

Safety Data and Analysis Module Resources

AASHTO Highway Safety Manual Part B
ATSSA: Cost Effective Local Road Safety Planning and Implementation http://media.atssa.com.s3.amazonaws.com/default-file/ATSSA%20Local%20Roads%20Revised.pdf
CMF Clearinghouse: Filtering Search Results video tutorial https://www.youtube.com/watch?v=CaMdFAllgil
CMF Clearinghouse: Investigation of Existing and Alternative Methods for Combining Multiple CMFs http://www.cmfclearinghouse.org/collateral/Combining_Multiple_CMFs_Final.pdf
CMF Clearinghouse: Understanding Search Results video tutorial https://www.youtube.com/watch?v=KwGsRkrR1kg
CMF Clearinghouse: Using the CMF Details Page video tutorial https://www.youtube.com/watch?v=IGd8CH3AekU
Crash Modification Factor (CMF) Clearinghouse http://www.cmfclearinghouse.org/userguide_CMF.cfm
Crash Outcome Data Evaluation System (CODES) Reports https://crashstats.nhtsa.dot.gov/#/PublicationList/27
FHWA: A Systemic Approach to Safety – Using Risk to Drive Action website http://safety.fhwa.dot.gov/systemic/
FHWA Good Practices: Incorporating Safety into Resurfacing and Restoration Projects https://safety.fhwa.dot.gov/roadway_dept/strat_approach/fhwasa07001/fhwasa07001.pdf
FHWA - Improving Safety on Rural Local and Tribal Roads: Safety Toolkit https://safety.fhwa.dot.gov/local_rural/training/fhwasa14072/isrltrst.pdf
FHWA Intersection Safety: A Manual for Local Rural Road Owners https://safety.fhwa.dot.gov/local_rural/training/fhwasa1108/fhwasa1108.pdf
FHWA Low Cost Safety Enhancements for Stop-Controlled and Signalized Intersections https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa09020/fhwasa09020.pdf
FHWA Low Cost Treatments for Horizontal Curve Safety 2016 https://safety.fhwa.dot.gov/roadway_dept/horicurves/fhwasa15084/fhwasa15084.pdf
FHWA Maintenance of Drainage Features for Safety – A Guide for Local Street and Highway Maintenance Personnel https://safety.fhwa.dot.gov/local_rural/training/fhwasa09024/fhwasa09024.pdf
FHWA Maintenance of Signs and Sign Supports – A Guide for Local Highway and Street Maintenance Personnel https://safety.fhwa.dot.gov/local_rural/training/fhwasa09025/fhwasa09025.pdf
FHWA Pedestrian Safety in Native America http://www.pedbikeinfo.org/cms/downloads/Ped_Safety_in_Native_America.pdf

<p>FHWA Roadway Departure Safety – A Manual for Local Road Owners https://safety.fhwa.dot.gov/local_rural/training/fhwasa1109/fhwasa1109.pdf</p>
<p>FHWA Road Safety Audit website http://safety.fhwa.dot.gov/rsa</p>
<p>FHWA: Systemic Safety Project Selection Tool https://safety.fhwa.dot.gov/systemic/fhwasa13019/sspst.pdf</p>
<p>FHWA Toolbox of Countermeasures and Their Potential Effectiveness for Intersection Crashes https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa09027/resources/Intersection%20Safety%20Issue%20Brief%208.pdf</p>
<p>FHWA Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes https://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/ped_tctpepc.pdf</p>
<p>FHWA Vegetation Control for Safety – A Guide for Local Highway and Street Maintenance Personnel https://safety.fhwa.dot.gov/local_rural/training/fhwasa07018/vegetationfv1108.pdf</p>
<p>Manual on Uniform Traffic Control Devices (MUTCD) https://mutcd.fhwa.dot.gov/</p>
<p>Motor Carriers Management Information System (MCMIS) Homepage https://ask.fmcsa.dot.gov/app/mcmiscatalog/mcmishome</p>
<p>NCHRP 17-50: Highway Safety Manual User Guide http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP17-50_UserGuide.pdf.</p>
<p>NCHRP 500 Reports http://www.trb.org/Main/Blurbs/152868.aspx</p>
<p>NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two Lane Highways http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_440.pdf</p>
<p>NCHRP Report 613: Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections https://www.nap.edu/read/14162/chapter/1</p>
<p>NHTSA – Fatality Analysis and Report System (FARS) Homepage https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars</p>
<p>NHTSA State Traffic Safety Information (STSI) https://cdan.nhtsa.gov/stsi.htm#</p>

Roadway Module Resources

FHWA Guidelines for the Use of Raised Pavement Markers https://www.fhwa.dot.gov/publications/research/safety/97152/index.cfm
FHWA Lighting Handbook (2012) https://safety.fhwa.dot.gov/roadway_dept/night_visib/lighting_handbook/pdf/fhwa_handbook2012.pdf
FHWA Low Cost Treatments for Horizontal Curve Safety 2016. https://safety.fhwa.dot.gov/roadway_dept/horicurves/fhwasa15084/
FHWA - Maintenance of Sign and Sign Supports: A Guide for Local Roads Maintenance Personnel (2010) https://safety.fhwa.dot.gov/local_rural/training/fhwasa09025
FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads https://safety.fhwa.dot.gov/hsip/hrrr/manual/hrrr_2014.pdf
FHWA Office Of Safety, Horizontal Curve Safety website https://safety.fhwa.dot.gov/roadway_dept/horicurves/
FHWA Office of Safety, Nighttime Visibility – Sign Retroreflectivity website, https://safety.fhwa.dot.gov/roadway_dept/night_visib/sign-retroreflectivity.cfm
FHWA Office of Safety, Pavement Friction website https://safety.fhwa.dot.gov/roadway_dept/pavement_friction/index.cfm
FHWA Office of Safety, Roadway Departure Safety website https://safety.fhwa.dot.gov/roadway_dept/
FHWA Office of Safety, Rumble Strips and Rumble Stripes website https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/
FHWA Procedures for Setting Advisory Speeds on Curves (2014) https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa1122/fhwasa1122.pdf
FHWA -Roadway Delineation Practices Handbook, 1994. https://safety.fhwa.dot.gov/ped_bike/docs/rdwydelin.pdf
FHWA Roadway Departure Safety: A Manual for Local Rural Road Owners https://safety.fhwa.dot.gov/local_rural/training/fhwasa1109/fhwasa1109.pdf
FHWA Safety Evaluation of Improved Curve Delineation (2009) https://www.fhwa.dot.gov/publications/research/safety/09045/09045.pdf

<p>FHWA Toolbox of Countermeasures and Their Potential Effectiveness for Roadway Departure Crashes https://safety.fhwa.dot.gov/tools/crf/resources/briefs/rdwydepartissue.pdf</p>
<p>MUTCD 2009: Section 2C-09 Chevron Guidance: http://mutcd.fhwa.dot.gov/htm/2009/part2/part2c.htm#section2C09</p>
<p>MUTCD 2009 Table 2C-5. Horizontal Alignment Sign Selection https://mutcd.fhwa.dot.gov/htm/2009/part2/part2c.htm#table2C05</p>
<p>MUTCD 2009: Section 3B.07 Warrants for Use of Edge Lines https://mutcd.fhwa.dot.gov/htm/2009/part3/part3b.htm#section3B07</p>
<p>MUTCD 2009: Section 3B.11 Raised Pavement Markers – General https://mutcd.fhwa.dot.gov/htm/2009/part3/part3b.htm#section3B11</p>
<p>MUTCD 2009: Chapter 3F Delineators https://mutcd.fhwa.dot.gov/htm/2009/part3/part3f.htm</p>
<p>NCHRP 500 Vol 3: A Guide for Addressing Collisions with Trees in Hazardous Locations http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v3.pdf</p>
<p>NCHRP 500 Vol 4: A Guide for Addressing Head-on Collisions http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v4.pdf</p>
<p>NCHRP 500 Vol 6: A Guide for Addressing Run-Off-Road Collisions http://trb.org/publications/nchrp/nchrp_rpt_500v6.pdf</p>
<p>NCHRP 500 Vol 7: A Guide for Reducing Collisions on Horizontal Curves http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v7.pdf</p>
<p>NCHRP 500 Vol 9: A Guide for Addressing Collisions Involving Older Drivers http://trb.org/publications/nchrp/nchrp_rpt_500v9.pdf</p>
<p>NCHRP 600 Human Factors Guidelines for Road Systems: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600Second.pdf</p>
<p>NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips. http://www.cmfclearinghouse.org/studydocs/nchrp_rpt_641-GuidanceRumbleStrips.pdf</p>
<p>Toolbox of Countermeasures for Rural Two-Lane Curves http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1113&context=intrans_reports</p>
<p>Speed Management Toolbox for Rural Communities http://www.intrans.iastate.edu/research/documents/research-reports/rural_traffic_calming_toolbox_w_cvr.pdf</p>

Roadway Module Resources

AASHTO Roadside Design Guide (2011)
FHWA Clear Zone Page https://safety.fhwa.dot.gov/roadway_dept/countermeasures/safe_recovery/clear_zones/
FHWA Clear Zone and Horizontal Clearance https://www.fhwa.dot.gov/programadmin/clearzone.cfm
FHWA Every Day Counts – Safety Edge Design and Construction Guide https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/se_des_gde.pdf
FHWA Every Day Counts - Safety Edge Guide Specification https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/gsse.pdf
FHWA Every Day Counts – Safety Edge website https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/safetyedge.cfm
FHWA Maintenance of Signs and Sign Supports https://safety.fhwa.dot.gov/local_rural/training/fhwasa09025/fhwasa09025.pdf
FHWA - Manual for Selecting Safety Improvements on High Risk Rural Roads, Chapter 4 - http://safety.fhwa.dot.gov/hsip/hrrr/manual/
FHWA Noteworthy Practices: Roadside Tree and Utility Pole Management (2016) https://safety.fhwa.dot.gov/roadway_dept/countermeasures/safe_recovery/clear_zones/fhwasa16043/fhwasa16043.pdf
FHWA Office of Safety - Countermeasures that Provide for a Safe Recovery https://safety.fhwa.dot.gov/roadway_dept/countermeasures/safe_recovery/
FHWA Office of Safety - Countermeasures that Reduce Crash Severity https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/
FHWA Roadway Departure (RwD) Strategic Plan https://safety.fhwa.dot.gov/roadway_dept/docs/rwd_strategic_plan_version2013.pdf
FHWA Rumble Strips and Rumble Stripes https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/
FHWA - Rumble Strip Implementation Guide: Addressing Bicycle Issues On Two-Lane Roads https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/bike_ig/

<p>FHWA Rumble Strip Implementation Guide: Addressing Noise Issues On Two-Lane Roads https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/media/RumbleStripGuide_Noise/noise_bpg.cfm</p>
<p>FHWA Rumble Strip Implementation Guide: Addressing Pavement Issues On Two-Lane Roads https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/media/RumbleStripGuide_Pavement/pavement_bpg.cfm</p>
<p>FHWA Technical Advisory T 5040.29 Paved Shoulders (1990) https://www.fhwa.dot.gov/pavement/t504029.cfm</p>
<p>FHWA Vegetation Control for Safety (2008) https://safety.fhwa.dot.gov/local_rural/training/fhwasa07018/</p>
<p>HSM – Table 13-9 - American Association of State Highway and Transportation Officials. Highway Safety Manual. Washington, DC, 2010.</p>
<p>NCHRP 500 Volume 3 – A Guide for Addressing Collisions with Trees in Hazardous Locations http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v3.pdf</p>
<p>NCHRP 500 Vol 6: A Guide for Addressing Run-Off-Road Collisions http://trb.org/publications/nchrp/nchrp_rpt_500v6.pdf</p>
<p>NCHRP 500 Volume 8 – A Guide for Addressing Collisions with Trees in Hazardous Locations http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v8.pdf</p>
<p>NCHRP 641: Guidance for the Design and Application of Shoulder and Center Line Rumble Strips. 2009.</p>

Unsignalized Intersection Module Resources

AASHTO Green Book – A Policy on Geometric Design of Highways and Streets - Section 9: Intersections.
AASHTO Highway Safety Manual http://www.highwaysafetymanual.org/Pages/default.aspx
CMF Clearinghouse http://www.cmfclearinghouse.org/
ENTERPRISE Transportation Pooled Fund – Design and Evaluation Guidance for Intersection Collision Warning Systems (ICWS) http://www.enterprise.prog.org/Projects/2010_Present/developingconsistencyIWS/Design_and_Eval_Guidance/Guidance%20for%20ICWS%20Version%201-122011.pdf
ENTERPRISE Transportation Pooled Fund – Design and Evaluation Guidance for Intersection Collision Warning Systems (ICWS) – Draft 1 http://enterprise.prog.org/Projects/2010_Present/developingconsistencyIWS/workshop2/Guidance%20for%20IWS%20DRAFT%20091511.pdf
FHWA – Innovative U Turn Intersections Page https://safety.fhwa.dot.gov/intersection/innovative/uturn/
FHWA Intersection Safety: A Manual for Local Rural Road Owners https://safety.fhwa.dot.gov/local_rural/training/fhwasa1108/fhwasa1108.pdf
FHWA Intersection Safety – Roundabouts and Mini-Roundabouts https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/
FHWA Intersection Safety Strategies – 2 nd Edition https://safety.fhwa.dot.gov/intersection/conventional/signalized/FHWA-SA-15-085_Strategies_2.pdf
FHWA Issue Brief #8 Toolbox of Countermeasures and Their Potential Effectiveness for Intersection Crashes (2009) https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/docs/brief_8.pdf
FHWA Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa09020/fhwasa09020.pdf
FHWA Maintenance of Signs and Sign Supports: A Guide for Local Highway and Street Maintenance Personnel https://safety.fhwa.dot.gov/local_rural/training/fhwasa09025/
FHWA Objectives and Strategies for Improving Safety at Unsignalized and Signalized Intersections https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa08008/inter_guide_key.pdf
FHWA Proven Safety Countermeasures: Left and Right Turn Lanes at Two-Way Stop-Controlled Intersections. https://safety.fhwa.dot.gov/provencountermeasures/left_right_turn_lanes/

<p>FHWA Proven Safety Countermeasures: Reduced Left-Turn Conflict Intersections: https://safety.fhwa.dot.gov/provencountermeasures/reduced_left/</p>
<p>FHWA Proven Safety Countermeasures: Roundabouts: https://safety.fhwa.dot.gov/provencountermeasures/roundabouts/</p>
<p>FHWA Proven Safety Countermeasures: Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections https://safety.fhwa.dot.gov/provencountermeasures/syst_stop_control/</p>
<p>FHWA Manual for Selecting Safety Improvements for High Risk Rural Roads https://safety.fhwa.dot.gov/hsip/hrrr/manual/</p>
<p>FHWA – Median U-Turn Intersection Informational Guide https://safety.fhwa.dot.gov/intersection/alter_design/pdf/fhwasa14069_mut_infoguide.pdf</p>
<p>FHWA – Restricted Crossing U-Turn Intersection Informational Guide https://safety.fhwa.dot.gov/intersection/alter_design/pdf/fhwasa14070_rcut_infoguide.pdf</p>
<p>FHWA Stop-Controlled Intersection Safety Through Route Activated Warning System https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/fhwasa11023/index.cfm</p>
<p>FHWA Unsignalized Intersection Safety Webpage https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/</p>
<p>ITE and FHWA ISSUE Brief #8 Toolbox of Countermeasures and Their Potential Effectiveness to Make Intersections Safer (2004) http://library.ite.org/pub/e26c7e9c-2354-d714-5181-4cc79fba5459</p>
<p>ITE Unsignalized Intersection Information Guide http://www.ite.org/uiig/</p>
<p>MUTCD Section 2A.15 Enhanced Conspicuity for Standard Signs https://mutcd.fhwa.dot.gov/htm/2009/part2/part2a.htm</p>
<p>NCHRP 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_440.pdf</p>
<p>NCHRP 500 Volume 5: A Guide for Addressing Unsignalized Intersection Collisions http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v5.pdf</p>
<p>NCHRP Report 562/ TCRP Report 112: Improving Pedestrian Safety at Unsignalized Crossings http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf</p>
<p>NCHRP 780 – Design Guidance for Intersection Auxiliary Lanes. https://www.nap.edu/catalog/22296/design-guidance-for-intersection-auxiliary-lanes</p>
<p>Roundabouts: An Informational Guide Second Edition (NCHRP 672) http://www.trb.org/Publications/Blurbs/164470.aspx</p>

Signalized Intersection Module Resources

AASHTO A Policy on Geometric Design of Highway and Streets (Green Book).
AASHTO Guide for the Development of Bicycle Facilities, 4th Edition.
FHWA Handbook for Designing Roadways for the Aging Population https://safety.fhwa.dot.gov/older_users/handbook/aging_driver_handbook_2014_final%20.pdf
FHWA Intersection Safety Issue Brief #13: Access Management. https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/brief_13.cfm
FHWA Issue Brief 8: Toolbox of Countermeasures and Their Potential Effectiveness for Intersection Crashes https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/docs/brief_8.pdf
FHWA Low Cost Safety Enhancements for Stop-Controlled and Signalized Intersections https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa09020/fhwasa09020.pdf
FHWA Proven Safety Countermeasures Backplates with Retroreflective Borders https://safety.fhwa.dot.gov/provencountermeasures/blackplate/
FHWA Proven Safety Countermeasures Leading Pedestrian Interval https://safety.fhwa.dot.gov/provencountermeasures/lead_ped_int/
FHWA Proven Safety Countermeasures Yellow Change Intervals https://safety.fhwa.dot.gov/provencountermeasures/yellow_xhg_intervals/
FHWA Retroreflective Borders on Traffic Signal Backplates - A South Carolina Success Story https://safety.fhwa.dot.gov/intersection/conventional/signalized/case_studies/fhwasa09011/fhwasa09011.pdf
FHWA Signalized Intersection Informational Guide 2 nd Edition https://safety.fhwa.dot.gov/intersection/conventional/signalized/fhwasa13027/fhwasa13027.pdf
FHWA Signalized Intersection Website https://safety.fhwa.dot.gov/intersection/conventional/signalized/
FHWA/ITE Issue Brief 6: Engineering Countermeasures to Reduce Red-Light Running (RLR) http://library.ite.org/pub/e26c796b-2354-d714-5117-125d2ad594bd
Guidelines for Determination of Optimal Traffic Responsive Plan Selection Control Parameters https://static.tti.tamu.edu/tti.tamu.edu/documents/0-4421-2.pdf
ITE Manual of Traffic Signal Design
ITE Traffic Control Devices Handbook
Manual on Uniform Traffic Control Devices. 2009 Revised. https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm
National Associate of City Transportation Officials (NACTO) Urban Bikeway Guide

NCHRP Report 440 – Accident Mitigation Guide for Congested Rural Two-Lane Highways http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_440.pdf
NCHRP Report 457 - Evaluating Intersection Improvements: An Engineering Study Guide http://onlinepubs.trb.org/onlinepubs/nchrp/esg/esg.pdf
NCHRP Report 500 Volume 12: A Guide for Reducing Collisions at Signalized Intersections http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v12.pdf
NCHRP 672 - Roundabouts: An Informational Guide https://www.nap.edu/read/22914/chapter/1
NCHRP Report 731 - Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections http://www.trb.org/Publications/Blurbs/168017.aspx
NCHRP 812 - Signal Timing Manual 2 nd Edition http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_812.pdf
Older Drivers at a Crossroads https://www.fhwa.dot.gov/publications/publicroads/07jan/02.cfm
TRB Access Management Manual, 2 nd Edition