

Microscopic Simulation Modeling of (Blind) Pedestrians

@ Roundabouts and Channelized Turn Lanes

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Outline

- Problem Overview
- Why Simulation?
- Intersection Types
 - ⇒ Roundabouts
 - ⇒ Channelized Turn Lanes
- Research Approach
- Examples

Problem Overview

- Pedestrian Accessibility and Safety
- Impacts of Pedestrian Activity on Vehicle Operations
- Special Case: Blind Pedestrians
- Model Pedestrian Crossings at Roundabouts and Channelized Turn Lanes
- Research Sponsors
 - ➔ National Eye Institute - What is the Problem?
 - ➔ NCHRP – What are Possible Solutions?

Why Simulation?

- Minimize Data Collection Cost
- Minimize Risk for Study Participants
- Test Potential Countermeasures
- Test Proposed Future Conditions

Roundabouts

- Traffic Does Not Stop!
- Is it safe for Pedestrians?
- Concerns for Blind Pedestrians, Elderly, Children
- Pedestrian Impact on Vehicles?



Photographer: www.skysiteaerial.com

Channelized Turn Lanes

- Turning Traffic Does Not Stop
- Similar Concerns to Roundabout
- 'Correct' Geometry of Turn Lane and Crosswalk?



Source: <http://www.walkinginfo.org/>

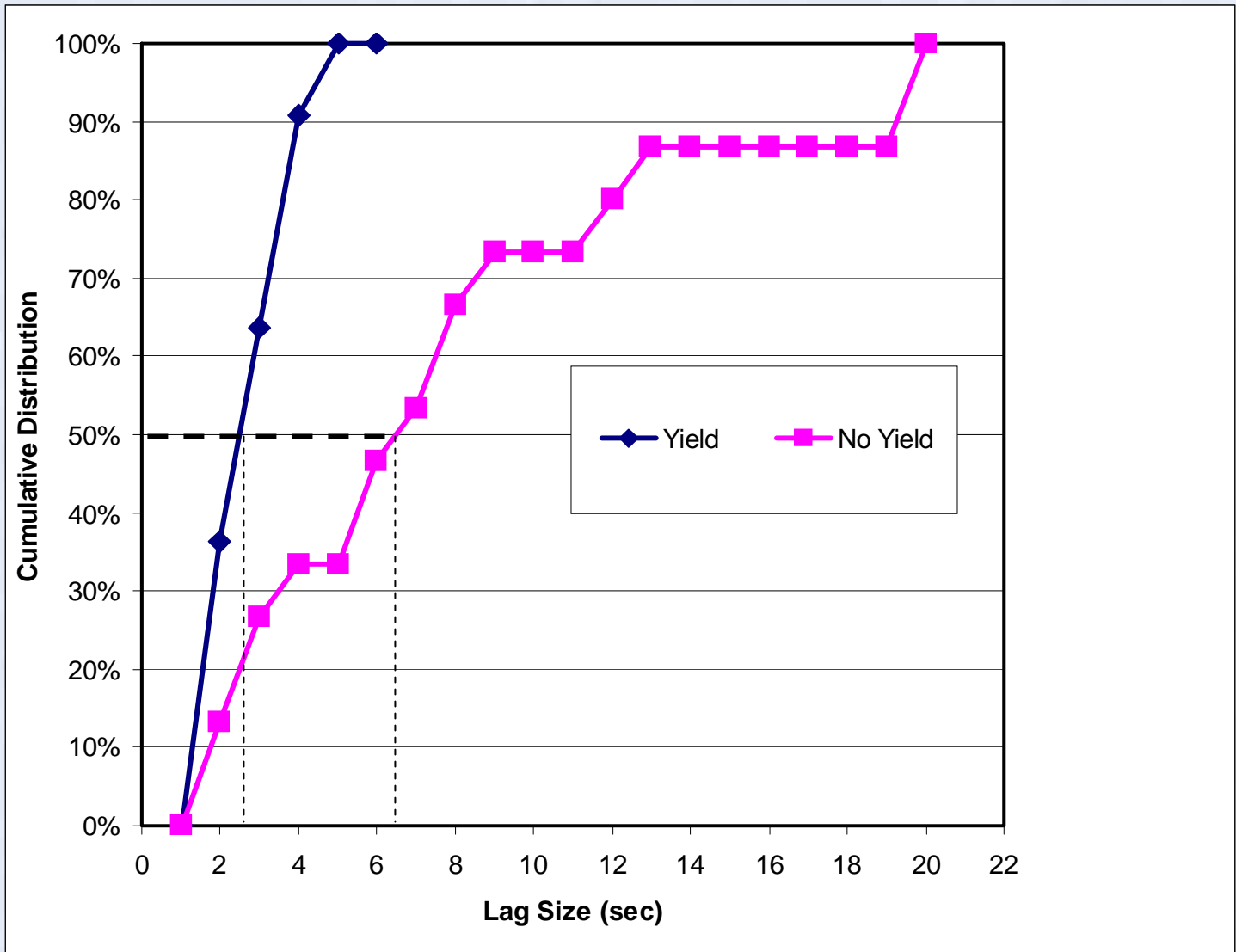
Research Approach

- Video Data Collection in the Field
 - ⇒ Pullen-Stinson Roundabout
 - ⇒ More Sites in the Future
- Data Extraction from Video
 - ⇒ Maximize Accuracy and Efficiency
 - ⇒ Manual Methods
 - ⇒ (Semi-) Automated Method
- Microscopic Simulation
 - ⇒ VISSIM

ITRE-mv Data Extraction Sample Movie



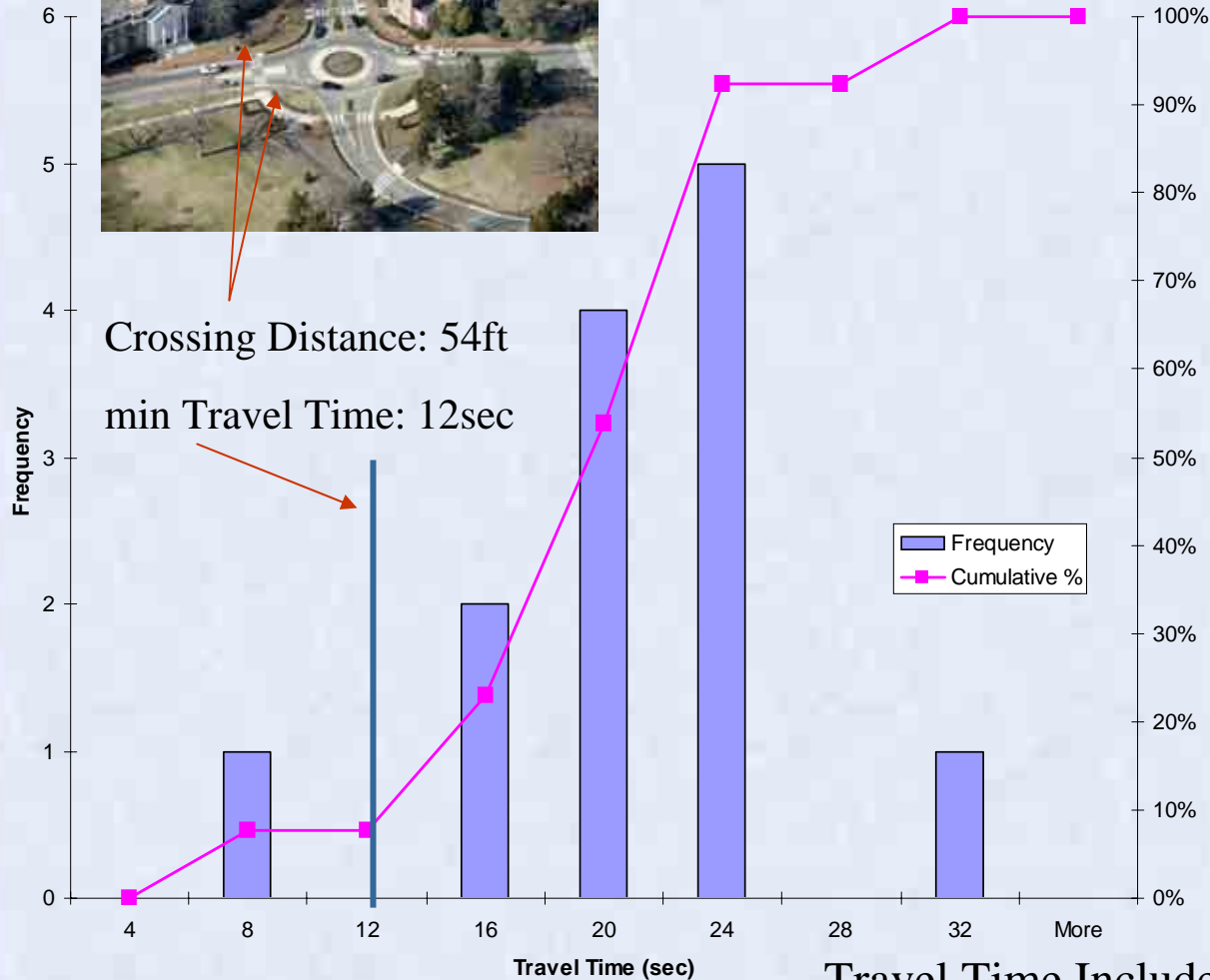
Time lag between crossing initiation and vehicle in crosswalk



Pedestrian Travel Time Distribution



PED Travel Time Histogram



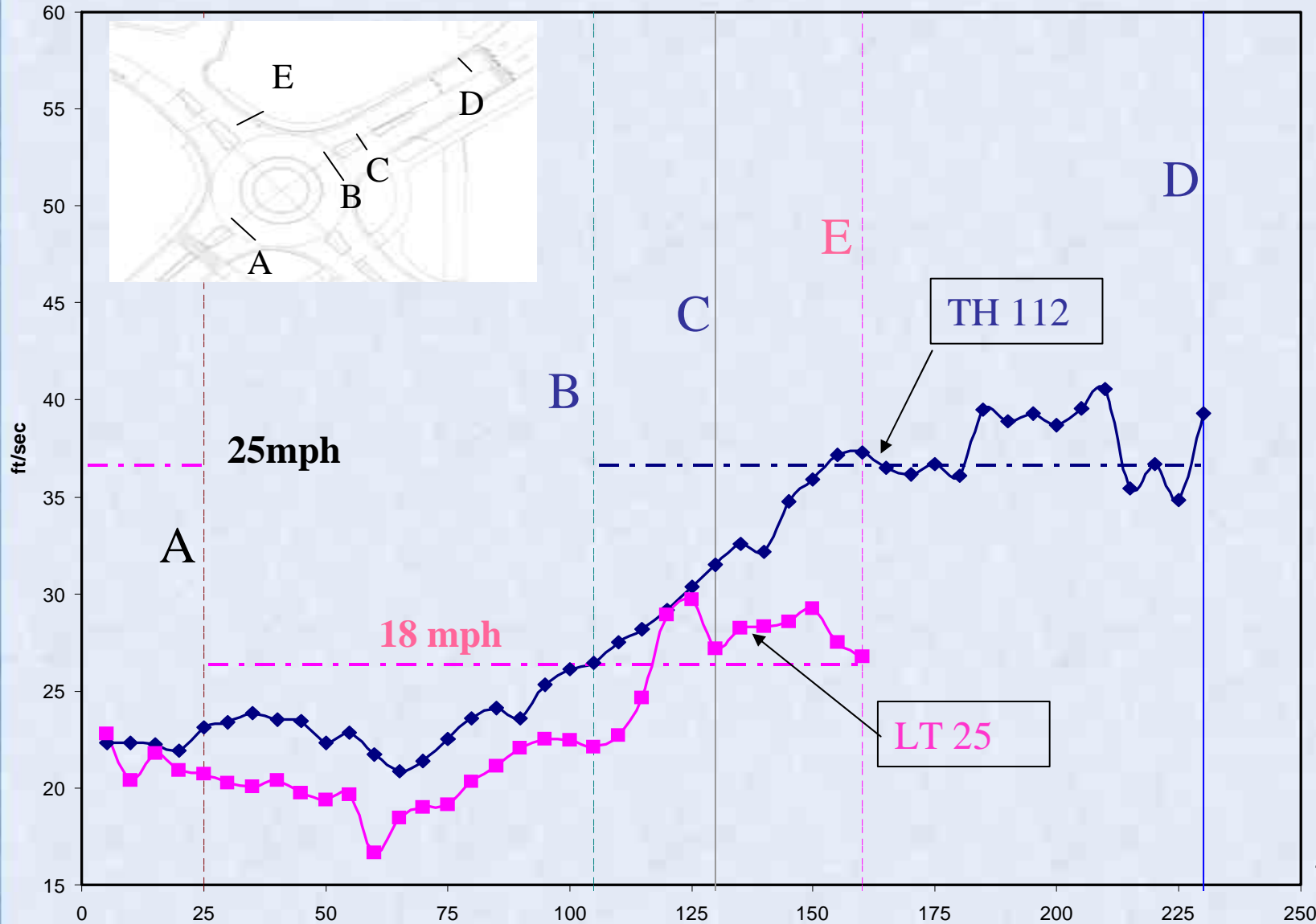
Crossing Distance: 54ft
min Travel Time: 12sec

Travel Time Includes:

- Waiting time @ curb and splitter island
- Actual crossing time

Average Speed Profile (ft/sec) by O&D

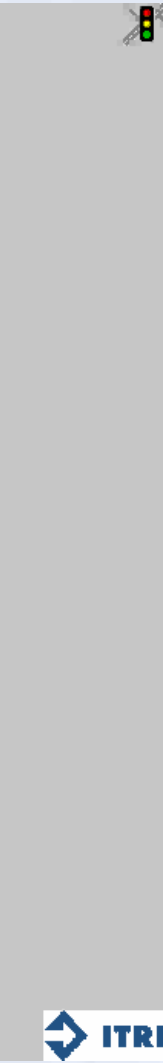
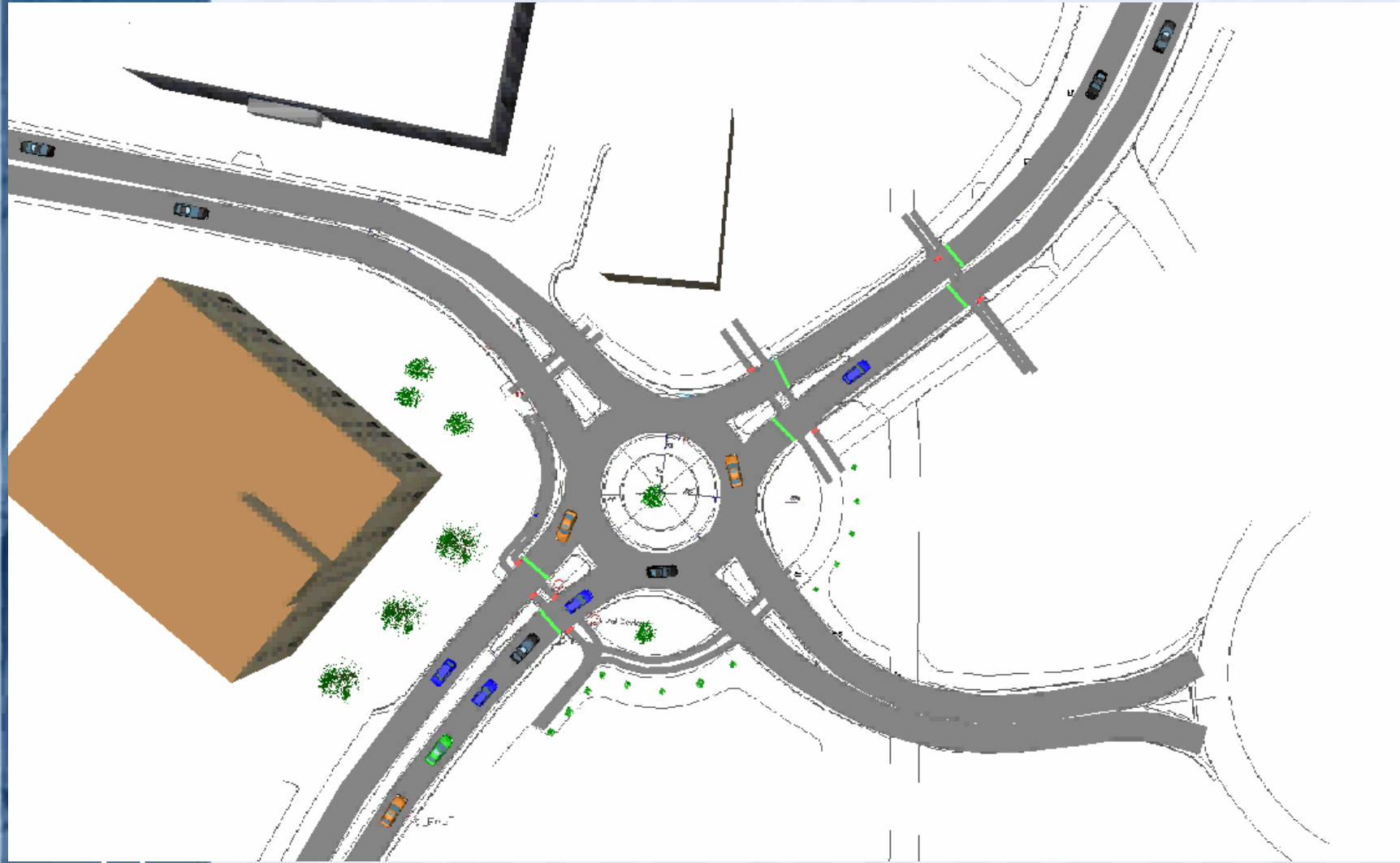
Speed Profile



Yield Detection Pullen-Stinson Roundabout



Example Simulation Pullen-Stinson Roundabout



Long Term Goals

- Identify safety treatments for pedestrian Crossings
- Assure treatments don't compromise vehicle movements
- Unobtrusive evaluation of pedestrian safety

Questions ??