



# Anti-Terrorism Strategies for Land Transportation - A Risk-Informed Approach

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# Agenda

- ◆ Definition of Terrorism
- ◆ Terrorist Attacks on Land Transportation
- ◆ Tradition Approach
- ◆ Risk-Informed Approach
- ◆ Case Study





# Definition of Terrorism

- ◆ What
  - ▣ *Deliberate and unlawful act dangerous to human life and/or properties and/or business commercial activities*
- ◆ Who
  - ▣ *Terrorist groups such as political, religious extremist, nationalist, racist etc.*
- ◆ Why
  - ▣ *For the purpose of advancing a political, religious or ideological cause*
- ◆ How
  - ▣ *Bombing, arson, operational sabotage, biological and chemical attacks, cyber attack etc.*
- ◆ Where
  - ▣ *Anywhere, anytime*
- ◆ E.g. Sept 11, Madrid Bomb Attack, London Bombings





## London Bus Bomb Attack

## Sept 11 World Trade Center



## Casablanca Hotel Bomb Attack



Photo Source: <http://news.bbc.co.uk>





# Land Transportation

- ◆ Roads
- ◆ Bridges
- ◆ Tunnels
- ◆ Rail Systems (trains, depots, subway, stations)
- ◆ Vehicles



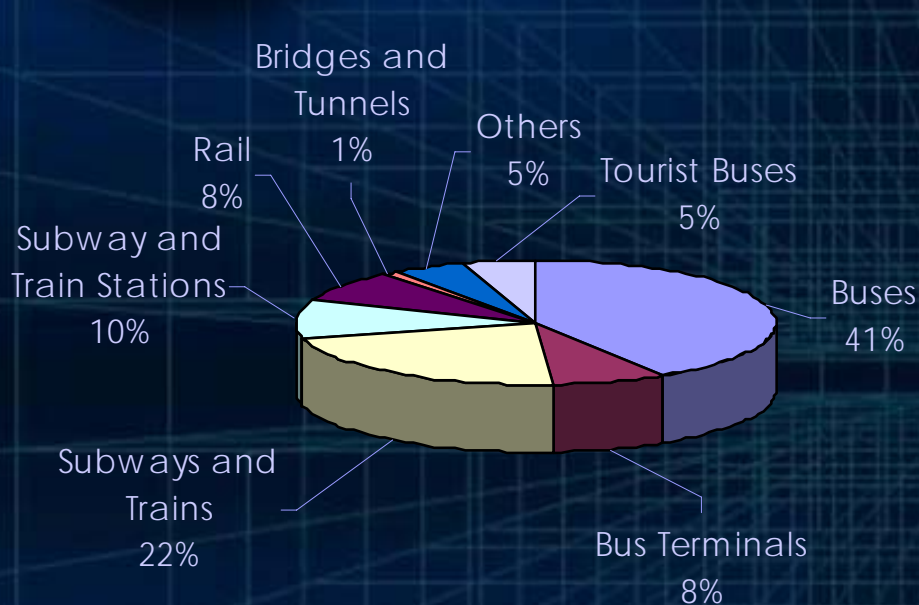


# Terrorist Attacks on Land Transportation

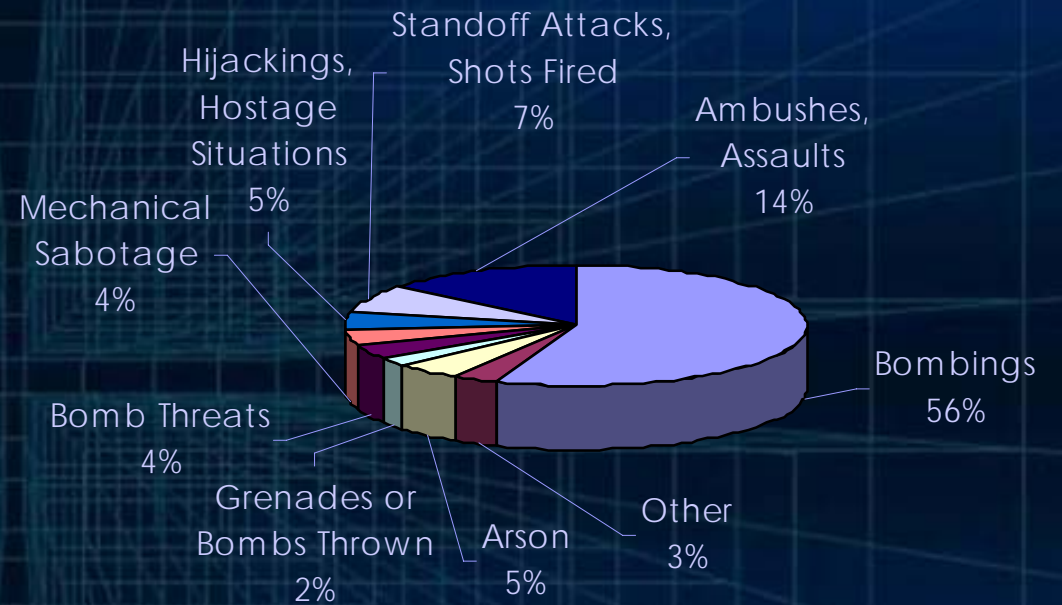
- ◆ Land Transportation Infrastructures are vulnerable for terrorist attacks
  - ▣ *Ease of access*
  - ▣ *Low security level*
- ◆ Attractive targets for terrorist attacks
  - ▣ *Mass flow of public*
  - ▣ *Disruption of city transportation network*
  - ▣ *High impact, news worthy*



# Statistics on Land Transportation Terrorist Attacks



**Targets of Attacks of Land Transportation (1997-2000)**



**Tactics used against Land Transportation (1997-2000)**

Source: B.M. Jenkins, L.N. Gersten, "Protecting Public Surface Transportation Against Terrorism and Serious Crime: Continuing Research on Best Security Practices", Sept 2001





# Tradition Approach for Anti-Terrorism Strategies

- ❖ Reactive Approach
- ❖ Develop strategies from lessons learnt from previous attacks
- ❖ Compliance to prescriptive codes or standards (e.g. NFPA 130, NFPA 502 etc.)





# Potential Problems of Tradition Approach

- ❖ Increasing and new threats of terrorism
- ❖ Old/Existing Land Transportation infrastructures: Outdated standard may not be applicable
- ❖ Terrorist threats generally not covered in standard
- ❖ Similar design requirements for different locations





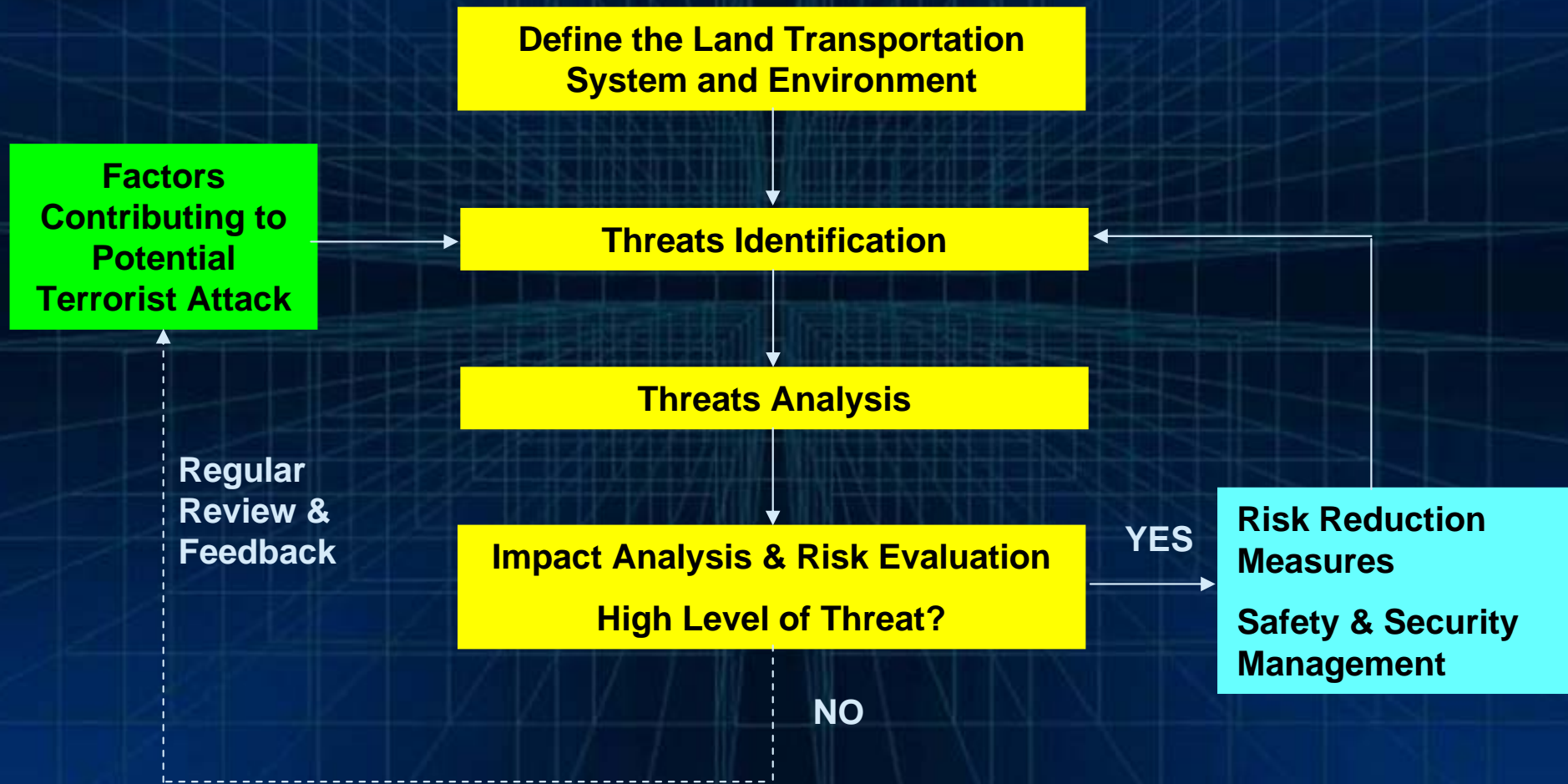
# Risk-Informed Approach for Anti-Terrorism Strategies

- ◆ Taking a proactive, comprehensive and systematic approach to develop Anti-Terrorism Strategies
- ◆ Compare the risk exposure from different threats
- ◆ Evaluation of Anti-Terrorism Measures
- ◆ Selection of best option(s) / alternative(s) based on best risk benefit





# Risk Management Framework







# Develop Anti-Terrorism Strategies

- ◆ Eliminate

- ◆ Treat

  - ▣ *Reduce threat exposure/vulnerability*

  - ▣ *Reduce the impact*

- ◆ Tolerable??





# Case-Study

## Madrid Bomb Attack - 11<sup>th</sup> March 2004



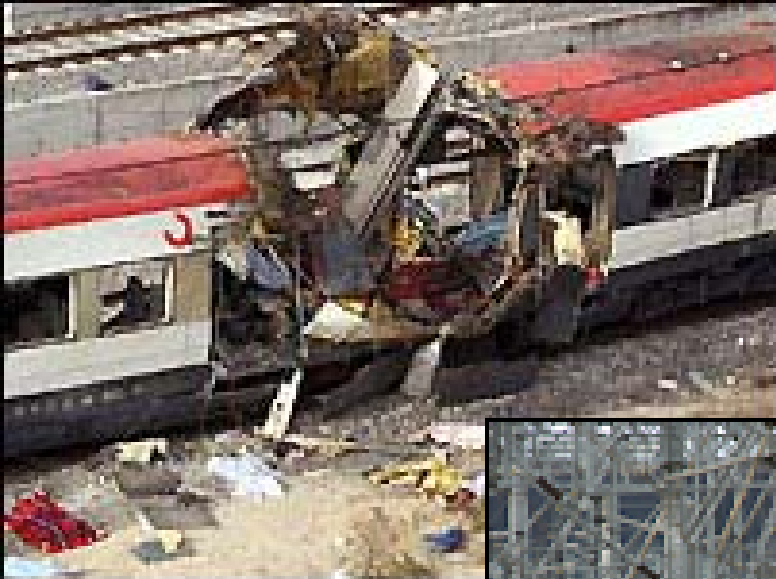
Source: BBC News

[[http://news.bbc.co.uk/1/shared/spl/hi/europe/05/madrid\\_bombings/html/1.stm](http://news.bbc.co.uk/1/shared/spl/hi/europe/05/madrid_bombings/html/1.stm)]





# Madrid Bomb Attack



Source: BBC News





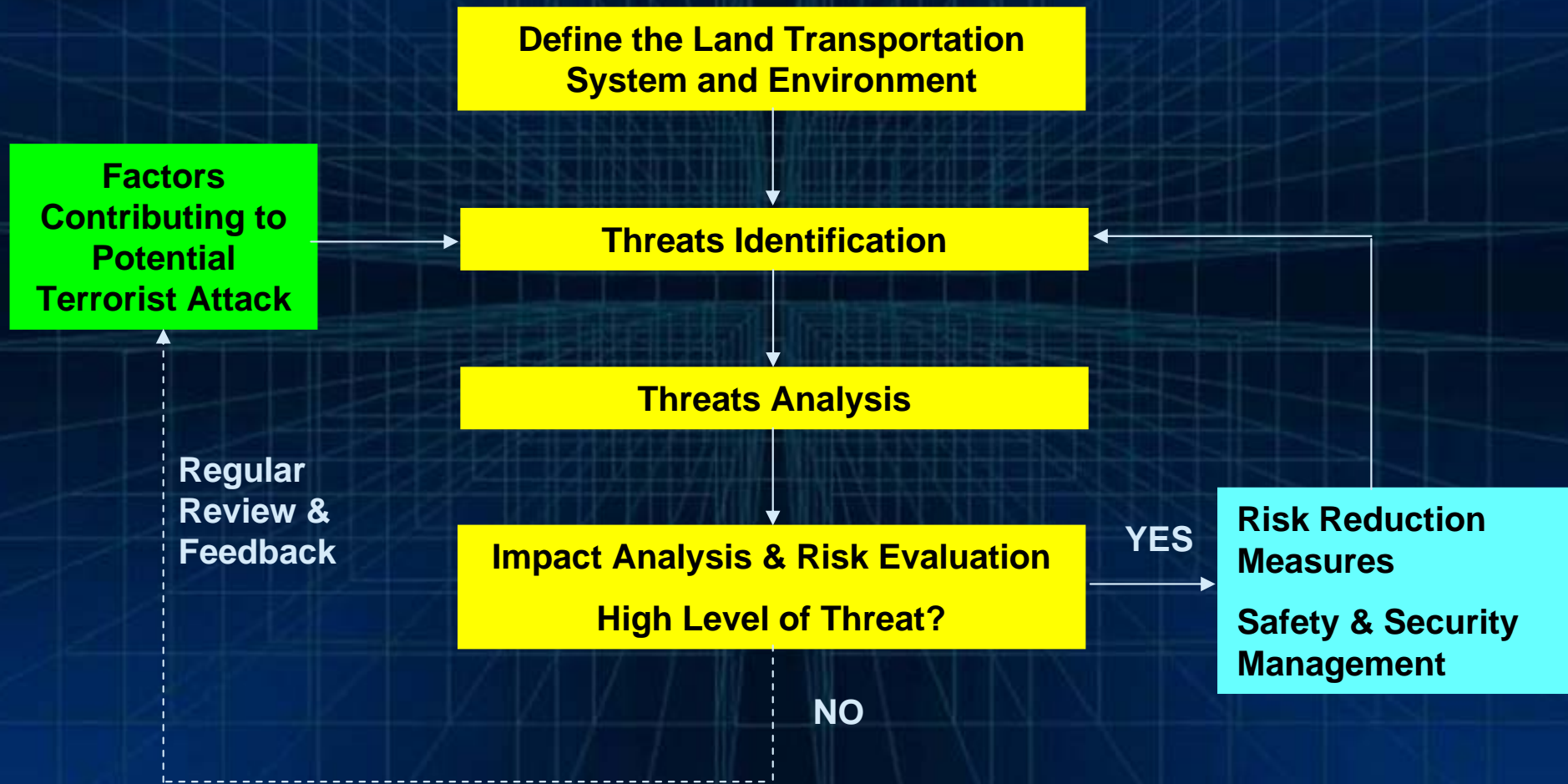
# Define Land Transportation System & Environment

- ◆ Mode of Transportation: Commuter System
- ◆ Location: Madrid of Spain





# Apply Risk Management Framework







# Threats Identification & Analysis

- ◆ **What / Where:** Attack on busy commuter line (train, station)
- ◆ **Why:** Exerting political pressure on local government following the attack
- ◆ **When:** Attack during peak hours - maximize the destruction + disruption to business operation
- ◆ **Who:** Attack by radical religious followers (e.g. suicide bombs)
- ◆ **How:** Formation of terrorist network within the country - shared information and resources Attack may follow similar patterns from the terrorist network





# Impact Analysis

## ◆ Potential Impact:

### ▣ *From the local perspective:*

- Major injuries & fatalities
- Major interruption to operations
- Major disruption to business operations
- Political pressure on local government

### ▣ *From the world-wide perspective:*

- Adverse impact / pressure on global business
- Political issues on nation-countries





# Risk Evaluation

## ◆ Risk Evaluation

- ▣ *Qualitative Approach - risk matrix*
- ▣ *Quantitative Approach - risk modeling*
- ▣ *Threat level perceived to be relatively high / low*





# Risk Reduction Measures + Safety & Security Management

- ◆ Provisions for commuter system
- ◆ Operation procedures
- ◆ Nation-wide provisions & consideration
- ◆ Interactions between different parties:
  - ▣ *Operators, Police, Security Services, Emergency Responders, Government, Safety & Security Specialists, Public etc*





# Conclusion – Importance of applying Risk-Informed Approach

- ◆ Take more proactive approach manage & control terrorism risk
- ◆ Apply Risk Management framework to identify, analyze and evaluate threats in systematic & comprehensive manner
- ◆ Develop efficient, effective, balance and optimum anti-terrorism strategies
- ◆ Deal with terrorism threats in a comprehensive, logical, and cost-effective manner