Freight Operations study
I-64 WB MM 105 – 99

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Operations Problem

➢ I-64 Westbound
  ▪ From MM 105 to MM 99
  ▪ Weekday evening Peak hours

➢ Speed Differentials
  ▪ Steep grades
  ▪ Mix of passenger vehicles and freight traffic

➢ Lane Utilization
  ▪ Driver behavior (lane changing, braking, small gaps)
  ▪ Existing law for trucks & comb. vehicles traveling below posted speed limit

➢ Congestion
  ▪ Reduced speeds
  ▪ Reduced travel time
Approach

- Operational Analysis (2015-16)
  - Crashes
  - Grades
  - Traffic volume and mix
  - Speeds
  - Lane utilization
  - Truck climbing lane warrants evaluation (AASHTO)

- VISSIM Model (2016)
  - Model exiting traffic conditions
  - Evaluate potential solutions
Findings

➢ **Average Daily Traffic (ADT):** 18,700 vehicles (14% Trucks)

➢ **PM Peak Hour:** 5-6 PM (M-F)
  1,840 vehicles (9% Trucks)

➢ **Posted Speed Limit:** 65 MPH

➢ **85th percentile speed:** +71 MPH

➢ **MM105.5 to 100.2**
  ▪ Overall travel speeds decrease as vehicles travel uphill

➢ **MM104 (5-6PM)**
  ▪ 73% (1,350) of vehicles are using the inside/left lane

➢ **MM 100.2**
  ▪ 21% of vehicles traveling in the right/outer lane are traveling at speeds lower than 50 MPH
Findings

➢ Consistent Pattern observed from data:
  ➢ Non-Peak period—Truck Volume in left lane is lower than the truck volume in right lane
  ➢ Peak Period (4:00-6:00 pm)---Truck volume in Left Lane exceeds the Right Lane truck volume

➢ Field Observations during PM peak period: Trucks that move to the left lane generally do so to overtake slow moving Trucks in the right lane
Speed Comparison

I-64 Speeds at Mile Marker 105.5

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<th>Inside Lane</th>
<th>Outside Lane</th>
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I-64 Speeds at Mile Marker 100.2

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5-Year Crash Analysis

- I-64 WB - MM 104 – 99
  - 76 total crashes from 2010 – 2014
  - 52.05 crashes per 100 Million VMT
    +2.64% from Culpepper District Average
    +20.28% from Staunton District Average
  - No Fatal crashes
  - 41% (31) Rear-End crashes (highest type)
  - (7) Non-rear end; attributed to speed differentials

- 50% of all crashes Rear-end or speed related
AASHTO Climbing Lane for Multi-Lane Highways

If ONE of the following principles is satisfied, *consideration* of a truck climbing lane IS WARRANTED:

**Critical Length of Grade:** Length of grade exceeds the critical length of grade.
- ✓ **Segment meets criteria**

**Service Flow Volume:** Service flow volume is greater than 1,000 vehicles per hour per lane (vphpl) but less than 1,700 vphpl.
- ✓ **Segment meets criteria**

**Operational Assessment (Level of Service):** Existing level of service exceeds LOS D and would be improved one grade level with the addition of a truck climbing lane.
- X **Segment does not meet criteria**
Traffic Model Findings

➢ 100% Truck Restriction on Left Lane was modeled

➢ Left Lane impacts: In the higher grades, average speed goes up in the left lane, compared to existing conditions; Speed difference is significant (5% increase), although less volume is processed.

➢ Right Lane impacts: Speed difference is minimal over existing and more volume is processed

➢ Average speed (Trucks & Cars combined) slows down around 3:00 PM and starts increasing around 7:00 PM
Potential Solutions and challenges

▪ Interim Solutions: Upgrade existing signs and use Changeable Message Signs (CMS) to alert trucks to use the right lane

▪ Monitor & Evaluate effectiveness

Static Signing: Completed 2016

CMS signs activated 3/23/17 (M-F; 3-7:00 PM)

• CMS sign message at MM 102 & 104

• CMS sign at MM 110 displays travel time to I-81/Staunton
Potential Solutions and challenges

➢ Temporary Solution - FHWA Hard Shoulder Running
  ▪ Approval must be obtained from FHWA for Hard Shoulder Running
  ▪ Providing Refuge/Pull-offs for breakdowns needed
  ▪ The intent is for these facilities to be temporary in nature and not a permanent solution for long-term capacity provision
  ▪ Requires an ITS system to operate dynamically

➢ Construction of a westbound truck climbing lane.

➢ Funding
QUESTIONS?