

**The economic cost of suicide and non-fatal suicidal behaviour in the Australian
construction industry by state and territory**

A report conducted for Mates in Construction

August 2015

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Executive summary

Background

Suicide has gained recognition worldwide as a significant public health problem. In Australia, suicide is the leading cause of death for males aged 25-44 years and females aged 25-34 years. A death by suicide has ripple effects, impacting the lives of any number of individuals who inevitably suffer intense and conflicted emotional distress in response to a death of this kind. Given most suicides occur within people of working age, it is surprising that very little research has been conducted into the cost of suicide or non-fatal suicide behaviour (NFSB) in the work-place or on the potential impact of work-place suicide prevention strategies.

Aim

The aim of the current study is to quantify the costs of suicide and NFSB in the Australian Construction Industry (CI) by state and territory.

Method

Suicide data were obtained from the National Coronial Information System for the period 2001-2012. Occupational information was coded according to Australian standards with CI workers falling into three major groups: technicians and trades worker; machine operators; and, drivers and labourers. Age standardised incidence rates were calculated using the direct standardisation method. The analysis used a costing methodology endorsed by the National Occupational Health and Safety Commission and used in a recent Safe Work Australia report. In this analysis, for every suicide there are 15 attempts with 3 (17%) resulting in full incapacity and 12 (83%) resulting in short absence. Corresponding duration of absence (for use in calculation of production disturbance costs) are 0.2 weeks for short absence; and, 2.6 weeks for full incapacity and fatality. Costs were derived for the year 2012 using an incidence-based approach with future costs discounted to 2012 dollars.

Results

In 2012, a total 169 male CI workers lost their life to suicide with an average age of 37 years. There was considerable variability among states and territories with Western Australia (WA) and New South Wales (NSW) recording 42 deaths followed by Queensland (QLD) and Victoria (VIC) with 36 and 33 deaths respectively. For

those states where age standardised rates of suicide could be calculated, rates of suicide in the CI was higher than the state and national average with the exception of QLD where the CI had comparable rates to the state average. The total cost of suicide and NFSB in the Australian CI is estimated at \$1.57 billion. The majority of this cost is attributed to the cost associated with NFSB resulting in full incapacity (76.5% of total costs) followed by the cost of suicide (23.3% of total costs). By state, the cost of suicide and NFSB in the WA CI accounts for 29.4% of total costs (\$461 million) followed by NSW (22.7% of total costs or \$356 million), QLD (22.1% of total costs or \$345 million) and VIC (16.6% of total costs or \$259 million).

Discussion

In undertaking this analysis a range of data, assumptions and methods were used. The focus has been on the human cost of suicide and NFSB to the CI. It has not considered the wider implications to the Industry in terms of damage to property, loss of company image or the considerable investment the Industry makes complying with work health and safety regulations. The results provide a conservative assessment of the cost associated with suicide and NFSB in the Australian CI by state and territory. Given the significant cost of this largely preventable problem, more effort needs to be devoted to addressing mental health in the CI.

Introduction

Suicide has gained recognition worldwide as a significant public health problem. In Australia, suicide is a leading cause of death with 2,522 deaths (aged over 15 years) in 2013 (1,885 male deaths and 637 female deaths), representing 1.5% of all deaths over the age of 15.¹ Most deaths by suicide are among people of working age with suicide being the leading cause of death for males aged 25-44 years and females aged 25-34 years.¹

A death by suicide has a flow-on effect, impacting the lives of any number of individuals – from family to friends, colleagues, clinicians, first responders, coronial staff, volunteers of bereavement support services and other associates – who inevitably suffer intense emotional distress in response to a death of this kind.²⁻⁴

To date, there has been limited research into the cost of suicide and non-fatal suicidal behaviour to the construction industry (CI). While being employed is associated with reduced risk of suicide overall, recent evidence suggests suicide rates are differentially distributed across industry and occupational groups. A recent review by Milner et al (2013) on suicide by occupation found a stepwise gradient in risk, with the lowest skilled occupations at greater risk of suicide than the highest skill-level group.⁵ In a separate analysis using data from the National Coronial Information System (NCIS), Milner et al (2014) confirmed that this gradient also applies within the CI.⁶ There has been no research to date on the cost of non-fatal suicidal behaviours (NFSB), referring a non-habitual act with the a non-fatal outcome that the individual, expecting to, or taking the risk to die or inflict bodily harm, initiated and carried out with the purpose of bringing out wanted changes.⁷

The aim of the current study is to quantify the costs of suicide and NFSB in the Australian CI by state and territory.

Methods

Rates of suicide and non-fatal suicide behaviour in the Construction Industry

Suicide data were obtained from the NCIS for the period 2012. NCIS is a national internet based data storage and retrieval system for Australian coronial cases, established in 2001.^{8,9} NCIS is utilised by coroners, government agencies and

researchers for identifying cases for death investigation, research and to monitor external causes of death in Australia.⁸ Only males were included in this study as there were very small numbers of female suicides in the CI, with resulting issues of confidentiality.

Occupational information was coded according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO) (up to the 6-digit level) and the Australian and New Zealand Standard Industrial Classifications (ANZSIC), Division E.¹⁰⁻¹³ Those in the Construction Industry were identified as being involved in the construction or demolition of buildings and other structures.¹³ Occupations coded as being in the CI fell into three major ANZSCO groups: technicians and trades workers (ANZSCO 3); machine operators and drivers (ANZSCO 7); and, labourers (ANZSCO 8).¹² For consistency with Milner et al (2013),¹⁰ cases in higher skilled occupations such as construction managers (ANZSCO 1) and architects were excluded as their skills were considered more relevant to other ANZSIC categories such as Division M Professional, Scientific and Technical Services. Due to small numbers among machine operators and drivers (ANZSCO 7) employed in construction, this group was combined with labourers (ANZSCO 8). The skill specialisation required in these two groups was similar; hence their combination was justified. Further detail on occupational coding can be found in Appendix 1.

NCIS suicide numbers, CI workers (technicians and trades workers; machine operators and drivers; and, labourers), and Census 2011 were used in calculation of age standardised rates of suicide. Age standardised incidence was calculated by the direct standardisation method, using the 2001 standard population, as used by the Australian Institute of Health and Welfare (AIHW).^{14,15} Age-standardisation is a technique used to enhance the comparability of data from different populations by making adjustments for the confounding effects of compositional differences in age structure between the populations or sub-populations being compared.¹⁶ A directly age-standardised rate is defined as the weighted average of event rates, with the weights being equal to the proportion of people in each age group in a chosen standard population. Age standardised male suicide rates for each state / territory and Australia were sourced from the Australian Bureau of Statistics (ABS).^{1,17} It is

important to note that the AIHW recommends against calculating age standardised male suicide rates where numbers are low.¹⁴

Levels of severity of work-related incidents

The Safe Work Australia report created five mutually exclusive categories of severity to define the level of severity. These categories were based on definitions from the National Dataset for Compensation and were developed using incident severity and duration of absence. Severity can range from minor incidents involving little or no absence from work to fatalities (Table 1).

Table 1: Safe Work Australia categories of severity

Category label	Severity	Category Definition
Short absence	Less than 5 days off work	A minor work-related injury or illness, involving less than 5 working days absence from normal duties, where the worker was able to return to full duties
Long absence	Five days or more off work and return to work on full duties	A minor work-related injury or illness, involving 5 or more working days and less than 6 months off work, where the worker was able to return to full duties
Partial incapacity	Five days or more off work and return to work on reduced duties or lower income	A work-related injury or illness which results in the worker returning to work more than 6 months after first leaving work
Full incapacity	Permanently incapacitated with no return to work	A work-related injury or disease, which results in the individual being permanently unable to return to work.
Fatality	Fatality	A work-related injury or disease, which results in death.

Source: Safe Work Australia, 2012¹⁸

The World Health Organisation (WHO) estimates that between 20% - 30% of the workforce will suffer from serious a mental health problem and for every employee who dies by suicide, another 10-20 will make a suicide attempt (17% resulting in a permanent disability and 83% no disability).¹⁹ These statistics are supported by research in Australia.^{4,8,9} In this analysis, for every 15 suicide attempts there is one fatality, and from the 15 attempts, 3 (17%) are classified as full incapacity and 12 (83%) classified as short absence. Corresponding duration of absence (for use in calculation of production disturbance costs) are 0.2 weeks for short absence; and, 2.6 weeks for full incapacity and fatality.

Estimating cost of suicide and non-fatal suicide behaviour across Australian Construction Industry by state and territory in 2012

In 1995, the Industry Commission developed a methodology to examine the direct and indirect cost of work-related incidents.²⁰ The Industry Commission methodology was further refined based on the recommendations of independent reviews^{21,22} Further revisions were made to the methods in a 2004 report undertaken by the National Occupational Health and Safety Commission²³ and a 2012 report by Safe Work Australia.¹⁸ This updated method is used in the current analysis to provide an estimate of the cost of suicide and NFSB across the Australian CI by state and territory.

Although a full explanation of methods is available in the 2012 Safe Work Australia report,¹⁸ it is important to consider key issues. Both direct and indirect costs were considered for a range of economic agents (including employers, workers and the government) and by severity of injury. The average cost associated with each category were combined with estimates of suicide and self-harm incidents by CI workers to produce an estimate of total costs. The classification structure for economic costs is based on six conceptual cost groups: production disturbance costs; human capital costs; medical costs; administrative costs; transfer costs; and, other costs (Table 2). A summary of the key parameters, assumptions and data sources for cost items is provided in Appendix 2.

Production disturbance costs

Production disturbance costs reflect short term impacts until production is returned to pre-incident levels and includes the value of lost production and staff turnover costs. Value of lost production is measured by combining average duration of absence (by severity category)¹⁸ with male average weekly earnings (AWE) by state and territory.²⁴ Cost of overtime reflects the proportion of overtime related to work-related injuries and wage of workers that would not be required if there were no injury. Overtime is valued by combining AWE with duration of absence (by severity category) and adjusting by 0.4.^{18,24} The cost of replacing existing staff affected by work-related incidents is equivalent to six weeks of AWE; and the cost of training new staff in the event of a full incapacity or fatality is equivalent to 2.5 weeks of AWE.^{18,24} Tax losses due to foregone income are valued using tax rate of 22%.²⁵

Human capital costs

This analysis uses the human capital approach to costing. Human capital costs consider the long run costs, such as loss of potential output, occurring after a restoration of pre-incident production levels.¹⁸ They are calculated as a residual between total human capital loss and deadweight loss to society from taxation redistributions.

For full incapacity or fatality, human capital costs are measured by considering the value of potential future earnings from time of injury to retirement age (i.e., <65years) assuming a constant discount profile and productivity loss. The discount profile considers the likely changes in the value of money over time by including the opportunity cost of saving (4.1%)²⁶ and the rate of inflation (2.8%).²⁷ A productivity factor of 1.6% is applied to reflect long term increases in AWE above the prevailing wage inflation rate.²⁸

NCIS data are used to identify the average age of suicide for 2012 for CI workers used in this analysis (technicians / trades workers, machine operators / drivers, labourers). The average age of suicide is used as a proxy for the average age of a full incapacity case. For full incapacity, future earnings also include the average social welfare payments received since these contribute to post-injury income. These costs are borne by the government through the disability support pension – equivalent to \$816 per fortnight (in 2012 dollars).²⁹ It is assumed that an incapacitated person will receive the disability support pension from time of incident until average age of death. Life expectancy at birth (for each state and territory) is used as a proxy for average age of death.³⁰ Further, it is assumed the fully incapacitated and deceased never return to work and the full cost is borne by the government in terms of lost income and tax revenue. These assumptions are consistent with those used in the Safe Work Australia report.²⁵

Medical costs

Medical costs are expenses incurred by workers and the community through medical treatment. Average medical costs for three severity levels were obtained from Safe Work Australia: \$500 per short absence; \$13,375 per full incapacity case; and, \$2,930 per fatality.^{18,31} In all work-related incidents involving medical care, the

employer covers the first \$500, employers contribute 15% of the difference (if any), with the government accounting for the remainder.

Administrative costs

Administrative costs included in this analysis are investigation costs, travel costs and funeral costs. Investigation costs consider the costs of investigating an incident and the administrative cost of collecting and reporting information on work-related incidents. Average investigation costs by severity are sourced from Safe Work Australia: \$28 per short absence; \$2,374 per full incapacity case; and \$2,840 per fatality.^{18,31} It is assumed that government investigation costs would be equal to the cost borne by the employer. Travel costs represent expenses for travel to doctors, rehabilitation centres, solicitors etc, \$4 per short absence and \$730 per full incapacity case.^{18,31} For full incapacity cases, the government is assumed to match travel expenses 1–1 with the individual, in effect assuming a 50% travel concession for full incapacitated workers. Funeral costs are estimated at \$4,000 and borne entirely by the worker (family).^{18,31} It is acknowledged that funeral costs may be associated with all deaths, fatality by suicide brings these costs forward.

Other costs

Other costs included in this analysis are cost of carers and aids/modifications for full incapacity cases and the cost of postvention services for fatalities. Postvention is a psychological first aid, crisis intervention, and other support offered after a suicide to affected individuals or the work-place as a whole to alleviate possible negative effects of the event.³ The Department of Human Services value disability support for carers at \$3,203 per annum and support for aids and modifications at \$913 per annum.^{18,31} The total of these payments is discounted to present value terms.

A fatality by suicide has a flow-on effect, impacting the lives of any number of individuals, from family to friends, colleagues, clinicians, first responders, coronial staff, volunteers of bereavement support services and other associates, who inevitably suffer intense and conflicted emotional distress in response to a death of this kind. Research suggest that each fatality by suicide impacts directly on six to twenty people.² The economic cost associated with suicide bereavement has been estimated at \$14,058.³² Evidence from an Industry source suggests that each fatality

by suicide may be witnessed by on average three colleagues who may then require counselling and time off work as part of postvention care. These costs are estimated at \$10,000 per worker from time of incident to return to full duties. This assumption is consistent with other attempts to measure ripple effects of suicide. However, the assumption is conservative as it only considers the impact on workers and not families or friends.^{4,5,9}

Transfer costs

The redistribution of public sector resources to care for incapacitated person incurs deadweight costs on society - for every dollar of tax raised, about 28.75 cents is absorbed in the distortions induced and the administration of the tax system. In this analysis the deadweight loss is measured as the value of taxation receipts foregone, equivalent to 28.75 cents in every foregone tax dollar.³³

Incidence based approach to costing

Consistent with the Safe Work Australia report,¹⁸ the methodology used in this analysis is based on an incidence based approach. The incidence based approach offers a better estimate of the economic cost, since it allows the future costs for new cases to be followed over the expected lifetime of the case. This approach is known as the lifetime cost approach, and provides an indicator of the benefits of reducing work-related incidents. The costs that an injury imposes in future years are discounted to present values, i.e., constant 2012 dollars in this analysis. The lifetime cost approach assumes the levels and structures of current costs accurately reflect future costs.

A further assumption made in the Safe Work Australia report and, carried over to this report, is that the methodology is based on an *ex-post* approach in which costs are attributed to incidents after they occur and as a direct result of the incident.

Compensation-based data, on which the Safe Work Australia report is based, lends itself to an *ex-post* estimation process. Current and future costs associated with each case can be assigned individually (since the number of cases and the nature of each case is known), and total costs are estimated by aggregating the cost of each case and/or cost component from the bottom-up.

Table 2: Economic cost borne by the employer, worker and government

Conceptual group	Cost item	Employer	Worker	Government
Production disturbance costs	Value of lost production	Overtime premium and value of wages paid while away from work	Zero	Zero
	Staff turnover costs	Staff turnover costs	Zero	Zero
Human capital costs	Net present value of lost earnings	Zero	Zero	Loss of income & welfare payments transferred to worker for loss of wage minus deadweight loss associated with tax revenue forgone
Medical costs	Medical and rehabilitation costs	Threshold medical payments	Gap payments	Medical payments not covered by employer or worker
Admin. costs	Investigation costs	Employer investigation costs	Zero	Costs of running the compensation system (including investigation claims)
	Travel costs	Zero	Out of pocket expenses	Compensation for travel costs
	Funeral costs	Zero	Out of pocket expenses	Zero
Other	Carers	Zero	Zero	Payments to carers
	Aids, equipment & modifications	Zero	Zero	Reimbursements for aids, equipment & modifications
	Postvention	Postvention	Zero	Postvention
Transfer costs	Deadweight costs of tax revenue foregone	Zero	Zero	Deadweight costs of tax revenue foregone

Results

Suicide and non-fatal suicide behaviour indicator data

In 2012, a total 169 male CI workers lost their life to suicide (Table 3). New South Wales (NSW) and Western Australia (WA) recorded 42 deaths followed by Queensland and Victoria with 36 and 33 deaths respectively. Age standardised CI death rates were able to be calculated for these states – small numbers in the other states precluded the ability to observe reliable suicide rates and have therefore been excluded. Age standardised CI death rates were considerably higher in all states except for QLD. For example, in 2012, the rate of suicide per 100,000 people in WA was 41.8 for the CI and 22.0 for the entire state. In QLD, the rate of suicide per 100,000 people was 20.9 for the CI and 21.0 for the entire state. The National average was 16.8 deaths per 100,000, substantially lower than those seen in the CI.

Using the WHO evidence on the relationship between suicide and NFSB, suggests there were 2,535 non-fatal suicide attempts with 431 resulting in full incapacity and 2104 resulting in a short absence from work.

Across all Australian states and territories, the average age of a suicide among CI workers was 37 years. This age varies from a low of 32.8 years in the Northern Territory (NT) to 59.5 years in the Australian Capital Territory (ACT). However, only one suicide was recorded in ACT during 2012. Victoria (VIC) had the second highest age of suicide at 40.4 years.

Table 3 reports the age life expectancy at birth in males by state and territory. Average life expectancy is highest for those males living in ACT (81.2 years) and VIC (80.5 years) and lowest for those living in NT (74.7 years) and Tasmania (TAS) (78.7 years).

Potential years of life lost (PYLL) are derived by subtracting average life expectancy with the average age of a suicide. PYLL are highest in QLD (43.3 years) and WA (43 years) and lowest in ACT (21.7 years) and TAS (39.2 years).

Table 3: Suicide indicator data related to the Australian construction industry by state and territory, 2012

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	AUS
<i>Death by suicide</i>									
Suicide fatalities	1	42	6	36	7	2	33	42	169
Age standardised death rate - CI	N/A	20.7	N/A	20.9	N/A	N/A	16.8	41.8	22.2
Age standardised death rate - state/territory	np	14.1	31.0	21.0	17.9	21.7	13.7	22.0	16.8
<i>Non-fatal suicide behaviour</i>									
Non-fatal suicide attempts	15	630	90	540	105	30	495	630	2535
Attempts resulting in full incapacity	2.6	107.1	15.3	91.8	17.9	5.1	84.2	107.1	431.0
Attempts resulting in short absence	12.5	522.9	74.7	448.2	87.2	24.9	410.9	522.9	2104.1
<i>Suicide indicator data</i>									
Average age of suicide	59.5	39.7	32.8	36.2	39.5	39.5	40.4	37.1	38.3
Potential productive years lost (<65)	5.5	25.3	32.2	28.8	25.5	25.5	24.6	27.9	28.0
Average life expectancy males	81.2	79.9	74.7	79.5	79.8	78.7	80.5	80.1	79.9
Potential years lost	21.7	40.2	41.9	43.3	40.3	39.2	40.1	43.0	42.9
Average weekly earnings	\$1,547	\$1,267	\$1,419	\$1,270	\$1,166	\$1,070	\$1,215	\$1,556	\$1,285

Average cost of suicide and non-fatal suicide behaviour

Table 4 provides an overview of the average cost associated with NFSB and suicide incidents in the Australian CI by state and territory for 2012. The cost of an incident involving a short-term absence ranges from \$860 in TAS to \$996 in WA. The cost of an incident resulting in full incapacity ranges from \$1.12 million in ACT to \$3.27 in WA. The cost of a suicide ranges from \$0.75 million in TAS to \$2.72 million in NT. The key cost driver in both full incapacity cases and a fatality is lost income (and taxes) and, for full incapacity only, the additional cost of welfare payments.

Total cost of suicide and non-fatal suicide behaviour

Table 5 provides an overview of the total cost associated with NFSB and suicide incidents in the Australian CI by state and territory for 2012. Total costs are derived by multiplying estimates of suicide and NFSB by state and territory (Table 3) with estimates of the average cost per incident (Table 4). The total cost of suicide and NFSB in the Australian CI is estimated at \$1.57 billion. The majority of this cost is attributed to the cost associated with NFSB resulting in full incapacity (76.5% of total costs or \$1.20 billion), followed by the cost of a suicide (23.3% of total costs or \$365 million) and NFSB resulting in a short absence from work (0.1% of total costs or \$1.96 million). By state and territory, the cost of suicide and NFSB in the WA CI accounts for 29.4% of total costs (\$461 million) followed by NSW (22.7% of total costs or \$356 million), QLD (22.1% of total costs or \$345 million) and VIC (16.6% of total costs or \$259 million).

Table 4: Average cost of suicide and NFSB in the Australian construction industry by state and territory, 2012

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
<i>NFSB resulting in short absence</i>								
Prod disturb costs	\$433	\$355	\$397	\$356	\$326	\$300	\$340	\$436
Human capital costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Medical costs	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Administrative costs	\$60	\$60	\$60	\$60	\$60	\$60	\$60	\$60
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transfer costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Subtotal</i>	<i>\$993</i>	<i>\$915</i>	<i>\$957</i>	<i>\$916</i>	<i>\$886</i>	<i>\$860</i>	<i>\$900</i>	<i>\$996</i>
<i>NFSB resulting in full incapacity</i>								
Prod disturb costs	\$49,705	\$40,709	\$45,616	\$40,821	\$37,472	\$34,387	\$39,037	\$50,019
Human capital costs	\$929,247	\$2,298,060	\$3,047,464	\$2,604,862	\$2,227,029	\$2,084,156	\$2,125,575	\$2,958,566
Medical costs	\$13,375	\$13,375	\$13,375	\$13,375	\$13,375	\$13,375	\$13,375	\$13,375
Administrative costs	\$6,974	\$6,974	\$6,974	\$6,974	\$6,974	\$6,974	\$6,974	\$6,974
Other	\$85,051	\$84,212	\$84,670	\$84,222	\$83,909	\$83,621	\$84,056	\$85,081
Transfer costs	\$35,912	\$112,278	\$161,315	\$130,664	\$107,482	\$98,632	\$103,378	\$154,546
<i>Subtotal</i>	<i>\$1,120,264</i>	<i>\$2,555,607</i>	<i>\$3,359,414</i>	<i>\$2,880,919</i>	<i>\$2,476,241</i>	<i>\$2,321,145</i>	<i>\$2,372,394</i>	<i>\$3,268,562</i>
<i>Suicide</i>								
Prod disturb costs	\$49,705	\$40,709	\$45,616	\$40,821	\$37,472	\$34,387	\$39,037	\$50,019
Human capital costs	\$531,871	\$1,662,865	\$2,389,122	\$1,935,171	\$1,591,834	\$1,460,763	\$1,531,050	\$2,288,875
Medical costs	\$2,930	\$2,930	\$2,930	\$2,930	\$2,930	\$2,930	\$2,930	\$2,930
Administrative costs	\$11,236	\$11,236	\$11,236	\$11,236	\$11,236	\$11,236	\$11,236	\$11,236
Other	\$114,348	\$114,348	\$114,348	\$114,348	\$114,348	\$114,348	\$114,348	\$114,348
Transfer costs	\$35,912	\$112,278	\$161,315	\$130,664	\$107,482	\$98,632	\$103,378	\$154,546
<i>Subtotal</i>	<i>\$746,002</i>	<i>\$1,944,366</i>	<i>\$2,724,568</i>	<i>\$2,235,170</i>	<i>\$1,865,302</i>	<i>\$1,722,295</i>	<i>\$1,801,979</i>	<i>\$2,621,955</i>

Table 5: Total cost of suicide and NFSB in the Australian construction industry by state and territory, 2012

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	AUS
<i>NFSB resulting in short absence</i>									
Prod disturb costs	\$5,391	\$185,445	\$29,686	\$159,392	\$28,450	\$7,459	\$139,725	\$227,861	\$783,411
Human capital costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Medical costs	\$6,225	\$261,450	\$37,350	\$224,100	\$43,575	\$12,450	\$205,425	\$261,450	\$1,052,025
Administrative costs	\$747	\$31,374	\$4,482	\$26,892	\$5,229	\$1,494	\$24,651	\$31,374	\$126,243
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transfer costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Subtotal</i>	<i>\$12,363</i>	<i>\$478,269</i>	<i>\$71,518</i>	<i>\$410,384</i>	<i>\$77,254</i>	<i>\$21,403</i>	<i>\$369,801</i>	<i>\$520,685</i>	<i>\$1,961,679</i>
<i>NFSB resulting in full incapacity</i>									
Prod disturb costs	\$126,747	\$4,359,883	\$697,929	\$3,747,369	\$668,876	\$175,372	\$3,284,984	\$5,357,087	\$18,418,246
Human capital costs	\$2,369,579	\$246,122,196	\$46,626,193	\$239,126,348	\$39,752,461	\$10,629,194	\$178,867,132	\$316,862,434	\$1,080,355,537
Medical costs	\$34,106	\$1,432,463	\$204,638	\$1,227,825	\$238,744	\$68,213	\$1,125,506	\$1,432,463	\$5,763,956
Administrative costs	\$17,784	\$746,942	\$106,706	\$640,236	\$124,490	\$35,569	\$586,883	\$746,942	\$3,005,553
Other	\$216,881	\$9,019,052	\$1,295,445	\$7,731,580	\$1,497,783	\$426,469	\$7,073,271	\$9,112,133	\$36,372,613
Transfer costs	\$91,576	\$12,024,953	\$2,468,122	\$11,994,961	\$1,918,549	\$503,022	\$8,699,219	\$16,551,919	\$54,252,319
<i>Subtotal</i>	<i>\$2,856,673</i>	<i>\$273,705,488</i>	<i>\$51,399,033</i>	<i>\$264,468,319</i>	<i>\$44,200,903</i>	<i>\$11,837,838</i>	<i>\$199,636,994</i>	<i>\$350,062,976</i>	<i>\$1,198,168,225</i>
<i>Suicide</i>									
Prod disturb costs	\$49,705	\$1,709,758	\$273,698	\$1,469,557	\$262,304	\$68,773	\$1,288,229	\$2,100,818	\$7,222,841
Human capital costs	\$531,871	\$69,840,344	\$14,334,732	\$69,666,151	\$11,142,840	\$2,921,526	\$50,524,641	\$96,132,743	\$315,094,848
Medical costs	\$2,930	\$123,060	\$17,580	\$105,480	\$20,510	\$5,860	\$96,690	\$123,060	\$495,170
Administrative costs	\$11,236	\$471,923	\$67,418	\$404,505	\$78,654	\$22,473	\$370,796	\$471,923	\$1,898,926
Other	\$114,348	\$4,802,616	\$686,088	\$4,116,528	\$800,436	\$228,696	\$3,773,484	\$4,802,616	\$19,324,812
Transfer costs	\$35,912	\$4,715,668	\$967,891	\$4,703,906	\$752,372	\$197,263	\$3,411,458	\$6,490,948	\$21,275,419
<i>Subtotal</i>	<i>\$746,002</i>	<i>\$81,663,368</i>	<i>\$16,347,406</i>	<i>\$80,466,127</i>	<i>\$13,057,116</i>	<i>\$3,444,591</i>	<i>\$59,465,299</i>	<i>\$110,122,108</i>	<i>\$365,312,017</i>
Total	\$3,615,038	\$355,847,126	\$67,817,957	\$345,344,830	\$57,335,273	\$15,303,832	\$259,472,094	\$460,705,770	\$1,565,441,920

Discussion

The purpose of this study has been to quantify the cost of suicide and NFSB in the CI by Australian state and territory.

In undertaking this analysis a range of data, assumptions and methods were used. The focus has been on the human cost of suicide and suicide behaviour to the CI. It has not considered the wider implications to the Industry in terms of damage to property, loss of company image or the considerable investment the Industry makes complying with work health and safety regulations.

The analysis relied on the best available evidence and used NCIS data to identify fatalities by suicide in the CI. Data were, however, available for males only. Although males represent the majority of construction workers and have higher rates of suicide than females, the results will, nevertheless, be an underestimate of the true cost of suicide and suicide behaviour. National standards were used to classify CI workers with a focus on technicians, tradesmen, machine operators, drivers and labourers. However, these standards are not perfect and when matched with NCIS, certain construction-related employees such as managers and/or other professionals were omitted.

As highlighted in the Safe Work Australia study,¹⁸ economic costing is not an exact science. Cost estimates depend on the particular costing approaches used, the range of cost components that can be estimated, the quality of available data and the value of key parameters. Assumptions relating to the values of key parameters in this study have been chosen to be deliberately conservative. This study has closely followed the methodology adopted by Safe Work Australia which had been endorsed by the National Occupational Health and Safety Commission.¹⁸ However, certain methodological variations were required to suit this study and to add value to the Safe Work Australia report. For example, unlike the Safe Work Australia report, this analysis included postvention costs associated with suicide bereavement and counselling. Evidence suggest that postvention costs are significant to both the community and the industry and failure to include these costs would underestimate any cost estimate.^{3,32,34}

It is important to note that the costing methodology adopts a work-place perspective. The causes of suicide are multidimensional and costs are multifaceted. Our costing methodology captures only one aspect of the costs of suicide and NFSB, and therefore, probably underestimate the total cost of suicide to society.

World Health Organisation guidance on the relationship between suicide and NFSB has been used to identify the relationship between fatality by suicide, NFSB resulting in full incapacity and NFSB resulting in only a short absence from work.¹⁹ These relationships have also been supported by Suicide Prevention Australia³⁴ and evidence from the Australian National Survey of Mental Health and Wellbeing.³⁵ Data from the United States suggests that this relationship is closer to 25:1 (not 15:1 as used in this analysis). Where appropriate we have matched severity of injury using categories developed by Safe Work Australia using national compensation data.^{18,31} This analysis, however, used three out of the five possible categories excluding long absence and partial incapacity. Our assumption that the majority of NFSB cases return to work after a short absence may underestimate the true prevalence of self-harm incidents that belong in either of these other two categories, hence underestimating the true cost of suicide to the CI.

Our costing methodology, consistent with the Safe Work Australia approach,¹⁸ adopts an incidence based approach. The incidence based approach is more appropriate for comparative economic analyses. The alternative prevalence based approach assesses the number of people within the system at a given point in time, regardless of when the injury occurred. Under this approach, costs are generally allocated in a top-down manner, where total expenditures for a given year are proportioned across the identified categories of injury or illness.³⁶ While the prevalence approach to measuring total cases would provide the best estimate of total costs, since costs would be estimated over the total number of cases currently in the system at a given point during the reference year, it is difficult to obtain accurate prevalence data relating to occupational injury. Using inaccurate or incomplete prevalence data is likely to result in an underestimate of the number of cases and therefore produce an underestimate of total costs.¹⁸

In spite of these methodological challenges the results provide a conservative assessment of the cost associated with suicide and NFSB in the Australian CI for the year 2012. Each incident involving a short-term absence is estimated to cost between \$860 (TAS) to \$996 (WA); each incident resulting in full incapacity is estimated to cost between \$1.12 million (ACT) to \$3.27 million (WA); and, and each suicide is estimated to cost between \$0.75 million (TAS) to \$2.72 million (NT). The average age of a suicide in 2012 ranges from 32.8 years (NT) to 59.5 years (ACT), equating to a loss of 32.2 years and 5.5 years of lost potential productive employment. Multiplying average costs estimates with NFSB and suicide by state and territory results in a total cost of suicide and NFSB in the Australian CI is estimated at \$1.57 billion. Total costs varied by state from \$3.62 million in the ACT to 461 million in WA.

According to the World Health Organisation and Suicide Prevention Australia, suicide is mostly preventable, yet significant gaps exist in our understanding of the relationship between work and suicide thereby limiting prevention efforts.^{19,34} If employers were more aware of the economic consequences of the impact of mental disorders on their employees, the work-place could provide an ideal setting for mental health promotion and prevention.

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Appendix 1: Industry and occupational definitions

The Construction Division (E) includes units mainly engaged in the construction of buildings and other structures, additions, alterations, reconstruction, installation, and maintenance and repairs of buildings and other structures.

Units engaged in demolition or wrecking of buildings and other structures, and clearing of building sites are included in Division E Construction. It also includes units engaged in blasting, test drilling, landfill, levelling, earthmoving, excavating, land drainage and other land preparation.

The industries within this division have been defined on the basis of their unique production processes. As with all industries, the production processes are distinguished by their use of specialised human resources and specialised physical capital. Construction activities are generally administered or managed at a relatively fixed place of business, but the actual construction work is performed at one or more different project sites.

This section contains the following subsection:

- Subdivision 30 Building Construction
- Subdivision 31 Heavy and Civil Engineering Construction
- Subdivision 32 Construction Services

Occupations we included in construction (per industry coding)

1. Building Construction (residential and non-residential building construction)
 - House construction, alteration or renovation
2. Heavy and Civil Engineering Construction, e.g:
 - Construction of roads, bridges, railway tracks, mine sites, dams, swimming pools
 - Structural steel construction workers 8217 (eg rigger, scaffolder)
 - Structural steel trades, e.g. metal fabricators, boiler makers, welders.
3. Construction Services
 - *Land development and site preparation, e.g.:*
 - Earthmoving, excavating

- *Building structure services, e.g.:*
 - Concreting
 - Bricklaying
 - Roofing
 - Structural steel erection services egg metal storage tank or silo erection, reinforcing steel erection, welding, truss or joist work on construction projects
- *Building installation services*
 - Plumbing services (including roof plumber)
 - Electrical services egg light, wiring and cable installation
 - Repair and maintenance of electrical wiring (note: repairing electrical appliances is not included in Construction Industry)
 - Air conditioning and heating services (e.g. air conditioning duct work installation)
 - Fire and security alarm installation services (e.g. fire alarm system, fire sprinkler, closed circuit video surveillance system installation, repair and maintenance of fire or security alarm systems)
 - Other building installation services (e.g. installing curtains, lifts, insulation material)
- *Building completion services*
 - Plastering
 - Carpenter (egg wooden flooring installation, cabinet making - on site fabrication)
 - Tiling and carpeting egg floor sanding and polishing
 - Painting and decorating
 - Glazing
- *Other construction services e.g. landscape construction services*
 - Brick paving
 - Pool fencing
- *Construction machinery operator egg*
 - Crane driver (coded under Crane, Hoist and Lift Operators)
- *Other construction services (not elsewhere classified)*

- Waterproofing of building (coded under Insulation and Home Improvement Installers)

Occupations excluded from construction

- Any level 1 (manager) occupations e.g. Construction manager (1331). We did not include these under construction, as their skills were considered general managerial skills not necessarily specific to construction.
- Architects and building consultancy services were not included in construction as their skills fit more into the professional group (Division M 692) Architectural, Engineering and Technical Services.
- Building operation jobs: e.g. facilities manager, building manager, Building operations manager, Building Services Coordinator
- Council workers
- Building materials suppliers
- Jobs in the manufacturing industry e.g. Fitters, Turners
- Jobs in Mining e.g. Driller, Miner 7122, mining labourers 821
- Boat or other vehicle builders
- Sand blasting or steam cleaning of building exteriors
- Landscaper (coded as Gardeners 3622)

Occupations in the following areas have been included in construction: (drawn from occupational groups 3, 7 and 8):

Source: ABS (2013). Australian and New Zealand Standard Classification of Occupations. Cat. No. 1220.0. Canberra: ABS.

Group 3: Trades and technicians

- This group comprises of skilled construction/plumbers/floor etc tradespersons
- Builders (without more information) have been coded as 3 Trades and technicians (Note: these people were originally coded in level 1 but were later recoded into the general level 3 category)
- Construction trades workers without more information - coded as 33

- Building and engineering technicians 312 (egg. site supervisor, foreman, estimator, building surveyor, leading hand, building scheduler, VicRoads works manager)
- Set builders (e.g., drama set)- code as carpenter 331212 (from ABS)
- Patio builder or patio installer– code as wall and floor tiler
- Brick cleaner / brick cutter – code as ABS Bricklayer (331111)
- Renderers – code as plasterer
- Building planner/designer – coded as Architectural Draftsperson 312111 as they may not be a qualified architect in professionals category.
- Linesman / electrical lineman have been included in construction as they are classified by ABS as an Electrical distribution trades worker, who prepare, install, repair, maintain and patrol electric power distribution networks. These task are part of Heavy and Civil Engineering Construction.

Foreman

- If no other information, code Foreman in ANZSCO 3. These occupations are usually in construction.
- A **construction foreman** is the worker or tradesman who is in charge of a construction crew. Normally the **foreman** is a construction worker with many years of experience in a particular trade who is charged with organizing the overall construction of a particular project. Typically the foreman is a person with specialist knowledge of a given trade who has moved into the position and is now focused on an overall management of all trades rather than any particular specialized group.
- Foremen are best understood as Project Managers who have come to that position after experience as a construction worker, as opposed to an individual who has followed a professional project management development program.
- Specifically, a foreman may train employees under his or her supervision, ensure appropriate use of equipment by employees, communicate progress on the project to a supervisor and maintain the employee schedule. Foremen may also arrange for materials to be at the construction site and evaluate plans for each construction job.

Roof related jobs

- Roof Tiler includes the following: - Roofer, roof builder, roof maintenance contractor, roof and gutter installer, roof renovator, roof repairer, roof restorer, roofing company, roofing contractor
- Roof carpenter - coded as carpenter 331212

Group 7: machinery operators and drivers

- Coded the following as earthmoving plant operators 7212:
 - Earthmoving Contractor
 - Proprietor earth moving co.
- Asphalt contractor and asphalted coded as Paving Plant Operator 721913
- Asphalt worker coded as Paving and Surfacing Labourer 821511 – “worker” in the title may suggest lower skilled job, we don’t know so code down.

Group 8: unskilled labourers

- Construction self-employed coded as 821
- Concrete Cutter – coded as Concreter 821211
- Marina Construction – coded as Structural Steel Construction Workers 8217 – included in construction group
- Building maintenance e.g. Handyman, Building Maintenance Supervisor, Building supervisor have been included in construction

Other coding notes

If occupation is non-specific and could fit into numerous skill level categories, code down. i.e., ‘construction’ – code down to at least as 821 (assume they are not a construction manager)

- Include ‘labourers’ (code as 8) and tradesman/tradesperson (code as 3) without further job information in the construction group.
- Code all contractors and sub-contractors in trade they are in, e.g. painting contractor coded as painter, contractor with Austin Cranes coded as crane operator
- Code the following as Bricklayers, Carpenters and Joiners 331:
 - Apprentice builder

- Builder/painter
- Builder/construction
- Self-employed builder
- Sub contactor builder
- Code Builder/carpenter as carpenter 331212
- Builder/carpenter's labourer – coded as Builder's Labourer 821111

Appendix 2: Summary of key parameters used in costing analysis

Item	Description	Source
Production disturbance costs (time off work / overtime)	Average weekly earnings (AWE) x average duration of absence (by severity category); AWE x average duration of absence x 0.4	ABS Cat. No. 6302 (Employee earnings - : males, by State and Territory); Safe work Australia report
Staff turnover costs	The cost of replacing existing staff affected by work-related incidents (26 weeks of AWE) and training of new staff (2.5 weeks of AWE)	ABS Cat. No. 6302 (Employee earnings - : males, by State and Territory);
Human capital costs	For full incapacity or fatality: loss of earnings from time of injury to retirement age (i.e., <65years), discount rate = 4.1%, inflation rate = 2.8%, productivity rate = 1.6%. For full incapacity, future earnings includes average social welfare payments received (since these contribute to post-injury income).	ABS Cat. No. 6302 (Employee earnings - : males, by State and Territory); RBA cash rate (2008-2014), ABS CPI (2008-2014), Commonwealth Government Intergenerational Report
Loss of government revenue	For full incapacity or fatality, taxation and other revenue foregone when workers are unable to work due to work-related incidents	ABS Cat. No. 6302 (Employee earnings - : males, by State and Territory); ATO estimates of effective taxation rate
Social welfare payments	Sickness and social welfare payments borne by the government for people with disabilities (disability support pension payments of \$816 per fortnight (in 2012 dollars) discounted to present value over the period between the incident and reduced life expectancy	Department of Human Services (http://www.humanservices.gov.au/customer/services/centrelink/disability-support-pension); ABS statistical indicators
Health and medical costs	Average medical costs from National dataset for compensation-based statistics	Safe Work Australia report
Administrative costs (legal costs)	Legal costs associated with a typical work-related incident	Safe Work Australia report
Administrative costs (investigation costs)	Investigation costs: As a proxy for the costs to firms, investigation and inspection costs reported in jurisdictional annual reports are assumed to match the cost to employers for these functions	Safe Work Australia report
Administrative costs (travel expenses)	Payments made for travel expenses to workers' compensation jurisdictions by claimants (as a proxy, assuming that compensation is adequate to cover these expenses).	Safe Work Australia report
Administrative costs (funeral expenses)	Average funeral costs are estimated at \$4,000.	Safe Work Australia report
Transfer costs	The redistribution of public sector resources to care for incapacitated person incurs deadweight costs on society - for every dollar of tax raised, about 28.75 cents is absorbed in the distortions induced and the administration of the tax system)	Access Economics 2009

Other (carers)	For full incapacity, the additional cost of care (estimated applicable disability support pension payments of \$3,303 per annum, discounted to present value over the period between the incident and reduced life expectancy)	Department of Human Services http://www.humanservices.gov.au/customer/services/centrelink/carer-allowance
Other (aids, equipment and modifications)	For full incapacity cases only, the present value of future costs for aids and modifications (Estimated applicable disability support pension payments of \$933 per annum, discounted to present value over the period between the incident and reduced life expectancy).	Department of Human Service http://www.humanservices.gov.au/customer/services/centrelink/pension-supplement
Other (postvention)	Cost associated with bereavement for 6 family / friends - estimated at \$14,058 per person; employer cost associated with providing counselling and time off work for 3 colleagues who may have witnessed fatality - estimated at \$10,000 from time of incident to return to full duties	Multiplier effect for 6 people by Corso et al (2007), average social cost of bereavement by Comans et al (2013)