
"Improving STOP! - A New Diagnostic Approach for Quickly Remediating the Red Light Running Safety Problem"

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Agenda

- **The Right Angle Collision Epidemic**
- **Comparison of Strategies**
 - Traditional
 - Automated Enforcement
 - RLR Diagnostic
- **The Equipment**
- **How it Can be Applied**
- **Conclusions**
- **Q&A**

The Right Angle Collision Epidemic!

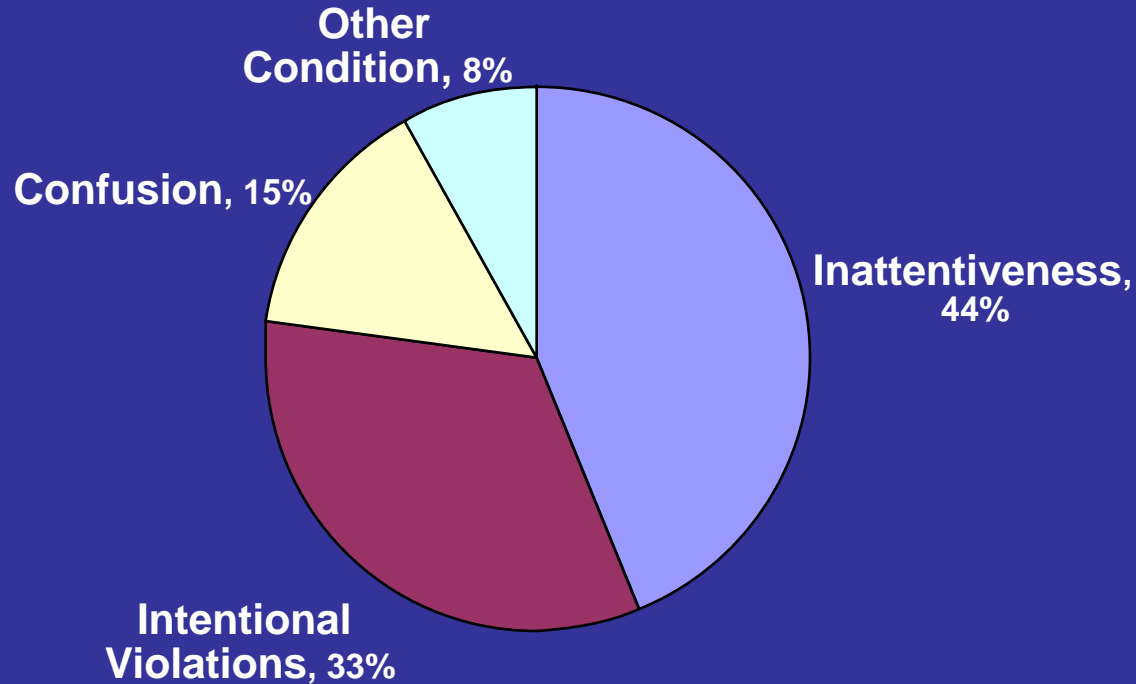
Annual Statistics...

- *168,000 injured*
- *854 fatalities*
- *Economic loss of \$14 billion*

Source: NHTSA 2004, FHWA 2003 Statistics



Red Light Running - Driver Behavior



Source: FHWA unpublished study by BMI

Strategy Comparisons

Traditional Traffic Engineering Approach

1. Prioritize Intersections Using Crash Records and Collision Diagrams
2. Identify and Apply Countermeasures
3. Evaluate Results (via Crash Statistics)
4. Repeat



Automated Enforcement

- Pass Legislation
- Develop Team
 - Police/Local Agency/RLR Contractor
- Monitor Violations
 - Assess Problem & Seek Solutions
- Issue Tickets
- Monitor Performance



Red Flex Equipment



Diagnostic Approach

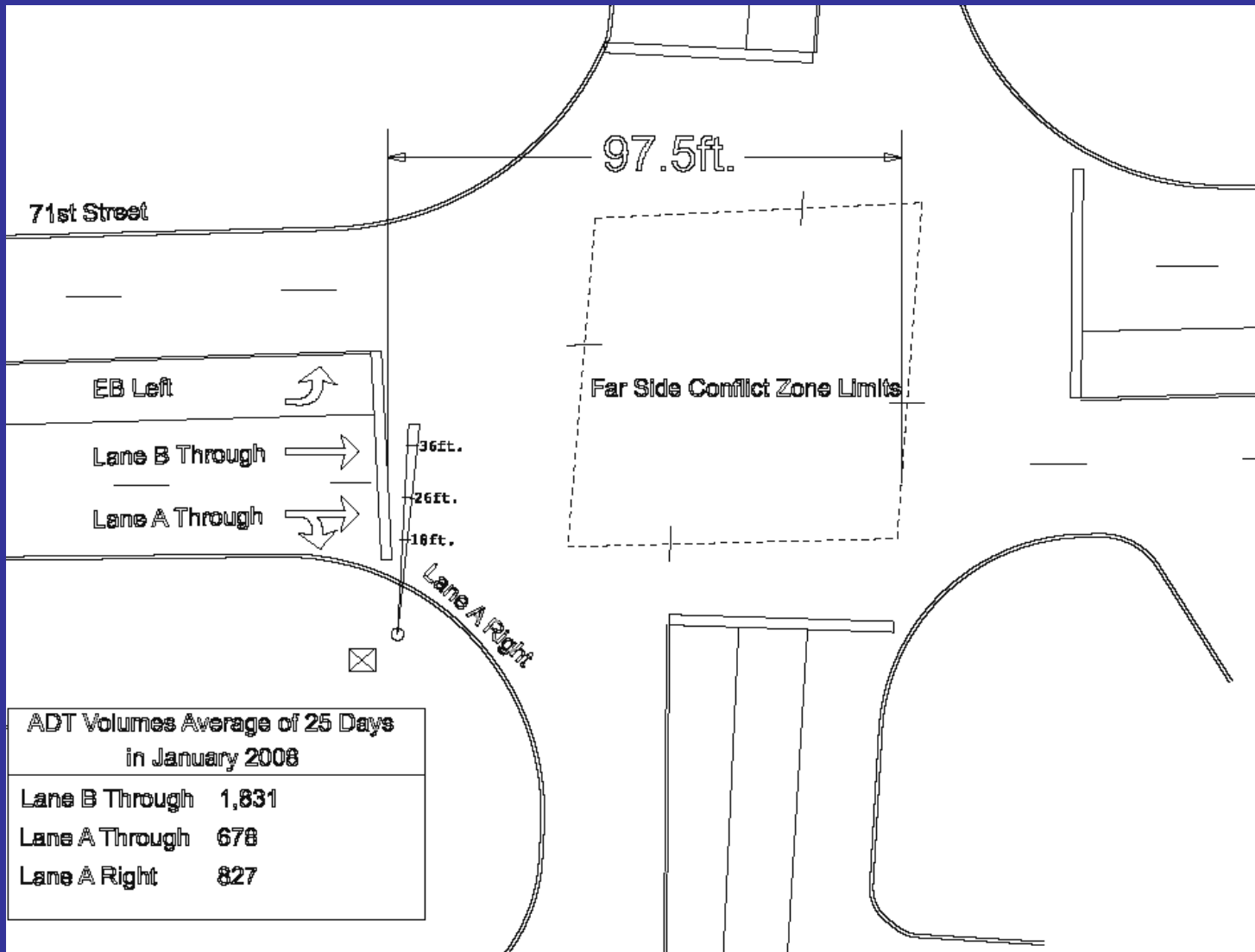
- Identify Top Intersections (Crash Statistics)
- Check Clearance Intervals
- Measure RLR Violations
- Apply Countermeasures
 - Engineering
 - Selective Enforcement
 - Automated Enforcement
- Evaluate
- Repeat



Basis for the Diagnostic Approach

- Crashes are Relatively Rare Events
- RLR Violations are Frequent Events
- RLR Violations can be used as Surrogate

It's All About Exposure



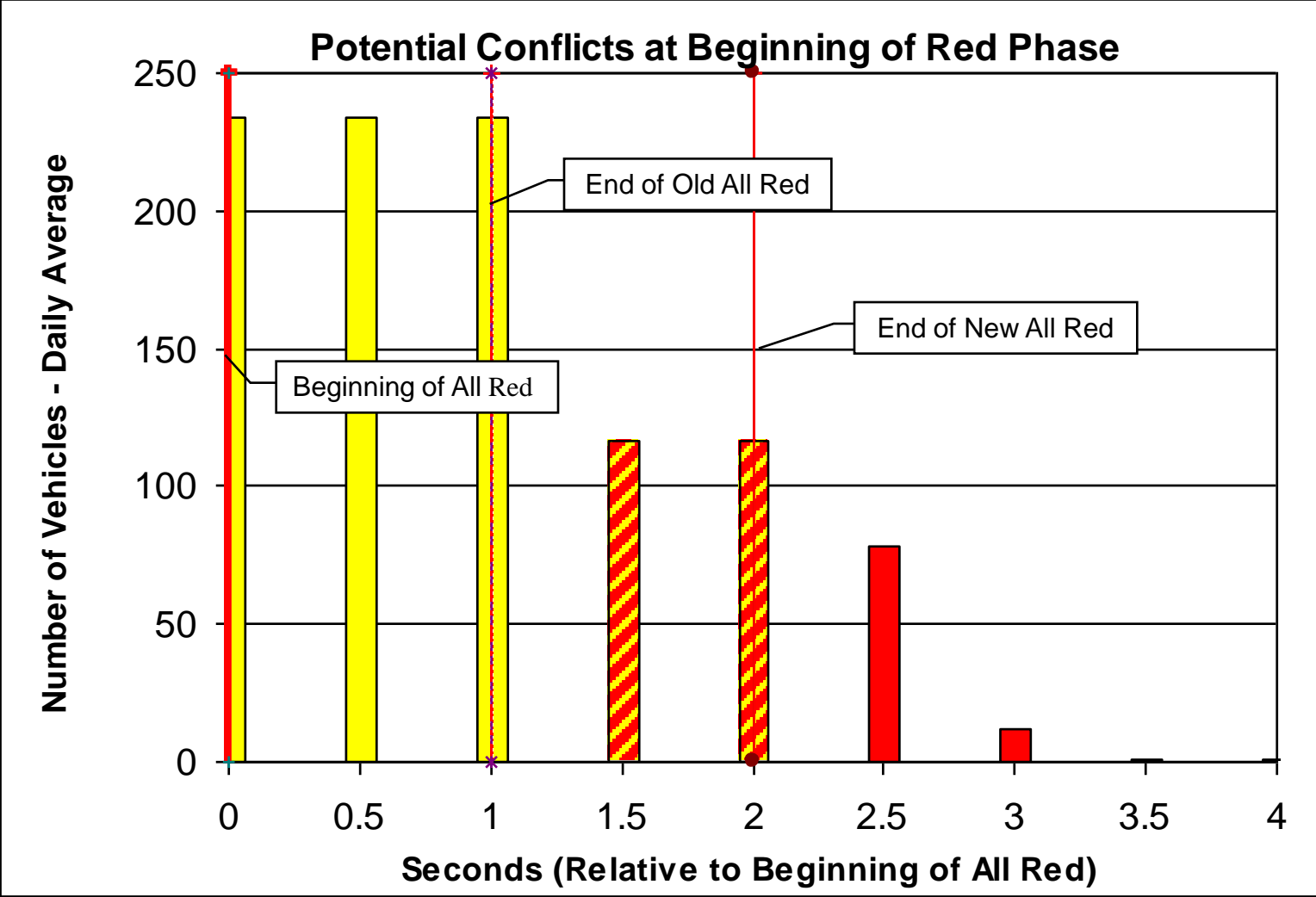
At-Risk Behaviors (Types of RLR Violations)

- Four Categories
 - Late Yellow
 - Shallow Red (< One Second)
 - Deep Red (> One Second)
 - Early Departures
- Risk is a Function of Exposure

How this can be applied ...

Applications

- **Engineering Changes**
 - Timing Changes
 - Signal Display Improvements
 - Sight Distance Improvements
- **Enforcement Remedies**
 - Random Enforcement
 - Selective Enforcement
 - Automated Enforcement



- Protected Vehicles in Conflict Zone
- Previously Unprotected Vehicles in Conflict Zone
- Unprotected Vehicles in Conflict Zone

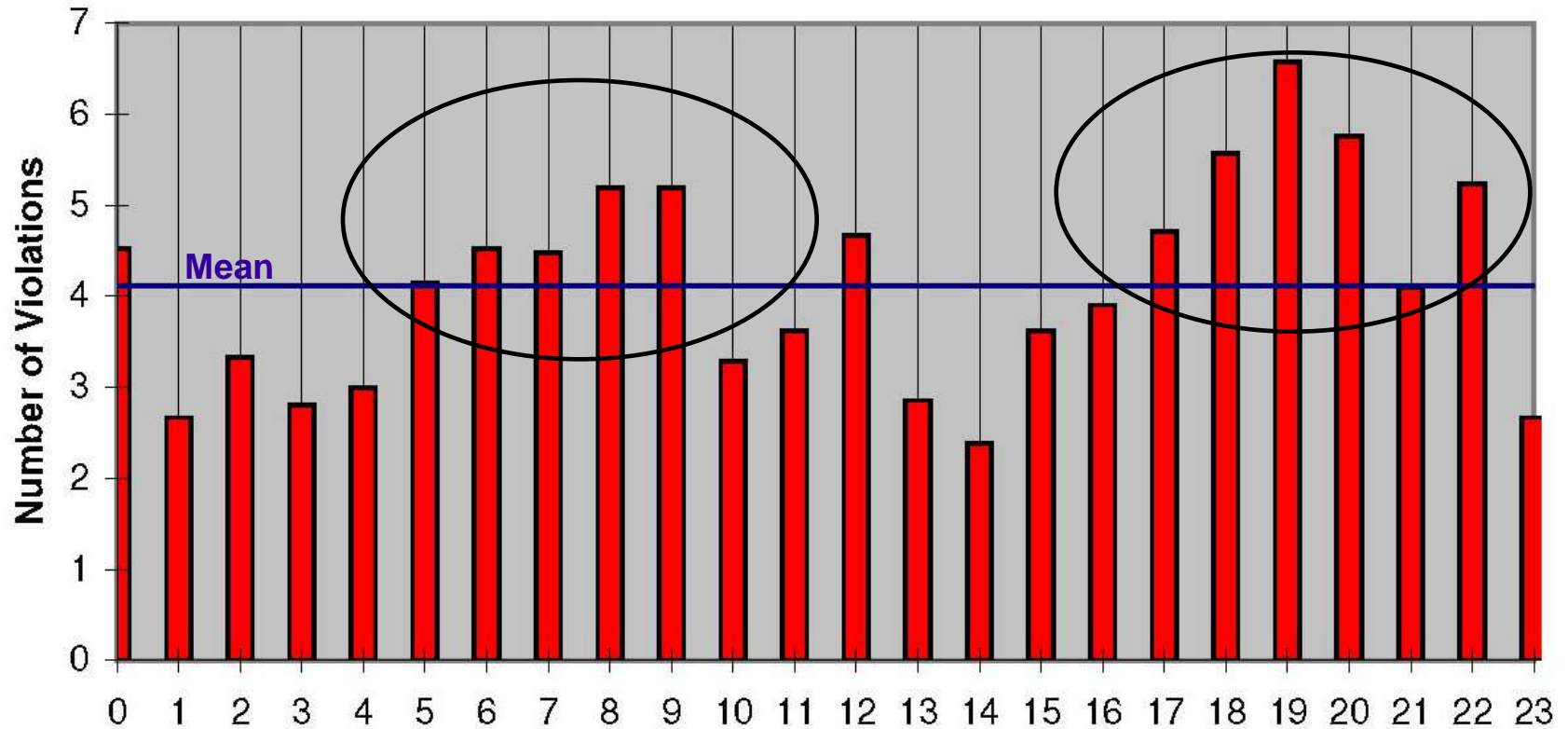
RLR Countermeasure - Enforcement

- Hour of the Week violation data provided to law enforcement
- Selective Enforcement is Conducted
- Weekly Reports Guide Further Enforcement Details



Arcade St. at Minnehaha Ave.
“High Crash Rate - St. Paul”

RLR Violation Reporting (Hourly)



Average Hourly Red Light Violations

Engineering Countermeasures

- Improve signal visibility
- Improve signal conspicuity



RLR Monitoring Equipment

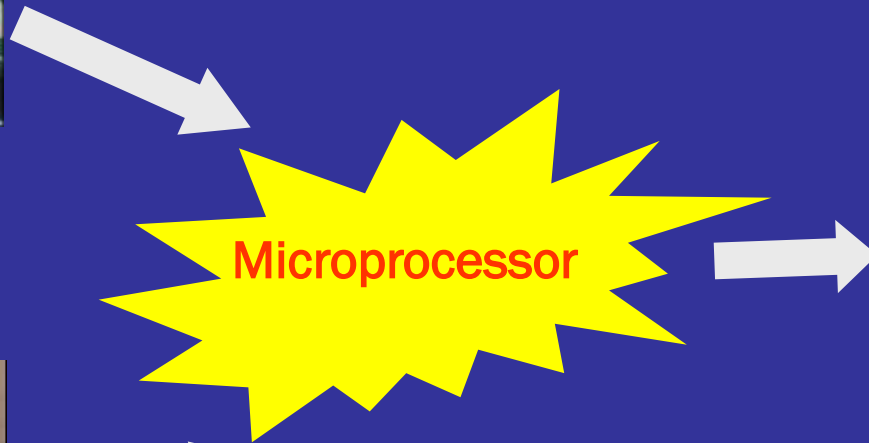
Project Tool



Vehicle Detectors



Phase Detectors



Information

Conclusions

- ✓ **The Diagnostic Approach is Effective**
- ✓ **Improves Red Light Compliance**
- ✓ **Targets Engineering Countermeasures**
- ✓ **Enhances Enforcement Countermeasures**
- ✓ **Confirms Results Rapidly**

For More Information, Contact...

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Engineering Countermeasures

- Improve Clearance Intervals
- Improve Signal Timings



Before



After

Enforcement Countermeasures



Automated Enforcement



Selective Enforcement

Study Results

Study Results – Raw Data

Location	Red Light Violations	Late Yellow Entries	Red Light Violation Reduction
<u>Wyoming, MI</u>			
Before	76	411	
After	4	51	95%
<u>Lansing, MI</u>			
Before	18	304	
After	9	166	50%
<u>Southfield, MI</u>			
Before	10	172	
After	28	111	-180%

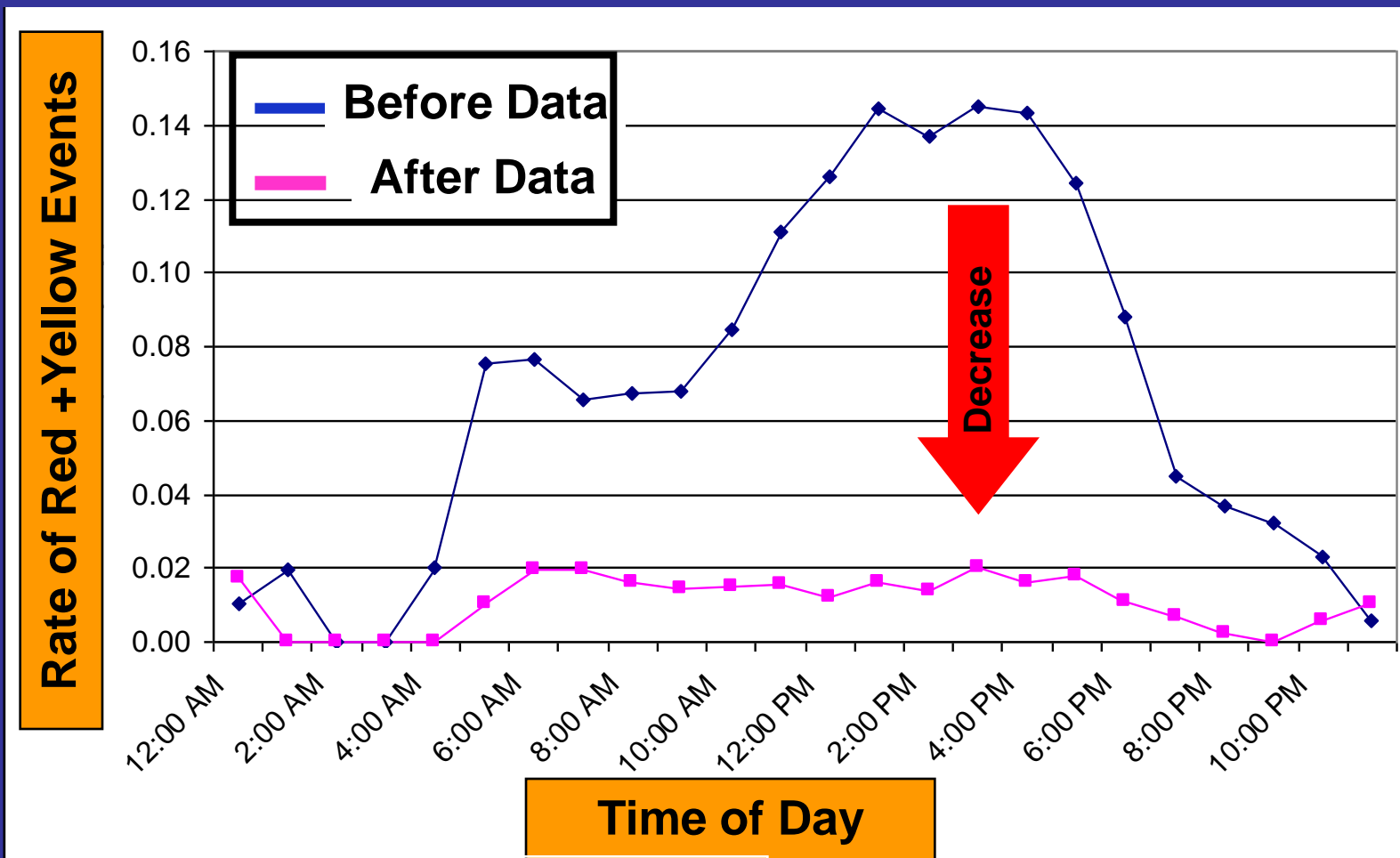
Study Results

Distances to Signal Display

Location	Distance to Signal Displays (Before)	Distance to Signal Displays (After)	Combined Reduction (Red + Late Yellow)
Wyoming, MI	30-40'	105'	86%
Lansing, MI	45-55'	80'	52%
Southfield, MI	50-60'	135'	25%
Overall*			54%

***Numeric average of all three sites**

RLR Countermeasures - Signal Geometry



Note: 3-hour averages shown

RLR Countermeasures - Clearance Intervals

- Intersection with highest crash rate in St. Paul, MN
- WB All Red extended 1 sec, Yellow extended ½ sec
- Showed immediate/sustained results (10% reduction)



Snelling Ave. at St.
Anthony Ave.

“Top Crash Rate - St. Paul”

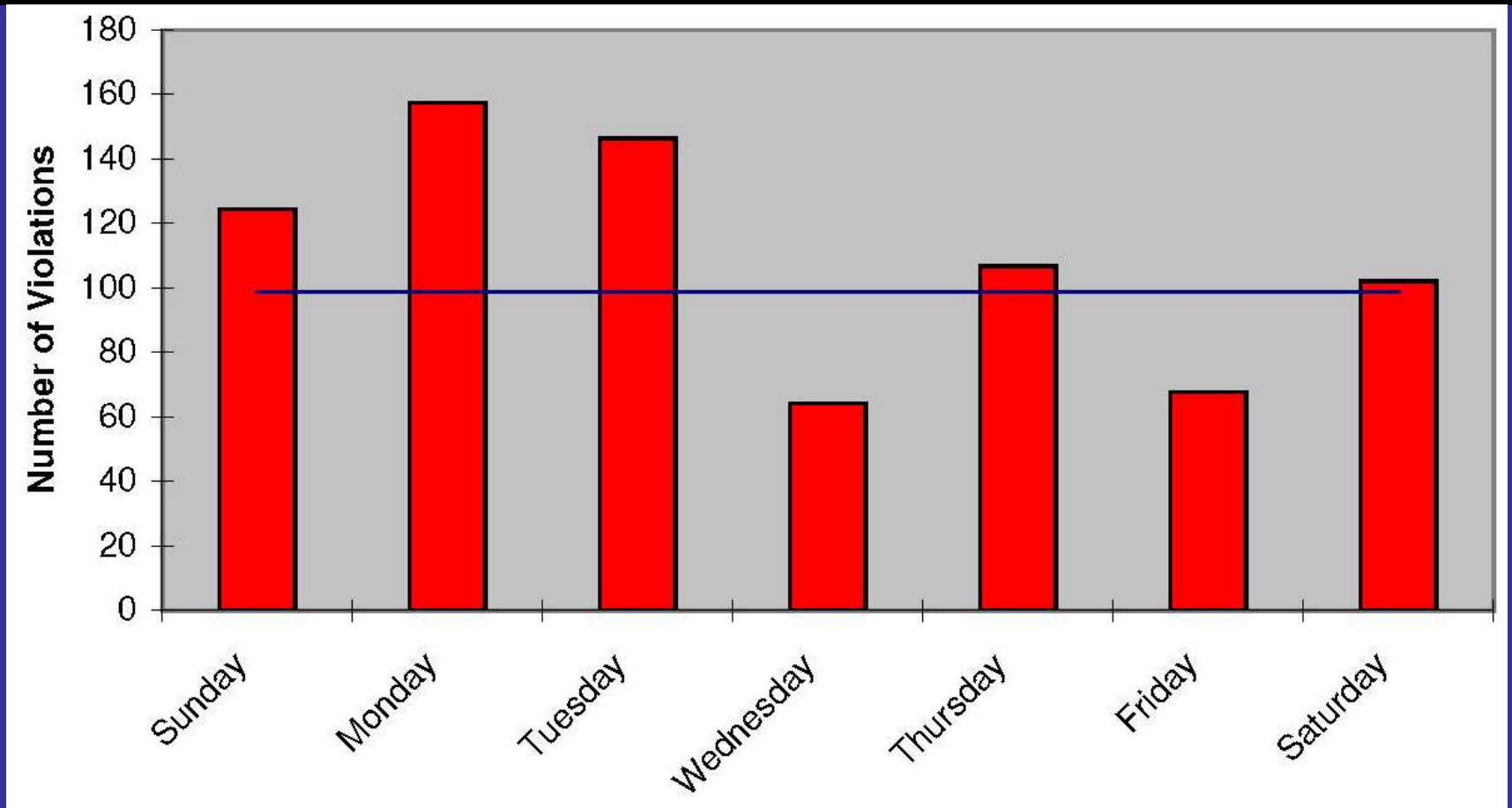
Countermeasures – Engineering Solutions

- In “Top 5” for angle crashes - Indianapolis
- Avg. 100 EB red light violations per day (~3% violators)
- Average of 125 late yellow entries per day
- Pending Clearance Interval changes



71st @ Georgetown Rd.
Indianapolis, IN
“Crash Rate in Top 5 – Indianapolis”

RLR Violation Reporting (Weekly)



Average Red Light Violations By Day of Week