UNECE Working Party 1 on Road Traffic Safety
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Safety at Level Crossings

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Train is the safest land transport mode but....
Germany, 19/12/2012; two freight trains hit a bus at a LC around Düsseldorf. No injured people, no fatality. A freight train pulled by locomotive DB Schenker 185 388 derailed the track. The train had two locomotives reverse in mind, 189 074 e065. The latter less fortunate ended up in a neighboring garden, destroying a house. If no injuries is deplored, the damage is very important.
Existing international rules and regulations on level crossings

Traversing level crossings is safe for road users and pedestrians as soon as they respect traffic signs and signals as laid down in the Highway Code and based on the UN “Convention on road traffic” and the “Convention on Road Signs and Signals“ both signed in Vienna in 1968 and applied worldwide.
According to the Vienna Convention road signs and signals, road traffic rules, Train has priority, CARS and PEDESTRIANS MUST STOP.
Almost 98% of all accidents at level crossings (at least in Europe) are caused by misuse of road users and pedestrians who do not respect traffic signs and signals. These people usually live and work near level crossings. Misuse is caused by error or deliberately.
Consolidated figures in the 27 countries in the EU according to ERA (European Railway Agency):

> 123,000 LC in 2010 in Europe (5 LC per 10 line-km) (estimation of 1 million LC worldwide)

> 29% of LC in Europe are active (with protections manual or automatic barriers, and/or visual and audible warnings). Others are passive (with a ST ANDREW’s cross, a STOP, no protection)

> LC significant accidents decrease: 528 in 2011, 619 in 2010, 831 in 2009

> 294 fatalities at LC in 2011 (359 in 2010, 405 in 2009) and 304 serious injuries in 2011 in the EU.

> Fatalities at level crossings represent 28% of all rail fatalities in the EU, ONLY 1.2% of all road fatalities in the EU this is why the road sector does not pay too much attention to this interface.

> The highest number of casualties on the railways is represented by persons hit by rolling stock in motion (trespassers): 63% of all railway fatalities

> LC is the second highest source of accidents and casualties after trespass on the railways. All together they represent 90% of all casualties on the railways.
According to the ERA 2012 safety report
Category of LC users involved in collisions in 2010

Figure 22 - Types of the LC user involved in accidents investigated by NIBs

- Heavy vehicles: 20%
- Pedal cycles/motorbikes: 4%
- Farm vehicles: 4%
- Others: 5%
- Pedestrians: 22%
- Passenger cars: 45%
Significant collisions with pedestrians at LC

Olivia Bazlinton, 14, and Charlotte Thompson, 13, were hit by a train as they walked over train tracks at Elsenham station footpath crossing in the UK: http://www.itv.com/news/anglia/topic/elsenham/
http://www.bbc.co.uk/news/uk-england-essex-16786373
Number of LC: 6293
Significant collisions at LC with trucks involving casualties on trains

12 October 2011: St Médard, Brittany, France: 3 fatalities on train: a passenger train collided with a lorry carrying a heavy earthmoving machine, seriously injuring five persons; a further 39 people sustained minor injuries. Number of LC: 18055
5 June 2007: Kerang, Central Victoria, Australia: 11 deaths on the train.
Collision with a semi-trailer and a train: **Biggest rail level crossing tragedy in Australia** with the highest number of fatalities on the train over decades. Since then: inspection, risk assessment, safety management, education campaigns… **Total number of LX in 2011: 23 500**
26 June 2011, Near Reno, Nevada, U.S.A.: 6 Fatalities (including the loc driver and truck driver) on an Amtrak train crash. **Number of LC:209 982**
13.09.2011: 11 fatalities, 228 injured persons at LC at Flores in Buenos Aires, Argentina: a bus and 2 trains collided at a level crossing.

http://news.sky.com/home/article/16069376 Number of LC: 15892
Hungary, May 2003: 33 persons were killed when the Budapest-Nagykanizsa train hit a tourist bus full of mainly elderly German holiday makers at a level crossing near Siofok.

Number of level crossings: ~6100
12 October 2010, Ordzhonikidze, Ukraine: 42 killed. A bus packed with rush-hour commuters crashed into a train at a level crossing in Ukraine after jumping a red light, killing 42 people. The bus was crushed and then shunted at high speed further down the track before the train came to a halt near the village of Marganets in the Dnipropetrovsk region of central Ukraine.
13 July 2012, Mpumalanga South Africa: 26 people killed, 14 injured.
A freight train struck a truck carrying 40 farm workers in a container similar to the ones used in shipping, at a level crossing near Hectorspruit. The truck collided with the train. Truck driver was responsible, he ignored signage.

2010, Cape Town, South Africa: 10 Young school children killed on a minibus.
Driver convicted of murder following the deaths of the 10 children after he ignored warning signals and a lowered boom, overtook a row of cars and his taxi was hit by a train at a level Crossing. He was sentenced to a total of 20 years of jail time.
First enforcement CCTV camera installed at level crossing in Cape Town on 7 June 2012 during ILCAD.

Number of LC: 1168
Significant collisions with buses involving casualties on road users where Railways responsible

- 17 November 2012: Collision of a train with an Egyptian school bus killing 50 children
  - LC barriers were open when crash happened.
  - The cause of the accident does not seem to be a human fault either from the train driver nor from the bus driver.
  - Egypt's railway system has a poor safety record, mostly blamed on badly maintained equipment and poor management.
Collisions may also involve oversize trucks, trucks transporting dangerous goods.

France, 31 May 2011: Collision of a train and an oversize truck transporting a rotor blade of a wind turbine. The truck stopped on an LC and was hit by a train. No casualty but many damages on the truck, the rotor blade, the locomotive and the railway infrastructure and signalling.

Sainte Foy, France, 8 Sept. 1997: 13 deaths and 43 seriously injured persons when a train collided with a fuel tank truck.
How to reduce risks at the interface between road and rail …

Level crossings represent a big operational risk for the railways. The most logical solution would be:

> to engineer out the problem and remove all level crossings but it would restrict mobility in many places.

> In addition building bridges or underpasses is not always possible in built up areas; it is also very expensive (5 to 10 million EUR in Europe) and is the result of a long process.

> Level crossings are also very useful to the community and very often local authorities want to keep them.
First solution: Better ENGINEERING (1)

- Close as many private, farm and pedestrians LC
- Replace LC when possible by underpasses or bridges
- Upgrade passive LC (only STOP and ST Andrew’s cross with active protections: barriers, bells and flashing lights),
- Install 4 semi barriers instead of 2 to avoid zigzaging
- Install skirts on barriers to impede pedestrians and bikers to go underneath barriers
- Markings before the barriers to warn cars to stop
- Messages inside the barriers (Sweden) to indicate to drivers that may break the barriers when trapped
First solution: Better ENGINEERING (2)

- Low costs devices at low traffic level crossings:
  - MICRO System in Switzerland
  - Wave System in Norway (captors on tracks listening to train vibrations)
- Speed bumpers to decrease speed
- CCTV cameras to film behaviors
- Improving vertical alignment of LC
- Improving visibility by
  - cutting vegetation
  - Installing led lights on barriers, along tracks, double sight lights, overhead lights
- Posting automatic LED safety messages (UK)
- Reducing the boom gate closure time
- Install obstacle detectors (Israël, Germany, Japan ...) but expansive and stops the traffic
- Location of LC on GPS aboard cars (TomTom In France, Garmin in the U.K. ...)
- Dedicated Short Range Communications (DSRC) – Cooperative ITS for Safer Railway Crossings: A world-first trial of a technology capable of significantly reducing railway level crossing accidents by allowing vehicles to “talk to each other” trialled in Australia: visit [AusDSRC Cluster](http://ausdsrc-cluster.org)
Other solution to decrease the number of accidents at LC: **ENFORCEMENT**

15 BTP vans with fixed camera (U.K.)

50 Dutch Special Surveillance Officers

Automatic speed radars placed 50 meters before the LC in France: 26 LC equipped in 2013

Red light automatic enforcement cameras: 24 LC equipped in France: offenders get a 135-euro-fine + 4 points taken from their driving licence
Other solution to decrease the number of accidents at LC: EDUCATION

ILCAD (International Level Crossing Awareness Day) is organized and coordinated by UIC

- On a single date (usually early June), a single theme to address users’ behaviour
- Using the following supports: A website: www.ilcad.org, a facebook page https://www.facebook.com/ilcad, a twitter page http://twitter.com/#!/ilcad, a youtube channel: http://youtu.be/4YGMtmKocfk to promote all partners’ actions
- A common logo: ILCAD
- A common motto: “Act safely at level crossings” (translated in 28 languages)
- Common communication supports given to ILCAD partners on a collaborative basis:
  - Videos (4 from 2010) + a new project in cooperation with the UN-ECE in Geneva in 2014
  - Posters made according to the public targeted: adults in 2011, children in 2012, teenagers in 2013, professional drivers in 2014
- The awareness message is addressed to the public, the media... through a press release in various languages, a press conference, publications on social networks, through International drawing contests for children (4 of them: 2011-2014)
- ILCAD and UIC got the support from institutions: EC/UN-ECE (new working party on level crossing safety created at UNECE in Geneva: kick off meeting on 20 January 2014)
5th edition of ILCAD 2013: 45 countries

EU countries, Ukraine, Turkey, Morocco, Cameroon, Nigeria, South Africa, Mongolia, India, Pakistan, Australia, New Zealand, the whole American continent) with small or bigger campaigns.
Press conference and round table at UNECE on 7 May 2013

Eva Molnar, Director, UNECE Inland Transport Committee

Right: Alan Davies, RSSB, ELCF Chairman

Presentations from Estonia, Greece, India, Italy, Switzerland and U.K.
• 5th edition in 2013, public targeted: Pedestrians and Distraction.
Video clip on distraction in the U.K.

Network Rail awareness video
http://youtu.be/Uy-slfsW7tg
CCTV film on trucks misusing LC in the Belgian Port of Antwerp

• The Global Level Crossing and Trespass Symposium (GLXS) is a biennial event that brings together engineering, safety and security professionals from highway, rail, law enforcement and regulatory authorities around the world. The symposium provides an opportunity to exchange information and share best practices to improve the safety of the at-grade interface between highway and rail systems.

• The 2014 GLXS will take place from 3 to 8 August at the Urbana-Champaign campus of the University of Illinois.

• Call for papers: http://ict.uiuc.edu/railroad/GLXS/Callforpapers.php
• Registration http://ict.uiuc.edu/railroad/GLXS/overview.php
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ILCAD, 3 June 2014:
Press conference, round table, Lisboa, Portugal