ODOT Region 1 Hot Spot CRF List

General Notes: All Injury = Fatal, A, B & C

Orange = Special Condition CRF

Yellow = Not a traditional CRF value

Counter measure Number	Countermeasure	Crash Type	Injury, PDO or All	Service Life (Years)	Existing Intersection Traffic Control	Urban or Rural	CRF %	Range of CRF	Who's CRF?
H2	Right Turn Lane on Single Major Road Approach: Unsignalized Intersection (3- or 4-leg)	All	All	20	Non Signal	Either	**14**	14 - 26%	HSM
H4	Right Turn Lane on Single Major Road Approaches: Signalized Intersection (3- or 4-leg)	All	All	20	Signal	Either	**4**	4 - 9%	HSM
H5	Right Turn Lane on Both Major Road Approaches: Signalized Intersection (3- or 4-leg)	All	All	20	Signal	Either	**8**	4 - 9%	HSM
H6	Channelized Right Turn Lane with Raised Median	All	All	20	Signal or Non Signal	Either	**35**	25 - 50%	2007 Desktop Reference
H8	Left Turn Lane on Both Major Road Approaches: Urban, Unsignalized Intersection (4-leg)	All	All	20	Non Signal approach crashes only	Urban	**36**	36 - 58%	HSM
H11	Left Turn Lane on Single Major Road Approach: Urban, Signalized Intersection (3-leg)	All	All	20	Signal	Urban	**7**	7 - 15%	HSM
H12	Left Turn Lane on Both Major Road Approaches: Urban, Signalized Intersection (4-leg)	All	All	20	Signal	Urban	**19**	17 - 48%	HSM
H14	Left Turn Lane on Both Major Road Approaches: Rural, Signalized Intersection (4-leg)	All	All	20	Signal	Rural	**33**	17 - 48%	HSM
H19	Convert to All-Way Stop Control (From Rural 2-Way or Yield Control)	All	All	10	Non Signal	Rural	**48**	18 - 75%	HSM
H20	Install Urban Traffic Signal	Angle	All	20	Non Signal	Urban	**67**	-143 - 77%	HSM
H25	Install Lighting at Intersection	Night	All Injury	20	Signal or Non Signal	Either	**38**	31 - 38%	HSM
H26	Install Lighting on a Roadway Segment	Night	All Injury	20	None - Roadway	Either	**28**	17 - 29%	HSM
H27	Install Any Type of Median Barrier	All	All Injury	20	None - Roadway	Either	**30**	-24 - 43%	HSM
H30	Reduce Urban Driveways from 48 to 26 - 48 per mile	All	All Injury	20	None - Roadway	Urban	**29**	25 - 31%	HSM
H32	Reduce Urban Driveways from 10 - 24 to less than 10 per mile	All	All injury	20	None - Roadway	Urban	**25**	25 - 31%	HSM
H33	Provide a Raised Median, Urban 2-Lane Road	All	All injury	20	None - Roadway apply by approach	Urban	**39**	39%	HSM
H34	Provide a Raised Median, Urban Multi-Lane Road	All	All injury	20	None - Roadway apply by approach	Urban	**22**	0 - 22%	HSM
H45A	Install Urban Variable Speed Limit Signs with Queue/Weather Warning System	All	All	10	None - Roadway	Urban	**14**	N/A	ODOT Study
H48	Convert 4-Lane Roadway to 3-Lane Roadway with Center Turn Lane (Road Diet)	All	All	20	None - Roadway	Urban	**29**	29%	**HSM**
H50	Install Guide Signs	All	All	20	None - Roadway	Either	**15**	15%	2007 Desktop Reference
H53A	Add Acceleration Lane (Interchange)	All	All	20	None - Roadway	Either	**CRF = 100*(1-e$^{(-2.59*L)}$)** **Where, L = Length of Acceleration Lane (in mile)**	N/A	HSM
H55	Truck Priority System (Detection)	All			just for one direction		**23**		

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I1	Install Lighting at Intersection	Night	All Injury	20	Signal or Non Signal	Either	**38**	31 - 38%	HSM
I2	Improve Signal Hardware: Lenses, Reflectorized Back plates, Size, and Number	All	All	20	Signal	Either	**10% for 1-2 CM's from List 12.5% for 3-4 CM's from List 15% for 5-6 CM's from List**	0 - 46%	Caltrans/Intersection Implementation Plan/Engineering Judgment
I3	Replace Doghouse with Flashing Yellow Arrow Signal Heads	Left Turning	All	20	Signal	Either	**25**	25%	ODOT Systemic Worksheet
I4	Replace Urban Permissive or Protected/Permissive Left Turns to Protected Only	Left Turning	All	20	Signal per approach	Urban	**99**	6 - 99%	HSM
I5	Replace Urban Permissive Left Turns to Protected/Permissive	Left Turning	All Injury	20	Signal	Urban	**16**	6 -99%	HSM
I6	Install Coordination or Adaptive Signal Timing of Urban Traffic Signals	All	All	10	Signal	Urban	**7**	7%	Coordination of Traffic Signals across Jurisdictional Boundaries: Field and Modeling Results (2000)
I7	Install Actuated Advance Warning Dilemma Zone Protection System at High Speed Signals (Microwave Detection)	All	All	10	Signal	Either	**8**	0 - 43.6%	Clearinghouse (not in HSM)
I8	Install Flashing Beacons as Advance Warning at Intersections (Not Coordinated with Signal Timing)	All	All	10	Signal or Non Signal apply per approach	Either	**13**	10.2 -13.3%	2007 Desktop Reference
I9	Install Actuated/Coordinated Flashing Beacons as Advance Warning for Signalized Intersections	Rear End	All	10	Signal per approach	Either	**36**	36 - 62%	Clearinghouse (not in HSM)
I10	Increase Triangle Sight Distance	All	All Injury	10	Signal or Non Signal	Either	**48**	11 - 56%	Clearinghouse (not in HSM)
I12	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Larger Signs, Additional Stop Signs and/or Other Intersection Warning or Regulatory Signs	All	All	10	Non Signal	Either	**10% for 1-2 CM's from List 12.5% for 3-4 CM's from List 15% for 5-6 CM's from List**	10 - 55%	Caltrans/Intersection Implementation Plan/ODOT Engineering Judgment
I13	Provide Flashing Beacons at All-Way Stop Controlled Intersections	Angle	All	10	Non Signal	Either	**28**	5 - 58%	HSM
I16	Install Transverse Rumble Strips on Approach(es)	All	Fatal/A	10	Non Signal	Either	**39**	21.5 - 39.2%	Clearinghouse (not in HSM)

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BP1	Install Pedestrian Countdown Timer(s)	Pedestrian	All	20	Signal	Either	**70**	0 - 70%	Clearinghouse (not in HSM)
BP2	Provide Intersection Illumination (Bike & Ped)	P & B Night	All Injury	20	Signal or Non Signal or None - Roadway	Either	**42**	42%	HSM
BP3	Install Urban Leading Pedestrian or Bicycle Interval at Signalized Intersection	P & B	All	10	Signal	Urban	**37**	37 - 45%	Clearinghouse (not in HSM)
BP4	Install No Pedestrian Phase Feature with Flashing Yellow Arrow	Pedestrian	All	20	Signal	Either	**43**	43%	*Accident Analysis & Prevention* (Chen)
BP7	Install Raised Median with Marked Crosswalk	Pedestrian	All	20	Non Signal or None - Roadway	Either	**46**	46%	Clearinghouse (not in HSM)
BP10	Install Rectangular Rapid Flashing Beacon with Median (3-Lane or More Roadway)	Pedestrian crossing	All	20	Non Signal or None - Roadway	Either	**56**	10 - 56%	
BP14	Install Pedestrian Signal	P & B	All	20	Non Signal or None - Roadway	Either	**55**	15 - 69%	Caltrans / 2007 Desktop Reference
RD1	Increase Distance to Rural Roadside Obstacle from 3 ft. (1 m) to 16 ft. (5 m)	All	All	20	None - Roadway only roadway departure ro fixed object crashes	Urban	**44**	22 - 44%	HSM