

METRO: A research project about fire and explosion safety in underground transportation systems

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Organizadores / Organizers



FUNDACIÓN **MAPFRE**

Madrid, 20 – 22 de Febrero de 2013
Centro de Convenciones Mapfre

Outline

- Projects facts
- WP1 - Design fires
- WP2 - Evacuation

Project facts

- A research project about fire and explosion safety in underground rail transportation systems
- Partners from different disciplines
- Total budget: **2 million USD**
- Three years: **Dec 2009 - Dec 2012**
- Web page: **www.metroproject.se**

Project facts

- Nine (9) partners in METRO



Project facts

- Work Packages - WP
 - WP1 - Design fires
 - WP2 - Evacuation
 - WP3 - Integrated fire control
 - WP4 - Smoke management
 - WP5 - Extraordinary strain
 - WP6 - Rescue operations
 - WP7 - Project management



Project facts

- Funding bodies
 - Stockholm METRO (SL)
 - Swedish Civil Contingencies Agency (MSB)
 - Swedish Transport Administration
 - Swedish Fortifications Agency
 - Brandforsk

Project facts

- Outcome
 - safer underground transportation systems in the future
- Examples
 - new way-finding systems at exits
 - new equipment for first responders
 - new data for design of transp. systems
 - new tactics for first responders, etc

Outline

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- WP1 - Design fires
- WP2 - Evacuation

WP1 - Design fires

- Steps
 1. Models-scale tests
 2. Full-scale test
 3. Development of correlation models
 4. Development of design fires

WP1 - Design fires



METRO

WP2 - Evacuation

- Steps
 1. Literature review - accidents
 2. Questionnaire survey - operators
 3. Laboratory experiment - train to track
 4. Laboratory experiment - tunnel
 5. Evacuation - Stockholm METRO
 6. Egress model

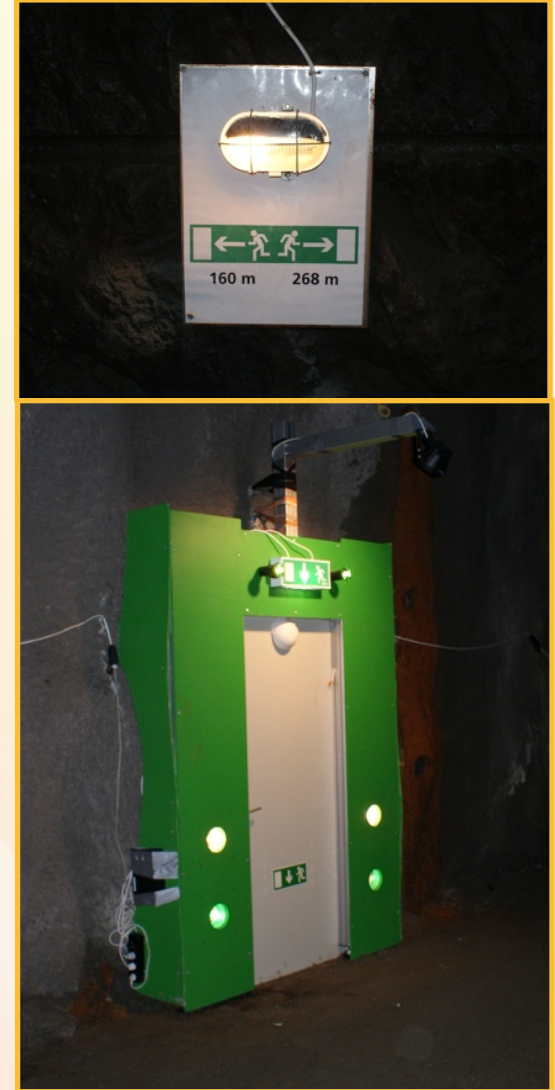
WP2 - Evacuation

- Laboratory experiment - tunnel
 - Studied aspects
 - walking speed
 - behavior
 - way-finding
 - systems
 - Participants
 - 100
 - all ages



WP2 - Evacuation

- Wall signs (always)
- Std design
- Green flashing lights
- Illuminated exit + strong lights
- Sound (siren + voice message)



WP2 - Evacuation

- Procedure
 1. arrive
 2. safety instructions
 3. video of train trip
 4. enter the tunnel
 5. walk in the tunnel
 6. led out by fire fighter
 7. questionnaire
 8. interview



WP2 - Evacuation



WP2 - Evacuation

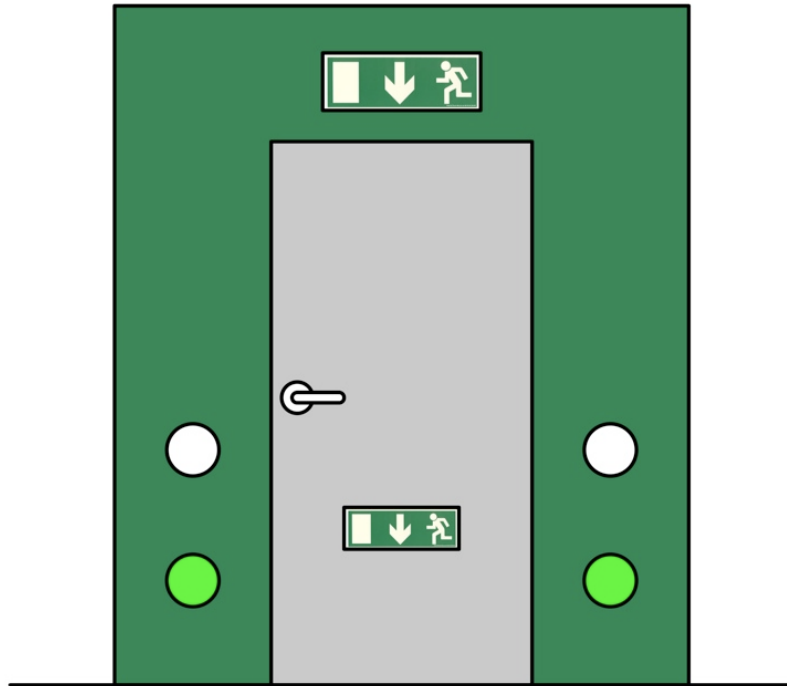
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WP2 - Evacuation

- Way-finding systems
 - Std design - sometimes worked
 - Flashing lights - good
 - Illuminated + strong lights - misinterpretations
 - Sound - excellent
- Walking speed in smoke

WP2 - Evacuation



WP2 - Evacuation

- Way-finding systems
 - Std design - sometimes worked
 - Flashing lights - good
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Summary

- Projects facts
- WP1 - Design fires
- WP2 - Evacuation

Gracias por su atención
Thanks for your attention



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