



Highway Safety Improvement Program Systemic Application

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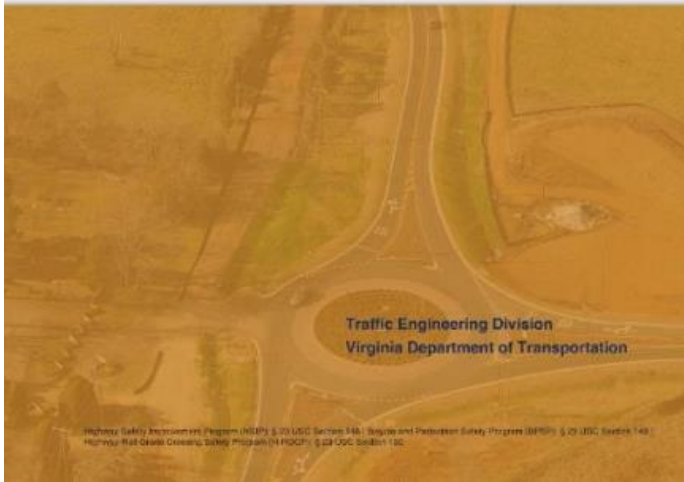
HSIP Program Delivery Manager

December 2016

VDOT HSIP Program



 **Highway Safety Improvement Program**
Virginia Department of Transportation
Implementation Guidelines



- Coordinated with the 2012-2016 Strategic Highway Safety Plan (SHSP)
- Involves a comprehensive, data driven approach
- Funds projects that implement countermeasure(s) to address severe crashes or systemic risk factors on any public road

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HSIP Project Requirements:

1. Advance program purpose of reducing severe crashes, or risks to transportation users.
2. Address hazardous situations through good safety planning and identified by safety data driven network screening.
3. Comply with the VDOT design guidelines and standards.
4. Upgrade non-standard safety features to existing standards if related to the targeted crashes.

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HSIP funds are available for two types of projects:

- 1) Locations or corridors where a known, 'substantive safety' problem exists as indicated by location-specific data on severe crashes; or
- 2) Locations where a risk based analysis has demonstrated the need for low-cost, widely implemented systemic countermeasures that target high-risk roadway features.

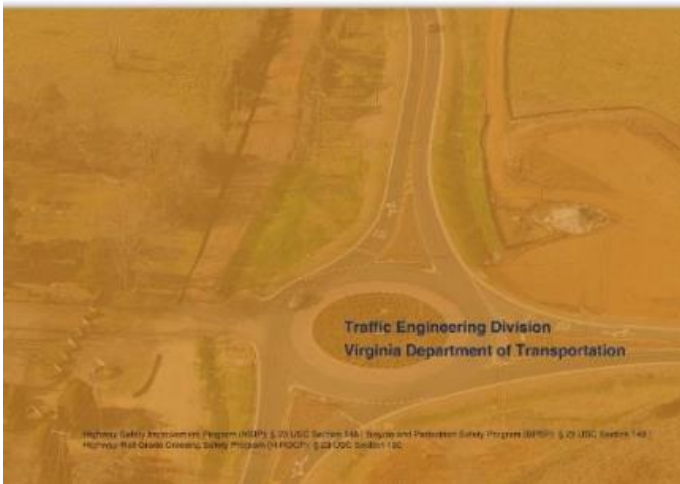
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HSIP Implementation process involves:

- The identification of high risk locations
- An analysis of problems and countermeasures
- The prioritization and scheduling of improvement projects



 Highway Safety Improvement Program
Virginia Department of Transportation
Implementation Guidelines



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Highway Safety Programs



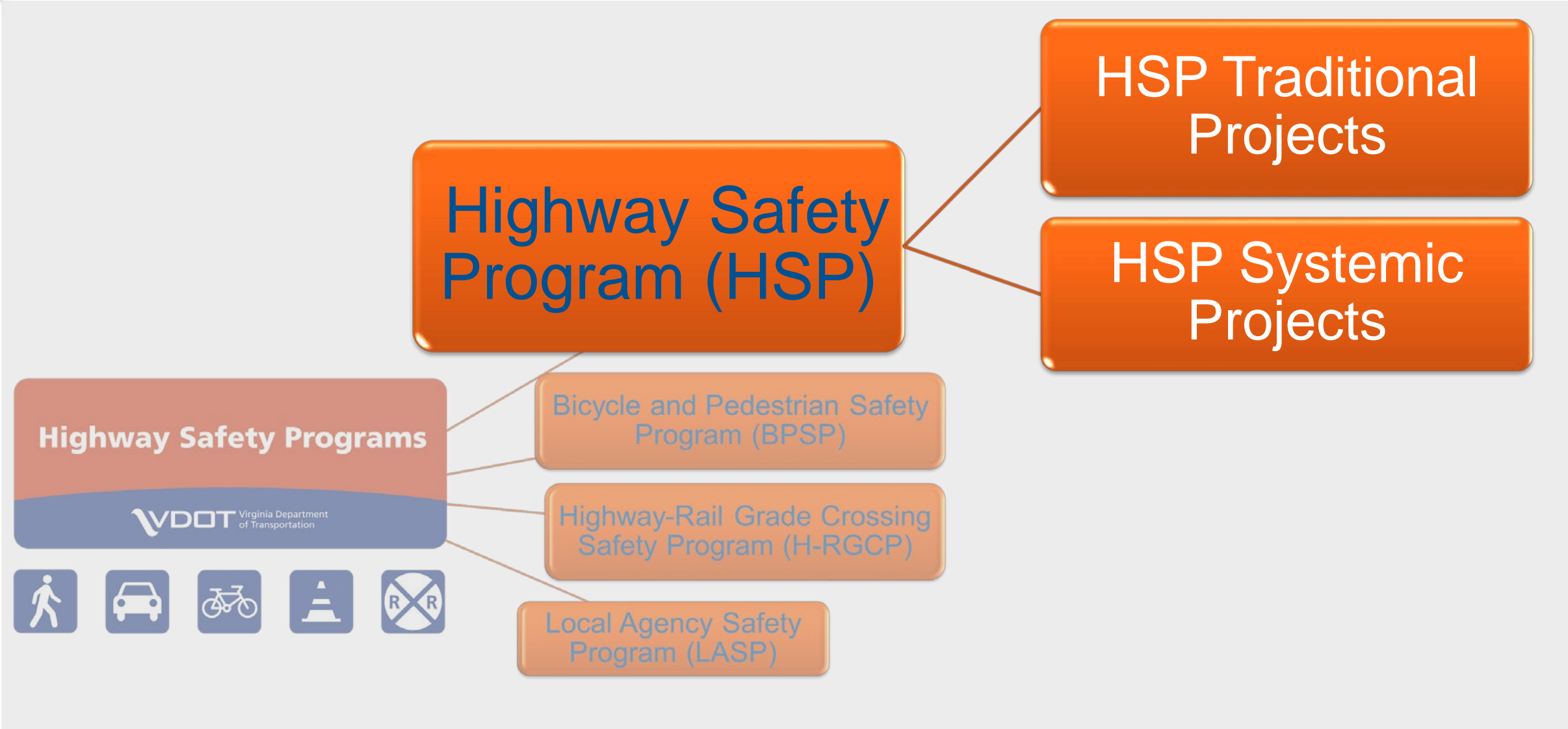
Highway Safety Program (HSP)

Bicycle and Pedestrian Safety Program (BPSP)

Highway-Rail Grade Crossing Safety Program (H-RGCP)

Local Agency Safety Program (LASP)

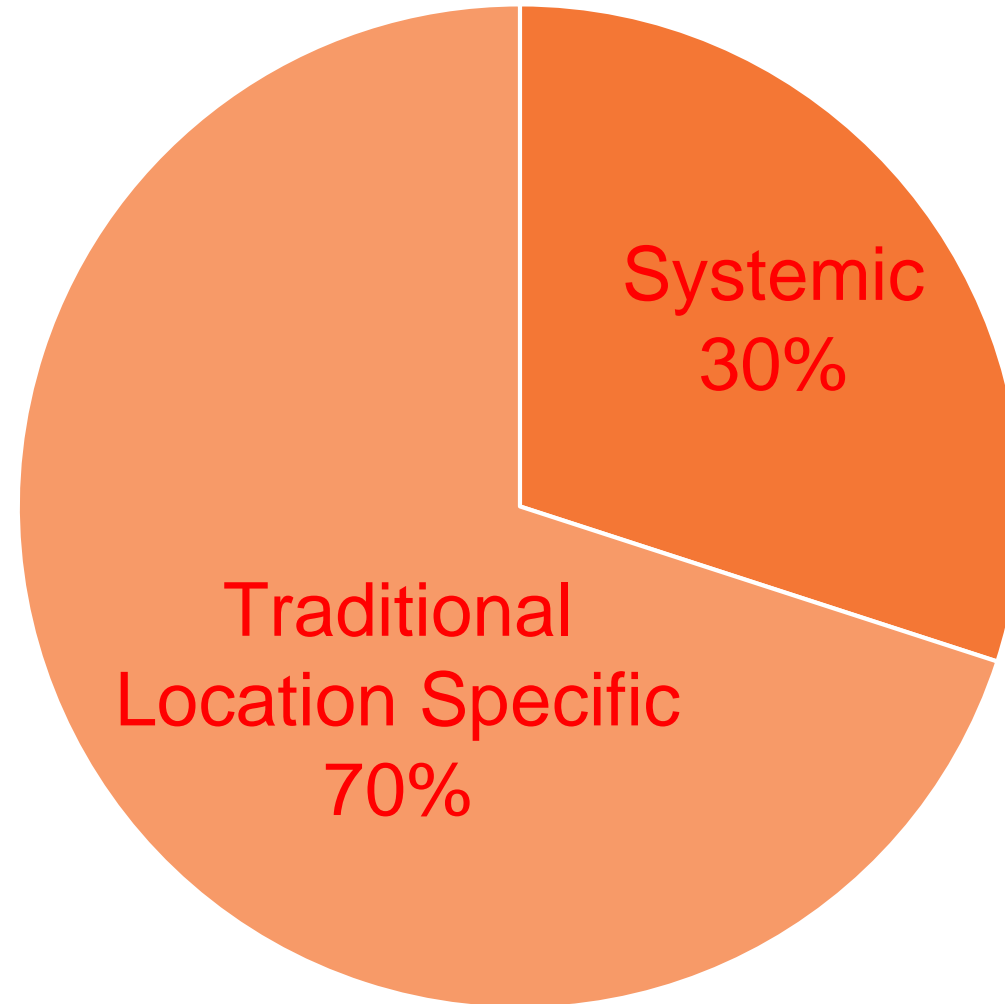
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VDOT HSIP Program Funding Target



Traditional
Location-Specific



Systemic

Systemic HSP Application Process

Step 1: Determine Focus
(crash and/or facility type)

- Focus Crash Type (angle, rear-end, etc.)
- Focus Facility Type (unsignalized intersections, undivided corridors, etc.)

Step 2: Analyze Risk Factors

- Determine what roadway elements are associated with those focus crash or facility types
- Example risk factors can be found in the HSM

Step 3: Select Countermeasures

- Select countermeasures to address the focus crash/facility type and corresponding risk factors.

Steps 4 - 8:
Determine number of Locations

- Select the total number of locations that have the selected risk factors present.
- Select a crash threshold.
- Determine the number of locations that meet that threshold.
- Based on the available budget or other constraints, determine the deployment level estimate.

Step 9: Determine Targeted KAB Crashes


- Determine the number of KAB crashes that will be addressed at the Systemic Improvement Deployment Locations.

Systemic Form Example



VDOT HSIP Systemic Application

Enter general project information

 Highway Safety Improvement Program				FOR OFFICE USE ONLY Project #: xxxxxxxxxxxx Receive #: xxxxxxxx HSIP File: xxxxxxxx				HSIP-Proposal Rev (7/15/14) Priority #:	
Systemic Improvements Proposals FY2016-17								Date Received: Month x, 2016 Repeat Proposal:	
Agency:		Project Sponsor:		VDOT District:		Area Location Code		Study Period (Begin and End Dates)	
Street Address:		City, State, Zip:		VDOT Region:		Small Urban (5,000 - 49,999)			
County	System	Traffic Control	Functional Class Code	Email:		Fed. Sys. Code	Program Type		
		No Traffic Control	Urban Interstate	Tel:		NHS	Regular		

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Enter focus crash and facility type

Focus Crash Type	Risk Factor	Proposed Systemic Improvement	Total Locations	Crash Threshold (# crashes in # years)	Locations meeting threshold
Roadway_Departure	Inadequate delineation (signs, pavement markings, delineators)	Curve warning signs (advance warning, chevrons, etc.)	20	12 crashes in 5 years	10
Focus Facility Type	Excessive speed	Transverse rumble strips	5	5 crashes in 5 years	5
Curve	Excessive speed	Dynamic warning sign for high-speed approaches	5	8 speed related crashes in 5 years	3

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Select the proposed systemic improvement

Focus Crash Type	Risk Factor	Proposed Systemic Improvement	Total Locations	Crash Threshold (# crashes in # years)	Locations meeting threshold
Roadway_Departure	Inadequate delineation (signs, pavement markings, delineators)	Curve warning signs (advance warning, chevrons, etc.)	20	12 crashes in 5 years	10
Focus Facility Type	Excessive speed	Transverse rumble strips	5	5 crashes in 5 years	5
Curve	Excessive speed	Dynamic warning sign for high-speed approaches	5	8 speed related crashes in 5 years	3

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Determine number of locations that will be treated.

Proposed Systemic Improvement	Total Locations	Crash Threshold (# crashes in # years)	Locations meeting threshold	Deployment Level Estimate (%)	No. of Systemic Improvement Deployments	Targeted KAB Crashes (over 5 years)
Curve warning signs (advance warning, chevrons, etc.)	20	12 crashes in 5 years	10	50%	5	14
Transverse rumble strips	5	5 crashes in 5 years	5	80%	4	8
Dynamic warning sign for high-speed approaches	5	8 speed related crashes in 5 years	3	50%	2	8

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Enter targeted KAB crashes

Proposed Systemic Improvement	Total Locations	Crash Threshold (# crashes in # years)	Locations meeting threshold	Deployment Level Estimate (%)	No. of Systemic Improvement Deployments	Targeted KAB Crashes (over 5 years)
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Calculate benefit-cost ratio

Benefit: Compute the economic benefit of each improvement					
Proposed Systemic Improvement	CMF Value (For KAB Crashes)	Applicable Crash Types	Include CMF in Final Analysis? (yes/no)	Source	Notes
Curve warning signs (advance warning, chevrons, etc.)	1.43	All	No	inghouse.org/detail	2 star CMF
	0.84	All	Yes	inghouse.org/detail	
			No		
Transverse rumble strips			No		
	0		No		
	0		No		
Dynamic warning sign for high-speed approaches	0		No		
	0		No		
	0		No		

As noted on the CMF Clearinghouse:

- Common practice is to multiply CMFs when multiple countermeasures are implemented at one location.
- It is unlikely the full effect of each countermeasure would be realized.
- Unless the countermeasures act completely independently, multiplying several CMFs is likely to overestimate the combined effect.

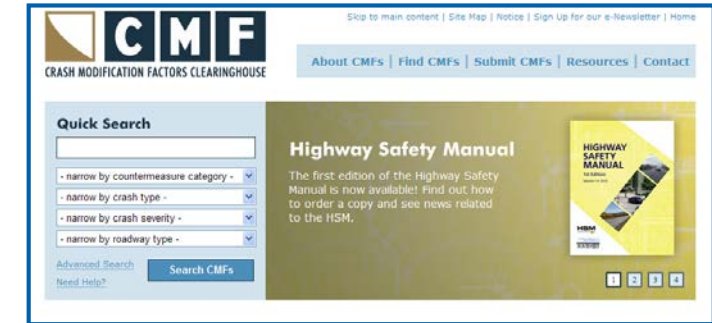


How CMF's are Applied

As noted on the CMF Clearinghouse:

- Max CMF multiplied = 3

Benefit-Cost Ratio				
Include in Analysis? (yes/no)	Present Value of Benefit	Present Value of Cost	B/C by CMF	B/C Ratio
Yes	\$ 1,979,537.30	\$ 14,250.00	138.9	138.9
No	\$ -	\$ -	0.0	
No	\$ -	\$ -	0.0	



Questions?

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