



External Research Report

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# Suicide in New Zealand's Construction Industry Workforce: Factors Identified in Coronial Reports

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## **Preface**

This report presents the results of a study that analysed the content of coronial reports for suicides in New Zealand's construction industry through the lens of factors drawn from the wider suicide research literature.

## **Acknowledgements**

This study was jointly funded by the Building Research Levy and Site Safe New Zealand.

The research team gratefully acknowledges the advice and guidance provided by:

- Sophia Graham, Mental Health Foundation
- Suicide Mortality Review Committee, notably Dr Carlene McLean and Clive Aspin
- John Macdonald, Registered Master Builders Association Board Director
- Professor Marc Wilson, School of Psychology, Victoria University of Wellington.

# Suicide in New Zealand's Construction Industry Workforce: Factors Identified in Coronial Reports

## BRANZ Study Report ER40

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### Reference

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### Executive Summary

In 2016, we learned that almost 7% of working-age male suicides in New Zealand were by workers in the building industry, according to a report by the Suicide Mortality Review Committee. In 2018, a scoping study identified a need for more evidence about the phenomenon of suicide in the context of the construction industry (Bryson & Duncan, 2018). In response, Site Safe undertook this study, which was partly funded by BRANZ through the Building Research Levy.

This study analysed the content of 300 coroners' closed case files of construction workers in New Zealand who died by suicide between 2007 and 2017. This data source was chosen because it is a rich source of information about the circumstances surrounding a suicide. However, the variability of coronial reporting methods meant that testing for causation or correlation was not possible. The analysis was therefore limited to a description of factors found in the reports.

The results support the view that there are a multitude of factors that contribute to suicide risk for construction industry workers.

The findings provide some new details about these factors, especially work-related ones.

Job insecurity or uncertainty and work-related stress stood out in coronial reports, particularly for self-employed contractors and business owners. Injury or illness impacting on someone's capacity to work also featured. These details will probably be of interest to:

- construction industry influencers (someone with the power to influence how the industry functions at a system level)
- construction health and safety practitioners keen to manage the risk of work-related factors harming the mental wellbeing of their workforce, including subcontractors
- membership bodies interested in supporting their small and medium construction business members
- the trade training sector.

This report provides neither solutions nor frameworks for preventing suicides in New Zealand's construction industry. It is an objective technical report offering for the first time evidence-based details that can be used to inform views about what dimensions suicide prevention and mental health education initiatives should address. Further, it offers some baselines to support any future efforts to evaluate impact.

Ideally, any action prompted by this report will be coordinated in nature and include the construction industry, the mental health sector, government and the research community. These actors have the wherewithal to determine what format suicide prevention and mental health education initiatives should take. Working together, this group can use the evidence presented in this report to influence the phenomenon of suicide in New Zealand's construction industry.

## **Keywords**

Construction, coroner, mental health, suicide.

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## Introduction

The number of suicides has been increasing for the last four years, and men account for three out of four suicides, according to the Coronial Services of New Zealand (2018). The New Zealand construction industry is one of New Zealand's largest industries, and its workforce is mostly male. As such, it is experiencing the highest number of suicides of any industry in the country. Almost 7% of working-age male suicides were by workers in the building industry, according to a report by the Suicide Mortality Review Committee in 2016.

New Zealand's construction industry is not alone. Overseas, high numbers of suicides in the construction industry have also been reported in Australia, Canada, Finland, UK and Korea especially amongst younger workers aged 20–24 (Gullestrup, Lequertier & Martin, 2011; Heller, Hawgood & Leo, 2007; McIntosh et al., 2016; Turner, Mills, Kleiner & Lingard, 2017). In Australia, for example, construction workers aged 18–25 are six times more likely to die from suicide than an accident at work (Mates in Construction, 2018).

BRANZ Study Report SR411 Mental health in the construction industry scoping study (Bryson & Duncan, 2018) initiated the process of investigating the mental health of New Zealand's construction workforce. It found a need for more work to be done to increase our understanding of the phenomenon of suicide in New Zealand's construction industry. It also identified demand from some key players in the construction industry for more evidence that could inform suicide prevention and mental health education initiatives.

In response, Site Safe undertook this study, which was partly funded by BRANZ through the Building Research Levy.

### What is known

Suicide happens as a result of a complex interaction of a multitude of factors (Milner, Maheen, Currier & LaMontagne, 2017). There is no single risk factor linked to suicide. Rather, each case involves a combination of work-related and non-work-related risk factors that accumulate and compound over time, subsequently leading to an

individual taking their life (Milner et al., 2017). The wider research literature has described some of these factors, none of which have been measured in the context of New Zealand's construction industry.<sup>1</sup>

Risk factors associated with the construction industry have been linked to higher rates of suicide including long working hours, relationship break-downs, transient working conditions, lack of help-seeking behaviour, unhelpful masculine stoic beliefs, social isolation and mental health problems (Heller et al., 2007; Milner et al., 2017; Player et al., 2015). Substance abuse is also a risk factor for suicide in the literature (Cavanagh, Carson, Sharpe & Lawrie, 2003; Pompili et al., 2010), and international research has shown that construction workers have higher rates of drug and alcohol use than the general population (Bush & Lipari, 2013; Hersch, McPherson & Cook, 2002).

Mental illness has also been identified as one of the strongest predictors of suicide risk (Cavanagh et al., 2003; Fleischmann et al., 2005). Depression in particular is associated with suicide (Bertolote, Fleischmann, De Leo & Wasserman, 2004; Isometsä, 2014), and previous research has indicated men working in male-dominated industries have high rates of depression (Roche et al., 2016). It is known that New Zealand's construction industry workforce is mostly male.

This study aims to address the gap in our understanding by describing the factors in the context of New Zealand construction. It is hoped that the report will stimulate industry demand for targeted action. This could include supporting further research, advocating for policy changes, implementing evidence-based suicide prevention initiatives and/or reviewing industry leadership behaviours through the lens of worker mental health.

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<sup>1</sup> A fuller literature review is available on Site Safe's website at <https://www.sitesafe.org.nz/guides--resources/research/>

## Methodology

### Study description

This is a mixed methods study that analyses and describes a qualitative dataset drawn from the content of coroners' closed case files of construction workers in New Zealand who died by suicide between 2007 and 2017. It seeks to describe the factors relating to demographic variables and risk factors.

Coroners' reports were used for two reasons. Firstly, these reports exist to provide insights into why a person died if the circumstances surrounding a death are unexpected, violent or suspicious. Secondly, they provide a rich source of demographic information on suicides and details on the circumstances and underlying causes of deaths. Many studies, such as those of Taylor and Collings (2010) and Milner et al. (2017), successfully used coronial reports as their main source of data to reveal new insights into factors and stressors leading to suicides. To date, no comprehensive analysis has been done of New Zealand coronial reports with a view to providing new insights about suicide in the construction industry.

### Ethics approval

The coroners' closed case files were requested from Coronial Services under section 30 of the Coroners Act 2006 (the Act). Under the Act, coroners' files are public information. The research team did not have access to any medical records, police reports, photographic evidence or any other personal information that was not presented in the words of the coroner.

The research team strictly adhered to section 71 of the Act whereby no individual details of a self-inflicted death may be made public. As such, all the data reported in this report is in aggregated form, and the research team has taken measures to ensure no individual case can be identified. These measures are described in more detail later in this section.

This study did not require ethical approval as it was an observational study involving the use of publicly available information about deceased persons. A 'scope of review' assessment was requested from the Health and Disability Ethics Committee (HDEC) to confirm that ethical approval was not required in this instance. HDEC agreed

that this study was outside the scope of that which would require ethical approval, so none was sought.

The research team developed and operated under a project-specific ethics policy for the duration of the project. It sets out the principles, practices and procedures around the ethical conduct of the research and ensures the wellbeing of the researchers who performed the study.<sup>2</sup>

### **Data source – coroners' reports**

Coronial Services provided the research team with 339 suicide files of people categorised in Coronial Services' system as working in the construction industry and having died by suicide. The period covered is 10 years from 2007 to 2017 and includes all available closed case files for suicide in the construction industry since such records began under the Act in 2007. This number of cases provided the opportunity to identify factors over an extended period with a high degree of confidence.

Only the certificate of findings and the coroner's summary of circumstances of death were supplied by Coronial Services. No medical records, images, police reports, toxicological reports or other relevant documents were included.

The certificate of findings is part of the coroner's file that describes who the person was and the cause of death. This information was used by the research team as the source of demographic data.

The coroner's summary of the circumstances of death provides a description of what was going on in the deceased's life before they died. It attempts to explain why the person might have died by suicide and confirms that there is enough evidence to rule the death a suicide under the Act. This section of the report is where the research team was able to identify, code and analyse the factors that may have contributed to the person's decision to die by suicide.

### **Data storage and security**

The coroners' reports and all files related to the research are in digital format and stored in a password-protected network drive. Access to the files is strictly limited to the research team involved in the coding and analysis of the files.

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<sup>2</sup> The details of this approach can be made available on request.

## Coding and data analysis

A coding scheme was developed based on risk factors for suicide described in the research literature. Additional factors were identified in the dataset during a process of thematic analysis undertaken by the researchers responsible for analysing the coroners' files. These new factors were built into the coding scheme, and an iterative approach to coding the data was taken where all the case files were recoded to account for new factors as they emerged.

Two researchers analysed the coroners' reports and coded the following data – sex, age, region of residence, date of death, occupation, region of death, location of suicide, method of suicide and circumstances of death. To achieve an acceptable level of inter-rater reliability, the researchers developed the coding scheme together, worked closely during the coding process and cross-coded at least 20% of the sample. Consistency of coding was very high for all cross-coded case files, so further cross-coding was deemed unnecessary.

To protect the identity of the deceased individuals, the dataset was purged of personal identifiers such as name and residential address. Data was aggregated, and reporting was focused on describing the factors found in the sample. The variables reported in this study were coded as follows:

**Age, date of birth and date of death:** As not all coroners' files provide data on age, the date of birth and date of death were used to calculate the age of the deceased.

**Region of residence:** Residence data was used to derive information for geographical regions where the suicides happened.

**Occupation:** As there is no standard classification for occupations used across the coroners' reports, occupation codes were developed as they occurred in the dataset. The codes are consistent with commonly understood trade classification within the construction industry.

**Circumstances of death:** Review of the research literature and thematic analysis of the dataset was used to develop a coding scheme.

An iterative deductive process was employed to identify, analyse and report repeated themes from the coroners' files. Factors in the coding scheme were coded as present or not present in each case file.

No individual cases were discussed. Moreover, only findings that account for 3% of the sample (nine cases) or more were reported to avoid any individual cases being identified. This arbitrary cut-off point was chosen by the research team on the basis that it is high enough to protect the identity of cases in the dataset yet low enough that the findings could be reported in enough detail to remain useful.

Factors around the method and location of death were not reported here as they are not relevant to the aims of this study.

The coded data was recorded by hand onto coding sheets by the researchers before being entered into SPSS Statistics software and Microsoft Excel. Because the dataset was largely qualitative, subjectively reported by a third party and incomplete, the analysis was limited to descriptive methods. More complex analysis of the variables generated through this coding process would have been inappropriate (i.e. to test whether there are relationships or associations between variables).

## Results

A total of 339 coroners' closed case files were provided by Coronial Services for this study. The coding process revealed that two of the cases were not ruled as suicides by the coroner, and a further 37 were not from occupations within the construction industry. This left 300 case files in the sample for analysis.

One of the key considerations is the data source itself. Coronial reports present a valuable but variable view of the circumstances surrounding suicides. For instance, the length of each report varied from two to 71 pages and depended on the circumstances of death and the coroner's reporting style. The quality and completeness of data varied across the files. 27 cases did not contain any information around circumstances of death, and some did not have data on age and place of death on

the certificate of findings. Moreover, there is no data concerning the person's various identities (ethnic, gender, sexual orientation etc). Coronial reports are therefore not suitable as a single source of data upon which to base a suicide prevention and mental health education programme.

The following sections present and describe what factors were found amongst the case files, usually as a percentage of the overall sample.

In addition to the graphs presented in the body of this report, tables displaying the frequencies and percentages for all the findings reported are attached in the Appendix. Due to rounding, percentages presented in the figures and tables throughout this document may not add up precisely to a 100%.

The results of the study describe *who* is affected, followed by the findings that help explain *why* suicide in construction is happening. The sections of the report are presented in the following order:

1. **Demographics** – presents the factors around who died by suicide in the construction industry, where and in which occupation.
2. **Mental illness symptoms** – describes the mental health status of the sample.
3. **Previous suicide attempts** – presents the factors around the prevalence and timing of previous suicide attempts.
4. **Substance use** – shows the rates of substance use in the sample.
5. **Personal and work - related factors that may have contributed to suicide cases.**
6. **Professional help-seeking** – describes which professionals the cases had actively sought help from. While the results present the prevalence of each factor in the case files, it is important that the results are read knowing that suicide is complex with many contributing factors. No single factor explained why suicide in the construction industry happens.

## Demographics

99.0% of the cases were male, and the mean age at time of death was 37.6 (SD 12.8) years.

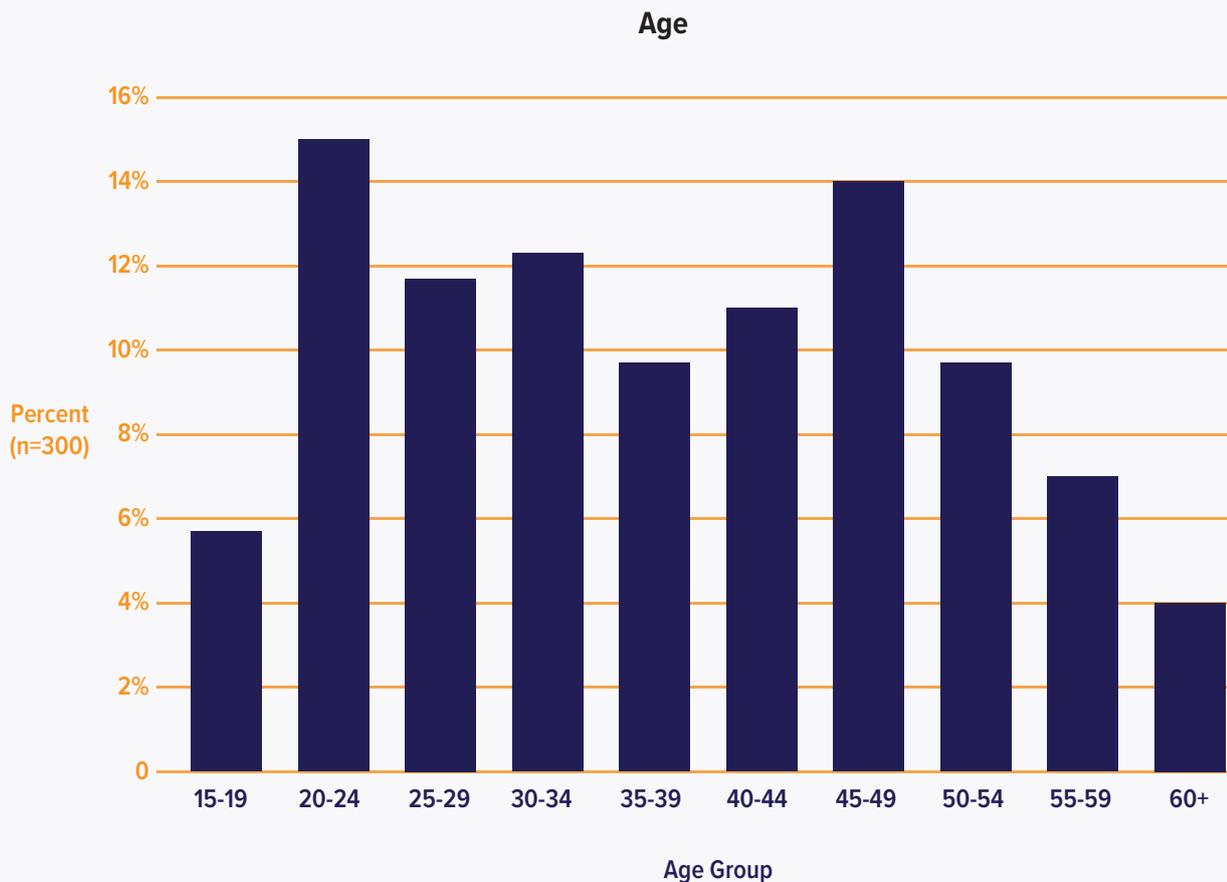


Figure 1. Age at time of death (refer to Table 1 in Appendix)

Figure 1 shows that there are two age groups where suicide was more common in the sample. 15.0% of cases died at age 20–24, while 14.0% died at age 45–49. This pattern reflects that of the general suicide statistics for men in New Zealand where rates of suicide tend to peak in their early 20s and again in their late 40s and early 50s (Coronial Services of New Zealand, 2018).

The place of residence for each case was coded by geographical region. Figure 2 shows the 10 regions with the highest proportion of cases. Auckland accounts for most of the cases at 25.7%. As New Zealand’s most densely populated region with a large construction industry workforce, this is unsurprising.

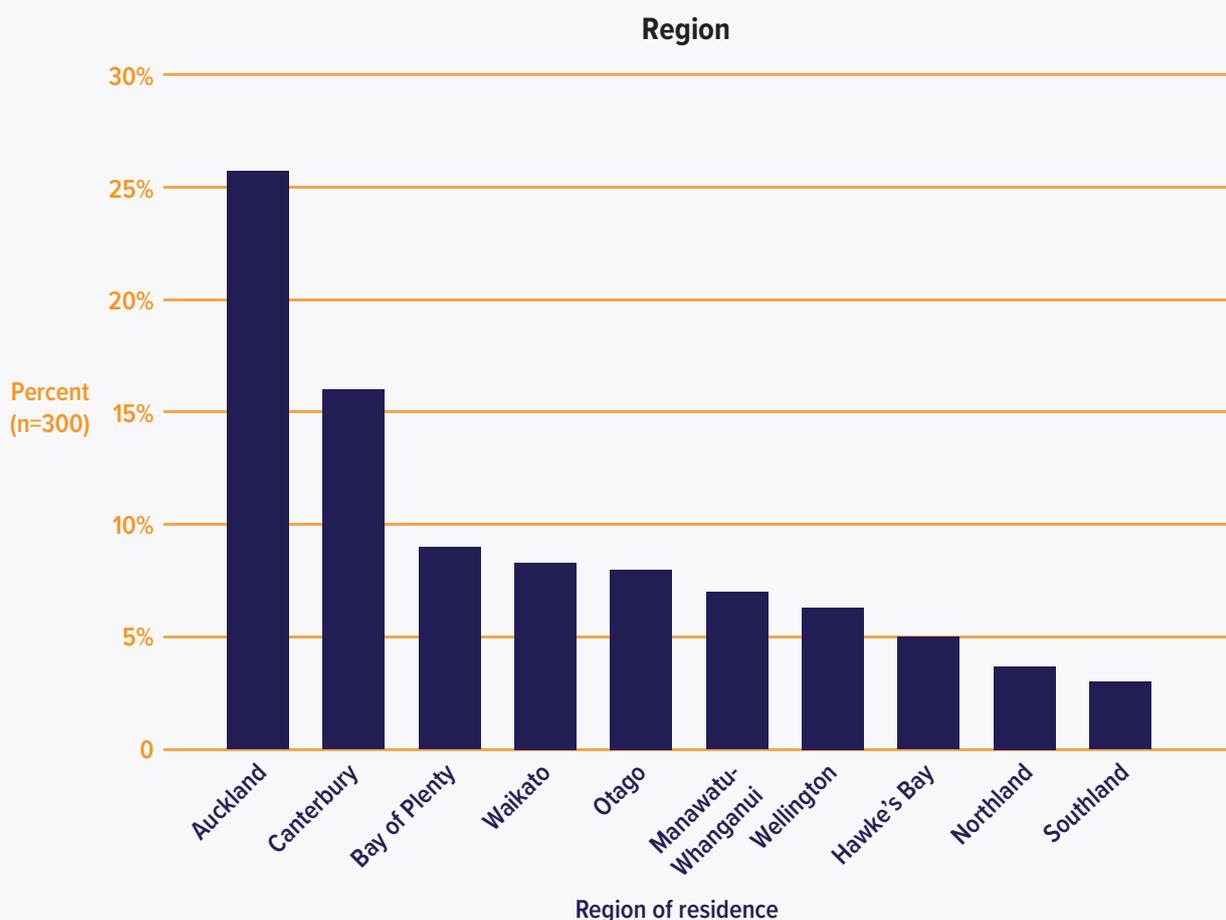


Figure 2. Geographical region of residence (refer to Table 2 in Appendix)

Suicides by construction industry workers occurred in all the other regions of New Zealand over the time period of this study (2007–2017). However, where regions accounted for less than 3% of all cases and represented only a small number of people, they are not reported here to avoid identifying individual cases.

42.0% of cases were married or in a relationship at the time they died, and 41.0% had children.

Coroners record the occupation of each case, and this was coded by trade. Figure 3 depicts the 10 trades that each accounted for 3.0% or more of the total sample.

The rest of the sample was made up of smaller numbers of cases from a variety of other trades such as bricklayers, floor finishers and glaziers.<sup>3</sup> The statistics for occupations that account for less than 3.0% of the overall sample are not reported here to avoid identifying individual cases.

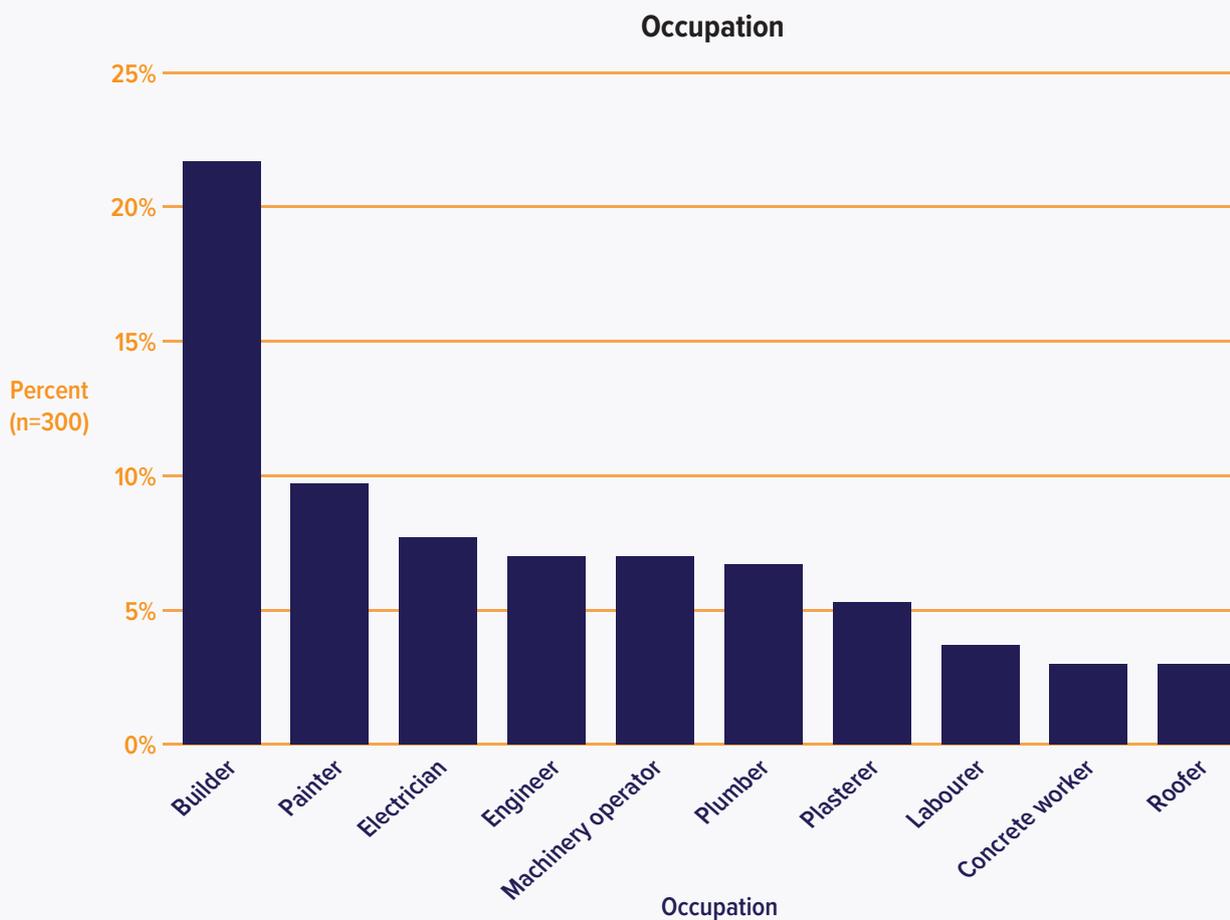


Figure 3. Occupation (refer to Table 3 in Appendix)

<sup>3</sup> “Other” in Table 3 sums up all other trades that are highly varied, but each accounting for less than 3% of the total sample.

Builders represent the greatest proportion of industry suicides at 21.7% of all cases. Of those amongst builders cases, one in six (16.9%) were apprentices. Builders represent the largest proportion of tradespeople in the construction industry, and these figures are likely reflecting this rather than any over-representation of builders in the suicide statistics.

### Mental illness symptoms

Most coroners included a medical history in their reports. This section describes the number of cases where symptoms of mental illness were medically identified in the deceased's medical history and recognised by the coroner. This could be a general practitioner's (GP) assessment and medical treatment of a mental illness, a psychologist's clinical diagnosis or a psychiatric assessment as part of admission into the public mental health system. This does not necessarily mean each of these cases had a clinical diagnosis of a mental illness, though many did. Rather, it means that the coroner reported that a medical professional described symptoms typical of a mental illness.

What is reported here is what was identifiable in the coroners' files and is a simplistic description of a case's psychopathology (behaviours and experiences indicative of mental illness). Mental illness and mental distress themselves are complex. Comorbidity (having symptoms of more than one illness) is common, and the factors that impact mental illness and mental distress are vast and varied. Further, experiencing symptoms or having a diagnosis of a mental illness does not on its own explain why someone died by suicide.

Figure 4 shows that almost half (48.0%) of the cases in our sample were reported to have had symptoms of mental illness described by a medical professional.

**Proportion of sample with and without medically identified symptoms of mental illness**

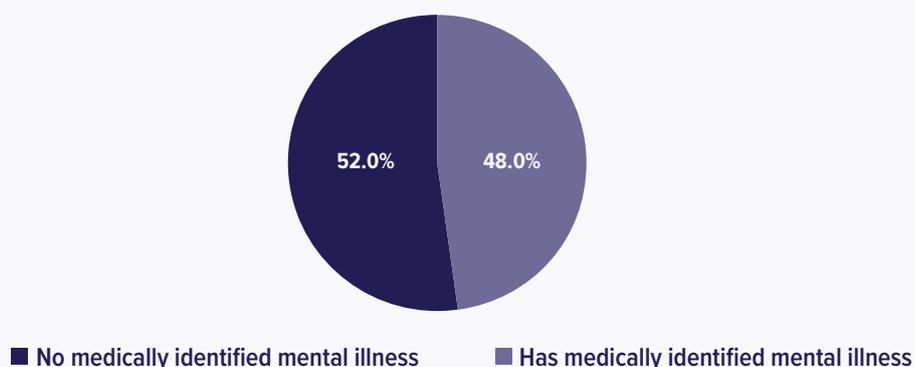


Figure 4. Proportion of sample with medically identified symptoms of mental illness reported in the case file (refer to Table 4 in Appendix)

This section focuses on the mental health of the 144 cases where a mental illness was likely a contributing factor to the suicide.

Figure 5 describes the different mental illness symptoms that were apparent in the coroners' files. Symptoms of depression were most often reported as present in the medical history of suicide cases. Three-quarters (75.7%) of the 144 cases with a medically identified mental health issue experienced symptoms of depression. Just over a third (34.7%) had problems with substance use or addiction, and one in five (20.1%) experienced symptoms of anxiety.

Many cases had symptoms of more than one mental illness. 45.1% of cases with a mental health issue in their medical history had symptoms of two or more illnesses.

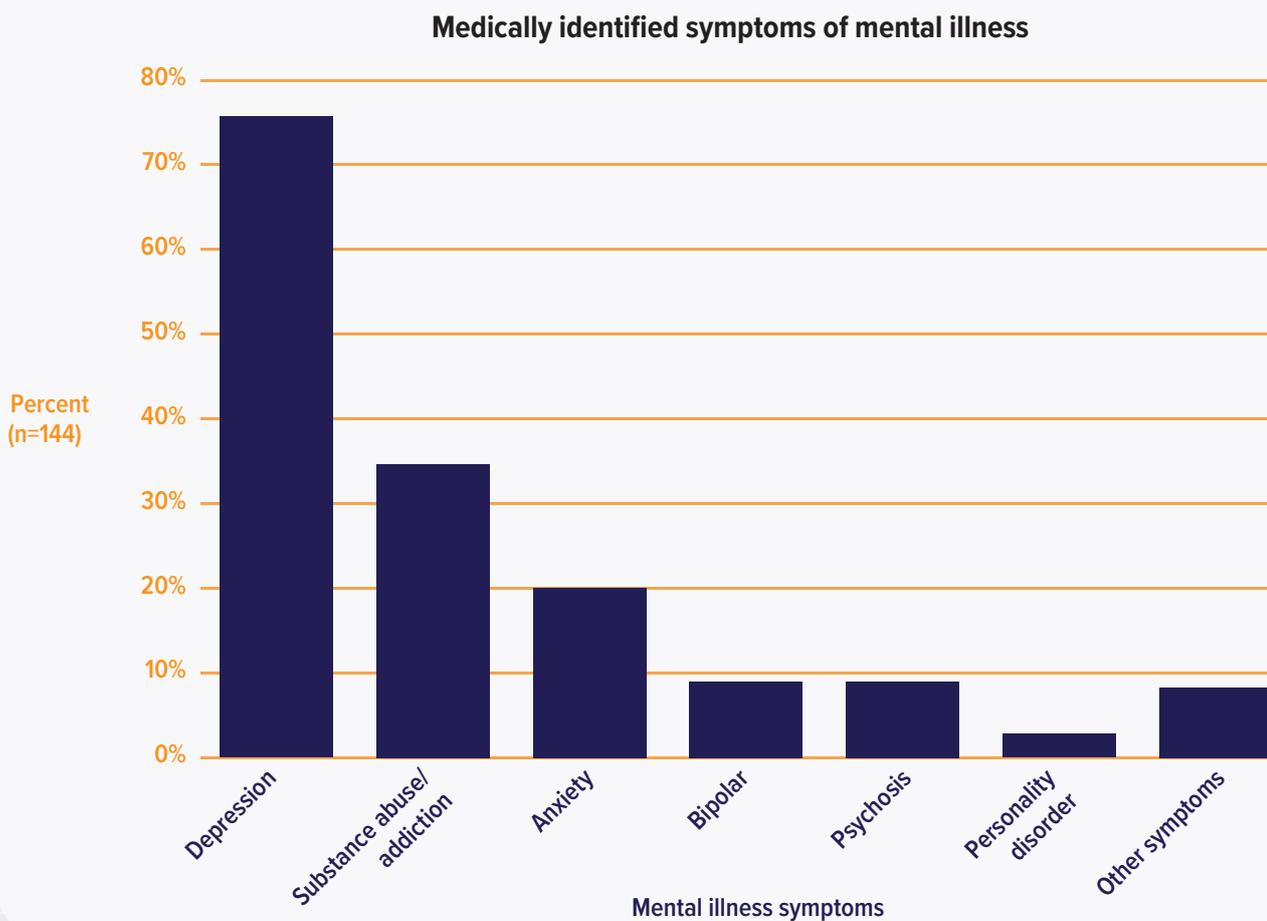


Figure 5. Medically identified symptoms of mental illness (refer to Table 5 in Appendix)

## Previous suicide attempts

A quarter (25.0%) of the entire sample (n=300) had previous suicide attempts mentioned in the coroner's file. Two-thirds of those cases (66.7%) had made just one previous attempt, while the rest had made two or more. Just over a quarter (26.7%) of the cases with previous attempts had most recently attempted suicide in the three months prior to their death. Another quarter (24.0%) had most recently attempted suicide in the year before their death. This is likely to be an underestimate of the true prevalence of previous suicide attempts because coroners may not have been aware of, or chose not to report, previous attempts.

## Substance use

Any substance use mentioned by the coroner as being relevant leading up to, or at the time of death, has been coded for.<sup>4</sup> This includes substances that were evident in the post-mortem toxicology report, substance use mentioned by family and/or friends during the coroner's inquiry and medically identified substance use issues.

Alcohol was the substance most commonly mentioned in the coroners' case files. More than a third (37.3%) of all the cases in the sample were using alcohol before or when they died in a way that attracted the coroner's attention. It should be noted that, when alcohol use was mentioned by the coroner, it was usually in the context of problematic use. Socially acceptable drinking behaviour was very rarely mentioned in the case files as it was likely not relevant to the coroner's inquiry.

Cannabis use was reported for 9.3% of the total sample, and other substances of abuse were used by 10.0% of cases. These rates are lower than the general population use according to the New Zealand Drug Foundation's statistics (2019), which might suggest that coroners were not reporting substance use in every instance.

## Personal and work-related factors

Personal and work-related factors that might have contributed to a person's suicide were coded. These are events or circumstances in the person's life that likely caused them distress leading up to their death. It must be re-emphasised that, while the prevalence of each factor is reported individually, the cases in the sample were complex and

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<sup>4</sup> See Table 6 in the Appendix for the list of substances reported in the coroners' report.

suicide occurred due to a multitude of inter-related factors. That is, no single factor can explain why suicide occurs.

In the current study, nearly three-quarters (74.0%) of the sample were reported to have been dealing with at least two of the factors identified here. Almost half (49.0%) were trying to manage at least three. The limitations of this data source must also be kept in mind when interpreting these findings. Coroners reported enough information to rule a death as suicide in each case. However, it is highly likely that, in many cases, there are factors not reported by the coroners in addition to the ones reported here.

### Personal factors

Coroners reported the personal factors relevant to the circumstances of death. Family and friends of the deceased were often involved in the coroner's inquiry, and the reports tend to focus on the personal aspects of a case that might explain why a person died by suicide.

More than half (54.3%) of the sample were reported to be dealing with a relationship break-up or relationship problems with their romantic partner at the time they died. This was the most common factor across the sample. Figure 6 shows that 36.3% of the cases were dealing with a relationship break-up when they died, while a further 18.0% were having relationship problems with their partner.

This finding indicates that relationship break-down at home may be a stressor for men who die by suicide in the construction industry.

**Relationship problems identified in the case files**  
(n=300)

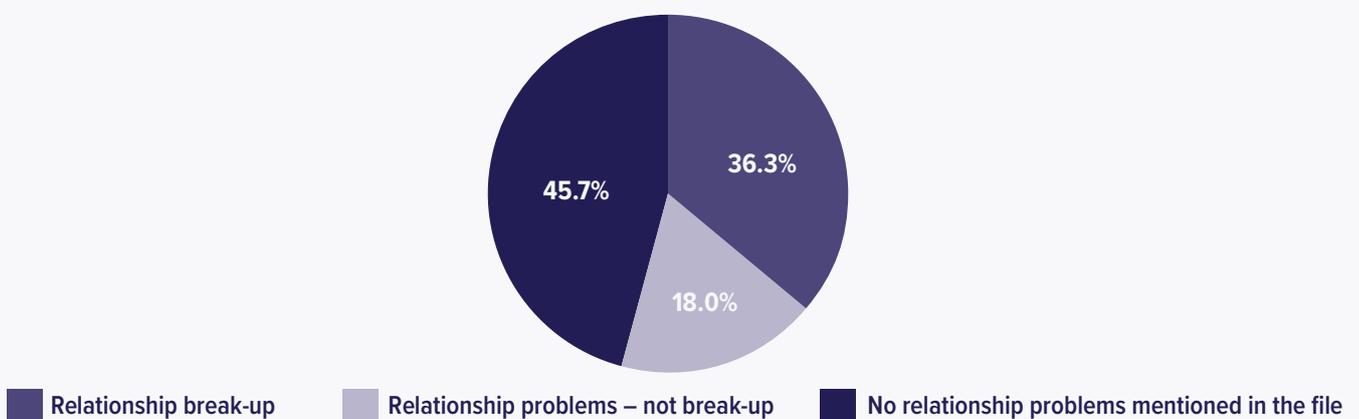


Figure 6. Relationship problems identified in the case files (refer to Table 7 in Appendix)

Other interpersonal issues were evident in the case files. Figure 7 shows that 13.3% of the cases were experiencing relationship problems with other people in their lives apart from their spouse. This includes parents and extended family, friends and ex-partners.

Family violence was a factor mentioned in 8.7% of the case files. 6.3% of the cases were reported to have been experiencing issues around access to their children.

Interpersonal relationship difficulties were a factor for most cases in the sample. While these might be perceived as personal issues, their impact on an individual's ability to safely carry out their job and the interaction between work-related factors and personal factors must be considered.

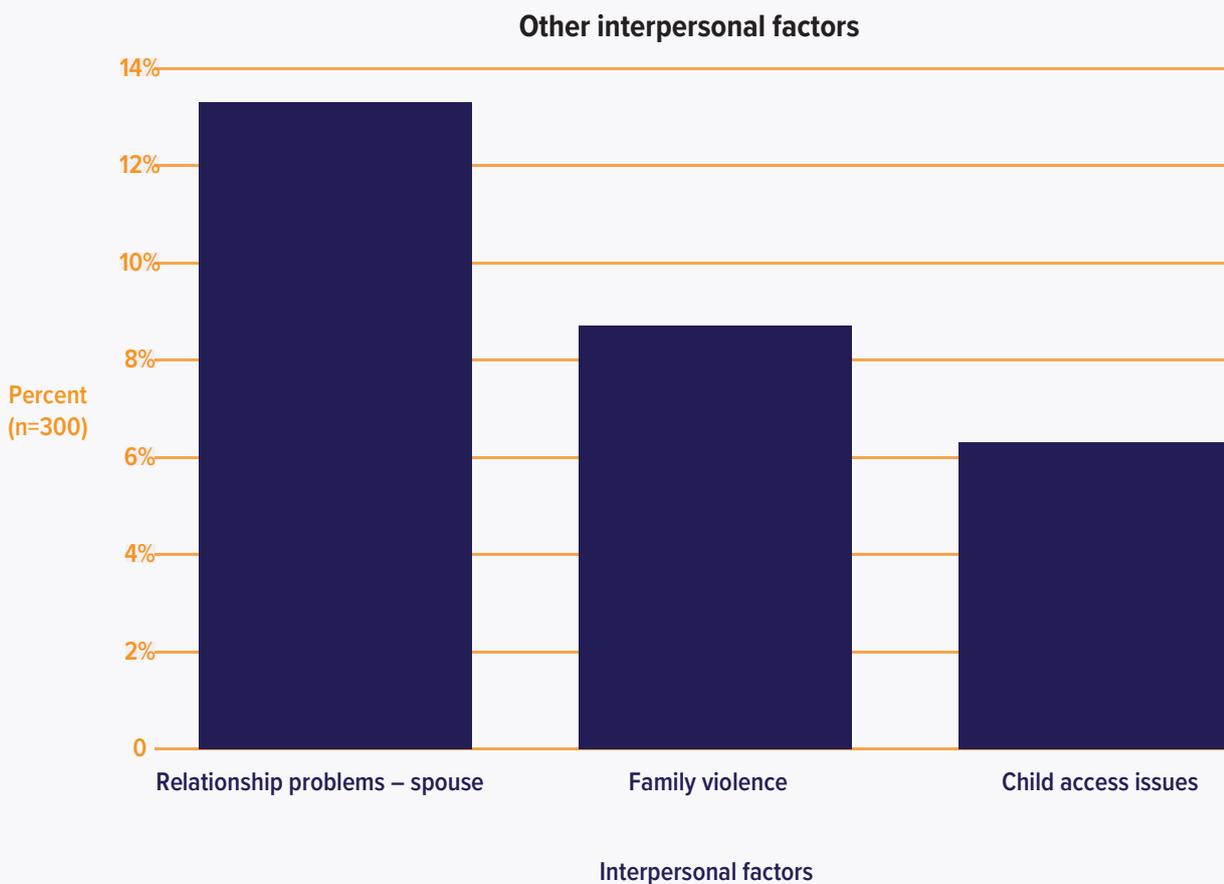


Figure 7. Other interpersonal factors identified in the case files (refer to Table 8 in Appendix)

Several other personal factors were identified in the coroners' files. Figure 8 depicts the five most prevalent factors that were not relationship based. Almost one in five (19.7%) of the sample was under personal financial strain. Coroners described cases where debt was an issue, people were unable to pay household bills and the strain of financial responsibility for families with children. 42.4% of the cases that were linked to financial stress were also experiencing job insecurity or had physical illness or injury impacting their ability to work at the time they died. This demonstrates one of the likely interactions between work and personal factors for construction industry workers.

15.3% of cases were engaged with the criminal justice system at the time they died. This includes situations such as recent police involvement, awaiting a court appearance or an active protection order.

It was reported in the previous section that 5.7% of cases had an injury or illness that was impacting their ability to work. An even larger number were experiencing injury or illness but were working regardless. A total of 15.0% of cases had physical illness or injury mentioned in their coroner's report.

13.7% of cases were experiencing grief over the death of someone they cared about.

7% were experiencing homelessness or serious housing issues, such as impending eviction or having to stay with friends or family members as they had nowhere else to live.

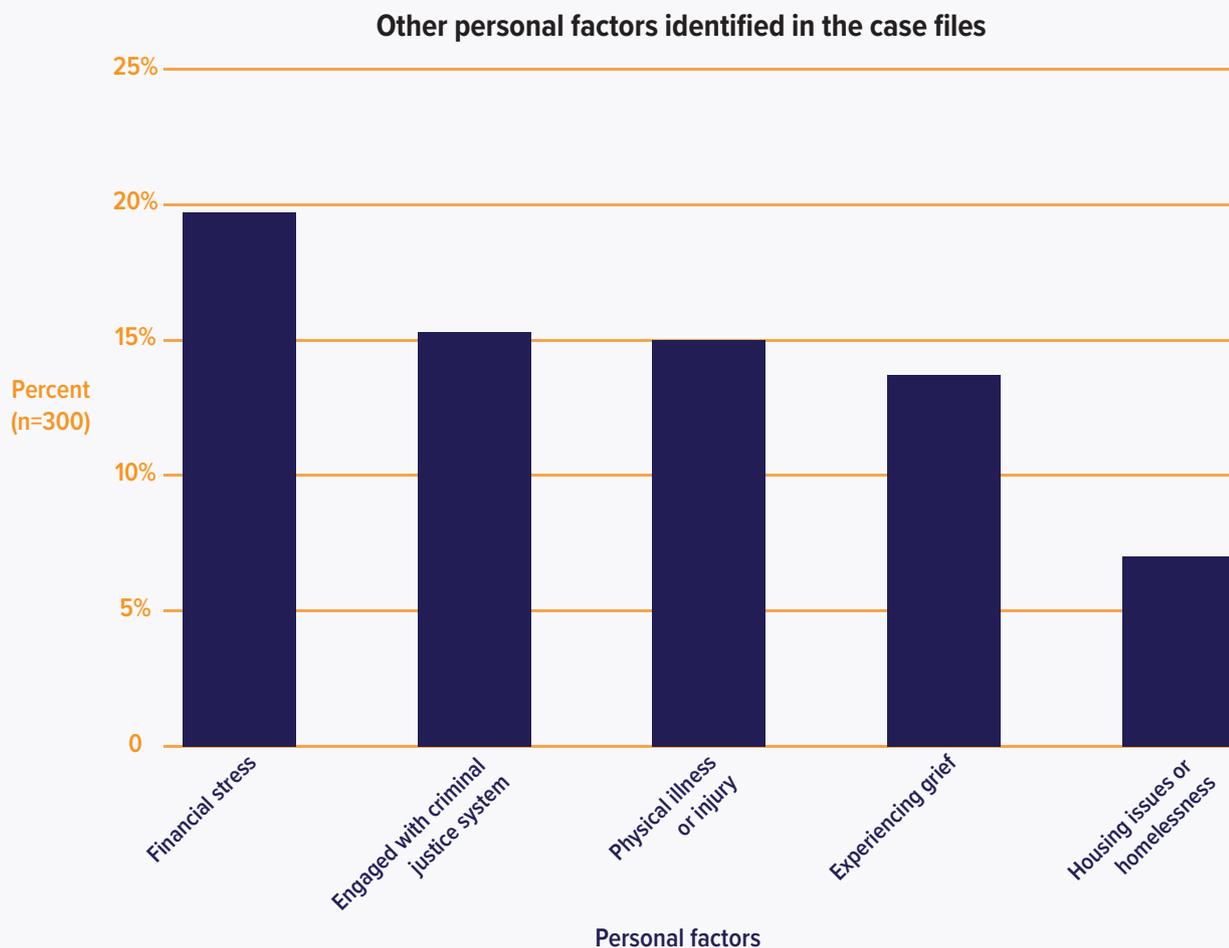


Figure 8. Other personal factors identified in the case files (refer to Table 9 in Appendix)

There were other personal factors that were less commonly mentioned by the coroner. Factors that appeared in 3–5% of the case files were:

- the person lived alone
- the person recently relocated to a new town, region or country
- infidelity was the cause of relationship problems or break-up
- the person was caring for a family member or friend with an illness or disability.

### Professional help-seeking factors

Coroners often described what kinds of help a case might have sought for mental distress in the past. For the purposes of this study, the focus was on professional help-seeking. This was defined as an individual actively asking for or seeking help from a professional in the past.

48.3% of cases had sought help for their mental distress from someone in the past. Figure 9 shows who they sought help from. GPs were the most popular choice for help-seeking in the sample (34.4%). This is consistent with previous research that found that GPs were the most common source of help for people who later died by suicide (Milner et al., 2017). A quarter (25.3%) of cases were reported to have sought help from a mental health service in the past, while 6.3% were reported to have received private counselling. It should be noted that some were reported to have sought help from more than one source.

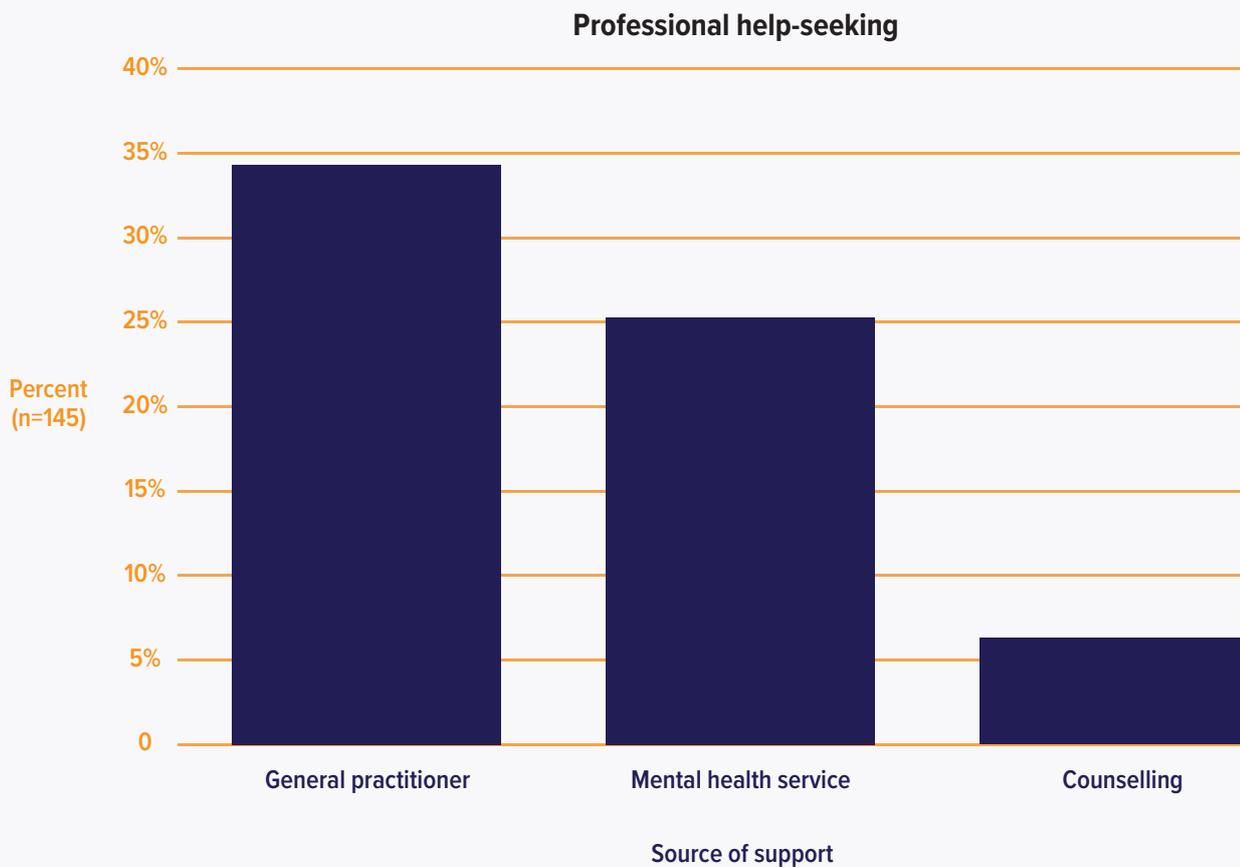


Figure 9. Previous help-seeking identified in the case files (refer to Table 10 in Appendix)

## **Work-related factors**

The research team coded work-related factors that were mentioned by the coroner.

Work-related factors were described in the case files less often than personal factors. There are several possible reasons for this, not least of which is that personal factors may indeed have been more prominent in the lives of cases in this sample. Another explanation is a potential bias towards personal factors during a coroner's inquiry. Coroners almost always include family and friends in their inquiries, and once they have gathered sufficient evidence to rule the death a suicide, the inquiry is often concluded. This means that, if family and friends describe personal circumstances that the coroner deems enough evidence to make a ruling, other factors relating to other contexts (such as work) may be missed.

This might mean that work-related factors can go unreported if family members or friends involved in the coronial process were unaware of them or personal factors were judged to be more relevant. Therefore, the prevalence of work-related factors reported here may be an underestimate.

Nearly a third (32.3%) of all cases had work-related factors mentioned in their coroner's report. Figure 10 shows the work-related factors mentioned in the case files and the proportion of the sample that were affected by them. These were as follows:

- 13.0% of cases were experiencing some form of job insecurity or uncertain work situation. This includes things like feeling they were going to be fired or laid off, having no work lined up after their current job finished or any other threat of impending unemployment.
- 9.7% of the sample were experiencing stress related to running a business. This includes financial stress around tax responsibilities, business debts or the costs of running a business. It also includes legal problems such as court cases or compliance issues and, for some, complete business failure.

- 6.7% of the cases were linked to stressors of a high-pressure industry. These stressors include pressure to deliver under tight deadlines, juggling the responsibilities of multiple projects and dealing with subcontractors, compliance or client issues.
- 5.7% of the cases were dealing with an injury or illness that was impacting their ability to work. Some of these cases were unable to work at all, while others were attempting to work through their injuries.
- A further 5.3% were unemployed at the time they died.
- Another 5.3% were dealing with on-the-job stress. On-the-job stress refers to the challenges of day-to-day work, including performance issues, things going wrong on a job or simply not liking or enjoying the job.
- Workplace conflicts appeared in 4% of the case files. This usually involves disagreement or tension between workers or some form of disciplinary process was under way. This did not include behaviour considered to be bullying.
- Workload stress was evident in 4% of the case files and included working long hours or carrying increasing levels of responsibility.

### Work-related factors



Figure 10. Work-related factors identified in the case files (refer to Table 11 in Appendix)

A relatively small proportion of cases were self-employed or business owners (11.3%). This is likely to be an underestimate of the actual rate of self-employment in the sample, as coroners may not have explicitly stated whether a tradesperson was self-employed or not in every case. Nevertheless, for those cases where it was clear the individual was self-employed, work-related factors were more prevalent. Figure 11 compares the proportion of cases where work-related factors were evident for those who were self-employed versus the rest of the sample. Work-related factors were present in 64.7% of the self-employed case files, while they appeared in only 28.2% of the rest of the sample. This tells us that work-related stress may be felt more acutely by self-employed business owners in the construction industry.

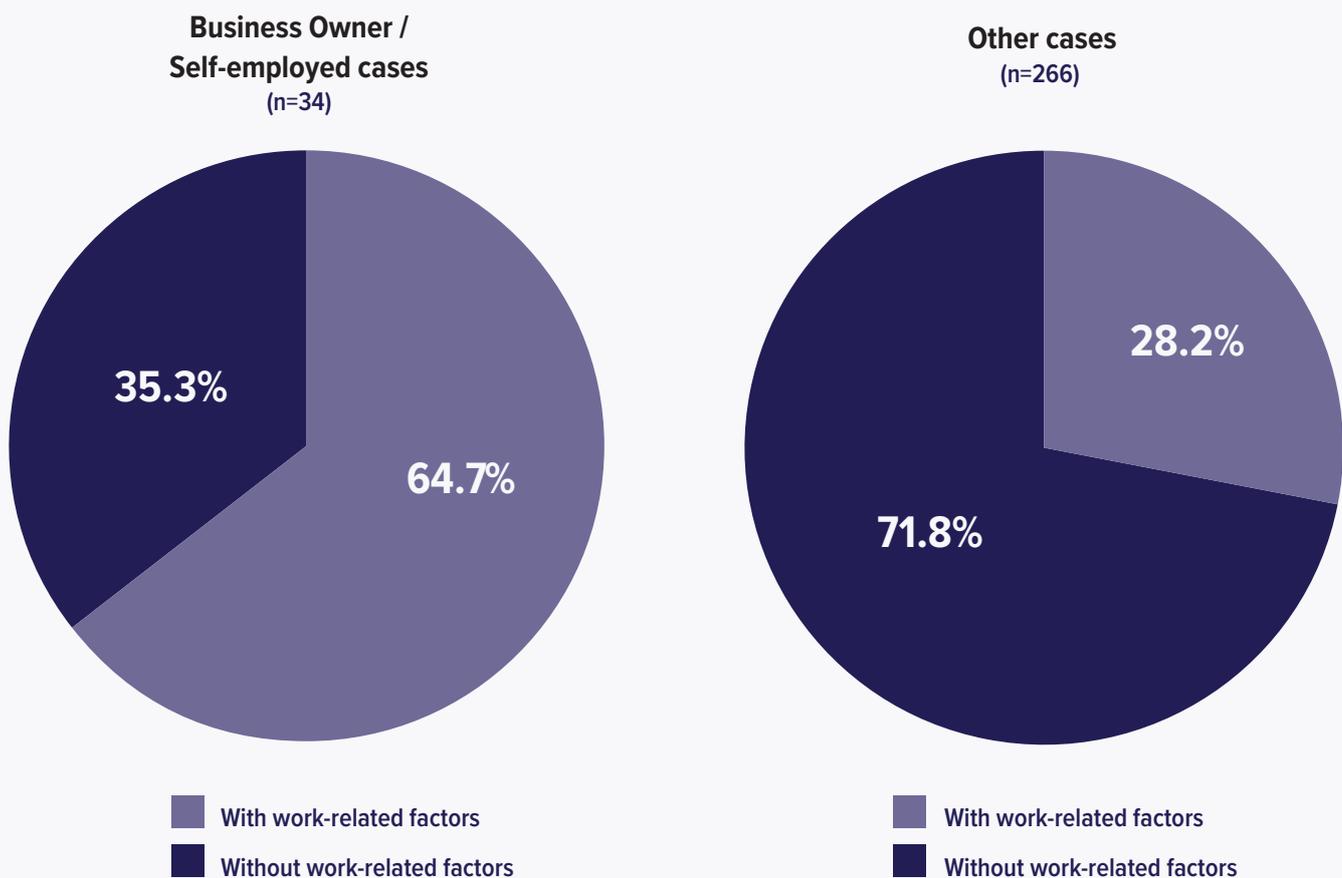


Figure 11. Work-related factors and self-employment (refer to Table 12 in Appendix)

## Discussion

This study was undertaken in response to a desire by some in the construction industry to better understand the problem of suicide among their workforce (Bryson & Duncan, 2018). The industry wanted to know what the problem looked like in order to know how to participate in the development and implementation of solutions.

The current study responded by describing the factors that contribute to suicide in the construction industry. Coroners' closed case files for suicides in the construction industry between 2007 and 2017 were analysed. The findings provide a clearer picture of the problem.

This section of the report discusses what the results of the analysis mean, and how they can be used in the future. This is the first study to investigate suicide in construction in New Zealand, and the new insights gleaned from this research provide the evidence needed to inform targeted action.

### Demographics

Analysing the demographic information available in the coroners' case files allowed us to identify specific groups within the construction industry that could be at greater risk of mental distress and suicide. We looked at the age, sex, geographical region and occupation of each case. Data concerning ethnicity was not available in the reports provided by the coroners and we were unable to report the identities (ethnic, sexual orientation etc) of the sample.

The New Zealand construction sector is a male-dominated industry, and we know that men are at greater risk of suicide in this country (Coronial Services of New Zealand, 2018). It is unsurprising then that most cases in this study are men. There are two age groups where suicide was more common for construction industry workers – the early 20s and the late 40s. This too is consistent with the national suicide statistics (Coronial Services of New Zealand, 2018). Auckland and Christchurch were the geographical regions with the largest proportion of suicides. These regions represent the biggest populations of construction industry workers over the time period of the study (MBIE, 2017), so this is also unsurprising.

Builders represented the greatest proportion of suicides for the industry, accounting for twice as many suicides as any other trade. One in six of these builder suicides were apprentices. Builders represent the largest trade in the New Zealand construction industry (MBIE, 2017; Statistics New Zealand, 2019) and so this finding is likely a reflection of the number of builders in the industry rather than a sign that builders are at increased risk compared to any other trade. The building sector is already beginning to address mental health, with work under way in both the major membership organisations (Registered Master Builders of New Zealand and New Zealand Certified Builders) and the piloting of the MATES in Construction programme on New Zealand commercial sites.

A lack of good compatible data describing the population of the construction industry means it is not possible to accurately test whether any particular trade is over-represented in the suicide statistics. The results of this study provide a mandate for the trades right across the construction sector to prioritise initiatives to improve mental health and wellbeing for their workforce. Some comparative analysis would be beneficial in future.

One approach to suicide prevention and mental health education could be ensuring there is an emphasis on mental health during health and safety training for apprentices of all trades. Mental health training in the apprenticeship curriculum ensures tradespeople start out their careers with an awareness of the stressors they may encounter and are equipped with some tools to manage them. It also sets the stage for ongoing training and awareness of mental health and wellbeing as part of health and safety throughout their working lives.

A number of other trades were in the data but represented less than 3% of cases. These findings demonstrate that the multitude of stressors that increase mental distress and the risk of suicide affect workers across a wide variety of trades or occupations in the construction industry. Suicide prevention and mental health education programmes must therefore reach a diverse range of workers across the industry and at multiple scales of business.

While it was not possible to identify the size of business each case worked in, it is clear from the variety of trades represented that workers from across the spectrum of business sizes are affected. New Zealand's construction sector is predominantly made up of small to medium enterprises (SMEs) (Statistics New Zealand, 2018) so suicide prevention and mental health education initiatives must be able to reach workers and employers in these businesses. This has implications for initiatives like MATES in Construction. This programme may need to be adapted or an alternative programme developed to reach New Zealand's substantial residential building sector, which is largely delivered by SMEs.

### **Mental illness symptoms**

The role that possible mental illness played in construction industry worker suicides was examined. The aim of this analysis was to highlight the underlying mental health issues that construction industry workers may be experiencing. The findings relating to mental illness relied on coroners' reporting of cases' medical histories. This was not always a reliable way to establish whether a mental illness had been diagnosed. Symptoms of mental illness were often described by medical professionals and treated without making a formal diagnosis.

Therefore, the findings of this study report the incidence of symptoms of mental illnesses rather than diagnosed mental illnesses. It is also important to note that a diagnosis or symptoms of mental illness does not on its own explain why a person has died by suicide. There are a multitude of factors that contribute to suicide risk, and the experience of mental illness is just one of these factors.

The literature describes disorders associated with increased risk of suicide as including depression (Bertolote et al., 2004), bipolar disorder (extreme periods of high and low mood), anti-social behaviours (risky and reckless behaviour), exposure to trauma, psychosis and substance-related disorders (Nock et al., 2008). It is known that the presence of comorbid disorders (having more than one mental disorder) is associated with elevated risk of suicide (Hawton, Houston, Haw, Townsend & Harriss, 2003). This study echoed the literature finding almost half of the sample had reported symptoms of mental illness to a medical professional. Most of these cases were experiencing low mood or depression.

These findings present an oversimplified picture of the mental health of the sample in that almost half the cases with symptoms of mental illness were experiencing symptoms of two or more disorders. Symptoms of anxiety, bipolar disorder and psychosis were also present. Nevertheless, a considerable majority of the sample population were indeed experiencing symptoms of depression. This provides a strong mandate for suicide prevention and mental health education initiatives to at least initially focus on depression in the workforce.

Nearly a third of the sample had reported problematic substance use or addiction to a medical professional. Alcohol and other drugs are sometimes used to self-medicate mental distress and cope with difficult life circumstances (Crum et al., 2013a; Crum et al., 2013b). Previous research has reported that substance use is associated with suicidal behaviour (Cavanagh et al., 2003; Pompili et al., 2010). Over a third of the sample were using alcohol in a way that drew the coroners' attention leading up to the time of their deaths. Further, in Bryson and Duncan (2018), interviewees mentioned concerns about drug use or excessive drinking within the construction industry. Taken together, these findings highlight the need for the industry to examine its drinking culture. Construction industry employers may need to consider the needs of workers who are struggling with alcohol abuse and the role alcohol plays in social situations within the work context.

A significant proportion of the sample had attempted suicide in the past. It is well established that previous attempts increase the risk of suicide in the future (Sakinofsky, 2000). This risk is greatest in the first year after an attempt and reduces over time (Suokas, Suominen, Isometsä, Ostamo & Lönnqvist, 2001). It is unreasonable to expect construction industry employers to know whether a member of their workforce had previously attempted suicide. However, there may be circumstances where a manager or colleague becomes aware that a worker has tried suicide in the past. Suicide prevention and mental health education initiatives for the industry will need to address how managers and co-workers deal with this information.

The Mental Health Foundation's Open Minds resources help managers to have conversations with workers they are worried about. The adaptation of these resources for the construction industry is already under way and will be a first step in providing the industry with the tools it needs to better deal with mental distress among its workforce.

In summary, depression and substance use were identified as the most common mental health problems among the sample. While mental illness is a multidimensional problem, prioritising education around depression and substance use issues, at least initially, would seem sensible. Suicide prevention providers and health and safety practitioners working to reduce suicide and increase wellbeing should ensure depression and substance use are addressed as part of their work. These findings also highlight the need for the construction industry to work closely with the mental health sector when addressing these issues.

### **Personal and work-related factors**

Personal factors were described more often than work-related factors in the coroners' report. There are several possible reasons for this, not least of which is that personal factors may indeed have been more prominent in the lives of cases in this sample. Another explanation is a potential bias towards personal factors during a coroner's inquiry. Coroners almost always include family and friends in their inquiries, and once they have gathered sufficient evidence to rule the death a suicide, the inquiry is often concluded. This means that, if family and friends describe personal circumstances that the coroner deems enough evidence to make a ruling, other factors relating to other contexts (such as work) may be missed.

An Australian study (Heller et al., 2007) found a preponderance of personal factors in a psychological autopsy of construction workers' coroners' files and other data. However, focus groups with industry workers as part of the same study revealed the impact of work stressors. This demonstrates a similar pattern to the New Zealand research in this field. Personal factors were mostly evident in the coroners' files in this study, while interviews of construction industry representatives in Bryson and Duncan (2018) focused on work-related stressors. For this reason, the results of this study concerning work-related factors may be an underestimate of their actual impact on cases in this sample and on the mental health of construction industry workers more broadly.

The complex nature of the many factors that contribute to suicide risk should also be kept in mind when interpreting these findings.

The factors described in this study, both work and personal, will be inter-related and in some cases compounding. Suicide is rarely the result of a single factor, and the findings of this study showed that the majority of cases were experiencing multiple factors at the time they died. This supports the conclusions of Milner et al. (2017) who found that no single factor explained suicide and that work and personal factors accumulated and interacted in the lead-up to someone taking their own life.

The prevalence of each individual factor reported here should not be interpreted as a prediction of how likely it is to lead to suicide. Many people have experienced these factors at some point and have not been at risk of taking their own lives. Rather, each of the factors described in this report should be considered pieces of a complex issue that must be examined fully. Noticing that a construction industry worker is experiencing one of the factors reported in this study does not necessarily mean they are at risk of suicide or that they are experiencing mental distress. However, it may be a reason to check in with them and ask if they are OK.

### **Work-related factors – some new details**

The study uncovered some new details about work-related factors.

The first is about job insecurity or a lack of work. The most prevalent work-related factor was that of job insecurity – the distress associated with the fear of losing your job or not knowing where the next lot of work is going to come from. This is consistent with the findings of Milner et al. (2017) who also describe transient work conditions as a risk factor. In the current study, there were some cases in which capacity to work seemed to be reduced by an injury. Others were unemployed when they died but had been employed by the construction industry in the past.

The second is about work-related stress. These factors focused on the stress of running a business, pressures of the industry and stress relating to heavy workloads and the day-to-day doing of the job. The stress of heavy workloads was also described by Amagasa, Nakayama and Takahashi (2005) and Kposowa (1999).

Work-related factors were more common for cases who were self-employed. While only a small proportion of the sample were self-employed business owners, they were twice as likely to have work-related factors described in their case files compared to the rest of the sample. Stressors related to business ownership were often financial, with tax obligations, business debts and the costs of running a business frequently mentioned by coroners. Total business failure was also a feature of many cases. Business ownership (compared to wage or salary worker) is not a variable that is prominent in the literature, indicating it may be deserving of further research. The implications of this finding are that business owners in the construction industry need to be given the tools to manage the stresses of business ownership and to understand the impact these stressors might have on their mental health.

One way to address this could be including business skills in the curriculum of trade training. Ensuring tradespeople know how to run a business before they start doing it may be one way of reducing the stress of business ownership. Additionally, help must be available to construction business owners when the stress of running a business becomes overwhelming. Importantly, they must know where to find this extra support when it's needed and feel comfortable asking for it.

It must also be acknowledged that, as awareness of the mental health issues in construction grows, business owners who employ workers are being asked to carry some responsibility for the mental health of their employees. It is important that, while employers are asked to look out for the wellbeing of those who work for them, they are also able to look after their own mental health. Programmes that aim to position employers or managers as a source of support for others will need to ensure adequate support is provided to them also. In larger organisations, health and safety practitioners will need to be mindful of the mental health of every layer of the business – from the executive team to the subcontractors.

It is also important that any support should not just be focused on work-related factors. While it might be tempting for an employer to dismiss a worker's personal factors as not relevant to the business, there is plenty of research that the costs of absenteeism, presenteeism

and workplace accidents could all be reduced by improving the overall mental health and wellbeing of the construction industry workforce (Goldberg & Steury, 2001; Siu, Phillips & Leung, 2004; Beseler & Stallones, 2010; Kim, Park, Min & Yoon, 2009).

Work-related factors are not unique to the construction industry, but the details uncovered by this study indicate the way the industry functions. For instance, construction is a competitive, high-risk/high-pressure industry that is subject to market forces largely outside its control and is heavily populated by small and medium enterprises. Levelling out the construction marketplace to provide greater job security and ease the pressure on its businesses and workforce would require far-reaching systemic and policy change driven by central government.

The recently announced Construction Sector Accord<sup>5</sup> signals that the government is aware of these issues and is working with industry to begin to address them. The industry-focused outcomes include workforce capacity and capability, greater pipeline certainty and confidence to invest for the future and that all our people go home safe every day. Some of the intended outcomes of the Accord are workforce focused and include job security and an environment that supports thriving mental health and wellbeing. If achieved, these outcomes will help to address some of the work-related factors identified in this study.

### **Personal factors**

The strongest theme to emerge from this study was that of distress as a result of interpersonal relationship problems. More than half the cases in the sample were dealing with a relationship break-up or problem with their romantic partner. This supports previous research where relationship break-down and access to children were identified as key stressors by Scourfield, Fincham, Langer and Shiner (2012). Relationship problems with people other than a partner, family violence and distress over access to children were also interpersonal factors identified in the files. These interpersonal factors tended to be the ones described in most detail by coroners. This is possibly because the family members involved in these relationships with the deceased were central to the coroner's inquiries, and so these issues became the focus of the report.

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<sup>5</sup> <https://www.constructionaccord.nz/the-accord/>

Almost a fifth of cases were experiencing personal financial stress. Milner et al. (2017) found financial stress contributed to suicide risk for construction industry workers in their sample also. Nearly half of the cases in the current study were also experiencing job insecurity or dealing with an injury that was interfering with their ability to work. This provides a clear example of how personal and work-related factors are likely to interact and possibly reinforce each other. As distress over one factor increases, the ability to manage other factors may be diminished. This finding should also prompt some reflection from the construction industry around the financial security of its workforce. It should raise concerns that such a large proportion of the sample were having financial difficulties while employed in construction.

Taken together with the finding that 7% of the sample were experiencing homelessness or serious housing insecurity, there is evidence that wages may not be keeping up with the cost of living in some sectors. Adequately addressing the mental health of the construction workforce will require industry to ensure those working in it are receiving at least a living wage.

The structure of the construction industry is also likely contributing to the financial insecurity of some workers. The construction industry is cyclic in nature (Peterson & Zwerling, 1998). The lack of long-term certainty that many construction and subcontracting businesses are operating under likely filters down to the individuals working within these businesses. The Construction Sector Accord aims to address at least some of this uncertainty by improving government procurement processes, more fairly allocating risk and more transparency and greater certainty around the pipeline of work. If effective, these systemic changes will enable construction companies to provide greater certainty and increased job security to its workforce.

Just over 15% of cases were engaged with the criminal justice system at the time of their death. Most often, this meant a case:

- had recent involvement with police but was not in the court system
- was awaiting a court appearance, either for trial or sentencing and/or
- was currently bound by the conditions of a protection order.

Engagement with the criminal justice system is a well-established risk factor for negative mental health outcomes, including suicide (Phillips, Padfield & Gelsthorpe, 2018). By the very nature of the demographic cohort employed in the construction industry, there will be individuals with criminal justice involvement in the workforce. Employers should understand that this is a risk factor for the mental health of those individuals.

Physical illness or injury was a factor in the personal lives of 15% of cases. This figure includes those whose ability to work was impacted by injury as well as those who were dealing with an injury that did not interrupt or impair their ability to work. Construction is often very physical work, and managing pain while trying to perform work duties is likely to have a negative impact on mental health. Chronic pain is a known risk factor for mental distress (Petrosky et al., 2018). The ‘harden up’ attitude to mental health in the construction industry described by Bryson and Duncan (2018) is likely applied to physical health as well. Shifting the construction industry’s culture away from this philosophy towards a greater acceptance of help-seeking will benefit workers’ physical and mental health.

Further research could help to better understand the impact injury is having on construction industry workers’ mental health. This could inform ways of better supporting them through recovery while also addressing their mental health. Potential questions to investigate include the following:

- Are there financial stressors associated with physical injury preventing someone from working?
- What are the psychological impacts of not being able to ‘be on the tools’ due to injury if you are a tradesperson?
- How is the mental health of a construction worker impacted when they continue to work through injury and experience physical pain as they carry out their job?
- What can be done to ensure physical injury doesn’t become a source of mental distress for construction industry workers?

Answering these questions would be a good start in reducing the negative impact of physical injury on construction workers' mental health.

## Conclusion and recommendations

Site Safe carried out this study in response to the need identified in a previous construction industry scoping study (Bryson & Duncan, 2018) for more evidence to inform the direction of initiatives that address suicide in the construction industry. This study has clearly described what the phenomenon of suicide in New Zealand's construction industry looks like.

Research of this type has never been undertaken on this scale in New Zealand before. The analysis of 300 coroners' case files sheds new light on the factors that are impacting the mental health of construction industry workers in this country. Coroners' files were identified as the most appropriate data source for better understanding the factors behind suicide for construction industry workers. Every closed case file since 2007 was included in the sample.

There are a multitude of factors that contribute to suicide risk for construction industry workers. Those described here are the most common, as reported in coroners' case files. There will be many more besides those identified in this report, and the complexity of suicide cannot be overstated. What this research achieves, for the first time, is a better understanding of who in the New Zealand construction industry is affected.

**Based on the findings of this study, recommendations are as follows:**

1. **Government considers prioritising funding to support initiatives that result from this report.**
2. **Industry leadership:**
  - a. focuses on influencing the work-related factors identified in this study in a way that minimises or eliminates the risk of mental harm to its workforce, particularly for those down the supply chain

- b. embraces evidence-based suicide prevention and mental health education initiatives and makes use of the resources available for managers (i.e. the Mental Health Foundation's Open Minds resources)
- c. works with mental health experts to adapt programmes such as MATES in Construction to be suitable for small and medium enterprise owner/operators.

**3. Vocational education and training sector:**

- a. adds some curriculum relating to mental health, financial literacy and business management skills, from apprenticeship to specialist levels
- b. builds mental health education into all health and safety training.

**4. Mental health sector:**

- a. prioritises depression symptoms and substance use in mental health education initiatives given the prevalence of these mental health issues in the sample
- b. ensures that suicide prevention and mental health education initiatives cater to construction businesses of all sizes, including small to medium enterprises, which make up the majority of the industry
- c. ensures that suicide prevention and mental health education caters to the needs of self-employed construction business owners, covering:
  - the mental health and wellbeing of their workers as well as themselves
  - building resilience and healthy coping strategies to manage a wide variety of stressors across work and personal contexts.

**5. Research community:**

- a. studies the impact that injury is having on construction industry workers' mental health
- b. studies what features suicide prevention and mental health education programmes should have to succeed in the context of New Zealand's construction industry

- c. studies the help-seeking behaviour of men in the construction industry.<sup>6</sup>

As the results of this study have many implications and recommendations for several different audiences, it would be sensible for a coordinated approach in any initiatives responding to this study to ensure their impact is maximised across the industry.

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<sup>6</sup> Work in this area is currently under way by Andy Walmsley (co-author of this report), a doctoral student at Massey University. Preliminary results of this research will be available in July 2020

## Bibliography

The research literature listed here informed the design of this research. A review of this literature can be found at <https://www.sitesafe.org.nz/guides--resources/research/site-safe-research/>.

Amagasa, T., Nakayama, T. & Takahashi, Y. (2005). Karojisatsu in Japan: Characteristics of 22 cases of work-related suicide. *Journal of Occupational Health*, 47(2), 157–164.

Berkman, L. F., Melchior, M., Chastang, J. F., Niedhammer, I., Leclerc, A. & Goldberg, M. (2004). Social integration and mortality: A prospective study of French employees of Electricity of France – Gas of France: The GAZEL Cohort. *American Journal of Epidemiology*, 159(2), 167–174.

Bertolote, J. M., Fleischmann, A., De Leo, D. & Wasserman, D. (2004). Psychiatric diagnoses and suicide: Revisiting the evidence. *Crisis*, 25(4), 147–155.

Beseler, C. L. & Stallones, L. (2010). Safety knowledge, safety behaviors, depression, and injuries in Colorado farm residents. *American Journal of Industrial Medicine*, 53(1), 47–54.

Bryson, K. & Duncan, A. (2018). *Mental health in the construction industry scoping study*. BRANZ Study Report SR411. Judgeford, New Zealand: BRANZ Ltd.

Bush, D. M. & Lipari, R. N. (2013). *Substance use and substance use disorder by industry*. SAMHSA, National Survey of Drug Use and Health.

Campbell, L. A., Jackson, L., Bassett, R., Bowes, M. J., Donahue, M., Cartwright, J. & Kisely, S. (2011). Can we use medical examiners' records for suicide surveillance and prevention research in Nova Scotia?. *Chronic Diseases and Injuries in Canada*, 31(4), 165–171.

Cavanagh, J. T., Carson, A. J., Sharpe, M. & Lawrie, S. M. (2003). Psychological autopsy studies of suicide: A systematic review. *Psychological Medicine*, 33(3), 395–405.

Cleary, A. (2012). Suicidal action, emotional expression, and the performance of masculinities. *Social Science & Medicine*, 74(4), 498–505.

Coronial Services of New Zealand. (2018). *Annual provisional suicide statistics for deaths reported to the Coroner between 1 July 2007 and 30 June 2018*. Accessed 29 April 2019, <https://www.mentalhealth.org.nz/assets/Suicide/2017-2018-Annual-Provisional-Suicide-Statistics-Final.pdf>

Crum, R. M., La Flair, L., Storr, C. L., Green, K. M., Stuart, E. A., Alvanzo, A. A., Lazareck, S., Bolton, J. M., Robinson, J., Sareen, J. & Mojtabai, R. (2013a). Reports of drinking to self-medicate anxiety symptoms: Longitudinal assessment for subgroups of individuals with alcohol dependence. *Depression and Anxiety*, 30(2), 174–183.

Crum, R. M., Mojtabai, R., Lazareck, S., Bolton, J. M., Robinson, J., Sareen, J., Green, K. M., Stuart, E. A., La Flair, L., Alvanzo, A. A. & Storr, C. L. (2013b). A prospective assessment of reports of drinking to self-medicate mood symptoms with the incidence and persistence of alcohol dependence. *JAMA Psychiatry*, 70(7), 718–726.

Cutright, P. & Fernquist, R. M. (2005). Marital status integration, psychological well-being, and suicide acceptability as predictors of marital status differentials in suicide rates. *Social Science Research*, 34(3), 570–590.

De Leo, D. & Evans, R. (2004). *International suicide rates and prevention strategies*. Ashland, OH: Hogrefe & Huber Publishers.

Fleischmann, A., Bertolote, J. M., De Leo, D., Botega, N., Phillips, M., Sisask, M., Vijayakumar, L., Malakouti, K., Schlebusch, L., De Silva, D., Nguyen, V. T. & Wasserman, D. (2005). Characteristics of attempted suicides seen in emergency-care settings of general hospitals in eight low-and middle-income countries. *Psychological Medicine*, 35(10), 1467–1474.

Flood, P. & Blair, S. (2013). *Men's sheds in Australia: Effects on physical health and mental well-being*. Melbourne, Australia: Beyond Blue. Accessed 11 April 2019, <https://www.beyondblue.org.au/docs/default-source/research-project-files/bw0209.pdf?sfvrsn=2>

Gardon, Z. (2004). Seeing the problem is half the solution to workplace bullying. *CCH's Australian OHS*, Dec/Jan, 26–27.

Goldberg, R. J. & Steury, S. (2001). Depression in the workplace: Costs and barriers to treatment. *Psychiatric Services*, 52(12), 1639–1643.

Goñi-Sarriés, A., Blanco, M., Azcárate, L., Peinado, R. & López-Goñi, J. J. (2018). Are previous suicide attempts a risk factor for completed suicide? *Psicothema*, 30(1), 33–38.

Gullestrup, J., Lequertier, B. & Martin, G. (2011). MATES in construction: Impact of a multimodal, community-based program for suicide prevention in the construction industry. *International Journal of Environmental Research and Public Health*, 8(11), 4180–4196.

- Hassan, R. 1996. *Social factors in suicide in Australia*. Trends & Issues in Crime and Criminal Justice No. 52. Canberra, Australia: Australian Institute of Criminology. <https://aic.gov.au/publications/tandi/tandi52>
- Hawton, K., Houston, K., Haw, C., Townsend, E., & Harriss, L. (2003). Comorbidity of axis I and axis II disorders in patients who attempted suicide. *American Journal of Psychiatry*, 160(8), 1494-1500.
- Hawton, K., Zahl, D. & Weatherall, R. (2003). Suicide following deliberate self-harm: Long-term follow-up of patients who presented to a general hospital. *The British Journal of Psychiatry*, 182(6), 537–542.
- Heller, T. S., Hawgood, J. L. & Leo, D. D. (2007). Correlates of suicide in building industry workers. *Archives of Suicide Research*, 11(1), 105–117.
- Hersch, R., McPherson, T. & Cook, R. (2002). Substance use in the construction industry: A comparison of assessment methods. *Substance Use & Misuse*, 37(11), 1331–1358.
- Holt-Lunstad, J., Smith, T. B. & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, 7(7), e1000316.
- Isometsä, E. (2014). Suicidal behaviour in mood disorders – who, when, and why? *The Canadian Journal of Psychiatry*, 59(3), 120–130.
- Jarvholm, B. & Stenberg, A. (2002). Suicide mortality among electricians: Authors' reply. *Occupational and Environmental Medicine*, 59(9), 649–649.
- Kim, H. C., Park, S. G., Min, K. B., & Yoon, K. J. (2009). Depressive symptoms and self-reported occupational injury in small and medium-sized companies. *International archives of occupational and environmental health*, 82(6), 715.
- Kleiman, E. M. & Liu, R. T. (2013). Social support as a protective factor in suicide: Findings from two nationally representative samples. *Journal of Affective Disorders*, 150(2), 540–545.
- Kposowa, A. J. (1999). Suicide mortality in the United States: Differentials by industrial and occupational groups. *American Journal of Industrial Medicine*, 36(6), 645–652.
- Kposowa, A. J. (2003). Divorce and suicide risk. *Journal of Epidemiology & Community Health*, 57(12), 993–993.
- Lambert, G., Reid, C., Kaye, D., Jennings, G. & Esler, M. (2003). Increased suicide rate in the middle-aged and its association with hours of sunlight. *American Journal of Psychiatry*, 160(4), 793–795.

Lopez-Castroman, J., de las Mercedes Perez-Rodriguez, M., Jausent, I., Alegria, A. A., Artes-Rodriguez, A., Freed, P. ... & Oquendo, M. A. (2011). Distinguishing the relevant features of frequent suicide attempters. *Journal of Psychiatric Research*, 45(5), 619–625.

Mandell, W., Eaton, W. W., Anthony, J. C. & Garrison, R. (1992). Alcoholism and occupations: A review and analysis of 104 occupations. *Alcoholism: Clinical and Experimental Research*, 16(4), 734–746.

Martin, G. & Gullestrup, J. (2014). Help-seeking and men: An innovative suicide prevention program from the construction industry. In D. Lester, J. F. Gunn III & P. Quinnett (Eds.), *Suicide in men: How men differ from women in expressing their distress* (pp. 332–352). Springfield, IL: Charles C Thomas Publisher.

Mates in Construction. (2018). *Why MATES exists – are suicide rates high in the construction industry?* Retrieved from <http://matesinconstruction.org.au/about/why-mic-exists/>

MBIE. (2017). *Future demand for construction workers*. Wellington, New Zealand: Ministry of Business, Innovation and Employment

McIntosh, W. L., Spies, E., Stone, D. M., Lokey, C. N., Trudeau, A. T. & Bartholow, B. (2016). Suicide rates by occupational group – 17 states, 2012. *Morbidity and Mortality Weekly Report*, 65(25):641–645.

Milner, A., Maheen, H., Currier, D. & LaMontagne, A. D. (2017). Male suicide among construction workers in Australia: A qualitative analysis of the major stressors precipitating death. *BMC Public Health*, 17(1), 584.

Milner, A., Spittal, M. J., Pirkis, J. & LaMontagne, A. D. (2013). Suicide by occupation: Systematic review and meta-analysis. *The British Journal of Psychiatry*, 203(6), 409–416.

Ministry of Health (2017). *A strategy to prevent suicide in New Zealand: Draft for public consultation*. Wellington, New Zealand: Ministry of Health.

Nakao, M. (2010). Work-related stress and psychosomatic medicine. *BioPsychoSocial Medicine*, 4(4).

New Zealand Drug Foundation. (2018). *Drug use in NZ*. Accessed 15 May 2019, <https://www.drugfoundation.org.nz/policy-and-advocacy/drugs-in-nz/>

Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A. ... & De Graaf, R. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British Journal of Psychiatry*, 192(2), 98–105.

O'Brien, R., Hunt, K. & Hart, G. (2005). 'It's caveman stuff, but that is to a certain extent how guys still operate': Men's accounts of masculinity and help-seeking. *Social Science & Medicine*, 61(3), 503–516.

Parke, W. & Warren, A. (2012). The Effects of boom bust on national construction industry performance. Auckland, New Zealand: Construction Clients' Group. Accessed 9 April 2019, [https://www.constructing.co.nz/files/file/301/The%20Effects%20of%20Boom%20Bust%20on%20National%20Construction%20Industry%20Performance%20\(2\).pdf](https://www.constructing.co.nz/files/file/301/The%20Effects%20of%20Boom%20Bust%20on%20National%20Construction%20Industry%20Performance%20(2).pdf)

Peterson, J. S. & Zwerling, C. (1998). Comparison of health outcomes among older construction and blue-collar employees in the United States. *American Journal of Industrial Medicine*, 34, 280–287.

Petrosky, E., Harpaz, R., Fowler, K. A., Bohm, M. K., Helmick, C. G., Yuan, K. & Betz, C. J. (2018). Chronic pain among suicide decedents, 2003 to 2014: Findings from the National Violent Death Reporting System. *Annals of Internal Medicine*, 169(7), 448–455.

Phillips, J., Padfield, P. & Gelsthorpe, L (2018). Suicide and community justice. *Health and Justice*, 6(14), 1–12.

Player, M. J., Proudfoot, J., Fogarty, A., Whittle, E., Spurrier, M., Shand, F. ... & Wilhelm, K. (2015). What interrupts suicide attempts in men: A qualitative study. *PLoS One*, 10(6), e0128180.

Pompili, M., Serafini, G., Innamorati, M., Dominici, G., Ferracuti, S., Kotzalidis, G. D., Serra, G., Girardi, P., Janiri, L., Tatarelli, R., Sher, L. & Lester, D. (2010). Suicidal behavior and alcohol abuse. *International Journal of Environmental Research and Public Health*, 7(4), 1392–1431.

Powell, V., Barber, C. W., Hedegaard, H., Hempstead, K., Hull-Jilly, D., Shen, X. ... & Weis, M. A. (2006). Using NVDRS data for suicide prevention: Promising practices in seven states. *Injury Prevention*, 12(suppl 2), ii28–ii32.

Roberts, S. E., Jaremin, B. & Lloyd, K. (2013). High-risk occupations for suicide. *Psychological Medicine*, 43(6), 1231–1240.

Roche, A. M., Pidd, K., Fischer, J. A., Lee, N., Scarfe, A. & Kostadinov, V. (2016). Men, work, and mental health: A systematic review of depression in male-dominated industries and occupations. *Safety and Health at Work*, 7(4), 268–283.

Sakinofsky, I. (2000). Repetition of suicidal behaviour. In K. Hawton & K. Van Heeringen (Eds.). *The international handbook of suicide and attempted suicide* (pp. 385–404). Chichester, UK: John Wiley & Sons

- Scourfield, J., Fincham, B., Langer, S. & Shiner, M. (2012). Sociological autopsy: An integrated approach to the study of suicide in men. *Social Science & Medicine*, 74(4), 466–473.
- Siu, O. L., Phillips, D. R. & Leung, T. W. (2004). Safety climate and safety performance among construction workers in Hong Kong: The role of psychological strains as mediators. *Accident Analysis & Prevention*, 36(3), 359–366.
- Stack, S. & Wasserman, I. (2007). Economic strain and suicide risk: A qualitative analysis. *Suicide and Life-Threatening Behavior*, 37(1), 103–112.
- Stack, S. (2000). Suicide: A 15-year review of the sociological literature – Part I: Cultural and economic factors. *Suicide and Life-Threatening Behavior*, 30(2), 145–162.
- Statistics New Zealand. (2018). *New Zealand business demography statistics: At February 2018*. Accessed 16 April 2019, <https://www.stats.govt.nz/information-releases/new-zealand-business-demography-statistics-at-february-2018>
- Suicide Mortality Review Committee. (2016). *Ngā rāhui hau kura: Suicide Mortality Review Committee feasibility study 2014–15*. Wellington, New Zealand: Suicide Mortality Review Committee
- Suokas, J., Suominen, K., Isometsä, E., Ostamo, A. & Lönnqvist, J. (2001). Long-term risk factors for suicide mortality after attempted suicide – findings of a 14-year follow-up study. *Acta Psychiatrica Scandinavica*, 104(2), 117–121.
- Taylor, B. & Collings, C. (2010). *Location and methods of suicide in New Zealand*. Auckland, New Zealand: Te Pou o Te Whakaaro Nui
- Turner, M., Mills, T., Kleiner, B. & Lingard, H. (2017). Suicide in the construction industry: It's time to talk. In F. Emuze & M. Behm (Eds), *Proceedings of the Joint CIB W099 and TG48 International Safety, Health, and People in Construction Conference*, Cape Town, South Africa, 11–13 June 2017, pp. 45–55.
- Uribe, I. P., Blasco-Fontecilla, H., García-Parés, G., Batalla, M. G., Capdevila, M. L., Meca, A. C. ... & Vidal, D. P. (2013). Attempted and completed suicide: Not what we expected? *Journal of Affective Disorders*, 150(3), 840–846.

## Appendix - Tables

**Table 1: Age at time of death**

Age	Frequency	Percent (n=300)
15–19	17	5.7%
20–24	45	15.0%
25–29	35	11.7%
30–34	37	12.3%
35–39	29	9.7%
40–44	33	11.0%
45–49	42	14.0%
50–54	29	9.7%
55–59	21	7.0%
60+	12	4.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

**Table 2: Geographical region of residence**

Region	Frequency	Percent (n=300)
Auckland	77	25.7%
Canterbury	48	16.0%
Bay of Plenty	27	9.0%
Waikato	25	8.3%
Otago	24	8.0%
Manawatu-Whanganui	21	7.0%
Wellington	19	6.3%
Hawke's Bay	15	5.0%
Northland	11	3.7%
Southland	9	3.0%
Other*	24	8.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

\* Other includes Taranaki, Tasman, Gisborne, West Coast, Nelson, Marlborough and overseas.

**Table 3: Occupation**

Occupation	Frequency	Percent (n=300)
Builder/building apprentice	65	21.7%
Painter	29	9.7%
Electrician	23	7.7%
Engineer	21	7.0%
Machinery operator	21	7.0%
Plumber	20	6.7%
Plasterer	16	5.3%
Labourer	11	3.7%
Concrete worker	9	3.0%
Roofer	9	3.0%
Other*	76	25.3%
Total	300	100.0%

\*Other includes trades such as bricklayer, floor finisher, joiner/cabinetmaker, line worker, glazier and manager/supervisor.

**Table 4: Proportion of sample with and without medically identified symptoms of mental illness**

Mental illness	Frequency	Percent (n=300)
Has medically identified mental illness	144	48.0%
No medically identified mental illness	156	52.0%
Total	300	100.0%

**Table 5: Medically identified symptoms of mental illness**

Medically identified symptoms of mental illness	Frequency	Percent (n=144)
Depression	109	75.7%
Substance abuse/addiction	50	34.7%
Anxiety	29	20.1%
Bipolar	13	9.0%
Psychosis	13	9.0%
Personality disorder	4	2.8%
Other symptoms	12	8.3%

\*Percentages do not add up to a 100% as many of the cases reported symptoms of more than one mental illness.

**Table 6: Substances used around time of death according to the case files**

Substances used around time of death according to the case files	Frequency	Percent (n=300)
Alcohol	112	37.3%
Cannabis	28	9.3%
Other substances of abuse	30	10.0%

\*Percentages do not add up to a 100% as not all cases reported use of substances.

**Table 7: Relationship problems identified in the case files**

Relationship problems identified in the case files	Frequency	Percent (n=300)
Relationship break-up	109	36.3%
Relationship problems – not break-up	54	18.0%
No relationship problems mentioned in the file	137	45.7%
Total	300	100.0%

**Table 8: Other interpersonal factors identified in the case files**

Other interpersonal factors	Frequency	Percent (n=300)
Relationship problems – spouse	40	13.3%
Family violence	26	8.7%
Child access issues	19	6.3%

**Table 9: Other personal factors identified in the case files**

Other personal factors	Frequency	Percent (n=300)
Financial stress	59	19.7%
Engaged with criminal justice system	46	15.3%
Physical illness or injury	45	15.0%
Experiencing grief	41	13.7%
Housing issues or homelessness	21	7.0%

**Table 10: Professional help-seeking**

Previous help-seeking	Frequency	Percent (n=300)
General practitioner	103	34.3%
Mental health service	76	25.3%
Counselling	19	6.3%

**Table 11: Work-related factors identified in the case files**

Work-related factors	Frequency	Percent (n=300)
Job insecurity/uncertain work situation	39	13.0%
Stress related to running a business	29	9.7%
Stressors of high-pressure industry	20	6.7%
Work impacted by injury or illness	17	5.7%
Unemployed at time of death	16	5.3%
On-the-job stress	16	5.3%
Workplace conflicts	12	4.0%
Workload stress	12	4.0%

**Table 12: Work-related factors and self-employment**

<b>Business-owner/self-employed</b>	<b>Frequency</b>	<b>Percent (n=34)</b>
With work-related factors	22	64.7%
Without work-related factors	12	35.3%
<b>Others</b>	<b>Frequency</b>	<b>Percent (n=266)</b>
With work-related factors	75	28.2%
Without work-related factors	191	71.8%

