THINKING OUTSIDE THE BOX

Unique PTS Applications
WORLD TRADE CENTER

New York City
World Trade Center

Heavy Pedestrian Traffic

- Roads on the WTC campus in NYC are still not open to public vehicle traffic
- Commercial vehicles only
- Pedestrian traffic is heavy
- Construction is still ongoing on several of the WTC Towers
- A new train station called "The Oculus" recently opened, creating an influx of pedestrian traffic
Traffic Specifics

World Trade Center

• At most, 10 vehicles per hour travel onto the site

• During peak hours, up to 3,800 pedestrians per hour

• The Port Authority of NY/NJ needed to safely control pedestrian traffic, while still allowing commercial and construction vehicles into the area
Pedestrian Control

Portable Traffic Signals – Not just for cars!

- A custom PTS system was deployed that favored pedestrian traffic as a priority

- Pedestrian crosswalks rested in constant WALK mode until vehicle presence was detected via the video detection system
Pedestrian Control

Portable Traffic Signals - Not just for cars!

- When vehicles were detected, crosswalks switched to DON’T WALK to allow vehicles onto the site
HURRICANE SANDY RESTORATION

Mantoloking, NJ
The Problem

“Quite often there are low-volume access points, such as residential driveways, within the temporary one-lane section of roadway. There is the potential for motorists entering the roadway from these access points to misunderstand the direction of traffic, enter the roadway going in the wrong direction, and collide with a vehicle travelling through the work zone. While these access points should be monitored, existing methods are not always feasible.”

-2011 Texas A&M Transportation Institute Study
Previous Solutions

Flagging

• Impractical for multiple low-volume driveways

• Inefficient use of manpower

• Cost-prohibitive
Previous Solutions

Red-Yellow-Green Signals

• Lacks direction information

• Requires dedicated phasing, while all other movements are held

• Increases overall cycle lengths, resulting in longer traffic queues on main line
Development

• Circa 2011, TxDOT was looking for a solution to the problem of residential driveways within lane closures

• Several prototypes were developed based off feedback from TxDOT and TTI

• Each was tested in a real work area for compliance

• Project stalled for several months, until...
Hurricane Sandy

October 2012

- Extensive damage to the NJ Coast
- Route 35 completely washed out
Before Sandy
After Sandy
Hurricane Sandy

NJ Route 35

- During reconstruction, Route 35 was a single lane
- Heavily traveled road, large residential area
- Dozens of construction vehicles and contractor trucks in and out of each driveway
Project Specifics

Rt 35

• Overall work area of 1 mile

• 2 stages of ½ mile each

• Stage 2 had 31 driveways within the work area

• NJDOT wanted to avoid long cycle lengths and queues
Further Development

- Using the prototypes from the TxDOT work, a final design was developed alongside NJDOT

- 12” circular Red
- 8” flashing red arrows

- Only one indication is active at a given time
Signage

- Verbiage per NJDOT
- Affixed to each DAD
Hurricane Sandy Project

- 31 Driveway Assistance Devices ran for 13 months

- Community Outreach: NJDOT went door-to-door to explain the device so drivers were familiar

- 100% compliance – no reported issues or incidents
Approvals / FHWA Status

• The Driveway Assistance Device is NOT in the current MUTCD

• Several states have completed or are conducting official FHWA Experimentation of the device for future inclusion in the Manual

• Other states have used the device via a permitting or interim approval process
TEMPORARY RAMP METERING

Missouri
Temporary Ramp Metering

June/July 2011 FHWA Study

- FHWA conducted a joint field study with MoDOT on Work Zone Ramp Metering
- Pooled Fund Study TPF-5(081)
- Study was conducted by The University of Missouri under the Smart Work Zone Initiative
- Testing the effectiveness of temporary remap metering preceding freeway construction zones
Temporary Ramp Metering

FHWA Study

- Work zone ramp metering was deployed in 7 different work areas around Columbia, Missouri
- I-70 & US 63
- All areas were 2-to-1 lane closures
Typical Set Up

- Each location used a portable pedestal mounted traffic signal (Red-Yellow-Green)
- “Signal Ahead” Sign
- ”1 Vehicle Per Green” sign
- “Stop Here on Red” sign
- Four cameras
- Two radar guns
What Happened?

Results

- **Average of 24% reduction in total delay** (mainline plus ramp) at low truck percentages

- Evaluation suggests that temporary remap meters are best used at locations where there is potential for congestion and only activated when demand exceeds capacity
Other States Have Experimented As Well

Colorado DOT

• Multiple Locations around Denver
• Interstate 70
• Interstate 25
• Final Report/Findings are unavailable, but CDOT has encouraged the local contractor community to utilize ramp meters to increase efficiencies and safety
Other Ramp Metering Applications

Cape Cod, Mass.

- Trailer-mounted PTS used at a merge point leading to bridge construction
- Operated in Ramp Meter mode to alternate vehicles from either side of the merge point
- Eased congestion and queues on the ramp leading up to the merge point
AUTOMOMOUS VEHICLE TESTING

California
Autonomous Vehicles & PTS

- The Industry is involved in this new technology

- PTS are ideal for testing; easily adaptable in safe, controlled environments

- Ability to test not only the vehicles response to permanent signals, but to test those new signal components as well

- This testing is crucial in development of new signal technology as well, for both temporary and permanent applications (including pedestrians)
STURGIS MOTORCYCLE RALLY

Sturgis, South Dakota
• 50 weeks of the year, there is no need for traffic signals at most intersections

• Very low traffic volumes

• 4-way stop signs at most intersections
Sturgis Motorcycle Rally

Every August

- 500,000+ motorcycle enthusiasts flock to Sturgis for the Annual Motorcycle Rally

- Traffic volumes increase by 1000%

- Congestion and queues are a major problem

- **2018**: 505,969 vehicles
- **2017**: 469,103 vehicles
Traffic Management

SDDOT

- Tried flagging in the past – was inefficient and unsafe

- Switched to PTS at a series of intersections leading up to the town
Growing Bigger

- SDDOT has been using PTS for Sturgis every year since 2005

- 2015 was the 75\textsuperscript{th} Rally, with over 750,000 people

- 24 PTS were deployed to manage traffic, along with intersection illumination and manual wireless control for police officers
Results

”Before these signals were introduced we would use flaggers at various intersections during the day. People would drive down the wrong side of the road because of poor direction and visibility.”

--Dan Cooper, SDDOT

“The primary reason for the change (to PTS) was safety concerns with having personnel in the roadway with heavy congestion. A secondary issue was staffing and overtime pay to have flaggers at intersections for ten to twelve hours a day.”

--Monica Heller, SDDOT
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