



COMMONWEALTH of VIRGINIA

Office of the

SECRETARY of TRANSPORTATION

Transportation Performance Management Federal Performance Measures and Targets

Nick Donohue

Deputy Secretary of Transportation

Margie Ray

Performance Management Manager

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Virginia Department of Rail and Public Transportation



COMMONWEALTH OF VIRGINIA



Performance Management Measures and Targets

- **MAP-21 federal law establishes performance targets for:**
 - **Safety**
 - **Asset Management - Pavement & Bridge Condition**
 - **System Performance**
 - **Congestion**
 - **Air Quality**
- **HB2241/SB1331 – Board to establish performance targets for surface transportation**

Performance Management Target Setting Strategy

Challenged staff to develop a new rigorous data-driven methodology to establish targets

- **Understand how the system is working**
- **Identify and examine trends**
- **Determine whether current investments and strategies are working**
- **Provide findings to CTB for consideration**

Performance Management Target Setting Strategy

Development of targets using data-driven methodology not possible by Federal deadlines

Recommend Board adopt safety targets with acknowledgement that targets will be updated in the coming months using data-driven process

Recommend similar action for all performance measures to meet October 1, 2018 reporting deadline

USDOT published updated guidance on target setting this year leaving little time to develop and implement methodology

Performance Measures

Safety

- **Safety Performance Measures**
 - Number of fatalities*
 - Number of severe injuries*
 - Rate of fatalities per 100M vehicle miles traveled*
 - Rate of severe injuries per 100M vehicle miles traveled
 - Number of non-motorized fatalities and severe injuries
- **Safety Targets Due Annually**
 - Targets for 2018 established August 2017
 - 2019 targets submitted to FHWA by August 31, 2018

Note: 2019 Performance Report due to FHWA on all other measures by October 1, 2018

*Federal measure requiring coordination with Governor's Highway Safety Office

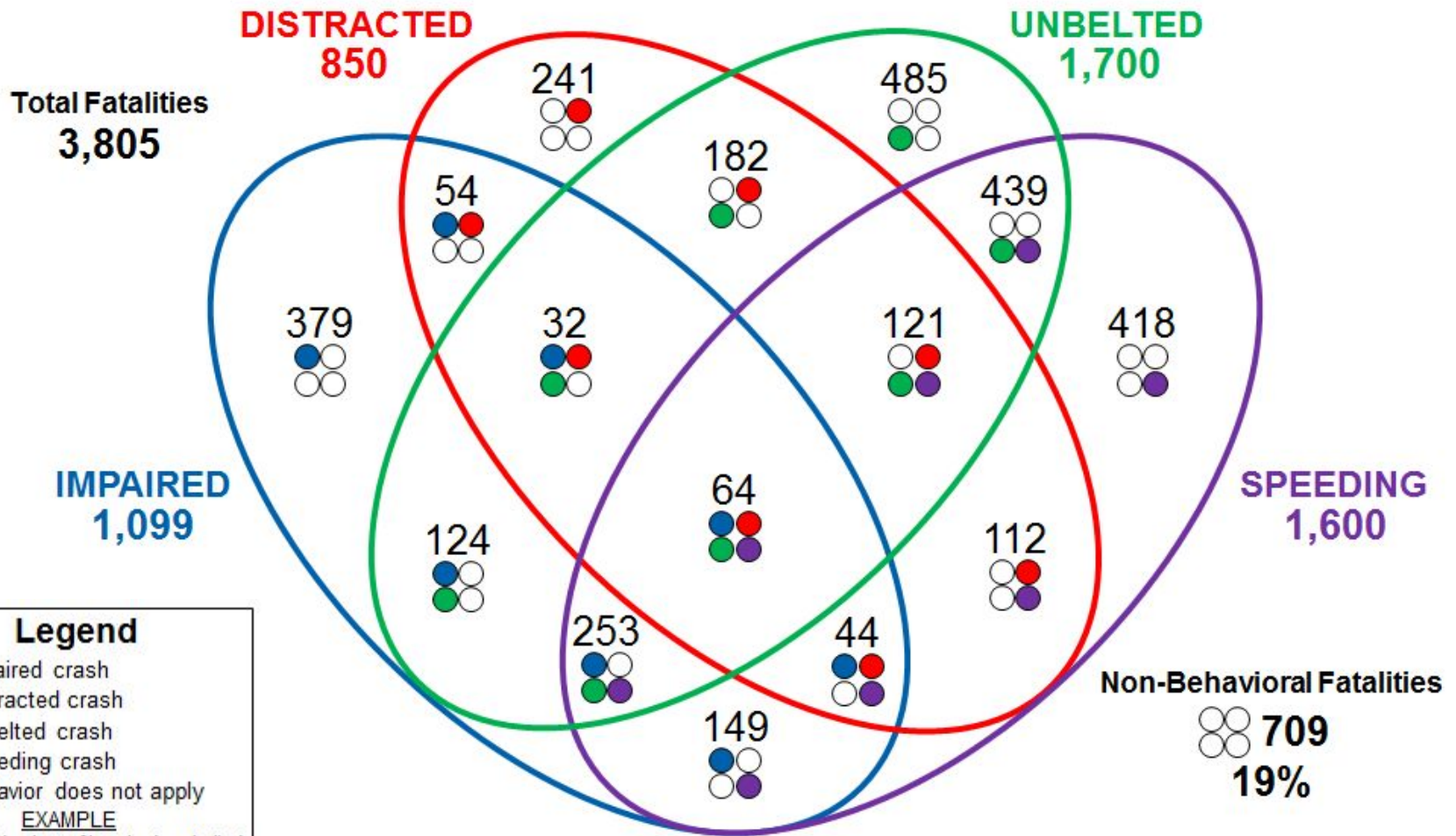
Safety Performance Measures Target Setting Analysis Plan

Analysis plan includes five steps:

- 1) Determine main cause of crash—infrastructure or behavioral
- 2) Determine degree to which behavioral crashes can be addressed through infrastructure countermeasures
- 3) Analyze external factors to predict future crash levels to establish anticipated baseline condition
- 4) Evaluate anticipated impacts of funded projects and strategies
- 5) Establish data-driven, realistic and attainable safety targets

Step 1: Causes of Fatalities

2013-2017 Crashes



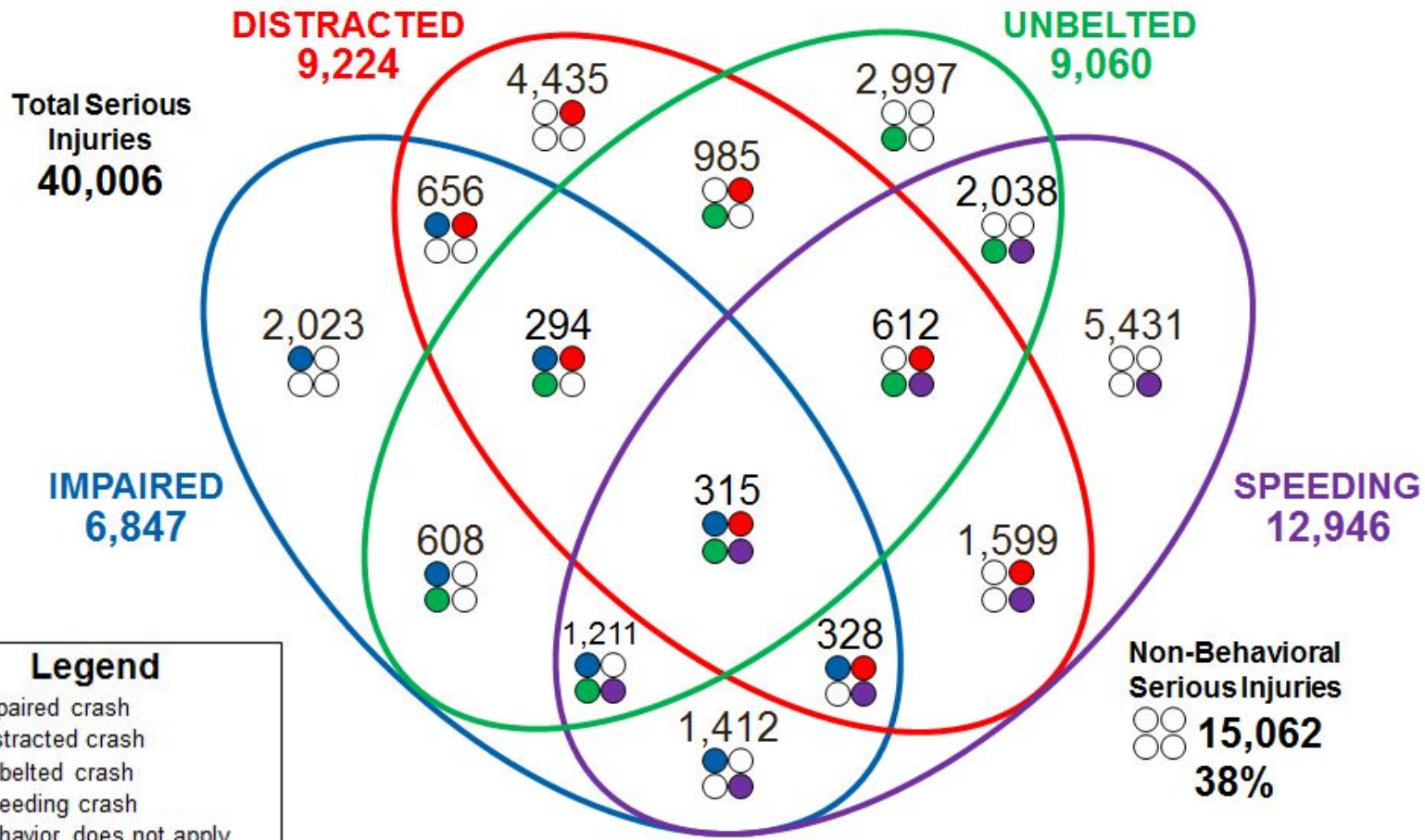
Legend

- Impaired crash
- Distracted crash
- Unbelted crash
- Speeding crash
- Behavior does not apply

EXAMPLE

● ● ○ = Number of impaired, unbelted fatalities where the driver was not distracted or speeding

Step 1: Causes of Serious Injuries 2013-2017 Crashes



Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

- **Certain behavioral causes can be fully or partially addressed through infrastructure countermeasures**
- **Review statistically significant sample of fatal and serious injury crash reports (several thousand)**
- **Determine whether infrastructure countermeasures can help address a particular crash**
 - **If so, to what extent? One-third? 50 percent?**
- **At completion of Step 2, all fatal and serious injury crashes will be categorized for appropriate countermeasures - (i) infrastructure, (ii) behavioral, or (iii) both**

Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

- When unbelted, impaired, speeding, and distracted behaviors are involved, it is harder to influence the crash with infrastructure. However, some behavioral crash outcomes can still be helped or prevented.
- For example, an unbelted driver who is distracted and speeding could be helped by the following infrastructure:
 - curve warning signs and delineation,
 - paved shoulders and rumble strips,
 - removing fixed objects near to the road or providing guardrail.

Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

Example #1 – Lane Departure Crash

- **Speeding (Behavioral), Un-Belted (Behavioral) Crash**
- **Vehicle passing double-sided line with limited sight line results in head-on crash**

Potential Countermeasure

- **Low cost – Centerline rumble stripes**
- **Medium cost – Construct full width paved shoulder and recoverable side-slopes**
- **Higher cost – Construct what is known as a 2+1 three lane roadway with alternating passing lanes; or, provide a four-lane roadway**

Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

Example #2 – Lane Departure Crash

- Distracted (Behavioral), Speeding (Behavioral) Departure Crash
- Vehicle runs off road and hits fixed object (i.e. tree)

Potential Countermeasure

- Low cost – Pave using a Safety Edge that provides for recovery; Add minimal paved shoulder and shoulder rumble strips or stripes (1-1.5ft paved); Remove trees in ROW recoverable area
- Medium cost – Construct wider paved shoulder and recoverable side-slopes within existing cross-section; Provide guard rail or cable
- Higher cost – Rebuild road to meet current design standards

Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

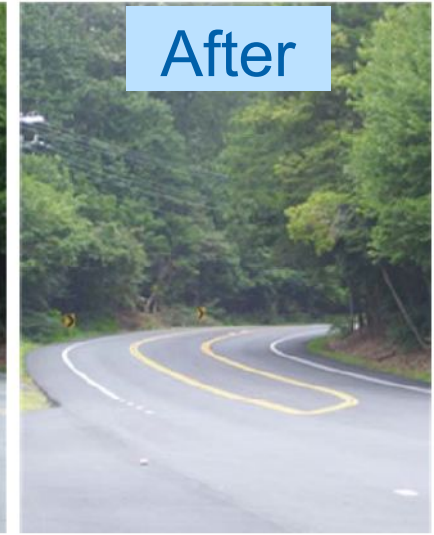
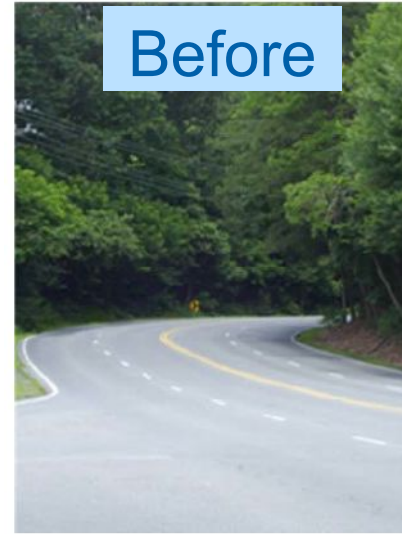
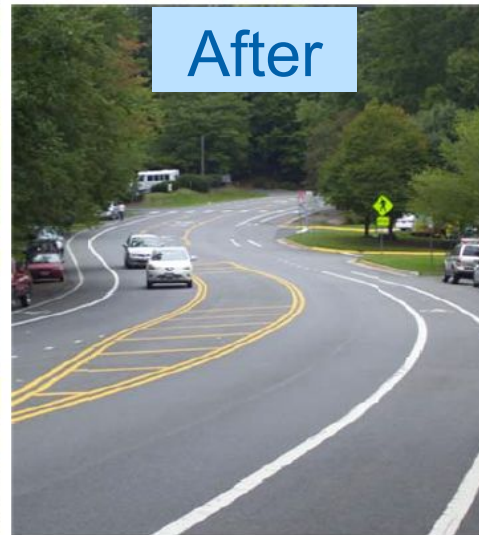
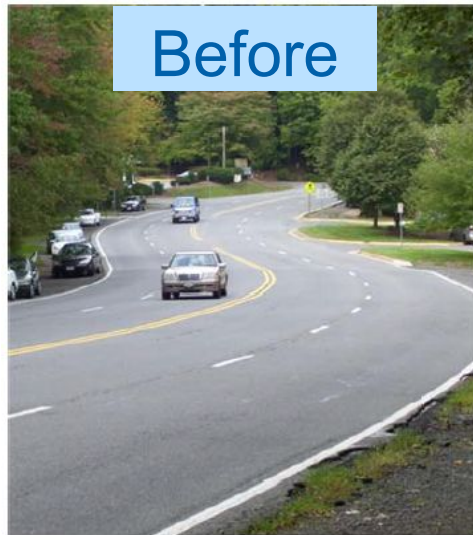
Example #3 – Intersection Crash

- Obviously Drunk (Behavioral)
- Vehicle runs a stop sign, angle crash with second vehicle

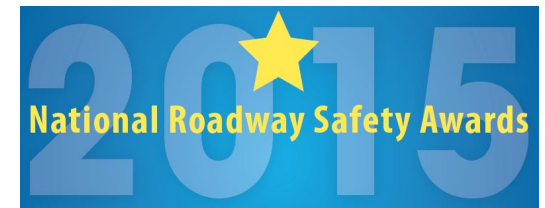
Potential Countermeasure

- Provide advance stop warning and stop bar
- Lighting and enhanced sight lines at the intersection may have provided possible avoidance, but having an “obviously drunk” driver on a 25 MPH roadway may not have changed the outcome with those improvements.

Step 2: Address Behavioral Crashes with Infrastructure Countermeasures



- Total and injury crashes reduced by 2/3
- Percent of drivers excessively speeding decreased from 13% to 1%



Step 2: Address Behavioral Crashes with Infrastructure Countermeasures

- **Many crashes cannot be eliminated by infrastructure because the driver is too impaired or distracted, speeding aggressively and/or occupants are unbelted.**
 - **Non-motorized users may also be impaired, distracted, or acting aggressively.**
- **For these high-risk motorists and crashes, changing behavior and attitudes through public policy, education, enforcement and technology is required.**

Step 3: Determine Future Baseline of Fatal and Serious Injury Crashes

External factors directly related to crash levels

- Vehicle miles traveled
- Vehicle miles traveled on rural roads
- Registered number of vehicles
- Number of licensed drivers
- Number of licensed drivers between ages 16 and 24
- Alcohol sales

External factors indirectly related to crash levels

- Unemployment rate
- Gross domestic product per capita
- Median income
- % of vehicle fleet that is 1991 model or newer

Step 4: Evaluate Anticipated Impacts of Funded Projects and Strategies

- Review programmed projects – HSIP, SMART SCALE
- Evaluate benefits of current investment strategies
- Evaluate current practices/policies driving infrastructure investments
- Evaluate various grant programs (behavioral)
- Quantify anticipated benefits

Step 4: Evaluate Anticipated Impacts of Funded Projects and Strategies

Example

- SMART SCALE Round 1 App ID 586 (UPC 109537)
 - Converting the intersection of US 15 and SR692 in Prince Edward County (Lynchburg District) from a signalized intersection to a roundabout.
 - Project Cost = \$2.8m
- 5-year crash history of 1 fatality and 12 other crashes with injuries
- Roundabouts provide anticipated 60% reduction in crashes
 - Potential benefit - over 5 years 0.6 less fatalities and severe injuries and 7.2 less crashes
 - Once completed, the improvement is there for a very long time and benefits will accumulate

Step 4: Evaluate Anticipated Impacts of Funded Projects and Strategies

Examples of Behavioral Strategies (Grant Programs)

Alcohol and Drug Impaired –

- Publicized (Mass Media) Sobriety Checkpoints and High Visibility Saturation Patrols – *“Drive Sober or Get Pulled Over”* (9% anticipated reduction)

Unbelted

- Publicized (particularly to low-use groups) Short-Term, High-Visibility Seat Belt Law Enforcement – *“Click It or Ticket”* (belt use increases during and then reverts back to a new higher overall level)
- School Programs and Enforcement on Campus (increases use by about 10 to 20%)
- Child Restraint Training and Check Stations (increases use by about 10%)

Step 4: Evaluate Anticipated Impacts of Funded Projects and Strategies

Examples of Behavioral Strategies (Grant Programs)

Distracted

- Increased GDL requirement for beginning drivers
- Communications and Outreach on Distracted and Drowsy Driving
 - School and Employer Programs
 - High Visibility Cell Phone and Text Messaging Enforcement

Speeding

- Communications and Outreach Supporting High Visibility Enforcement

Step 5: Establish data-driven, realistic and attainable safety targets

- Utilizing results of prior steps, establish a methodology for future target setting
- Consider investment levels and strategies necessary to achieve targets
- Updated baseline
 - anticipated impact of infrastructure
 - anticipated impact of behavioral actions/policy
 - new targets

Performance Management

Next Steps

- **July 18 (tomorrow) – Board considers adoption of Safety Performance Targets**
- **August 31 – Safety Performance Targets reported to FHWA**
- **September 18 – Board considers adoption of pavement and bridge condition and system performance targets**
- **October 1 – Pavement and bridge condition and system performance targets reported to FHWA**
- **October – Board briefed on safety analysis for Steps 1-2**
- **December – Board briefed on safety analysis for Steps 3-5**