

Berlin, 12 to 17 October 2014

RESEARCH ON FACTORS CONTRIBUTING TO RAILWAY SUICIDES IN ORDER TO DEVELOP PREVENTION METHODS

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<u>SUMMARY</u>

Railway suicide is a serious problem for railway companies and for society as well. In order to find out preventive measures, we examined factors that may contribute to these suicides. First, environmental or conditional factors were analyzed by comparison of characteristics of the places where the incidents have occurred or not occurred. Second, psychological factors to remind people of the rail to be the method to commit suicide were examined by the questionnaire survey. On the basis of the results, this study discusses the measures that omit these factors or reduce impacts of the factors.

INTRODUCTION

With the reduction of signal or vehicle failures, the percentage of railway operating disturbances due to railway suicide increases (Figure 1). Impacts of each railway suicide have expanded recently because the rail network has been connected more tightly and widely. Railway companies often receive a great loss including customers' distrust for the stable operation. Therefore, prevention of the railway suicides has become an important issue for railway companies [1, 2]. In addition, its prevention is expected as being socially responsible not for providing a chance to commit a suicide to possible victims.

Because an original reason for suicides is considered to be individuals' psychological suffering or distress, the psychological support for them is a substantial measure toward these suicides. This study would like to address the measures that only the railway companies can do, that is, reducing chances to commit suicides using the railway. For example, we consider half-height automatic platform gates at the edge of railway platforms as one of the suicide prevention systems (Figure 2). These gates have been in 11 existing stations in railway network of the JR East Company and will be inaugurate in other stations in the future. Nevertheless, the installation of these gates into stations requires a large amount of cost and time. Therefore, we also need to develop measures that are effective and inexpensive.



Figure 1: Reasons of operation disturbances responsible out of the railway companies [Ministry of Land, Infrastructure, Transport and Tourism, 2008]





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Figure 2: Automatic platform gates

This study was aimed at obtaining basic features concerning the railway suicide in the area of Tokyo capital area in order to speculate effective measures to prevent railway suicide. The measures that the railway company can take can be categorized into two types; one is facilities around railway tracks, and the other is information toward the public. As for the former, clarification of conditional factors contributing to railway suicides or suicide attempts was expected to help us to introduce effective facilities at appropriate location. For this purpose, we analyzed the suicide data of the location where each suicide occurred. Moreover, it is considered to be necessary to grab the passengers' image about railway suicide for the management of public information including mass media and education. Concerning this topic, we carried out the inquiry survey.

INVESTIGATION OF CONDITIONAL FACTORS RELATIVE TO RAILWAY SUICIDE

Two types of railway suicides were addressed in this study. One is the incident in which an individual jumped in front of trains from a platform at a station. The other is the incident in which the individual intentionally entered into the rails from a railroad crossing. We examined factors relative to the suicides for these two types, respectively. Data of the suicides that occurred on the four lines running in the Tokyo capital area were analyzed. The factors contributing to the occurrence of suicides were extracted by comparison between the places where the suicides have occurred and not occurred. In total, the number of the stations to be analyzed was 50, and that of the places around railroad crossings was 88. We used Hayashi's quantification method 2, multiple discriminant analysis including dummy data [3] and calculated the magnitude of impacts of possible independent factors on the suicides.

The result shows the suicides of individuals jumping in front of trains may be greatly affected by the conditional factors described below:

- · the place out of the views of station staffs
- · during a tight time-frame of trains
- · the station that has only main tracks
- · the place with less lighting at night
- · the station where express trains pass through

The analyses on the relative factors on the suicides by the individuals who entered the rails from the railway crossings yielded significance more clearly.

- $\boldsymbol{\cdot}$ at the track close to the crossing gates
- $\boldsymbol{\cdot}$ even at height of the rails and the streets
- · without barriers between the rails and the streets
- · during a tight time-frame of trains
- the place where the suicidal individual standing on the sidewalk can see oncoming trains clearly

If the individuals choose the place to commit suicide according to these conditions, the reduction of these environmental or conditional factors is predicted to decrease the suicide attempts. However, there are several factors that are difficult to change or manage such as the train operation diagram and the conformation of stations



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or streets. One of the measurements that we can introduce to prevent the suicides at the stations would be an optimal guard placement. Such guard placement, for example, may be more effective especially during morning and evening commute. The other measure can be an install of lighting to level out the strength of lighting on the platform. On the basis of the result mentioned above, however, there are few measures that the railway company can take to prevent the suicides around the crossings. The barriers between the rails and the roads are considered to be effective for invasion of suicidal people aside of the crossings, and the improvement of lighting at the crossings might have a moderate effect to reduce the number of the suicides [4].

INVESTIGATION OF IMAGES ABOUT THE RAILWAY AS A METHOD TO COMMIT SUICIDE

We examined what factor help individuals remind of the railway as a method or tool for the suicides. Previous report listened to survivors of a suicide attempt on London metro chose the railway as the method for the suicide. Results indicated that 45% of these survivors had known other individuals who committed suicides by jumping on the tracks [5]. In addition, it is suggested that suicidal individual decides an execution method, not by deep deliberation, by selection of an idea coming to their mind [6]. Such an idea is predicted to depend on what information concerning the railway individuals receive frequently.

We performed the questionnaire survey using the internet. Participants were 4692 individuals. Data that were completely analysed was those of 3808 participants.

The questionnaire included questions, for example,

- Experience that participants used the railway and encountered the operation disturbances caused by railway suicides
- Experience that participants used the railway and saw any information about the railway suicides at the station
- Experience that participants talked about the railway suicides with friends or families or heard it through the media.
- Methods to commit suicide that first come to participants' mind

International

Railway Safety Council

- General images about railway suicides



Figure 3: Responses to a question about the method to commit suicide that first come in participants' mind





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	The magnitude of impacts (Odds rate)
Experience to suffer from the operation disturbances	2.0
The talk in daily life about the railway suicides	2.0
The visual information about the operational condition at stations	1.7
Frequency of using the railway	1.6
News on TV or newspaper	1.5

Table 1: the factors that increase the frequency that the railway first comes to participants' mind as a method to commit suicide

First, we calculated the percentage of methods for the suicide. Moreover, we compared this percentage with the actual number of suicides that were occurred in Tokyo using these methods in 2010 (Figure3). The correlation between two values was 0.83. Such high correlation value may indicate that individuals attempt a suicide using the methods that they come to their mind easily.

Next, we examined the relationship between the percentage of the methods to be reminded of and experiences that participants have encountered the railway suicides when they used the railway. The results of the logistic regression analysis shows that the participants' experience to suffer from the operation disturbances and the talk in daily life about the railway suicides significantly increased the frequency of reminding of the rail as the method to commit a suicide (Table 1). The frequency was also greatly increased by the visual information about the operational condition that is provided for passengers at the station. Other options (subjective degree of inconvenience by the operation disturbance caused by railway suicides, fatality, the information about the railway suicide on the internet or by auditory guide, participants' sex, and easiness to conduct) were not shown to have significant effects. Based on the results, the cutoff of that information is predicted to reduce a chance that people consider the rail as the method for the suicide. In particular, the railway companies might arrange the way to visually provide the information about the operation at stations.

CONCLUSION

Measures to prevent railway suicide have been discussed according to the factors relative to occurrence of that suicide. We addressed the issue for the case that individuals jump in front of trains from a platform and the case that individuals intentionally enter the tracks from the crossings, respectively. Results indicated that the number of suicides might be decreased by the surveillance by the guard and lighting for the suicide that occurred at the station. Some measures are likely to need to be conducted in parallel especially for the case entering the tracks from the crossings. In addition, the questionnaire survey showed that the process in which the suicidal individual chooses the rail as the method to commit suicide includes the contact to the information about the railway suicide in daily life.

ACKNOWLEDGEMENT

Data of the investigation about images about the railway suicide were reprinted from RTRI REPORT, vol.22, Akatsuka et al., A suicidal behaviour model of railway suicides, 31-36 (in Japanese).

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