What is and Why WalkWorks?

- Collaboration of the Pennsylvania Department of Health and the University of Pittsburgh Graduate School of Public Health
- Mission: To improve health status by addressing chronic disease risk factors to prevent and reduce obesity, diabetes, heart disease and more
  - Increase physical activity in built environment through development of walking routes
  - Influence policy by funding development of active transportation plans designed to increase opportunities for physical activity
- Method: Community-based partners, municipalities, planning organizations

Today’s presenter

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www.completestreets.org

Three-part series on Complete Streets

• Part 1: Complete Streets basics and benefits (held on March 28, 2019)
• Part 2: Best practices in Complete Streets (today’s webinar)
• Part 3: Complete Streets planning and policies, Thursday, April 18

Best Practices for Design of Complete Streets
Fixed controls
• Geography

Fixed controls
• Climate

Fixed controls
• Climate
Design controls

- Functional classification
- Design speed
- Lane & roadway width
- Capacity & delay
- Intersection design
- Design vehicle

Old paradigm: “passive” design

- “Forgives” behavior through design, assumes worst case
- Designed for high speeds and high volumes
- Encourages high-risk behaviors from all users:
  - Driving too fast; crossing mid-block; bicycling on sidewalks
- Limits land use and building types, street life

New paradigm: “proactive” design

- Changes behavior through design
- Guides users through physical and environmental cues
- Slows vehicle speeds
- Encourages walking, bicycling, transit use
- Key to successful Complete Streets implementation
Minimum design often doesn’t mean quality design for walking and bicycling

- Every mode needs quality accommodations
  - Safe
  - Direct
  - Comfortable, low-stress

- Design to maximize these goals for walking and bicycling rather than designing to minimum requirements

Functional classification

Should street width be based on classification?
Should street width be based on classification?

Functional classification doesn’t adequately describe the street’s role in a community.

Context zones

Design: Plossel-Zyberk and Company
Context-based, descriptive terms

- Main Street
- Avenue
- Boulevard
- Parkway
- Pedestrian-oriented
- Auto-oriented
- Land uses and street designs

San Francisco’s street types

**Commercial**
- Downtown commercial
- Commercial throughways
- Neighborhood commercial

**Residential**
- Downtown residential
- Residential throughways
- Neighborhood residential

**Industrial**

**Mixed use**
- Special
- Parkways
- Park edge
- Park interior
- Multi-way boulevards
- Ceremonial (civic)
- Alleys
- Shared
- Paseos (ped only)

Speed
Speed impacts interactions

Drivers less likely to stop for people at crosswalks when driving at 30 mph +

Source: Bertulis and Dulaski, 2014.

Conventional design

Operating speed
  =
Design speed
  =
Posted speed

Complete Streets

Target speed
  =
Design speed
  =
Posted speed
To reduce operating speed:

- Narrower lane widths
- Narrower roadway
- Add “friction” with on-street parking, landscaping
- Space and synchronize signals for moderate speeds
- Smaller curb radii
- Reduced “shy distance” from median
- No superelevation
- Design of right turn lanes
- Horizontal deflection: curb extensions, chicanes
- Vertical deflection: speed humps, tables
- Textured paving
- Coordinate with building design to constrain sightlines

Costs to control operating speeds

- Design to E LOS → less pavement = less cost

Costs of designing to LOS C or D

- Pavement, longer crossings, more delay at intersections
- Consider LOS as one of many performance measures
Costs to control operating speeds

• Design to E LOS → less pavement = less cost
• Narrower travel lanes → less pavement = less cost

Narrower travel lanes

• Lane widths appropriate for 70 mph not needed for 30 mph traffic
• 10- and 11-foot lanes just as safe on urban arterials with posted speed limits of 45 mph or less
Costs to control operating speeds

- Design to E LOS → less pavement = less cost
- Narrower travel lanes → less pavement = less cost
- Signal progression → cost to interconnect
- Raised medians → include in project scope

Medians and pedestrian crossings:

- May reduce pedestrian crashes by 46% at marked locations
- May reduce pedestrian crashes by 39% at unmarked
- May reduce driver crashes by 39%
- Enhance visibility
- Reduce speeds

Consider medians:

- Multi-lane roadways
- Urban and suburban
- Mixture of people walking and driving (12k ADT)

Design:

- 8'-10' preferred, 6' minimum
Costs to control operating speeds

- Design to E LOS $\rightarrow$ less pavement $\rightarrow$ less cost
- Narrower travel lanes $\rightarrow$ less pavement $\rightarrow$ less cost
- Signal progression $\rightarrow$ cost to interconnect
- Raised medians $\rightarrow$ include in project scope
- On-street parking $\rightarrow$ revenue from meters

Costs to control operating speeds

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- Signal progression $\rightarrow$ cost to interconnect
- Raised medians $\rightarrow$ include in project scope
- On-street parking $\rightarrow$ revenue from meters
- Rightsizing number and width of lanes $\rightarrow$ minimal costs with resurfacing

Lane and roadway width
Do we have to widen roads to fit everything?

Don’t ask “How much do we need?”

Ask:
- How much do we have?
- What do we want?
- How do we design it to fit?

New approach: from the land use in

Result:
Context-appropriate. Sidewalks, bike lanes, & adequate travel lanes
Constrained corridor? Rightsize it!

- Convert 4-lane to 2 lanes, TWLTL, & bike lanes
- 29% crash reduction for ALL users

FHWA proven safety countermeasure

“Road diets can be low cost if planned in conjunction with reconstruction or simple overlay projects, since a road diet mostly consists of restriping. Roadways with Average Daily Traffic (ADT) of 20,000 or less may be good candidates for a road diet and should be evaluated for feasibility.”

Rightsizing tool: Narrower travel lanes

- Ten feet should be the default width for general purpose lanes at speeds of 45 mph or less.

*ITE Traffic Engineering Handbook, 7th Edition*
Rightsizing tool: Curb extensions

- Can help manage stormwater

Rightsizing tool: Curb extensions

- Can provide place for transit customers
Rightsizing tool: Curb extensions
  • Quick, cheap, meaningful change

Rightsizing tool: Bike lanes

Rightsizing tool: Transit islands
Rightsizing tool: Transit-only ROW

Capacity and delay

Defining mobility

Typical experience:
• 45 mph speed
• 2 min wait at signal

Viable alternative: 2-way progression set for 30 mph
Roundabout corridors
Golden, Colorado
• Four 2-lane roundabouts in a half mile
• Free-flow speeds reduced from 47 to 32 mph
• Reduced travel time end-to-end
• 40% fewer crashes

Defining mobility
Signal progression for driving & bicycling

Defining mobility
• With Complete Streets, volume and speed are outcomes—not inputs.
• Transportation is a means, not the ends
• Consider access to destinations as the goal
• Travel-time reliability more important to individuals
Peak hour

- Collect multi-modal data over 2-4 hours of peak traffic
- Use signal timing or TDM to shift congestion
- Use corridor-level performance measures rather than specific intersection peak LOS
- Look for solutions at the network level

VMT projections are overestimated

The reality

A post-construction analysis of traffic on arterials and collectors in urban areas revealed traffic forecasts were overestimated by a significant amount.
Overestimated VMT

- Implies a level of “needed” spending that is unachievable
- Encourages overbuilding projects, which leads to fewer projects and more maintenance costs
- Discourages lower-cost, lower-throughput streets that benefit communities

Future trends are unknown

- Changing demographics and preferences
  - Two largest age groups—Millennials and Boomers—want better access and proximity
  - Coming soon: connected vehicles, expanded shared mobility opportunities
- Plan for what you want in your community

Intersection design
Intersection principles

- Compact
- Self-evident
- Simple, right angles
- Access management
- Time for safety of all users

Improving intersections, inexpensive:

**Signal timing**

- Short cycles to function as network
- Reduce person delay
- Ensure enough time for people of all ages and abilities to cross
- Coordinated for low-speed travel
- Fixed-time signals where pedestrians are expected

**Improving intersections, inexpensive:**

- Leading pedestrian intervals/Lagging lefts
- Countdown clocks
- HAWK & RRFBs and high visibility crosswalks
- Bike boxes, advance stop lines
- Banning turning movement in crash-prone areas or where walking is prioritized
- Use interim design strategies
Improving intersections, as part of scope:

• Tighten radii
• Eliminate free right-turn lanes
• Curb extensions
• Modern roundabouts
• Square-off skewed intersections

Square off skewed intersections

• Improve visibility, safety for drivers
• Reduce crossing distance for people walking

Sight distance at intersections
Daylighting

Simple, low-cost, high-impact

Simple, low-cost, high-impact
Control vehicle

- Less common vehicle
- Infrequent turns
- Accommodated, but encroachment and complex maneuvers allowed/expected

Design vehicle

- Common user, regularly accommodated
- Turns frequently with little encroachment
- Consider:
  - DL-23 for neighborhood streets
  - SU-30 for downtown/commercial
  - WB-50 for designated truck routes (using full intersection for turns)
  - BU-40 for designated transit routes with full-time bus service

Design or control vehicle?
Lessons:
• Accommodate safe travel for all users
  • But aim for comfortable, attractive routes for walking, bicycling, and transit
• Use an iterative design process
  • Re-evaluate assumptions and decisions
  • Document your choices
• Don’t fear unique designs
• Don’t fear piloting new designs

Exercise
What streets in your community could benefit from re-imagining?

Please type your response into the question box. You may include the name of your community if you like.

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  Sign up for Part 3 at pawalkworks.com!