emergency planning a structured and formalized process designed to support preparedness and regulatory compliance (Samsudin, 2023; WorkSafe New Zealand, 2025b).

Emergency planning is also integrated into the national emergency management systems. Civil defence and emergency management legislation and guidance demonstrate the shared responsibilities across reduction, response, readiness, and post-incident recovery. This framework highlights risk assessment, coordination across agencies, and recovery planning (Tavakoli Taba et al., 2019). As a whole, these sources define emergency planning as a highly regulated activity that focuses on documented preparedness, and well-defined responsibilities, with limited focus on how these plans are executed at the worksite level.

Generic versus site-specific emergency planning practices

Despite regulatory standards for site-specific emergency planning, the literature describes that generic emergency plans are common in construction practice (Samsudin, 2023). WorkSafe New Zealand clearly indicates that emergency planning should be proportionate to the level of risk, requiring more comprehensive and detailed plans for high-risk environments (WorkSafe New Zealand, 2025b). This highlights that the emergency risks can vary depending on the nature of work activities, hazards, and site conditions.

Several studies highlight that generic emergency plans often prioritize immediate response actions, such as evacuation and first aid. However, they provide limited guidance on site-specific coordination, communication protocols, resource distribution, and information management (Samsudin, 2023). This is common in road construction, where work zones, traffic management arrangements, and contractor interactions vary with every project. As a result, emergency plans may not fully contain the changing conditions of road construction environments. This pattern was repeatedly reported across the literature, showing the gap between regulatory expectations and observed emergency planning practices.

Key limitations in emergency planning implementation

Across the reviewed literature, several recurring limitations were identified that affect the effectiveness of emergency planning practice. These include improper review and testing of emergency plans, inadequate incorporation of emergency procedures into daily site activities, insufficiently defined roles and responsibilities during emergency situations, and issues associated with the coordination across multiple contractors (Samsudin, 2023). Even though these limitations are not described as separate findings, they are consistently present in discussions of emergency planning and provide important settings for understanding effectiveness and injury prevention.

Summary of results

Overall, the identified literature describes that emergency planning in New Zealand’s construction sector is well established at the regulatory level, but its effective application and practical implementation can be challenging (Mowll et al., 2023). Emergency planning is frequently considered a documented compliance requirement, with evidence of limited prioritization to site-specific adaptation or integration into broader construction safety management processes. These trends provide a basis for examining how emergency planning contributes to injury prevention and where possibilities exist to strengthen its effectiveness, which are explored in the Discussion.

Discussion

This rapid review analysed how effective emergency planning is in New Zealand’s road and civil construction sector in reducing workplace injury risk through the integration of literature from construction safety, regulatory guidance, and industry practice. The identified findings highlight that emergency planning is well documented as a legal requirement; its effectiveness depends on how the plans are implemented, modified to site-specific risks, and incorporated into daily site activities. This review highlights that, while emergency planning is widely enforced within New Zealand's road and civil construction sector, it remains insufficiently used as a safety control whose effectiveness depends more on implementation quality than on regulatory compliance. Emergency planning is observed to be more effective when considered as an active safety control integrated within a broader system for managing construction safety.

Emergency planning as a control in road construction

Emergency planning is clearly incorporated within New Zealand’s health and safety management framework and is considered as an essential requirement for managing emergency situations in high-risk work environments (Federici et al., 2021; WorkSafe New Zealand, 2025b). Emergency occurrences also affect the road and civil construction with predictable risks arising from live traffic, temporary work environments, mobile plant operations, and environmental hazards. Therefore, emergency planning procedures are designed to support immediate response, proper coordination, and harm reduction when preventive controls are insufficient or fail. This proactive procedure is essential for controlling the severity of incidents and improving overall safety at the workplace.

This review's findings suggest that people typically approach emergency planning as a compliance-based requirement, not as an operational safety control. This statement complies with construction safety literature demonstrating that safety controls are often analysed based on their existence rather

than their practical impact (Othman et al., 2018). Even though emergency plans are present in documents to satisfy legal requirements, they may not have proper influence on-site decision-making during emergency situations, potentially leading to critical variations or gaps (D'Alessio et al., 2024). In such cases, evidence suggests that treating emergency planning mainly as a compliance requirement can limit its effectiveness. inadequate plan detail and poor integration into day-to-day operations may reduce its ability in minimizing losses followed by incidents (Tang et al., 2023).

Site-specific modification and operational effectiveness

The systematic theme developing from the review is the gap between regulatory expectations for site-specific emergency planning and the ongoing use of generic or standardized procedures in day-to-day construction practice. In New Zealand, regulatory guidance highlights that emergency plans should be proportionate to the level of risk and designed according to the characteristics of the workplace (WorkSafe New Zealand, 2025b). However, emergency planning in road construction is commonly based on standardized procedures used across multiple projects with limited consideration of local workplace conditions (Castañeda et al., 2025; Samsudin, 2023).

Road and civil construction are rapidly changing environments, with continuous changes to traffic management arrangements, site entry points, site conditions, order of operations, and the presence of diverse contractors. The importance of responsive, site-specific emergency planning is particularly evident in large-scale road construction projects. For example, consent conditions for the Transmission Gully motorway project in New Zealand required the Construction Traffic Management plan to be updated as works proceeded across multiple sections and phases, incorporating ongoing changes to access management, work scheduling, and traffic management (Environmental Protection Authority [EPA], 2012). This highlights that emergency arrangements in major road construction projects cannot remain constant and should be regularly checked and modified in accordance with the changing site conditions. General emergency plans may not adequately include these changes, minimizing their significance during emergency events. The literature describes that emergency procedures often focus on immediate response actions such as evacuation and first aid, while giving less attention to site-specific coordination, communication processes, and access arrangements for emergency services (Samsudin, 2023; Zou & Ergan, 2019).

The lack of site-specific plans can reduce the effectiveness of emergency planning by increasing the chances for delayed response, confusion over responsibilities, improper communication, and poor coordination during emergencies. In the road construction sector, the hazardous nature of the workplace, including live traffic and heavy machinery, increases the risk of serious harm; therefore, delays in emergency planning may significantly affect the severity of injuries. These findings indicate that emergency planning effectiveness is not determined only by the existence of procedures but by how they are implemented and integrated into day-to-day workplace activities.

Integration into construction safety management systems

The review further suggests that emergency planning is inadequately integrated into construction safety management systems. Emergency plans are commonly treated as isolated documents, separate from risk assessments, traffic management plans, and daily site activity plans (Zhang et al., 2019). When emergency planning is not integrated into daily construction management processes, its capacity to reduce injury severity during emergency events is significantly weakened. This organizational separation of emergency plans may reduce the visibility and practical usefulness for workers and supervisors, especially in rapidly changing construction environments where work pressures take priority (Zhang et al., 2024).

Integration of emergency planning into safety management systems is very essential for ensuring that emergency planning supports day-to-day decision-making. Road construction projects involve multiple contractors and subcontractors. As a result, effective emergency response is become shared responsibility that depends on shared understanding, proper communication, and coordinated response. The literature highlights that inadequate testing of emergency plans, poorly defined responsibilities, and limited drills can collectively weaken emergency preparedness and response capability (WorkSafe New Zealand, 2025b; Xu et al., 2021).

Construction safety studies indicate that an organization's safety performance depends on interactions among systems, behaviours, and management practices, rather than on independent controls (Othman et al., 2018). In this context, emergency planning should be incorporated within the same management systems that process hazard identification, risk assessment, and operational control. When emergency planning is not integrated within the safety management systems, its

overall capability to reduce injury severity and manage high-consequence events may be decreased (Brioso et al., 2018).

Mechanisms linking emergency planning to injury reduction

Even though this rapid review did not identify workplace injury rates, the findings provide an important understanding of the mechanisms through which emergency planning may influence injury reduction in road and civil construction. Emergency planning can influence injury rates by supporting immediate response actions, controlling incident progression, and preventing further harm following an incident (Tang et al., 2023).

Effective emergency planning enables the early identification of emergency situations and supports timely communication and coordinated response. In a road construction workplace, this may include immediate isolation of traffic movement, provision of first aid, and efficient coordination with emergency services. This response can significantly influence the impact of incidents such as collisions with vehicles, worker-plant collisions, natural disasters, or medical emergencies. On the other hand, emergency plans that are inadequately communicated or unfamiliar to workers may delay immediate response actions and increase the severity of incident outcomes (Kuligowski & Omori, 2014).

The findings describe that emergency planning is very effective when it works with the preventive controls rather than replacing them. Emergency preparedness doesn't remove hazards but provides an extra protection when incidents happen at the workplace. This agrees with construction safety literature that indicates the use of multiple controls to manage residual risk (Reason, 2016). Emergency planning should therefore be considered as a risk mitigation strategy within a broader occupational safety and health system rather than as an independent solution (Zhu et al., 2023).

Organisational and human factors influencing effectiveness of emergency planning

Organisational and human factors play a crucial role in influencing the effectiveness of emergency planning in practice. Leadership commitment, organizational culture, and worker involvement are important factors shaping how emergency plans are developed, communicated, and applied during emergency situations (Elvegård et al., 2024). The findings from the reviewed literature highlight that emergency plans are sometimes inadequately communicated to workers, especially in projects with a large workforce or multiple contractors (Obonadhuze et al., 2021).

Training and drills are very effective for improving the capability of emergency response, ensuring that the documented emergency plans translate into practical capability. A lack of proper testing of emergency procedures may result in workers being unfamiliar with their roles and responsibilities during an emergency. This can increase confusion, delayed responses, and poor coordination (Duruel & Çelebi, 2023). Skills for effective communication under stress, maintenance of situational awareness, and decision-making in complex environments are developed through systematic training and practical exercise (Tao et al., 2025).

In addition to physical hazards, emergency events in road construction environments and the nature of work activities may create significant psychosocial risks for workers, such as acute stress, mental overload, fatigue, and anxiety. High-pressure emergency situations, especially in live traffic environments, can affect decision-making ability, communication, and situational awareness, potentially making the emergency planning less effective. Poorly managed stress and fatigue may therefore increase injury severity during emergency events (Leung et al., 2012; WorkSafe New Zealand, 2025a).

These findings highlight the need to think about emergency planning as a process involving both people and systems, rather than a purely procedural requirement. Emergency plans that do not consider the human behaviour, organizational processes, and communication challenges may be less effective in reducing injury outcomes during emergencies (Navarro Claro et al., 2025).

Implications for practice, policy, and research

For construction settings, the findings indicate the importance of moving away from template-based emergency plans. Instead, emergency planning should focus on site-specific emergency plans that are adequately tested and reflect changing road construction conditions. Considering emergency plans as actively updated documents, supported by periodic drills and worker engagement, may improve emergency response capability and reduce the severity of injury outcomes (WorkSafe New Zealand, 2025b).

From a policy perspective, the findings show that regulatory frameworks could place greater emphasis on the implementation, testing, and review of emergency plans rather than focusing primarily on documentation. Strengthening requirements for integrating emergency planning within safety management systems for construction may support injury prevention and promote a more robust safety culture (WorkSafe New Zealand, 2025b; Yıldırım & Deniz, 2023).

Although international studies have investigated the link between emergency planning and injury outcomes, there is a lack of New Zealand-specific research directly analysing the relationship between the effectiveness of emergency planning and workplace injury reduction in road and civil construction. Existing literature and regulatory guidance largely describe emergency planning as a compliance-driven requirement. This gap highlights the necessity for focused study and further investigation within the New Zealand context.

In terms of research, the findings indicate the importance of New Zealand-specific evidence-based studies analysing emergency planning in road construction. Future research could work on exploring the connection between emergency preparedness practices and injury outcomes through organizational case studies, incident report analysis, and workers' viewpoints. Such research would strengthen the statement that emergency planning is a mechanism for injury reduction during emergency situations (Tagharobi et al., 2025).

Limitations and future research

The study adopted a rapid review methodology conducted within a 12-week timeframe, which naturally limited the scope of database searching and the depth of analysis. A number of international studies were excluded due to their limited relevance to the topic. However, transferable international evidence was included where the findings were applicable to the New Zealand road and civil construction sector. As a rapid review, the findings may not include all relevant literature. Furthermore, the review was supported by published sources and did not incorporate primary data or quantitative analysis of injury rates.

Future research builds on these findings by examining the effectiveness of emergency planning using mixed-method approaches, long-term studies, and analysis of incident data within the New Zealand road construction context. Proper attention to emergency preparedness would enhance its contribution to injury reduction.

Summary

Overall, this review highlights that while emergency planning is a mandatory requirement within New Zealand's road and civil construction sector, its effectiveness in reducing workplace injury risk depends significantly on how well it is implemented in practice. Emergency planning demonstrates the highest efficiency when plans are implemented on a site-specific basis, integrated into safety management systems, and supported by adequate training and regular drills.

Conclusion

This rapid review evaluated the effectiveness of emergency planning in New Zealand's road and civil construction sector in reducing workplace injury risk, combining findings from construction safety literature, regulatory guidelines, and industry practice. The findings highlight a strong contrast: though emergency planning is introduced as a mandatory requirement of the health and safety system, its practical effectiveness is often limited by improper application, a primary focus on compliance rather than operational integration, and an ongoing gap between generic procedures and the real condition of construction sites.

Emergency situations in road and civil construction are common and often lead to severe outcomes, resulting from interaction between live traffic, heavy equipment, and rapidly changing site conditions. Despite regulatory requirements for thorough and customised emergency planning, the review showed that many organizations commonly focus on documentation to demonstrate compliance but offer limited practical support during real-time emergencies. The ongoing use of generic emergency plans, rather than site-specific plans, appeared as a key barrier to effectiveness, especially in sectors like construction, where complex hazards, multiple contractors, and limited access conditions are common.

The review also indicates that emergency planning is often inadequately incorporated into safety management systems for construction. Preparing emergency plans as a separate document from daily operation controls and risk assessments may reduce their significance and impact.

Organisational and human factors-such as leadership commitment, worker involvement, and the level of training and drills-play an important role in defining whether documented plans translate into effective response capability. Lack of role clarity and inadequate testing can lead to delayed response and poor coordination, which could increase the severity of injury outcomes during emergency situations.

Even though the review did not directly measure injury rates, it explains the procedures through which effective emergency planning supports injury reduction during incidents. By properly implementing emergency plans, responders can quickly recognize emergencies, communicate in a timely manner, and coordinate their response, which helps control harm and reduce further injuries from incidents. Therefore, emergency planning serves as a harm-mitigation control and supports preventive measures within the risk management system.

In conclusion, emergency planning in New Zealand's road and civil construction sector should be recognized not simply as a regulatory requirement, but as an active and developing safety control. Focusing on site-specific implementation, incorporating it into safety management systems, and regular testing provides significant opportunities to improve its effectiveness. By focusing on these continuing implementation issues, emergency planning can make a more valuable contribution to reducing injury severity and improving safety in one of New Zealand's most high-risk industries.

Submission declarations

This article was undertaken as part of an academic study. It has not been published elsewhere and will not be published elsewhere in the same or any other form in English or another language without the written consent of the New Zealand Journal of Health and Safety Practice.

The work was self-funded, and I have no known conflict of interest.

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