

# **WATERCARE'S NEW MULTI-PURPOSE TRAINING FACILITY – ENHANCING TRAINING ACROSS THE CONSTRUCTION INDUSTRY**

*J Kubala, B Struthers*

*Watercare Services Ltd, Auckland, New Zealand*

---

## **ABSTRACT**

The construction industry inherently involves high-risk work. A major focus and challenge for the industry has been minimising and eliminating this risk with appropriate planning, training, and support for the workers on the ground.

Watercare's Central Interceptor Project has the desire to go above and beyond to create a new industry standard for construction health, safety and wellbeing. Those working in construction benefit from high-quality training facilities that provide hands-on and controlled hazards reflecting the risks encountered on site. To achieve this, the Central Interceptor Project has delivered a new multi-purpose training facility, which has been integrated into Watercare's day-to-day business.

Watercare's vision is to provide a high-quality training environment that has a meaningful impact to workers; from those starting their careers, refreshing their safety knowledge, or commencing a new role in the underground environment. Providing a safe environment ensures workers feel confident and empowered to manage their own safety as well as their colleagues on site. The training facility provides engaging and fit for purpose facilities, exemplifying Watercare's commitment to ensuring all workers go home safe at the end of each day.

Through a positive and collaborative relationship with the Contractor (March Cato), the training facility was constructed. The training facility consists of an above-ground shaft, 7.2m long tunnel, connecting manhole, scaffolding platform, and realistic simulations of services, jacking frames and hydraulic rams, and a muck wagon on rails. These features allow training to be delivered on a diverse range of construction activities, including confined space entry, working at heights and the use of self-contained self-rescuers. The dynamic resources embedded in the facility allow training to be tailored to meet the needs of the trainees or the specific construction risk, and for companies to engage training specialists to deliver custom training in a facility that mirrors real world work environments.

This paper highlights the positive impact this facility has had on the Central Interceptor Project, Watercare and the wider construction industry in its first year of operation. The facility has been used by internal and external parties with positive feedback validating the benefit of a purpose-built facility for industry use. This paper aims to showcase the benefits of purpose-built training facilities within

the construction industry and the importance of collaboration with industry partners when planning, constructing and operating training facilities to obtain the largest impact.

#### **KEYWORDS**

**Health, safety and wellbeing, Training, Training Facility, Central Interceptor Project**

#### **PRESENTER PROFILE**

Jane Kubala is a project engineer working for Watercare on the Central Interceptor Project. Jane project managed the design and construction of the new multi-purpose training facility for Watercare. Jane has witnessed the success of the facility within the past year and is excited to share the impact that the facility has had towards health, safety and wellbeing outcomes in the construction industry.

## **1. INTRODUCTION**

Watercare has developed a multi-purpose training facility (the facility) to ensure its workforce is provided with practical training opportunities that replicate the challenges faced in the field. This facility has been made available to the construction industry with organisations able to plan and implement their training programmes free of charge.

The positive feedback received regarding this facility has confirmed the importance of providing opportunities for workers to gain confidence and become competent prior to undertaking high-risk work. The ability to have a safe place to fail before going onto construction or operational sites is invaluable in achieving improved health, safety and wellbeing outcomes.

The construction industry and Watercare are making continuous improvements to mitigate risks and ensure workers go home safe every day. This paper discusses the importance of purpose-built training facilities, the impact of the facility within its first year of operation and the importance of collaboration with industry partners when planning, constructing and operating training facilities to obtain the largest impact.

## **2. HEALTH, SAFETY AND WELLBEING WITHIN THE INDUSTRY**

### **2.1 CONSTRUCTION INDUSTRY'S JOURNEY**

The construction industry involves high-risk work. Whether it is entering confined spaces, working at heights, or working around plant and equipment, minimising and eliminating the risks associated with these activities is crucial. Achieving this requires appropriate planning, training and support for the workers who undertake these activities.

The industry is continuously working to reduce the possibility of incidents or fatalities occurring and ensuring all workers go home safely every day. The establishment of organisations such as Construction Health and Safety NZ (CHASNZ) highlights the industry's focus and dedication to this aim (Construction Health and Safety NZ, 2018). Despite progress, there is still work to do. The construction industry had 12 work-related fatalities in the period May 2022 to April 2023 (Worksafe, 2023), along with 598 incidents resulting in injury, illness and serious harm from July 2022 to June 2023 (Worksafe, 2023) .

Investing in the health, safety and wellbeing of workers not only improves worker safety but also provides a secondary benefit to companies. A focus on worker safety can directly impact a project's success. Following an incident there are impacts to both employers and workers; from the time stood down investigating incidents, employee time lost, treatment for injuries, low morale and confidence within the workforce, or enforcement costs from regulators, these impacts can come at a considerable cost (Hinze & Appelgate, 1991). Additionally, demonstrating genuine care for worker safety can increase trust and loyalty

among workers, therefore, improving employee retention. The cost of a high attrition rate can be substantial with additional advertising, hiring, inductions and training required for each new employee.

The industry has invested significantly in updating policies, health, safety and wellbeing protocols and improving personal protective equipment (PPE) and worker conditions. Ikpe, et al., (2012), determined that for every £1 spent on accident prevention, contractors gain £3 as benefits. Companies have also focused on improving employee training. This training, however, often occurs in a classroom setting with limited practical application.

## **2.2 WATERCARE'S JOURNEY**

Large projects, such as Watercare's \$1.2 billion Central Interceptor Project, provides opportunities to elevate industry health, safety and wellbeing standards. The Central Interceptor Project involves constructing a 14.7km underground wastewater tunnel from Māngere Wastewater Treatment Plant to Grey Lynn, central Auckland. Around 500 staff are working across 16 sites on the project, which is due for completion in 2026.

The project places a key focus on the workforce and understands the importance of taking them on the journey. The Central Interceptor Project has introduced 2-day project inductions where the workers gain an understanding of the project values and purpose. The project has developed a 'Good to Great' programme implementing initiatives such as paying workers a living wage, subsidising healthy lunches, improving site welfare facility standards, and providing high-quality PPE for all workers, including sub-contractors. These initiatives demonstrate the project's work towards improving industry standards and placing greater importance on worker wellbeing.

It was acknowledged that these initiatives would come to an end upon the project's completion. To ensure a lasting impact, the decision was made to invest in an industry-leading training facility. The facility aimed to provide workers across the project, Watercare and the construction industry with a safe environment to fail while learning how to undertake high-risk work.

Although the Central Interceptor Project is Watercare's largest project, it is only one component in the large programme of works Watercare has planned. Watercare has planned to spend \$18.5 billion on water and wastewater infrastructure over the next 20 years (Watercare Services Limited, 2022). This level of investment will require a large level of construction across Auckland to grow, renew and maintain services. Watercare's role as a large client provides the opportunity to lead the way in encouraging and influencing change in health, safety and wellbeing across the industry. Development of initiatives and targets such as the '40:20:20 vision' (Figure 1) which aims to have a 20% year-on-year improvement in health, safety and wellbeing outcomes, has set the scene not only

for Watercare but for the industry in understanding Watercare’s commitment to this journey.



Figure 1: 40:20:20 vision

Understanding the impact and scope of this work, Watercare committed to the development of a training campus for their workforce. The original location of the multi-purpose training facility was to be based next to the induction facility that the Central Interceptor Project had developed. However, acknowledging that this training facility would out-live the project, the decision was made to move this training facility to the new training campus location.

Initially there was hesitation within Watercare towards investing in a training facility. Historically clients have not provided this type of investment and have left it up to the industry and training providers to ensure adequate training. However, this was seen as an opportunity for Watercare to demonstrate their commitment to the construction industry. The aim was to provide a tangible example of Watercare taking a leadership role within its supply chain and to demonstrate the dedication to driving positive change and improvement to health, safety and wellbeing across the construction industry.

### 3. TRAINING FACILITY PURPOSE

#### 3.1 RESEARCH SUPPORTING SIMULATED ENVIRONMENTS

The main idea for the multi-purpose training facility was giving workers a safe place to make mistakes. Research by Chernikova, et al., (2020) found that simulations are the most effective way to facilitate the learning of complex skills. Although the study focused on the medical and education professions, the learnings can be applied to the construction workforce with complex work and rescues required to occur on site. A case study undertaken on a group of nursing students by Azizi, et al., (2022) found that acquiring essential skills through simulations significantly improved the participants self efficacy. The outcomes of these studies supported the aim of the facility to build resilience in people and the processes.

### 3.2 EXISTING INDUSTRY EXAMPLES

The Central Interceptor Team took inspiration from other training areas that had been created by individual teams throughout the company. Examples within Watercare included the Maintenance Service Team constructing a replica of a residential neighbourhood. This area allowed for practice in repairing leaks in roads and footpaths, reinstatement following repair work and stakeholder interactions. The creation of this training area demonstrated the desire of the workforce to have training areas which represent real life, can be tailored to their work, and are readily available.

Training facilities in New Zealand and overseas were also reviewed to understand what was currently being used for practical-based training. Site visits were undertaken to large overseas projects such as Tideway, Sydney Metro and the Brenner Base Tunnel to understand the development of health, safety and wellbeing training programmes on large tunnelling projects.

Using this inspiration, the Central Interceptor Team wanted to go one step further by replicating a realistic on-site environment for the underground and water industries.

As part of the Central Interceptor Project 2-day general induction and 2-day underground induction, a small training facility was put together to allow users to walk on scaffolding, practice putting out fires on a fire simulation and walk through a container filled with smoke. These simulations provided an immersion experience while teaching important safety skills that did not require shutting down a construction site and interrupting work (Photograph 1). These exercises received positive feedback from across the project workforce and helped inspire the creation of the multi-purpose training facility.



*Photograph 1: Fire simulation during the Central Interceptor Project 2-day induction.*

The use of virtual reality (VR) was investigated; however, this option was not pursued due to the cost of the equipment deemed to outweigh the proposed training impact. Although fantastic in displaying a variety of different scenarios to the user, Watercare deemed that it did not allow for enough practical experience for users.

## 4. DESIGN AND CONSTRUCTION PROCESS

### 4.1 DESIGN OF THE FACILITY

Subject matter experts were heavily consulted throughout the facility's design stage. The goal was to create a world-class facility that replicated real-life conditions for workers, incorporated learnings from companies already providing hands-on training, and be multi-functional to accommodate different training requirements. Watercare understood that contractors constructing Watercare assets every day were the right people to achieve this aim, which resulted in this facility being put to tender as a design and build contract.

The Request for Proposal (RFP) provided to the industry included concept sketches demonstrating components that were required in the facility (Figure 2). These components included an above-ground shaft, a 7.2m long tunnel, connecting manhole, a scaffolding platform, and realistic imitations of services, jacking frames, jacks, a muck wagon and rail system.

The RFP clearly outlined the facility's aim and specified that the design had to allow for a range of training types. The tenderers were encouraged to submit a proposal that was based on their experiences and would be a realistic representation of the environments their crews worked in.

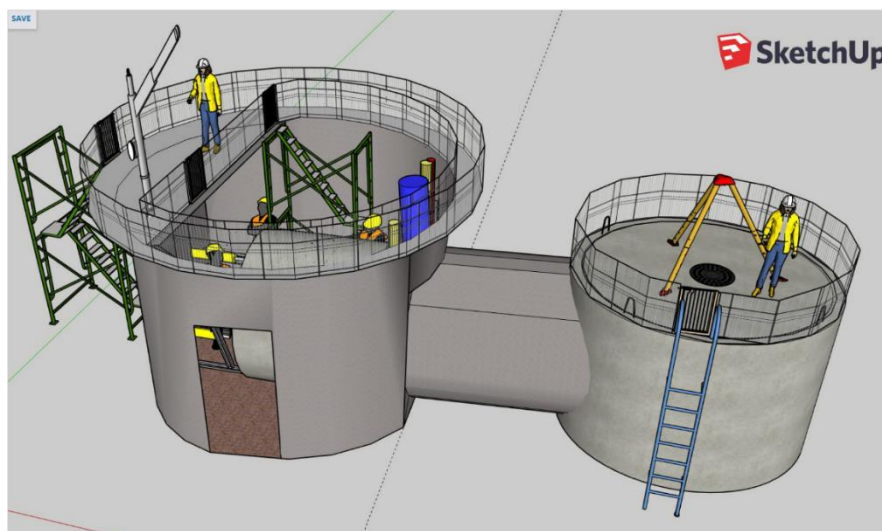
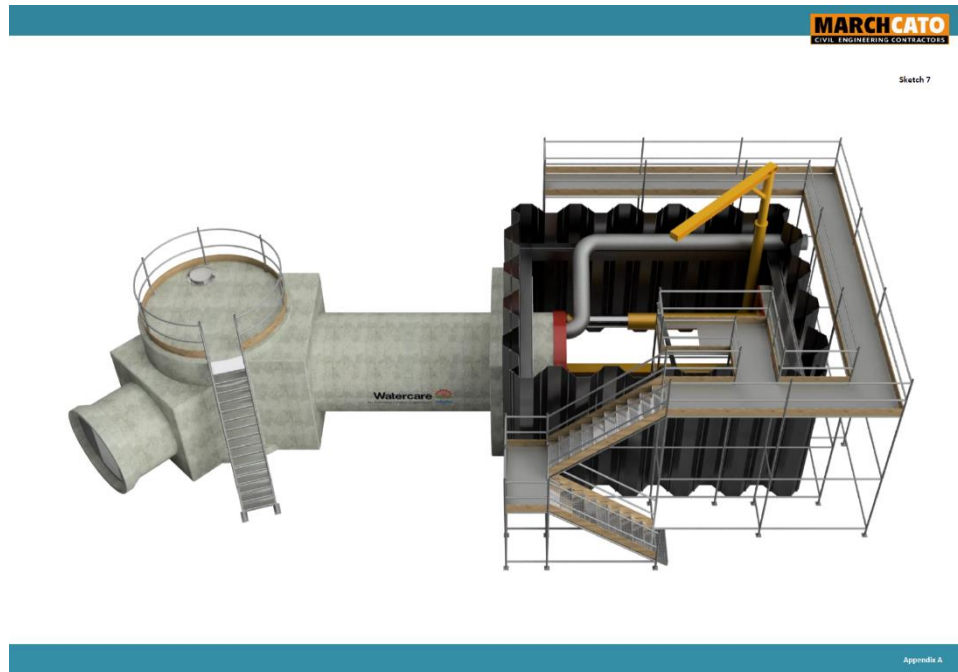


Figure 2: RFP design

The winning bid from March Cato (March Cato, 1997) picked up the vision of the facility and incorporated it into their design. Applying their expertise in underground construction environments, the design was able to be a realistic

representation of the spaces their crews work in each day. Their proposal understood that the facility aimed to replicate everyday life on site, with all its inherent challenges, in a safe environment that supported training delivery and assessment in a real-world environment (Figure 3).



*Figure 3:* March Cato tender submission

Following the contract award, Watercare took March Cato's design and worked with Mines Rescue (New Zealand Mines Rescue, 1926) and Safety 'n Action (Safety 'n Action, 1997) to review the design and ensure that the facility incorporated essential components to undertake effective training. These discussions provided key enhancements to the facility; examples included ensuring power points were placed in the right locations, an additional ladder added, and extending the scaffolding tube to ensure an adequate height to complete advanced working at heights training. This collaboration process and the willingness of the Contractor to incorporate these ideas allowed for the success of the facility.

## **4.2 CONSTRUCTION OF THE FACILITY**

Construction of the training facility occurred from December 2021 to June 2022. Although the design had been thoroughly reviewed during the design and tender stage, the construction stage allowed for fine-tuning and additional enhancements.

These additions included:

- The addition of a manhole access lid at the centre of the manhole to replicate Watercare assets in the field.
- Raising the corbels on either side of the manhole to create additional room for observers (Photograph 2).



- Placing plates on the rails inside the tunnel to reduce trip hazards. This is a safety inclusion that could be adopted by industry.



*Photograph 2: Raised corbels around the manhole*

A collaborative approach between March Cato and Watercare allowed the facility to be constructed to an optimal design and standard that both parties were excited to invite the industry to use (Photograph 3).



*Photograph 3: Completed multi-purpose training facility*

## 5. USE OF THE FACILITY

### 5.1 FACILITY OPERATION

To enhance and encourage training to be held at the multi-purpose training facility, Watercare established the Watercare Training Campus. An old cottage on the grounds was converted to classroom space to enable theory components of courses to be taught on site. A car park has also been installed and the mock-up of a residential street to practice network service maintenance has been improved.

A key objective for the Training Campus was to maximise utilisation, with training sessions booked 5 days a week. To achieve this, key actions were undertaken including:

- The facility was opened to the entire construction industry. Construction companies and organisations, such as Mines Rescue NZ, can hire out the campus for training, free of charge. Companies can bring their own trainers, use the classroom space, and plan their training activities around the facility.
- An open day and blessing with Watercare employees and industry professionals to encourage trainings to be booked (Photograph 4).
- Watercare holds all internal first aid, confined space, permit issuer, permit receiver and working at heights training at the facility. Working with Safety 'n Action (course facilitators) the courses have been tailored around Watercare's permit-to-work system. This approach exposes the workers to Watercare paperwork from the training stage and allows training to align with Watercare's health, safety and wellbeing policy and procedures.
- The facility was made available to all internal Watercare employees, empowering teams to focus on their own training needs.



*Photograph 4: Multi-purpose training facility opening day*

These decisions have ensured that the training campus and multi-purpose training facility have maximum utilisation and provide a valuable space for training across Watercare and the industry.

This utilisation did initially provide some challenges to the Watercare Training Team. The enthusiastic up take of the facility was not anticipated and therefore was not ready to meet the level of demand following the opening. With the implementation of the booking and operation procedures for the training campus this issue was resolved.

## **5.2 TRAINING MATURITY**

The facility has provided the opportunity for a range of training types to be enhanced. Two examples are discussed below.

The first is self-contained self-rescuer training which is a legally required training that occurs every 3 months for workers entering underground mining operations, as per Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016, S169. The Central Interceptor Project has a substantial workforce that is required to undertake this training regularly. Previously these refreshers took place in a portacom on construction sites with an instructor delivering a power point presentation at the front of the room and workers practice donning self-rescuers at the table.

This training has been significantly improved by every worker undertaking an annual self-contained self-rescuer refresher at the training facility. Workers now demonstrate the correct procedure for donning a self-rescuer and are required to walk through the facility while the tunnel and shaft is filled with smoke, simulating reduced visibility conditions. This exercise allows for workers to learn how to move in a group in limited visibility conditions with variations in ground levels and heights, replicating an emergency tunnel evacuation (Photograph 5).



*Photograph 5: Self-contained self-rescuer refresher training*

Another example is the use of the facility by NZ Mines Rescue to practice emergency response drills. Mines Rescue have utilised this facility for a variety of training scenarios, from minor injuries to life-threatening incidents, allowing the crew along with industry professionals to improve their response skills.

The facility's versatility has enabled training to occur in a 'safe to fail' environment, empowering trainees with the skills to undertake their roles with increased confidence and competence.

### **5.3 FACILITY FEEDBACK**

Watercare recognises that feedback from users of the facility is crucial to understanding the success of the facility and identifying areas for improvement. After each training course, attendees are sent a feedback form to provide comments on the facilities and course. The following comments were received from trainees who participated in confined space and gas detection refresher, working at heights refresher or first aid refresher courses (Photograph 6):

- *"The facilities provided were well matched to the actual type of work we do."*
- *"A well-structured course, great to see it being taken in-house."*
- *"It was a nice refresher training with props and scenarios used to make it feel like actual incidents."*
- *"...i think for a lot of the workers it is better to go outside and do the practical work sitting in a class room looking at books make a person loose interest"*

Constructive comments have also been received, which Watercare has acknowledge and are working towards incorporating into future trainings:

- *"Generally good however some more time on how to drive the gas detectors may be helpful and having all of the Watercare paperwork on hand would be great."*
- *"You may need to consider a cover or moving the practical area indoors as the setup has a great view of the Manukau but will be miserable in winter. This could lead to major headaches with course delays when the wind is up and rain horizontal."*
- *"great training facility with practical area. would just recommend the correct tools required for confined space area, for example lifting tools for manhole lids, the one to access the ladder part needs socket or other tool to remove bolts holding lid down, these items were not on site. Also some of the guys were a bit cautious of carrying the tripod up the scaffolding as its quite heavy, maybe a pully system or something to lift it up for the old boys."*



*Photograph 6: First aid course*

Feedback has also been received from external construction companies, and different industry organisations. NZ Mine's Rescue North Island Regional Manager, Paul Moffitt, has provided feedback stating, *"In the realm of underground mining and tunnelling operations, realistic safety training and preparedness are paramount, and the NZ Mines Rescue Service has seen fantastic value in the innovative Watercare Tunnel Training Facility."*

Fire and emergency New Zealand have also visited the training campus taking particular interest in the multi-purpose training facility (Fire and Emergency New Zealand, 2022). They have expressed interest in coordinating with Watercare to undertake training at this facility.

Fulton Hogan's Branch Manager – South Urban, John Paul Adams, found great benefit in using the facility for a large company safety day. He stated that: *"Fulton Hogan had the opportunity to use the training facility in Mangere last year for our Back to work induction. We had over 170 staff on the compound rotating through the different stations which were setup to emulated real world scenarios they would face out on site. The facility is a fantastic initiative as it allowed our staff to gain the practical experience by actually working with tools and materials in a real-world scenario without the real work dangers we would have on site. The hands-on approach promoted problem-solving skills as staff encounter real-life challenges and had to find solutions on the spot."*

*Additionally, this it also fostered teamwork and collaboration as we were able to mix the and mingle crews around. The Facility provided a safe environment for staff to make mistakes and learn from them, which is crucial in the construction industry where precision and attention to detail are paramount. Overall, the realistic hands-on approach training method allowed staff to gain practical skills and knowledge that they could then directly applied in real-world construction settings, making it a highly effective and valuable method of training."*

The positive feedback received validates the investment in this training facility, and the role it has towards improving health, safety and wellbeing within the industry.

## **5.4 OUTCOMES**

The facility has provided the opportunity to make training effective while being safe. By introducing small enhancements to trainings, such as workers bringing their own equipment to train in and inspect, familiarity with equipment has improved. This practice has also helped identify broken, outdated, or damaged equipment which can then be replaced. These small steps are all part of Watercare's health, safety and wellbeing journey.

The opportunity for workers to become more competent and confident in their day-to-day work is crucial to enhancing an organisations safety journey. Health, safety and wellbeing progress is a journey involving many factors. Training is just one part of the process, however, providing good training in a practical setting allows workers to be exposed to how work should be performed instead of how it has always been done.

Watercare has acknowledged the impact of this facility and is currently looking at further opportunities to add value to the facility. This includes installing a cover to allow trainings to be held in all weather, installation of lockout-tagout training components, and increasing the training scope to include load slinging and overhead crane (remote controlled).

Additionally, the facility also has a role in inspiring the future development of other training facilities by different organisations. By having this concept brought to life and sharing it with external parties, Watercare aims to encourage organisations to take the next step in investing in their workforce to ensure they are appropriately equipped. This collaborative approach aims to support the construction industry's journey by providing high quality, realistic training environments.

## **6. CONCLUSION**

Watercare's multi-purpose training facility was created to enhance training across the industry by providing a practical training experience. Although it has only been open a year, the positive feedback has validated the impact it is having on the construction industry.

The training facility is not intended to be unique. This paper aims to encourage other construction companies to invest in these types of facilities for their people and to make them available to industry. Although training is only one part of an organisation's health, safety and wellbeing journey, it is an important step in providing workers with the skills to undertake their work in a safe and competent manner.

## **ACKNOWLEDGEMENTS**

Photos provided by Simon Runting, Onsite Images, on behalf of Watercare Services Limited.

## References

Azizi, M., Ramezani, R., Karimi, E., Hayat, A.A., Faghihi, S.A. and Keshavarzi, M.H. (2022) 'A comparison of the effects of teaching through simulation and the traditional method on nursing students' self-efficacy skills and clinical performance: a quasi-experimental study' *BMC Nursing*, 21(1):283, doi: 10.1186/s12912-022-01065-z.

Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T. and Fischer, F. (2020) 'Simulation-Based Learning in Higher Education: A Meta-Analysis' *Review of Educational Research*, 90(4): 499–541, doi:10.3102/0034654320933544.

Construction Health and Safety NZ (2018) *CHASNZ*, <https://chasnz.org/> accessed 6 August 2023.

Fire and Emergency New Zealand (2022) *Training at Watercare's Mangere Wastewater Treatment Plant*, Fire and Emergency New Zealand website, <https://portal.fireandemergency.nz/notices-news-and-events/news/training-at-watercares-mangere-wastewater-treatment-plant/>, accessed 8 August 2023.

Hinze, J. & Appelgate, L. L. (1991) 'Costs of Construction Injuries' *Journal of Construction Engineering and Management*, 117(3):537-550, doi: 10.1061/(ASCE)0733-9364(1991)117:3(537)

Ikpe, E., Hammon, F. and Oloke, D. (2012) 'Cost-Benefit Analysis for Accident Prevention in Construction Projects' *Journal of Construction Engineering and Management*, 138(8): 991–998, doi:10.1061/(asce)co.1943-7862.0000496.

March Cato (1997) *March Cato*, <https://marchcato.co.nz/> accessed 6 August 2023.

Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations (2016), available at: <https://www.legislation.govt.nz/regulation/public/2016/0017/latest/DLM6732829.html> accessed 6 August 2023.

New Zealand Mines Rescue (1926) *New Zealand Mines Rescue*, [minesrescue.org.nz](http://minesrescue.org.nz) 6 August 2023

Safety 'n Action (1997) *Safety 'n Action*, <https://www.safetynaction.co.nz/en/> accessed 6 August 2023.

Watercare Services Limited (2022) *Statement of Intent 2022 to 2025*, Watercare Services Limited, available at: <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-annual-reports/Statements/watercare-services-limited-watercare-statement-intent-2022-2025.pdf>, accessed 6 August 2023.



Worksafe (2023) *Fatalities*, Worksafe website,  
<https://data.worksafe.govt.nz/graph/detail/fatalities?industry=Construction>  
accessed 6 August 2023.

Worksafe (2023) *Injury, illness and serious harm*, Worksafe website,  
[https://data.worksafe.govt.nz/graph/detail/injuries\\_serious\\_harm?industry=Construction](https://data.worksafe.govt.nz/graph/detail/injuries_serious_harm?industry=Construction),  
accessed 6 August 2023.