Best practices for mitigating consequences of railway suicide & trespassing incidents

UIC World Security Congress, Bratislava, October 26, 2012

Presented by MTRS & NICE
Agenda

• Consequences mitigation information reference source
• Information, situation management & decision support platform
• Improving decision support processes and incident management
RESTRAIL WP4 objectives

Develop methods and tools that mitigate the potential impact of suicides and trespasses on railway infrastructures

These should be
- Integrated into existing procedures and technologies
- Safe, effective and cost-efficient

Partners involved
- Railway – Deutsche Bahn AG, ProRail B.V.
- Research – Instytut Kolejnictwa
- Industry – Ansaldo STS, NICE Systems, MTRS3
CONSEQUENCES MITIGATION
INFORMATION REFERENCE
SOURCE
Consequences mitigation is all about ‘shut down time’

- A key factor in consequences mitigation is the reduction of the system’s ‘shut down time’, leading to:
  - Delays and cancellations of trains
  - Cost of alternative transport
  - Direct cost of incident management
- Other, relatively negligible costs, such as:
  - Damage to rolling stock
  - Damage caused to infrastructure
  - Repair of fences, etc.

Consequences mitigation ≈ Reduction of ‘shut down’ time
Incident response arrangements include three steps

- IM's response arrangements to incidents can be divided into three phases:
  - Phase 1 – immediate safety actions on site, reporting of the circumstances
  - Phase 2 – on-site management of an incident and provision of support to responding bodies
  - Phase 3 – restoration of routine operation

- Key issues in managing the actions, including the following:

<table>
<thead>
<tr>
<th>IM actions</th>
<th>Police actions</th>
<th>RU response</th>
<th>Fire &amp; EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assist responding bodies</td>
<td>Collect evidence and refute suspicion of third party involvement</td>
<td>Ensure passengers’ safety &amp; welfare</td>
<td>Ensure safety at the site</td>
</tr>
<tr>
<td>Ensure safety at the site</td>
<td>Establish contact with decision makers who are not present at the site</td>
<td>Cooperate with police investigation</td>
<td>Liaise with the police, the IM and RU</td>
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<tr>
<td>Brief responders</td>
<td>Liaise with the IM and RU</td>
<td>Provide rolling stock engineering support</td>
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<td>Provide engineering support</td>
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<td>Substitute driver</td>
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<td>Support police investigation</td>
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<td>Arrange alternative transport for passenger evacuation</td>
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<td>Aim for the earliest traffic restoration</td>
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<td>Liaise with 3rd parties</td>
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</table>
Police is pivotal for traffic restoration!

• Incidents with casualties always involve either full stoppage of train traffic or operation in degraded mode in the specific segment of the tracks

• Traffic restoration is always a function of two considerations:
  o Rail operations safety
  o Police permission
    ✓ Whether there are suspicious circumstances
    ✓ Need to interview witnesses
    ✓ Need to gather evidence at the site

Police, either directly or indirectly (general prosecution, judge on call), is pivotal, as they give the permission to restore traffic
Information sharing & lines of communication are key to effective incident management

• Parties involved in incident response require different types of information during the incident (summarised in a matrix)
• An information sharing platform is key to effective incident response, coordination & communication
  o Information sharing: arrival at the site:
    ✓ Incident location
    ✓ Identified ‘track access point’
  o Information sharing: response process, coordinated tasks management
• Lines of communication (LOC)
  o On-site LOC are characterised by interpersonal communication
  o Off-site IM OCC and on-site IM’s incident manager
  o Involved IM, RU and external C&C centres (OCCs, SOC, etc.)
• Communication means – commercial and/or railway cellular network (e.g. GSM-R), designated radio communication
GIS enables a common operational picture and fast access to tracks

GIS web services and interoperable lines of communication are essential for an effective response
Organisational interfaces, competences, training & exercises require constant maintenance

- Organisational interfaces & liaison - links at a senior level with external organisations (especially police & fire brigades)
- Memorandum of Understanding (MoU)
- Procedures
  - On site
  - Off site
    - Traditional media – never report railway incidents as suicide
    - New media – ‘flash announcements’ concerning the delays, never report railway incidents as suicide
- Involvement of external agencies – knowledge expansion (workshops, DVD, leaflet, dedicated training for police)
- Competences & training
- Exercises
Simple, ‘stand-alone’ off-the-shelf technology can support the decision making process

- Potential support of technologies
  - Information sharing platforms
  - Business process and information management
  - Mobile devices
  - Forward facing CCTV
  - Interoperable protocols for information sharing

- Debriefing and analysis of response arrangements

Forward facing CCTV can expedite and facilitate the decision making process of the police, thus reducing the shut down time
The following concept implements best-practice procedures.

1. Business Process – Suicide on the Tracks

## 1 - Initiation of Event / Incident

<table>
<thead>
<tr>
<th>Incident location</th>
<th>Line of route (between city A and city B) or from city A to city B</th>
</tr>
</thead>
</table>
| Initiation of incident | - Train driver calls OCC (OCC) and reports the incident  
                         - OCC calls the "incident manager" and reports a train accident with a person |
| Event / incident type | Incident |
| Event / incident category | Level 2 |
| Participants | Code | Participant |
|               | IMO01 | IM - relevant OCC |
|               | IMO02 | IM - incident manager on site |
|               | IMO03 | IM - mobile team |
|               | IMO04 | IM - off-site incident manager |
|               | IMO05 | IM - infrastructure maintenance team |
|               | RU001 | RU - On-site command post (RU or call manager) |
|               | RU002 | RU - off-site incident management (RU’s OCC) |
|               | RU003 | RU - mobile team |
|               | RU004 | RU - technical team |
|               | PL001 | Municipal police |
|               | PL002 | General prosecution / judge (on call) |
|               | PL003 | Transport / railway police |
|               | FR001 | Fire brigade |
|               | FR002 | Emergency medical services |
|               | OT001 | Bus company |
|               | OT002 | Motecan |
|               | OT003 | Cleaning contractor |

## 2 - Business Process Description

<table>
<thead>
<tr>
<th>Entity / Task no.</th>
<th>Activity titles &amp; operator's actions</th>
<th>Interface handling</th>
</tr>
</thead>
</table>
| IMO04/001 Incident reporting | 1. Obtain details from the reporting person on the incident location and description.  
2. Fill in an Incident Report form.  
3. Call the duty incident manager and verify details.  
4. Call the police and report the incident.  
5. Call the fire brigade and report the incident.  
6. Call the EMS and report the incident.  
7. Open communication channel with other relevant OCCs.  
8. Open communication channel with the OCC / lead person of the RU. | • Communications – autodial landline & mobile phones according to list  
• Indicate the incident location on a GIS map  
• Show relevant GIS layers (track no., track access points, LC, switches, signals)  
• Distribute GIS data to police, fire brigades, EMS & RU mobile team  
• Send SMS & e-mail messages according to the distribution list  
• Send the incident log form by e-mail according to the distribution list |
| IMO04/002 Coordination and support by other relevant OCCs (IMO01) | 1. Estimate the shut down time with other relevant OCC / OCCs.  
2. Decide whether the incident can be managed as part of routine OCC arrangements or requires separate off site management;  
3. Ensure safety on site:  
   • Traffic management;  
   • Traction current;  
4. Coordinate & verify infrastructure engineering support.  
5. Coordinate passenger welfare activities with RU.  
6. Coordinate logistical support. | • Communications – autodial landline & mobile phones according to predetermined list.  
• Send Incident logform by e-mail according to the distribution list |
| IMO04/003 Support the arrival of responding bodies at the site | | |
INFORMATION, SITUATION MANAGEMENT & DECISION SUPPORT PLATFORM
HOW CAN WE LEVERAGE BEST PRACTICES AND TECHNOLOGY TO MITIGATE THE CONSEQUENCES OF SUICIDES AND FATAL TRESPASSING INCIDENTS?
Train-pedestrian collision occurs on the railway tracks
Train driver calls the OCC operator, reporting the event using GSM-R
OCC operator manually initiates an incident using a Quick Launch button
Appropriate incident is created and relevant checklist is deployed.
OCC operator is requested to locate the incident on the map
Placement of the incident on a GIS-layered map

Additional supportive layers are revealed while zooming in.
Operator is requested to fill digital intake forms
### Incidents Log

- **Panic Button Activated \ Alarm**  
  *Urgent*  
  *Today 11:56:14 AM*

- **Train Pedestrian Collision \ Emergency**  
  *High*  
  *Today 12:15:42 PM*

- **Medical Emergency \ Medical**  
  *High*  
  *Yesterday 08:21:43 PM*

- **Line Maintenance \ Maintenance**  
  *Medium*  
  *Today 12:08:17 PM*

- **Weather Alert \ Weather**  
  *Medium*  
  *Today 03:15:52 AM*

- **Computer Theft \ Robbery**  
  *Normal*  
  *Yesterday 11:32:33 PM*

### Tasks

- **My Tasks**
  - Report incident to EMS, police and fire brigade
  - Communication with other relevant OCC’s
  - Communication with RU’s OCC, leader
  - Support safe access to tracks

### Incident reporting to rescue services can be automated
New Message

Subject:
Train Pedestrian Collision

Location:

Attached: Incident Log Form

Relevant stake holders can get incident Location and basic details to their mobile
Operator is instructed to liaise with relevant OCC’s
Suicide Attempt \ Emergency

Communication with other relevant OCC's

Tasks:
- Open communication channel with other OCC's
- Estimate shutdown time
- Re-route trains traffic in zone
- Get infrastructure engineering support
- Coordinate logistical & welfare support
Request for forensic evidence can be sent to on-site personnel.
- Evidence is uploaded by field personnel or obtained via wayside / forward facing CCTV
- Evidence is attached to the incident and is available for later consultation
Relevant logistics information is displayed.
Panic Button Activated \ Alarm
Urgent            Today 11:56:14 AM

Suicide Attempt \ Emergency
High            Today 12:15:42 PM

Medical Emergency \ Medical
High            Yesterday 08:21:43 PM

Line Maintenance \ Maintenance
Medium           Today 12:08:17 PM

Weather Alert \ Weather
Medium           Today 03:15:52 AM

Computer Theft \ Robbery
Normal            Yesterday 11:32:33 PM

Suicide Attempt \ Emergency
High            Today 12:15:42 PM

Issue SAP maintenance work order
Click when police arrived on site
Click when EMS arrived on site
Click when fire brigade arrived on site
Subcontractors receive maintenance work orders and arrival maps to site
Emergency forces arrival is time stamped and audited.
Suicide Attempt \ Emergency

Tasks

My Tasks

Click upon incident conclusion

Incidents Log

(1) Incidents to Acknowledge

- Panic Button Activated \ Alarm
- Train Pedestrian Collision \ Emergency
  High
  Today 12:15:42 PM
- Medical Emergency \ Medical
  High
  Yesterday 08:21:43 PM
- Line Maintenance \ Maintenance
  Medium
  Today 12:08:17 PM
- Weather Alert \ Weather
  Medium
  Today 03:15:52 AM
- Computer Theft \ Robbery
  Normal
  Yesterday 11:32:33 PM

My Tasks

Click upon incident conclusion

Info

Group: Security
Site: Global
Assigned to: Ron Smith

Operations

- Acknowledge
- Edit Incident
- New Task
- Deploy Procedure
- Add comment
- Find Similar
- Generate Report...
- More Info...
- Add Scheduled Task
- Close...

Comments

Logged in as: Ron Smith
Change User
Panic Button Activated \ Alarm
Urgent Today 11:56:14 AM

Train Pedestrian Collision \ Emergency
High Today 12:15:42 PM

Medical Emergency \ Medical
High Yesterday 08:21:43 PM

Line Maintenance \ Maintenance
Medium Today 12:08:17 PM

Weather Alert \ Weather
Medium Today 03:15:52 AM

Computer Theft \ Robbery
Normal Yesterday 11:32:33 PM

Suicide Attempt \ Emergency
12:28:10
Police permission to restore traffic
On-site IM confirms safe for resumption
Identify on-site police incident cause:
Complete incident form
Identify on-site police incident cause:
Suicide Attempted suicide
Attempted suicide
Fatal trespassing accident
Fatal trespassing accident
Serious trespassing accident
Trespassing incident
Uncategorized fatality
Uncategorized fatality
Incident Log:

- Panic Button Activated \ Alarm Urgent Today 11:56:14 AM
- Suicide Attempt \ Emergency High Today 12:15:42 PM
- Medical Emergency \ Medical High Yesterday 08:21:43 PM
- Line Maintenance \ Maintenance Medium Today 12:08:17 PM
- Weather Alert \ Weather Medium Today 03:15:52 AM
- Computer Theft \ Robbery Normal Yesterday 11:32:33 PM

Tasks:

- Mark on Police permission to restore traffic
- On-site IM confirms safe for resumption
- Complete incident form

More Info:
- Group: Security
- Site: Global
- Assigned to: Ron Smith

Operations:
- Acknowledge
- Edit Incident
- New Task
- Deploy Procedure
- Add comment
- Find Similar
- Generate Report
- More Info
- Add Scheduled Task
- Close

Comments:

Logged in as: Ron Smith
Internal traffic resumption procedures are verified
Suicide Event

Owner: Ron Smith  
Type: Security  
Severity: Normal  
Status: Acknowledged  
Opened on: 18-Jan-12 12:36:19 AM  
Opened by: Ron Smith  
Acknowledged on: 18-Jan-12 12:36:19 AM  
Acknowledged by: Ron Smith  
Location:

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**Deployed procedures and tasks**

<table>
<thead>
<tr>
<th>Task</th>
<th>Assigned to</th>
<th>Job Title/Group</th>
<th>Status</th>
<th>End Time</th>
<th>Completed by</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain details from the reporting person on the incident location and description.</td>
<td>All CR Operators</td>
<td>All CR Operators</td>
<td>Completed</td>
<td>6/10/2012 12:41:31 PM</td>
<td>Administrator</td>
<td></td>
</tr>
<tr>
<td>Fill in an Incident Report form.</td>
<td>All CR Operators</td>
<td>All CR Operators</td>
<td>Completed</td>
<td>6/10/2012 12:41:32 PM</td>
<td>Administrator</td>
<td></td>
</tr>
<tr>
<td>Call the duty incident manager and verify details.</td>
<td>All CR Operators</td>
<td>All CR Operators</td>
<td>Completed</td>
<td>6/10/2012 12:41:34 PM</td>
<td>Administrator</td>
<td></td>
</tr>
<tr>
<td>Call the police and report the incident.</td>
<td>All CR Operators</td>
<td>All CR Operators</td>
<td>Completed</td>
<td>6/10/2012 12:41:35 PM</td>
<td>Administrator</td>
<td></td>
</tr>
<tr>
<td>Call the fire brigade and report the incident.</td>
<td>All CR Operators</td>
<td>All CR Operators</td>
<td>Completed</td>
<td>6/10/2012 12:41:37 PM</td>
<td>Administrator</td>
<td></td>
</tr>
</tbody>
</table>

Full incident report including all tasks completed by different stake holders.
Combining best-practices and technology can assist in the mitigation of trespassing and suicide consequences and reduce the shutdown time.

Some of the supportive functionalities demonstrated were:

- Enforcement of consistent response checklists
- Improving inter-agency collaboration and communication channels
- Sharing common operating picture between all stakeholders
- Automation of tasks
- Context sensitive presentation of supportive information
- Impact analysis
- Incident reporting and reconstruction (complete audit trail)
- Integration with field sensors (e.g. SCADA, CCTV, mobile devices)
IMPROVING DECISION SUPPORT PROCESSES AND INCIDENT MANAGEMENT
Traffic restoration assessment model

- **Objectives:** develop a traffic restoration time forecasting model
- **Benefits**
  - Optimising the rescheduling of mainline rail traffic (passenger & freight)
  - Providing better and more accurate information to on- and off-site decision makers, enabling:
    - To optimally allocate internal and external resources
    - Provide alternative means of transport
    - Improve site logistics
    - Mitigate bottlenecks
  - Provide better information to passengers (stations, trains & Web)
Solution architecture

System architecture & information flow
THANK YOU