

PREVENTIVE EFFORTS ACCIDENTS IN A TRAIN ROAD WITHOUT AUTOMATIC DOOR CROSS TECHNOLOGY

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Abstract:*The number of train accidents that occur in several regions in Indonesia are caused by several factors, which are considered as railroad crossing points that do not yet have automatic doorstep technology, even some that do not yet have a doorstep at the railroad crossing, that is what becomes The biggest cause of train accident cases. To minimize train accidents in several regions in Indonesia, efforts are needed to prevent such train accidents. purpose of this study is to prevent and minimize accidents at railway crossings due to the absence of automatic door stop technology. the method used is empirical juridical, this study uses primary data obtained from the field, namely analyzing the problem by combining legal materials which are secondary data with primary data obtained from the field about preventive efforts to prevent accidents at railway crossings. The results study in the form of preventive measures by making automatic train doorstep, revamping of the crossing guard post and its officers, alarm and completeness of the track, periodic service of the train engine and carriages. Forms of preventive action can be in the form of the use of alarm applications and self-evaluation of PT. Indonesian Railways.*

Keywords:*Preventive Efforts, Accidents, Trains, Automatic Door Cross*

1. Introduction

The problem with railways is the high level of accidents, with many casualties and other social losses due to train accidents which has caused the image of services in railways to decline. Safety performance is increasingly becoming a demand and attention so it needs to be improved immediately. The cause of the high train accidents is the accumulation of various factors, including regulatory issues, management, conditions of infrastructure & facilities, human resources and others.

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During this time, the doorstop that is guarded by the operator is also inseparable from the occurrence of an accident, especially train lines that do not use the doorstop.

The railroad crossing is one of the most important things in preventing train accidents. Railroad crossing is one of a series of technologies found in the railroad system. Railroad crossings are intersections between railroads and highways. Railroad crossing is divided into two types. First, a level crossing which is defined as the elevation of the railroad and highway is in one area. Some level crossings are gated and some are without doors. A doorless crossing requires free viewing space. Secondly, crossings are not on a level that is defined as elevation of railroads and highways are not in one plane. Highways that are under the railroad are called underpass and highways that are above the railroad are called fly-over.

Railroad crossings cannot be ruled out in the safety of trains or road users who cross the railroad tracks. The importance of railroad crossing technology for the community. The railroad crossing is made to "discipline" motorists so that they do not break through when a train crosses even though in reality there are still many riders who break through. Traffic accidents on railway crossings with roads becoming more frequent. Based on data from the Ministry of Railway Safety Directorate of Transport, from 2006-2011, the number of accidents at crossings as much as 166 cases. From the figure was 50 dead and 76. (Muhammad RidhoTholabi Abu Balya, Automatic And Independent Latch System For Non Guardian Railway Latch, APEC Youth Scientist Journal Vol. 5).

Prevention of train accidents without a doorstop, other things to note also are: Scheduling of preventive train maintenance activities, The goal is to maintain railroad infrastructure in good operating conditions at low cost, also taking into account the limited available resources in terms of concerns the crew members. Equipment reducing with age and use and a good preventive maintenance program can greatly reduce their distrust in the sense that failures that can be expected can be anticipated. (Rita Macedo, RachidBenmansour, 2017)

<https://www.sciencedirect.com/science/article/pii/S1571065317300641?via%3Dihub>).

Communities as road users, whether bus drivers, cars, motorbikes, and other vehicles, should be responsible for their safety by understanding the railroad regulations because as long as they are along the railroad tracks, the safety of Railway travel takes precedence. Road users must also be aware that the regulations and supporting equipment for railroad travel safety or crossing roads are essentially to maintain the safety of train travel and support railroad traffic safety.

2. Theoretical Framework and Hypothesis Development

Law No. 23 of 2007 referred to as a railroad is a railroad facility with movable energy, both running alone or coupled with other railroad facilities, which will or are currently moving on railroad tracks related to railroad travel. The train accident discussed in this study is an event of a collision between a train crossing a railroad crossing but without the existence of the most automatic door technology that controls it, resulting in an accident.

Causes of accidents in the context of technological improvements and so that similar accidents do not occur again in the future, then there must be a preventive effort made by the government in terms of repairing the doorstep at the crossroads. The immediate causes of the most serious crossing levels of accidents are errors or violations by road users. (Andrew W Evants, 2011)

3. Research Method

The research method used is empirical juridical, this study uses primary data obtained from the field, which is analyzing the problem by combining legal materials which are secondary data with primary data obtained from the field about preventive efforts to prevent accidents at railway crossings.

4. Results and Discussion

Accident Prevention At Railroad Crossings Without Automatic Doorstop Technology

The rise of train accidents needs special attention and handling to prevent train accidents from happening again. Special attention and treatment requires support from all parties, including the government, KAI management, machinists, railroad crossing / train stations, other KAI employees, as well as the communities around the railroad and train users. One way to prevent or overcome train accidents is Automatic Train Protection (ATP).

ATP is a safety device whose basic function is braking and adjusting the train speed based on information from the signal or permitted speed limit. The information is sent from the train line to the facility / locomotive by means of a resonant magnetic field coupling. Information from this pathway activates the machinist procedure control process when driving a train / locomotive. If needed the ATP system will do braking in order to increase the safety value of the train trip if the driver is not paying attention to the signal or does not decrease the speed on the track that has speed restrictions or on the curved path.

ATP is one way to prevent train accidents in Indonesia. How to overcome train accidents can also be done by raising awareness of road users related to discipline in driving. Actual action by law enforcers to impose sanctions on road users who violate is an alternative to disciplining road users. Queuing awareness also needs to be developed in Indonesia to practice disciplined habits. In addition, the installation of the doorstop and the provision of railroad crossing guards need to be done to overcome train accidents in Indonesia.

<http://www.hbstephanus.com/2013/01/penggunaan-atp-untuk-mengurangi-resiko.html>

Many people still regard accidents as God's will or inevitable destiny. In principle. Train accidents are not an unavoidable or uncontrollable problem, with good control and planning will generate awareness, vigilance in traffic for road users, so the level of accidents that arise can certainly be reduced. Considering accidents caused by trains in Indonesia almost always cause losses, both fatalities and material losses. The following are the accident conditions that always occur in train transportation services:

- 1) Train collision with Train;

- 2) Crash of trains with four or two-wheeled vehicles;
- 3) People get hit by a train and
- 4) Accident at a railroad crossing without a doorstop.

In addition to the need for automatic doorstop in preventing train accidents, acrossing warning system to protect pedestrians and car drivers from speeding trains is also needed. The warning system has a vehicle detector system to determine whether a vehicle is trapped in a railroad crossing area, a train detector system to determine important train information including the speed and direction of a moving train, a display unit to display warning messages to pedestrians and motorists approaching railroad crossings, and communication systems to communicate important train information and pressured vehicle information to upcoming trains and display systems. This system provides early warning to future train operators to provide more reliable protection for vehicles pressed at railroad crossings and for drivers and pedestrians approaching the railroad crossings. (Wireless railroad grade crossing warning system, (<https://patents.google.com/patent/US5864304A/en>)).Statistical analyses were conducted to examine the effects of accident cause, type of track, and derailment speed. The analysis showed that broken rails or welds were the leading derailment cause on main, yard, and siding tracks. By contrast to accident causes on main tracks, bearing failures and broken wheels were not among the top accident causes on yard or siding tracks.(Xiang Liu, M. RapikSaat, Christopher P. L. Barkan, 2012)

Every accident has always a different cause, therefore it is necessary to handle accidents properly. As for to be able to overcome the train accident, efforts should be made to include:

Preventive actions are actions or efforts to prevent accidents. One form of preventive action is repair and or manufacture of automatic train doorstop, improvement of crossing guard posts and their officers, alarms and completeness of the track, periodic service of train engines and carriages. Roadworthiness testing of all trains, standard monitoring and evaluation of the portion and capacity of

passenger or freight cars. Forms of preventive action can take the form of the use of alarm applications and self-evaluation of PT. KAI (PT Indonesian railway).

[\(https://publicanonym.wordpress.com/2014/04/04/analisa-program-tanggap-darurat-kecelakaan-pada-pt-kai-sebagai-perusahaan-transportasi-nasional-bagian-1-tindakan-preventif-refersif/\)](https://publicanonym.wordpress.com/2014/04/04/analisa-program-tanggap-darurat-kecelakaan-pada-pt-kai-sebagai-perusahaan-transportasi-nasional-bagian-1-tindakan-preventif-refersif/)

1) Application of using the alarm system on the track

In every track of the TRAIN, both with and without safety bars, in addition to installing signs, they must also set alarms / sirens, because all the five most sensitive senses are the ear (hearing), because hearing can respond to information without being seen by the sense of sight especially the trajectory surrounding many tall buildings. Psychologically, when you hear the alarm (siren), there will be a tendency to be more careful than the other five senses. For example, Indra's vision (eyes) even though there are already written warning signs but the tendency of the influence of impatience remains greater. Alarms or sirens are installed on each lane, especially those that do not have a doorstop. To be safe, sensors or alarm switches / indicator lights are installed 500 meters before crossing, so drivers can quickly find out the position of the TRAIN API, to take security measures.

2) Evaluation of PT. KAI on the effectiveness of warning signs Even though there is a security doorway, it seems that the orderliness of the railroad tracks in Indonesia does not yet have the zebra line of the required safety limits, for example STOP limits 8-10 meters from the doorstop, so that the danger due to carelessness of the track guards or vehicles that will break through can be minimized. Compare with traffic light at the intersection of public roads besides being equipped with a STOP dividing line also sometimes still guarded by traffic POLICE.

3) Immediately inventory the crossing of the doorless train crossing and complete it immediately. Because crossing without a doorstop means also not guarded and that means no one is sounding a warning signal.

- 4) Coordinate with the local government / regency / municipal government for the construction of crossing doors. If the idea of developing fly over or underpasses as a solution is still difficult to implement, at a minimum do not allow a train to be crossed without a gate and without a gate. (ibid)

One of the important things to avoid accidents at railroad crossings is adequate facilities and facilities. Especially about the functioning of the doorstep of the train. Railway crossings are often encountered that do not have adequate automatic doorstep. Even worse, there are no guard officers who regulate and warn the motorists who want to pass.

PT KAI must really pay attention to crossings that are prone to accidents. The community requested that the guards be strict and disciplined in guarding railroad crossings. Crossings are important, and indeed there are many. PT KAI must pay attention to that. The guard must also be disciplined. Including the National Police continued to socialize driving awareness.

5. Conclusion, Implication and Limitation

5.1. Conclusion

Preventive efforts that must be made to prevent train accidents at crossroads, namely repair or manufacture of automatic train doorstep, improvement of crossing guard posts and their staff, alarms and completeness of the track. For crossings with relative doorstep, road users can comply. But crossings without doorstep tend to be accident-prone.

5.2. Implication and Limitation

PT KAI has taken part in being responsible for train accidents that often occur, because the main problem is the crossing of the railroad without a doorstep, in Law No. 23 of 2007 also has included the form of responsibility of the Railroad itself. Doing the doorstep multiplication and equipped with guarding.

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Wireless railroad grade crossing warning system,
<https://patents.google.com/patent/US5864304A/en>