Introduction

Agenda

Back to the Future!

New Trends
Future Challenges
What Can We Do?
Q&A

Billions have been invested in a new connected future!

Benefits of Embracing Emergent Trends in TR

- Safety
- Personal mobility
- Car share
- Light vehicles
- Time productivity
- Energy use / fuel consumption
- Roadway capacity
- Land use efficiencies
Common types of Pedestrian and Bike Crashes

Detroit – 1950 vs 2010
**New Trends**

- Population Density Increasing – 64% in 1950 to 84% now
- Employment Growth Increasing – increasing 5% in the next 8 years
- Vehicle Miles Traveled – expected to grow 1.1% annually for 20 years

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**New Trends**

"When vehicle miles traveled goes up — especially in dense areas — travel times go up with it."

Waze Data / Uber Data Confirm!

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**New Trends – Pedestrian Safety**

**BY THE NUMBERS**

From 2008 to 2017:

- Pedestrian fatalities increased by 35.4%
- Vehicle miles traveled increased by 8.1%
- Traffic deaths among motor vehicle occupants decreased by 6.1%
- Walking as a share of all trips increased by less than 1%

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**Following Trends - Equity**

Location of Pedestrian Fatalities by Household Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Number of Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>30</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
</tr>
</tbody>
</table>

**DANGEROUS BY DESIGN**

Traffic Fatalities by Race and Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number of Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>50</td>
</tr>
<tr>
<td>African</td>
<td>40</td>
</tr>
<tr>
<td>Hispanic</td>
<td>30</td>
</tr>
</tbody>
</table>

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**Engineering the Future of Mobility**
**Introduction**

**Agenda**
- Back to the Future!
- New Trends
- Future Challenges
- What Can We Do?
- Q&A

**Hypothetical future of safety**

**Planning for the unknown**

**Future Challenges – Adoption and Response**
- Private car ownership will drop 80% by 2030 in the US.
- The number of passenger vehicles on American roads will go from 247 million in 2020 to 44 million in 2030.
- Using electric ride-shares will be four to ten times cheaper per mile than buying a new car by 2021 (and each family could save up to $5,600 per year, compared to purchasing a car)
- Economist at Stanford
We have a unique opportunity to revolutionize how our streets respond and support people, not just react to a revolution for the technology running on it.

Tech isn’t the only thing changing

FHWA Guidance

FHWA supports flexible approaches to design of bicycle & pedestrian facilities.
Recognizes AASHTO’s bicycle & pedestrian design guides as the primary national resources for bicycle and pedestrian facilities.
Notes that NACTO’s Urban Bikeway Design Guide and ITE’s Designing Urban Walkable Thoroughfares guide build on flexibilities provided in the AASHTO guides.

GB is NOT a Detailed Design Manual

“The intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions.

It is not intended to be a detailed design manual that could supersede the need for the application of sound principles by the knowledgeable design professional.”

Green Book Foreword, 2011

…Significant Other Design Guidance Exists

Many national guidelines & best practices
State DOT standards & guidelines
Local agency standards and guidelines

And new “evolving” guidance…

Engineering the Future of Mobility
Principals of Designing for All Users in a CAV World

- Recognizes that flexibility is a necessary and desired aspect of the geometric design process.
- Uses a risk assessment and risk management approach for all aspects of the design for each mode.
- Use of engineering judgment is required!
Key Guidance Exists

Tort Liability Defense Practices for Design Flexibility

Create and file internal documentation that includes the rationale for your design decisions and any available facts/evidence to support those decisions.

Thoughts on Liability

- Shouldn’t let liability concerns get in the way of innovative and creative design responding to changes in our TR world.
- Understanding of applicable design guidance and standards is required, but unique approaches are almost always allowed and encouraged.
- Designers have the skills, experience and judgment to learn how to do this in an effective and responsible way.

Six-Step Future Complete Streets Design Process

- Define existing and future land use
  - Define land use context
  - Define transportation context

- Define goals and objectives
  - Identify deficiencies
  - Describe future objectives

- Decision making
  - Describe street type and initial design
  - Describe trade-offs and select best design