

# Link Safety Program

Sound Transit Board Briefing  
March 27, 2003

## Our Goal:

- Design, construct and operate a safe, clean, reliable, accessible and cost-effective system

# Link Safety Program

- ***Safety Certification***
  - Rainier Valley Safety
  - DSTT Safety
  - Aerial Guideway Safety
  - Safety Education

# Safety Certification

Safety certification is the systematic process to assure that safety related requirements of codes and standards are incorporated into the design, construction, testing and operation of the system.



# Safety Certification Implementation

Sound Transit initiated the Link Safety Certification process in 1999 by compiling information on potential hazards from other US transit properties.



# Safety Certification Checklists

- **Criteria Conformance Checklist** -  
The designer independently verifies that safety related Design Criteria are incorporated into drawings and specs
- **Specification Conformance Checklist** -  
The construction manager and contractor independently verify that the safety related design elements are constructed and installed

# FTA Requirements

- *January 1999* - Link began Preliminary Hazard Analysis (PHA)
- *January 2000* FTA issued “*Hazard Analysis Guidelines for Transit Projects*”
- *2001/2002* - Link hazard analysis concluded that critical items meet or exceed these federal guidelines

# Hazard Analyses

- **PHA - Preliminary Hazards Analysis**  
prepared to evaluate potential hazards during design phase
- **C/CIL - Critical/Catastrophic Items List**  
developed to perform risk assessment on most critical issues





# FTA Hazard Severity Categories\*

- I - **Catastrophic:** Death, System Loss
- II - **Critical:** Severe Injury, Major System Damage
- III - **Marginal:** Minor Injury, Minor System Damage
- IV - **Negligible:** Less than minor injuries

\* FTA "Hazard Analysis Guidelines for Transit Projects",  
January 2000



# Hazard Frequency Categories

*(Based on operating 19 hours/day)*

- |                       |  |
|-----------------------|--|
| <b>A – FREQUENT</b>   | Several times per year                 |
| <b>B – PROBABLE</b>   | Several times/year to once in 13 years |
| <b>C – OCCASIONAL</b> | Once in 13 to 131 years                |
| <b>D – REMOTE</b>     | Once in 131 to 13,000 years            |
| <b>E – IMPROBABLE</b> | Less than once in 13,000 years         |

# Hazard Resolution

- Our results concluded that the probability of a single system failure resulting in a critical chargeable accident is once in 131 to 13,000 years.
- This meets the FTA Guidelines



# Sound Transit's Role

## ***PREVENT SINGLE SYSTEM FAILURES FROM RESULTING IN SERIOUS ACCIDENTS***

- Identify Sources of Potential Hazards
- Document Potential Hazards
- Develop Mitigation or Resolution with FLSC
- Verify & Certify Resolution
- Track and confirm EIS commitments





# Link Fire/Life Safety Committee

- Fire/Life Safety Committee started in 1998
- Meetings with the Port, SeaTac, Seattle, Tacoma, Tukwila, KC Metro, ST and designers
- Meetings include Planning, DOT, Fire, Police and Building Code Officials
- Designers present safety or code related details to cities for concurrence
- MLK safety related elements endorsed by City

# Light Rail Accident Reduction

- Hazard Analysis
- Safety Certification
- Safe Engineering Design
- Public Education
- Vehicle and System Safety Analysis

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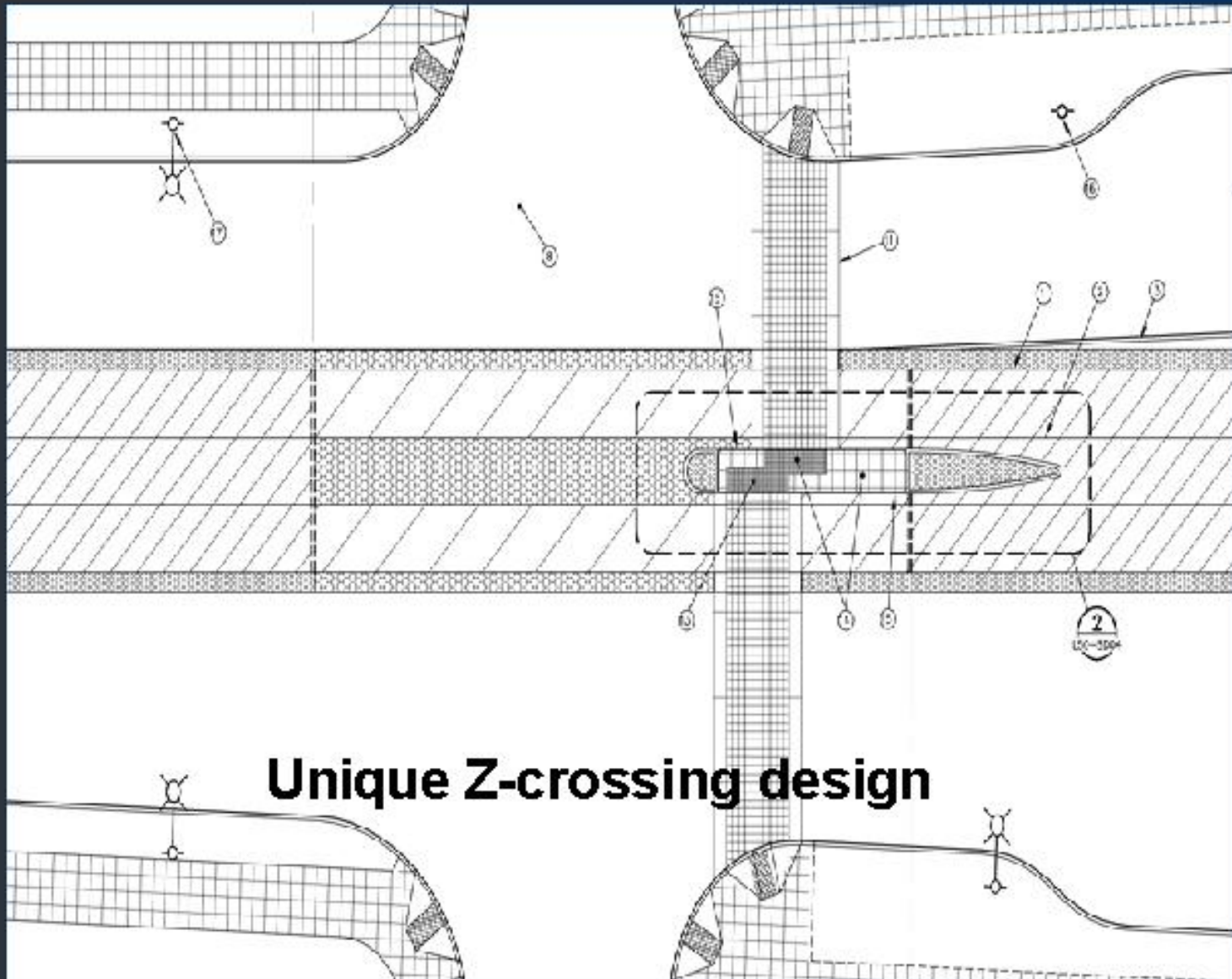
# K Safety Design Improvements

- **21** traffic & pedestrian intersections  
(12 existing)
- **10** signalized pedestrian only crosswalks  
(2 existing)
- **17** left turn lanes
- Adding sidewalks where they don't exist
- Widening many existing sidewalks
- Design addresses ADA needs



# Pedestrian Crossings

- Tactile warning strips indicate trackway
- Pedestrian islands have protective railing to accommodate pedestrians, wheelchairs, strollers and bicycles
- “Look Both Ways” signs
- Wide thermoplastic striping, texture and color change in crossing



**Unique Z-crossing design**

# Crossing Signals

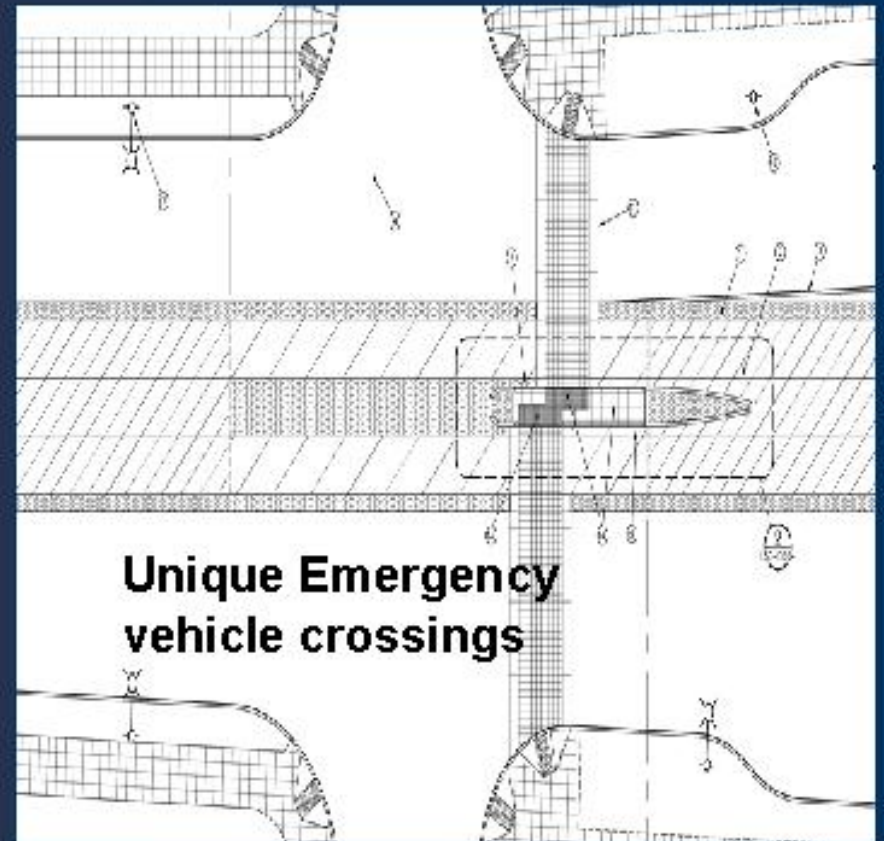
- All legal crossings are signalized, when trains approach, a warning bell is activated and a sign flashes
- Vehicle, pedestrian and train signals all integrated with City traffic controller
- Push buttons within pedestrian islands
- Illuminated crosswalk signs at crossings





# Emergency Response

- Emergency vehicle crossings of trackway
- Opticom Preemption
- No loss of response time with light rail



# Minimizing Accident Potential

- Left turns only from signalized left turn lanes.
- Illuminated “Train Coming” signs discourage left turn signal violators.
- Safety education provided to the community outlining light rail safety.

# Station Safety Features

- Fenced between station platforms
- Closed Circuit Television
- Passenger assistance intercom for emergency situations
- Illuminated message signs
- Tactile warning at platform edge









# Link Light Rail Project Enhances Safety

- Considering all of these corridor safety improvements,

*LINK LIGHT RAIL WILL BE SAFE*

- Light rail improvements will reduce accidents and make the MLK corridor safer

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# DSTT Safety

- Bus/train separation protection
- Includes interlocked bus and train signal system
- Fire/emergency management console at each station
- Central control of train functions
- Emergency backup to central control

# DSTT Safety

- Emergency ventilation system
- Sprinklers in tunnels
- Existing cross passages for quick evacuation
- Closed Circuit Television in platform areas
- Passenger assistance intercoms in stations



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- ***Aerial Guideway Safety***

# Aerial Guideway Safety

- Emergency access points
- Fire hydrants at emergency access points
- Rescue train to evacuate passengers
- Standpipes at all aerial stations
- Emergency walking between tracks
- Fire hydrants at stations

# Safety Education

- Rail safety outreach to schools, pedestrians, drivers and community groups
- Partner with transportation providers
- Safety outreach through construction and operation
- Outreach to English, non-English communities
- Outreach to persons with disabilities



# Link - Total Safety

- Link's Safety Program encompasses planning, hazard analysis, certification, design & construction verification and training.
- Since 1998, experienced rail transit safety experts have develop plans & performed analyses that ensure Federal & State safety compliance.
- *At completion of design and construction, we will certify that the system is safe.*



# Link Safety Program

Planning + hazard analysis + safety design +  
safety certification + safety education  
training =

***A SAFE LINK LIGHT RAIL SYSTEM***

Thank you.