

RAILWAY SUICIDES IN CANADA AND AROUND THE WORLD: AGENDAS FOR PREVENTION AND RESEARCH

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SUMMARY

This presentation describes railway suicides, their characteristics and measures to prevent them in various contexts. We first present the prevalence of rail-related suicide in Canada and comparison with other countries to assess the adaptability of suicide prevention measures from other parts of the world to the Canadian context. We then review of existing railway suicide prevention practices and all published research on railway suicide prevention in order to identify potential intervention strategies whose implementation is feasible in the Canadian context. A detailed proposal for testing two strategies was developed: 1) Installation of telephones and signs near crossings and public access to tracks in order to reduce the incidence of railway suicide by providing access to help when the suicidal person is in crisis. 2) Training for mental health professionals in facilities near railway tracks, in order to prevent railway suicide by intervening better to prevent at risk people from planning and doing a suicide attempt.

INTRODUCTION

This study is part of a multi-faceted project which includes: an investigation of the impact of railway suicides and accidental deaths on railway workers, an exhaustive review of research, policies and countermeasures to prevent rail suicides around the world and to reduce their impact, the development of specific recommendations that may be pilot tested, and a series of knowledge application activities to share the information gathered in these studies with stakeholders. This research programme is supported by Transport Canada, started in 2009 and will end in 2014.

INCIDENCE AND CHARACTERISTICS OF RAILWAY SUICIDE IN CANADA

Research Methods

In order to determine the prevalence and characteristics of railway fatalities in Canada we obtained data on all railway deaths from Transportation Safety Board (TSB) files, incident reports from Canadian National (CN) and Canadian Pacific (CP) and we visited provincial Coroners and Medical Examiners to obtain detailed information from investigations of fatalities from 1998 to 2007. None of the data sources contained all fatalities, with Coroners and Medical Examiners having reports on 81.4% of all the 1,134 cases of railway deaths that we identified. We identified 460 accidental deaths and 428 suicides. An extensive database was built on these sources, including information on the identification of the time and place of the incident, geographic and environmental description of the site of incident, the involved railway company and train identification, the type of incident, the description of the victims and of their psychosocial background, the description of the victims' behaviours on the day of the incident and during the incident and information about the train crew, their roles and actions. The present presentation reports on the analysis of the 428 suicide cases extracted from the database.

Sample

Railway fatalities were classified as suicides when either or all of the following characteristics were present in the case: there are clear indications of intent to die, the person does not act in putting themselves out of harm's way, there is a history of mental health problems or previous suicidal behaviour.

Incidence

The final sample comprised 428 suicides which represent 37.9% of all railway fatalities over the 10 year span of the study, include large annual variations (from 29.6% in 1999 to 53.5% in 2007). There are 43 completed suicides on average annually committed on railway rights of way. The proportion of railway fatalities which are suicides has been increasing: suicides accounted for 30% of railway fatalities in 1999 and 53% in 2007. Train suicides remain fairly rare yet traumatic events in Canada (an average of 43 per year). However, there seems to be an increase over the last 3 years of record (Fig 1). Suicides appear to be increasing, but we will have to wait for several more years before a trend can be confirmed. Between 2005 and 2007, rail suicides accounted for a mean of 1.55% of all suicides in Canada.

Characteristics of railway suicides in Canada

For each railway suicide, at least 6 individuals are confronted with potentially traumatic situations (2 engineers / conductors, at least one police officer from the railway or the community, at least one first respondent, a local manager and replacement crew). Most suicides occur on open track (66.7%) and very few in stations (2.2%). This means that prevention strategies aimed at identifying at risk people in stations and promoting help by posters placed in stations will not have much impact in Canada. However, the situation is different in urban metro and subway systems where the only easy access to tracks is in stations and trains enter stations at a much higher speed.

Suicides occur mostly in urban areas (85.0%). Most of the Canadian railway suicides occur in Ontario (56.1% of all rail suicides), which also is the most populated province of Canada. Commuter lines seem to be more at risk of having suicides. Passenger trains are also often involved in suicides. There are 3 explanation of this: Passenger trains are more likely to run in more densely populated areas, they are faster so they may be more attractive to suicidal people and they run on a schedule so they are easier to access.

Class one companies and urban trains are more likely to be involved in rail suicides. Suicides occur when weather conditions are mild. This may be explained by the fact that people may not want to venture to uncomfortable environments to commit suicide. 40% of suicides occur at night. Critical incident that occurs at night may have a stronger impact on crew members.

There are no clear hot spots in Canada. Strategies that would limit access to a specific area or which target a specific area will not be useful. There are several well researched risk factors for suicide in the general population, including mental health issues, substance abuse, social isolation and critical events occurring in the previous days. People who committed suicide by train show similar characteristics. However, due to the inconsistencies in data collection, we have to be careful in interpreting some of the findings. Railway suicide is an adult phenomenon. Our sample only contains 6.9% adolescents. This means that most of railway suicide prevention should be concerned with adult mental health and support systems.

Railway suicides vary according to gender. There are more men who commit suicide (3.3 men for 1 woman). However, when we compare the number of suicides among overall fatalities by gender, we observe that the percentage of female suicide among female fatalities is similar to the men's (47.8% and 44.3%). Women usually tend to use less violent methods than men, such as medications and men more often use more violent methods, such as a gun. A train suicide is considered to be a violent method.

Suicidal people are more likely to be living in delicate living situations. They are less likely to be employed (43% out of work). They live with a partner as often as the general population, which is not the case for other suicidal populations. They do not live alone as much as the general population. This means that there are people close to the individual at risk who may be able to identify a suicidal crisis, whether it is in a family or an institutional context.

People who commit suicide often live either very close to the tracks (less than 1km for 27.8%) or very far (more than 15km for 24.6%). It is difficult to make sense of this data, because people who live further away may also be familiar with the area for other reasons.

As is the case with most suicides, people who commit rail suicide usually experience problem situations in the day preceding their suicide, most often relationship problems, conflicts with parents and family, justice and police, financial difficulties, and substance abuse.

Mental health issues are often present, although probably underestimated as data on mental health problems is not systematically collected. Only 22% of individuals were under care for a mental health problem at the time of death.

People who die by railway suicide resemble people who die by suicide using other methods. Therefore, universal suicide preventive strategies that target all suicidal persons should impact railway suicides. Since Canadian journalists have been exercising great restraint in reporting on railway suicides, in Canada the choice of a train as a suicide means probably is related to the accessibility of this method more than anything else.

Information on the individuals' behaviour around the tracks prior to putting themselves in front of a train could help devise strategies to limit access to tracks or identify at risk people in the areas around tracks and access points (legal and illegal crossings). However, this data is not available at the present time and may be very difficult to obtain in the future. Our description of behaviours immediately before impact does not suggest specific prevention strategies since the time between people putting themselves in front of the train and the time of impact is too short for effectively avoiding the impact.

INCIDENCE OF RAILWAY SUICIDE AROUND THE WORLD

Railway suicides vary from country to country. Therefore, one has to be very careful when drawing conclusions from analyses and preventive measures that have been developed elsewhere. It is also important to note that data in different countries does not necessarily use the same criteria for classifying suicidal deaths. In order to properly compare countries in terms of their suicide mortality, it would be necessary to develop standardised indicators and data collection tools. However, some elements can be identified for comparison in various studies across the world. The following table summarises the main findings.

Summary of findings on railway suicide characteristics

Country where data has been collected	Number of railway suicide	Proportion of all suicides that are railway suicides	Location of suicides on the railway network	Peak times of incidents	Characteristics of suicidal people	Behaviour on and around the tracks
Asia						
India (Chowdurry, Dutta & Chowdurry, 2000)					15% psychiatric diagnosis	
Japan (Araki & Murata, 1986; Kerkhof 2003)		6.3%				
Europe						
Austria (Ememrson & Cantor, 1993, Deisenhammer et al., 1997)		5.7%	48% close to the Regional psychiatric hospital (Brisbane)			
Denmark (Lindekilde, 1986)		3.1%			81% are psychiatric patients (versus 38% for other means)	
Germany (Baumert et al., 2006, Erazo et al., 2005, Dinkel et al., 2011)	955 per year (1997-2002)	7% and increasing	30% in stations 55% on open track but in urban area Hotspots (6 to 29 suicides per km of rail) near psychiatric hospitals	April and September for men No seasonal variation for women		Jumping, lying on track, wandering on tracks
Hungary (Veress, 1980)		2.7%				
Italy (Kerkoff, 2003)					52% depression 8.4% schizophrenia	
Netherlands (Kerkhof, 2003, van Houwelingen et al., 2001)	180 per year	10-14%	Hotspots near psychiatric hospitals	Early evening for men, morning for women	74% between 20-59 years old (younger than population) More bipolar and psychotic disorders than with other means	
Sweden (Radbo et al., 2005)	48 per year(2000-2002)	6.2%	Suicides occur in densely populated areas	Most suicides in the daytime	Male/Female ratio 2.6:1 (similar to other means) Mean age 43 (younger than other means)	75% of suicide victims were waiting or loitering close to on the tracks before the train arrived
Turkey (Ozdogan et al., 2006)	65 per year(1997-2003)		Level crossings		Majority between 20-60 years old	

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United Kingdom (Abott et al., 2003; Clarke, 1994; Farmer et al., 1994; Kerkhof, 2003; Hudson, 1999, Farmer et al., 1991, Symonds, 1985)	163 per year (1995-1999)	5%	Clustering near psychiatric hospitals			The majority are seen waiting for the train
Oceania						
Australia (De Leo et al., 2008)					57% treated for schizophrenia (Brisbane) 40.4% with psychiatric diagnosis (in Queensland) 29.8% had alcohol in their blood	
North America						
Canada (Mishara et Bardon, 2013, Transport Canada, 1996)	43 per year (1999-2007)	1.5%	63% within 1km of home 66% on open tracks 85% in densely populated areas Important variations by province	July and August Late afternoon to early night	Males 4:1 Mean age : 39.5 (mostly adults) Unemployed, retired, on a pension (43%) 46% had a spouse Depression, bipolar (57%) 22% were under psychiatric care	Running from embankment, lie on track, stand / sit on track Very rarely in stations (6%)
USA (Federal railway Administration, 2008)						

MEASURES TO REDUCE THE NUMBER OF RAILWAY SUICIDE

The second phase of the project was based on an extensive review of research, policies and countermeasures to prevent railway suicide around the world in order to develop specific recommendation that may be pilot tested in Canada. We included in this review research investigations and reports on interventions to prevent suicide in all types of railway systems (long distance freight and passenger, suburban passenger, inner-city passenger and metro).

A number of possible measures to prevent railway suicides have been proposed. Most measures focus upon preventing suicidal people from accessing the tracks by physical means (barriers), limiting the risk of harm by suspending the tracks and identifying suicidal people before they attempt suicide. Very little has been done to decrease the risk of suicide in vulnerable populations or to influence the choice of the railway as a suicide method.

The most effective proven means to prevent suicide by train, installing fences or other barriers that prevent access to tracks or installing "suicide pits" in stations, are also the most costly. These approaches are unrealistic in Canada because of the vast extent of the railway network and the fact that railway suicides generally occur away from stations.

Although there has not been an important problem with media reporting on railway suicides in Canada, continued monitoring of media reports would be beneficial in order to identify needs for educating the media, should problems arise.

In Japan, several innovative methods have been tried, for example intensive blue lighting at the ends of stations, painting crossings bright green, mirrors in stations and charging the families of suicide victims very high clean-up costs. However, there have been little scientific studies of the effects of these interventions, with the exception of blue lighting, which has been reported as a promising intervention in one recent study.

In metro and subway systems, suicide attempters believe that they will have a certain, painless and instant death. However, unlike suicide attempter on long distance railways, a minority of subway attempters may actually die, and many will suffer from severe handicaps. A strategy that might be worth evaluating would consist of educating the general population about the fact that people who attempt suicide in the metro or subway usually do not die, and that their death is not always instant and painless.

Several other strategies focus on identifying "at risk" people, including video surveillance and training railway personnel (sometimes called "gatekeepers") to recognise people exhibiting behaviours that indicate that they may be suicidal. Although this may offer future promise, to date we do not have empirical data indicating the effectiveness of this approach. This approach may be useful in train stations, but many not be applicable on open track and at crossings, where most Canadian railway suicides occur.

Considering the particularities of the Canadian railway network, we have identified two promising strategies for which there is empirical support in other contexts, which could benefit from pilot testing in Canada. However, given the low frequency of occurrence of railway suicides and the extent of annual variations, if the impact of any interventions is to be scientifically evaluated, the interventions would have to be implemented on several hundred kilometres of the railway system and the impact assessed over at least four years. First, based upon studies of bridges and parking areas where suicides have occurred, the installation of telephones and posters advertising a helpline number to call, at crossings and along open tracks in areas where suicides have occurred and in stations, may prevent railway suicides. This may prove to be a costly measure. However, the costs may be worth assuming, given the human and financial costs of railway suicides. Second, training personnel in psychiatric facilities to better identify people at risk of suicide is a proven suicide prevention strategy worldwide, not specific to railway suicides. A large proportion of Canadian railway suicides occur near psychiatric facilities. If psychiatric facilities near tracks receive specific educational activities to identify clients who are at imminent risk of suicide, this may decrease suicides by their clients on nearby tracks.

Brief overview of existing measures and their level of validation

Objectives	Method or measure	Implementation studies	Empirical evaluation on the railway system
Reducing the risk of injury	Anti Suicide Pit	In metro stations in several cities in the world	In London, stations with so-called "suicide pits" (suspended rails so the train can pass over a person who has fallen) have fewer deaths among those who attempted suicide (O'Donnell & Farmer, 1994). Coats and Walker (1999) reported that the presence of a pit reduces overall mortality by 57%. This technical modification appears to save lives and could be incorporated into many more metro systems and areas at high risk of railway suicides.
Limiting access to tracks	Barriers along the tracks or platforms	In metro and train stations in several cities around the world	Effectiveness studies have been conducted in Hong Kong and have shown that the number of suicides was reduced and there was no substitution (use of unprotected stations).
	Overpasses	In one area in the Netherlands	Observation of a displacement of suicides to another area
Monitoring trespassing	Use of surveillance cameras	∅	∅
Discouraging trespassing	Removing hiding places	In some specific areas of the Netherlands	∅
	Signage and warnings	Such measures have been evaluated in various contexts, outside of the railway network, such as a car park where people used to come to kill themselves using car exhaust, or on bridges (Seattle, San Francisco, New York, New Jersey). They also have been tried in some railway environments, such as a Caltrain section of tracks, several Japanese metro networks, NUTransit in NJ, the UK railway network (by the Samaritan) and the Montreal Metro.	∅
	Mood altering lights	This measure has been implemented in Japan, where 94 crossings and 29 station platforms have been equipped from 2006 to 2010.	An empirical evaluation has been carried out recently where areas with blue lights have been compared to areas without blue lights on the Japanese railway network. The results are very promising. A sharp decrease in suicides was observed, with a reduction of 84% of suicides in the lighted stations. However, the study does not include an analysis of suicide trends in the areas surrounding the railways affected. It is therefore impossible to know if there was a substitution of suicide method.
Identifying at risk persons on railway property	Gatekeepers	Gatekeepers programmes have been implemented in metro and commuters systems, such as in Washington, Toronto and Montreal	∅
Providing access to help on and around railway property	Telephones and poster / signs	Implemented in the Toronto metro	∅
Identifying and treating at risk people in the community	Training mental health professionals in suicide prevention and	∅	∅

Application of suicide prevention measures to varied contexts

Variables to consider

Frequency of railway suicides

Network density

Population density

Costs

Adapting preventive measures to the Canadian context

The fourth phase of this project was to analyse, understand and develop interventions to prevent railway suicides in Canada and also to prevent the negative impact of suicides on employees.

Identification of areas to test the interventions for railway suicide prevention in Canada

The first step consisted of identifying eight areas of track where the incidence of suicides was higher than elsewhere. These areas would be used as the experimental group in the study of the impact of prevention strategies. The remainder of the network would serve as a control group for comparison in order to evaluate the effect of the prevention activities. Between 2004 and 2007 these 8 zones, which are only 2% of the railway network, accounted for 28% of railway suicides.

Proposals to evaluate prevention activities

1. Telephones and Signs

Research has shown that when a person is experiencing a suicidal crisis, is help is immediately available, the suicide may be prevented. Our first proposal is to install posters promoting telephone help and help seeking, along with telephones with free direct access to helplines, at strategic points along the railways in the experimental areas of track, where access to the tracks is available. This intervention would involve installing 150 new telephones and adapting 270 existing telephones (by adding a button for direct access to help) in the 8 zones identified as the experimental group. This strategy would be evaluated in terms of the numbers of calls using those phones and the numbers of suicide and attempts on the tracks in the experimental group, compared to areas without telephones and posters.

1b. Signs only

A less costly intervention would be to only install the posters at strategic access points along the rails where people coming to attempt suicide would see them. These posters would encourage seeking help and suggest resources.

2. Training in mental health facilities

This proposal is based upon the fact that a large proportion of people who commit railway suicide were receiving psychological or psychiatric treatment at the time of their suicide. Also, a large proportion of train suicides are within walking distance from a psychiatric facility. Thus, it would be a promising prevention strategy to improve the ability of personnel in mental health facilities to better identify and treat persons at risk of suicide. This training would have the added advantage of increasing the ability of those institutions to better prevent suicides in general. Numerous resources already exist to conduct this training and collaboration with these resources has been obtained. The evaluation of this intervention would include an assessment of the number of patients identified as being at risk, the treatment given to them and the number of suicides in the region in comparison with regions without the training.

CONCLUSION

Railway suicide is a tragic event impacting not only the victim and his family, but also the railway personnel involved, and it has high costs for the railway industry. Railway suicides are preventable. There are several promising programmes with the potential of preventing railway suicides in the Canadian context which can be implemented and their impact evaluated.

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