Preventing Platform, Pedestrian & Trespasser Fatalities

Intrusion Detection & Prevention Technologies Available for Rail Transit
Agenda

1. Opportunities for Intrusion & Hazards
2. Effects of different transit modes
3. Solutions to consider
4. Types of PEDS & PIDS
5. Implementation factors and choices
Hazards from History

- First recorded fatality
  - Opening of the Manchester and Liverpool Railway
  - First ever passenger railroad
  - 1830 Sept 15th

- Local MP William Huskisson fell under a train
  - Later succumbed to his injuries
TODAY: Crowd Platforms Distracted Passengers
Other Platform Hazards

- Drunken passengers falling onto tracks
- Baby strollers blown/rolling onto tracks
- Passengers deliberately pushed onto tracks as a train approaches
- Case study: mother carrying 3-year-old:
  - Mother mistook the train on the far track as being at the near track (side platforms)
  - Mother & child fell onto the tracks
  - Several people jumped down to rescue her
  ➢ **Even more people on the tracks!**
Safety - injury or even death from:

• Fall off platform into guideway
• Collision with train
• Electrocution

Security

• Threats from persons, or from objects dropped onto or left on track
• Far more prevalent since 9/11
• Railroads recent targets of terrorism:
  – Madrid, London and recently Toronto
Transit Mode – LFLRV

• LFLRV or street car

• Almost like a bus, but longer stopping distances

• Easy to get in/out of guideway
Transit Mode – HFLRV

• Significant platform height
• Effect of fall is greater
• Escape is more difficult
Transit Mode – HR Metro

- High speeds, crowded platforms
- Even harder to escape from a fall
• Platform Doors - full or half height
• Platform Edge Barriers with openings
  – Located at vehicle door open positions
  – Plus a detection system at the openings to monitor unauthorized intrusion (when no train is berthed)
• Intrusion Detection System located in the guideway for the length of the platform
• Other methods per Transit Authority approval...
Solution Comparison
PEDS vs. PIDS

- Full Height Doors (FS)
- Full Height Doors (PS)
- Half Height Doors
- Fully Segregated To Ceiling
- Partially Segregated

Highest Safety and Security

Highest Cost

Platform Edge Door System
Platform Intrusion Detection System

Lowest Safety and Security

Lowest Cost

PIDS Platform Edge
PIDS In-guide way
Prevention: Platform Doors

Japan Shinkansen

Half height PEDS
(Safety but not Security – can *climb* over)

London Underground

Full height PS-PEDS
(Safety but not Security – can *throw* over)

Full height FS-PEDS
(Safety & Security + Climate)
Detection – What Action Does a PIDS Trigger?

- Immediate stop of trains that are at or approaching platforms
- CCO (Central Control Operator) visual and audible alarm
- Change of CCO CCTV camera view
- Canned PA announcement
- Automatic visual announcement (some 2 levels: warn / stop)
- Strobe lights, etc.

www.delcan.com
Mechanical Plates with Sensors

Platform Intrusion Emergency Stop ("PIES")

- Fiberglass plates in track
  - **Vancouver** SkyTrain Expo Line
  - **Kuala Lumpur** Kelana Jaya Line
Guideway Intrusion Emergency Stop ("GIES")

- **Vancouver** SkyTrain
  - Millennium and Canada Lines
Guideway Intrusion Detection System ("GIDS")
- Two levels of alarm

- **Yong-In Everline**, South Korea
Other PIDS Designs

• Cameras with video analytics
  – Los Angeles: Transitvue.com

• Radar
  – Nuremburg
Configuration Scope

• **Factors to consider:**
  – Transit Mode (LFLRT, HFLRT, Metro)
  – Degree of ROW segregation from the public (street, tunnel...)
  – Platform conditions: loading, height, length
  – Environment – possible to have false trips from snow, ice?
  – Service Reliability – effects of false trips
  – Capital cost & LCC vs. impact of incidents and delays
  – Social behavior – disregard instructions vs. safety conscious

• **Options for implementation:**
  – Do nothing (driver vigilance & CCTV)
  – Install either PEDS or PIDS at all platforms
  – Install PEDS at underground and PIDS at above ground stations
• Must engage the public to develop culture of safety and security
• Will need signage & information
• Will need ongoing communication & education
• For example, SEPTA initiatives include:
  – Operation Lifesaver presentations to a variety of school and community groups
  – Monthly Safety Blitz programs - Safety Officers visit passengers at the railroad
  – Safety Awareness Day (first was held 2013 May 1)
  – Conduct such campaigns regularly
  – Conduct at locations known to be potentially hazardous

Source: Metro Magazine, 2013 May 15
The Decision of how to implement platform edge detection depends on technical, political and human factors.

The wise choice of solution will depend on:

- Knowledge of the market
- A solid Systems Engineering process
- Requirements definition & tradeoff analyses