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Review and analysis of the economic costs of level crossing accidents

Submitted by Poland

This informal document submitted by Poland and the ERA provides an analysis of the GE.1 survey findings related to the economic costs of level crossing accidents, and proposes next steps.

I. Background

In its first session, the Group of Experts on Safety at Level Crossings decided to extend the remits of its work programme, as described in the Terms of Reference, to the economic evaluation of safety at level crossings.

The Group of Expert shall notably review and analyse the economic costs of level crossings accidents based on data provided by country. It shall analyse the underlying methodologies with the view to prepare a recommendation on how to evaluate costs of lack of safety at level crossings at national level, as an input to strategic national safety improvement programmes.

The ultimate goals of the work should be to:

- Develop a comprehensive taxonomy of level crossing accident costs, their contributing factors and their order of magnitude.
- Develop an analytical framework that enables the estimation and forecasting of level crossing accident costs and effectively support resource allocation decisions.
- Prepare a catalogue of main measures for improving safety at level crossings including their typical costs.

II. Summary of issues

While LC accidents represent a fraction of all road (and partly also rail) accidents, their impact is often disproportionally large. The comprehensive quantifiable costs of accidents at level crossing often include substantial property damage, delays, costs of public-service agencies responding to the crash and its aftermath and many more. Little information has been developed about such costs and the lack of this information represents a limitation for decision makers to effectively judge the economic benefits of public investments to improve or eliminate level crossings.

Estimating costs of road accidents proved to be a useful concept to attract attention of decision makers and to promote evidence-based and effective policies at national and international level. Since accidents at level crossings are often excluded from road safety statistics[1], the estimates of costs of these accidents are rarely available. In their absence, it may be difficult to establish a cause for LC safety improvements.

The railway sector seems to have limited concern of direct and indirect costs associated with accidents at level crossings. This may be due to the fact that the direct costs are relatively low and often covered by insurance policies and indirect costs are often not established and analysed. Yet, the increasing pressure on competitiveness of railways brings the indirect costs under spotlight.

There are a number of frameworks available for estimating costs of road and rail accidents; however the development of specific frameworks for estimating costs of level crossings accidents was rather limited in UNECE countries.

[1] The CARE database of road accidents contains statistics on LC accidents for only X countries out of 29.

A comprehensive taxonomy (categorization) of costs components is the prerequisite for establishing a sound analytical framework. As a starting point, a categorization used in TRB 755 report, is proposed as a basis for further discussion:

Effect	*Impact*	*Cost Component*
Primarily	Direct	Property Damage
		Other direct costs
	Indirect	Work-related productivity loss
		Tax loss
	Intangible	Quality of life
		Pain and suffering
Secondary	Supply chain disruption	Rerouting and increased emissions
		Freight and passenger delays and reliability
		Increased inventory and its spoilage
		Prevention
		Lost sales

III. Findings from Survey

The following overview summarizes the replies to the questionnaires as received by 15 September 2014. Altogether 24 replies are available coming from 22 UNECE countries.

Estimation of costs of level crossing accidents in UNECE countries

In 7 out of 22 countries are the costs of level crossing accidents estimated at the national level.

These estimations are carried out by various actors: By a railway infrastructure manager (3 countries), national railway companies (1 country), National rail safety authority (1 country), National statistical office (1 country) and Research institute (1 country).

In all seven countries except one are the statistics compiled on annual basis (even if costs are established for each individual accident separately).

The motivation for establishing level crossing accidents costs and collecting relevant statistics vary between countries: They serve as input to national safety plan (2 countries); they are reported to ERA under CSI data (2 countries); they are established as they represent criteria for (EU) mandatory accident investigation (1 country); they are used in cost-benefit studies (1 country).

Type of costs considered

Property damage costs (Infrastructure Manager, Railway Undertaking, Highway vehicles) are the most commonly registered costs of level crossing accidents. They are followed by environmental costs and by costs of delays. The table below shows the number of countries (out of 22) in which the particular costs are reported.

Type of costs	*Nr of countries*
Property damage costs	16
Rescue services	3
Insurance	3
Work related productivity costs	6
Costs of casualties	5
Environmental damage costs	7
Investigation costs	1
Costs of delays	7
Costs of rerouting	1
Prevention costs	1
Lost sales	1

Estimation of costs of human life in UNECE countries

In 6 of 22 countries are the costs of human life established at the national level.

One country reported that VPF is used as a method (defined by the Directives 2004/49/EC and 149/2009/EC), one country provided reference to HEATCO study. One country uses expert opinion estimate at the national level.

Good practice worth sharing

India: The loss of human on Level Crossing is a loss to NATION because most of the death on Level Crossing in India is due to Accident of Train and Road Vehicle. It is worth mentioning that a person owning a vehicle must be a person above Mid-Income Group and he decided to cross track in hurry because he has value of Time.

Ireland: Values for economic indicators for various member states are given in the ERA CSI Guidance, Annex, Tab. 1-3

Russia: For yet in Russia there is no single methodology for cost estimates. Assessment of costs in different regions is different.

Belgium: ERA Guidance (study HEATCO 2008)

IV. Conclusions and next steps:

The initial survey confirm that the costs of level crossing accidents are not systematically estimated in UNECE countries and that in countries where they are, they do not usually cover all types of attributable costs.

The methodologies for estimating costs vary substantially between countries and even within countries. Some countries provided reference to a common methodology for estimating railway accident costs contained in the EU legislation (88/2014/EU).

Further action 1: Available methodologies for estimating rail/road accident costs should be reviewed by the subgroup and a method derived for the estimation of costs of level crossing accidents.

Further action 2: Authors of the methodology prepared by the World Bank should be invited to the next session of the Group of Experts to share their ideas on the development of the methodology.

Costs of casualties are established in a few UNECE countries only, in some others, they rely on estimates produced by external EU wide studies. ERA Guidance on CSI implementation has been quoted as a useful reference for a methodology and national fall back values of certain types of costs.

Further action 3: Available studies that produced estimates of economic costs of casualties should be reviewed by the subgroup and a recommendation made on their use in the absence of nationally established estimates.

A group should seek to collect exact amounts of costs for accidents at level crossings from a pool of UNECE countries with the view to establish typical contribution of single cost items to the overall costs of LC accidents.

Besides, certain data are available at ERA for EU-28 countries, through the accident investigation reports. These relates to infrastructure and vehicle damage costs in level crossing accidents investigated by National Investigation Bodies.

Further action 4: Prepare and execute a more detailed survey targeting relevant interested countries in order to get overview of typical costs incurred in LC accidents.

While the costs of LC safety equipment may be well known to rail infrastructure managers, the decision makers may not have access to a more comprehensive overview of all possible measures and their costs. This may limit their ability to make right decisions. The subgroup may want to discuss how to limit the list of measures to those most relevant to the work of the WP.

Further action 5: Prepare and execute a general survey on the costs of selected level crossing safety improvement measures.

Annex

A: Questionnaire responses

The table below summarizes the replies on the question "If you estimate the costs of LC accidents, which costs are included?"

Country	Property damage costs	Rescue services	Insurance	Work related productivity costs	Costs of casualties	Environmental damage costs	Investigation costs	Costs of delays	Costs of rerouting	Prevention costs	Lost sales
Belarus	X			X	X	X		X			
Belgium	X			X	X	X					
Bulgaria	X							X			
Estonia											
France											
Georgia											
Germany	X		X			X		X			
Greece	X			X				X			
Hungary	X		X					X			
India	X										
Ireland	X				X			X			
Italy	X	X		X		X					
Moldova											
Norway	X			X		X					
Poland	X										
Portugal	X										
Romania	X										
Russia	X	X	X	X	X	X	X	X	X	X	X
Spain											
Sweden											
Switzerland	X				x	X					
Turkey	X	X									