Part I: A Catalog of Treatments and Policies

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- Document best practices
- Original research to fill gaps in knowledge
- Develop guidance to plan/design/operate for non-motorized users

April 2018 – March 2020
Raise the roof
- Research & innovation – advance practice

Raise the floor
- Improve standard practice – adjust the status quo

Raze the barriers
- Improve processes for implementation
Part I: A Catalog of 29 Treatments and Policies

- Basic Treatments to Reduce Pedestrian Delay
- Better Crossing Experience
- Eliminating Conflicts with Parallel Traffic Turns
- Mitigating Conflicts with Parallel Traffic Turns
- Bicycle Phases and Special Bike Needs
- Special Phasing Techniques Favoring Pedestrians and Bikes

Today: Focus on 10 treatments/policies
SET 1: Basic Treatments to Reduce Pedestrian Delay

1. Evaluating Pedestrian and Bicycle Crossing Delay

2. Short Cycle Length

3. Maximizing Walk Interval Length
   a. General (Pre-timed Phases)
   b. Rest in WALK
   c. Adapting Minimum Green to Demand
   d. Adaptive Walk Intervals
   e. Changing from actuated to pre-timed

4. Permissive Periods for Pedestrian Actuation

5. Recall versus Actuation for Pedestrians
“Evaluating Pedestrian and Bicycle Crossing Delay”

- **Policy:** Whenever vehicular delay is reported, ped delay must be reported, too.

**Boston Example**

- **Timing Plan 1:** 123 s average ped delay
- **Timing Plan 2:** 45 s average ped delay (with 0.5 s increase in vehicular delay)

“Only what’s measured counts”
Basic Treatments to Reduce Pedestrian Delay

“Short Cycle Length”

Amsterdam Policy:
1. Make cycles as short as possible
2. Maximum Cycle = 100 s

- Less Pedestrian Delay, Less Transit Delay
- Better Ped/Bike Compliance
- Fewer Speeding Opportunities
Basic Treatments to Reduce Pedestrian Delay

“Maximizing WALK Interval Length”

Not this:

[Image: Green WALK interval with Ped Clearance]

but this:

[Image: Extended WALK interval within parallel vehicular phase]

[Make the WALK interval as long as will fit within the parallel vehicular phase]

For coordinated phases, use the setting “Rest in WALK”
SET 2: Eliminating Conflicts with Parallel Traffic Turns

1. Exclusive Pedestrian Phases

2. Protected Left Turns on Multilane Roads

3. Concurrent Yet Protected Pedestrian Crossings

4. Delta Islands for Ped and Bike Crossings
“Protected Left Turns on Multilane Roads”

Amsterdam Policy: On multilane roads, left turns are protected only, never “permitted”.

US Guidelines: Permitted lefts are OK unless:
- 50+ mph speed limit
- Crossing 4+ lanes
- Crash experience
  - Contrary to Vision Zero principles
"Concurrent Yet Protected Pedestrian Crossings"

a.k.a. Protected Right Turns, Right-Turn Overlap

Using right turn AND left turn signals to protect crossings from all turn conflicts
SET3: Mitigating Conflicts with Parallel Traffic Tums

1. Leading Pedestrian Intervals
2. Delayed Turn
3. Flashing Ped/Bike Crossing Warning
“Leading Pedestrian Intervals”  
a.k.a. Pedestrian Head Start

1. Audible signal needed
2. May bikes use it, too?
3. Can make cycle longer – and so in Netherlands:
   - NOT used where “protected intersection” layout gives peds/bikes a head start in space.
   - Only used where bike & car have the same stopline
"Leading Through Intervals" or "Delayed Turn" -
- With exclusive turn lanes

**LPI:**

**LTI:**

LTI in Charlotte ("LPI+")

New York City: Alternative to a protected bike phase
"Leading Through Interval" or "Delayed Turn"
- Without exclusive turn lanes
Mitigating Conflicts with Parallel Traffic Turns

“Flashing Ped/Bike Crossing Warning”

**Flashing Yellow Arrow**

**Flashing Bike Crossing Warning, Amsterdam**

“LET OP” = WATCH OUT
SET 4: Better Crossing Experience

1. Countdown for WALK + FLASHING DON’T WALK
2. Red Period Countdown
3. No Turn on Red
4. Independently Mounted Pushbuttons
5. Accessible Signals without Pushbuttons
6. Call Indicators
7. Serving Slower Pedestrians
SET 5: Bicycle Phases and Special Bike Needs

1. Indicating Bike Phases
2. Detection for Bicycles
3. Diagonal Bike Crossing Phases
4. Minimum Green and Safety-Based Green Extension for Bikes with Shared Traffic Signals
5. Minimum Width Crossing Islands for Bikes, and Single-Stage Bike Crossings next to Two-Stage Crossings for Pedestrians
“Indicating Bike Phases”

FHWA won’t allow bike green if there are permitted turn conflicts
SET 6: Special Phasing Techniques Favoring Peds and Bikes

1. **Multi-Stage Crossings**
   a. Progression through ped crossings
   b. Pedestrian Overlaps with Left Turn Phases and Different Lead-Lag Phasing Sequences

2. **Pedestrian Phase Overlaps with Each Other, with Bike Phases, and with Vehicular Holds**

3. **Re-service for the Ped/Bike Phase**

4. **Two-Stage Left Turn Progression for Bikes**

5. **HAWK Signals at Intersections with Minor Streets**
“Re-service for the Ped/Bike Phase”

Reservice: twice per cycle

Run free: on demand, allowing cars 10 s green between ped phases