| **DSP Recommendations for I-39 Mega Project**  *(06/01/2018 email from Burkel to Vieth and Vesperman)* | **DTSD SWR I-39/90 Mega Team Response**  *(06/18/2018)* |
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| 1. **Reduce speed limit both northbound and southbound to 55 mph from the WI/IL state line to Highway 12/18 in Dane County. Immediate implementation** | |
| * 1. We realize that speed reduction alone will not eliminate crashes. However, we believe the reduction in speed will decrease the overall number of crashes as well as their severity. With the speed to 55 mph, the 85th percentile of motorists will fall within a speed range that allows for decreased stopping distance and increased reaction. These factors allow a greater opportunity for collision avoidance. | DTSD agrees with DSP that crashes will not be eliminated by merely reducing the statutory speed limitation along the I-39 corridor within the work zones. It is unclear however, how DSP concludes reducing the posted speed limit will decrease the overall number of crashes. According to the Department’s ***Traffic Engineering, Operations & Safety Manual –*** WisDOT, June 2005 (Formerly Traffic Guideline Manual)”:  ***“Contrary to popular belief,*** ***lower speed limits do not necessarily improve safety. It is inappropriate to compare crashes on a fairly short segment of road to the statewide crash average, because a speed study is taken at the one section of highway you are dealing with. Crashes typically indicate another problem, which is generally not speed. The more uniform the speeds of vehicles in a traffic stream, the less chance there is for conflict and crashes.”***  ***Posting speed limits lower or higher than what the majority of drivers are traveling produces two distinct groups of drivers: those attempting to observe the speed limit and those driving at a speed they feel is reasonable and prudent. These differences in speeds can result in increased crashes due to tailgating, improper passing, reckless driving, and weaving from lane to lane. However, the number of traffic crashes along any highway is related to numerous factors.***  ***Regardless of the roadway involved, there are a statistical number of crashes that can be expected to occur no matter how safe a roadway is made. Investigations of crashes reveal that in the majority of cases there was a clear violation of a traffic law or rule of good driving. Proper analysis and evaluation of these factors require the experience and expertise of a traffic engineer. Based on these studies and as illustrated in the graph, the lowest risk of being involved in a crash occurs at approximately the 85th percentile speed. Figure 3 represents this fact that crashes are lowest at the 85th percentile speed.”***    The Department’s ***Wisconsin Motorists Handbook*** stresses that all drivers know and understand the concept of “Space Ahead” as it relates to following too close. It states:  ***Rear-end crashes are very common. They are caused by drivers following too closely (tailgating) to be able to stop before hitting the vehicle ahead when it suddenly slows or stops. Professionals believe a safe following distance should be no less than four seconds under ideal conditions. Here is an easy way to find out if you are following too closely***  ***Following-distance rule Watch for when the rear of the vehicle ahead passes a sign, tree or any other stationary point. Consider it to be your “mark.” Count the seconds it takes you to reach the same mark. (“One-thousand-one, one-thousand-two, one-thousand, three, one-thousand-four.”) You are following too closely if you pass the mark before you finish counting. If so, drop back and then count again at another mark to check the new following distance. Repeat until you are following no closer than the minimum recommended following distance. A minimum four second following distance is recommended under ideal driving conditions. However, in the following situations, you may need more distance between your vehicle and the vehicle in front to be safe:”***  Headways between successive vehicles are often observed to be less than 4 seconds, especially in platoons. The I-39/90 public outreach team is trying to educate the motoring public to leave more space through travel advisories, press releases, and social media.  To date, it appears the June 2nd change in speed limit has resulted in lower travel speeds. However, even though DTSD constantly collects speed data during I-39 construction, results for June 2018 are incomplete and will be compiled and reported out in early July. |
| * 1. Post those speed limit signs more frequently along the work zones. | DTSD has increased the frequency of regulatory “SPEED LIMIT 55” signs to an amount that is well in excess of the Manual on Uniform Traffic Control Devices (MUTCD)\* standard that would otherwise be installed within the same project limits to present motorist with speed limitation regulations. With respect to signing the MUTCD states:    ***“Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness.”***  Regarding Standardization of Signing Chapter 2. Section 1-3. of the Traffic Engineering, Operations & Safety Manual states the following:  ***“Although the Department exercises no control over the usage of non-conforming signs on other systems, except on sections being built under state contracts, the Department can and should be looked to for direction in preserving the uniformity of all traffic control devices. Signs are of special concern because they can be designed in almost endless variation.***  ***Part 1 of the Manual on Uniform Traffic Control Devices (MUTCD) gives specific positive purposes for the use of standardized traffic control devices. If these were closely followed by all agencies there would be no need for further discussion. Unfortunately, there are some who believe that non-uniform signs are more effective, generally because of their uniqueness.”***  \**The MUTCD is a document created by the United States Department of Transportation, Federal Highway Administration and is adopted by reference in accordance with title 23, United States Code, Section 109(d) and Title 23, Code of Federal Regulations, Part 655.603, and is approved as the national standard for designing, applying, and planning traffic control devices. It sets forth standards and principles that govern the design and use of traffic control devices for all streets, highways, and bicycle facilities open to public travel regardless of type or class.* |
| 1. **Emergency pull off zones approximately every mile in the work zones.** | |
| * 1. Currently, there is an average of one emergency pull off zone for every two miles of work zone. The goal in 2017 put forth by DTSD was to have one pull off for every mile. We concur with that goal and would like to see it implemented. The goal would be to accomplish this within 60 days. | There are a total of 39 emergency pullouts and safe refuge areas along the I-39/90 corridor. This includes the 21 access points that exist via interchanges, Safety Weight Enforcement Facilities (SWEF), and rest areas. In addition to these, there are also 18 emergency parking/pullout locations along the 45-mile corridor that have been constructed for the 2018 construction season. The exact spacing of these is based on proximity to interchanges, entrance/exit ramps, Safety Weight Enforcement Facility (SWEF), and other geographic considerations (e.g., steep slopes, wetlands, hillsides, streams, etc.) along the corridor. The following maps provide the locations of the emergency pull-out locations and spacing distances.  In addition, the design of emergency pullouts were greatly enhanced as part of the I-39/90 project. These additional enhancements include providing a paved surface, providing emergency access, and extending the pull-out distance from 150 to 450 feet in length. Standard detailed drawings depicting these conditions (original and improved) are included for review.  The concept of emergency pull off zones is included in the Strategies Matrix; see #9. The team continues to pursue opportunities with first responders for additional access points throughout construction stages. |
| 1. **Continue working to provide emergency access points along the counter-directional zones for emergency responders.** | |
| * 1. The current work zone configuration with narrow shoulders makes it nearly impossible for emergency responders to get through stopped traffic. Emergency access points strategically placed along the corridor will allow for quicker access to injured parties, quicker assessment of the scene and ultimately quicker clearance times. We had a few access points implemented in 2017 and would like this to continue. | There are currently numerous emergency access points throughout the I-39/90 work zones.   * 35 points of access using the interchange exit/entrance ramps * 21 emergency access points from local roads have been constructed * 11 gate access points through the median barrier wall * 11 emergency access points through vehicle gates through the barrier wall that separates the traveling public from the work zone (Map)   The concept of additional emergency access is included in the Strategies Matrix, see #7, 8, and 61. The team continues to pursue opportunities with first responders for additional access points throughout construction stages. |
| 1. **Additional speed trailers placed at identified high risk or high crash areas of the work zone. Immediate implementation.** | |
| * 1. Speed trailers provide motorists with feedback of their current driving speeds and how it relates to posted limits. This feedback differs from the barrage of posted signs motorists experience when traveling in a work zone of this magnitude and can better influence motorist behavior. | DTSD agrees that speed trailers provide motorist feedback of the current travelling speeds; however, there are numerous studies that indicate the benefits of these trailers slow traffic in short proximity relative to where they are stationed. They do not slow traffic over a long stretch of roadway along the entire corridor. Furthermore, research has proven that the effectiveness of these devices lessens after two to three weeks of use (BTO Work Zone Engineer). Finally, there are limited areas where these can safely be placed alongside the roadway. |
| * 1. We recommend the trailers be placed strategically in high crash areas. | It is difficult to determine statistically significant high crash locations in the I-39/90 work zone. Because crashes are random events, crash frequencies naturally fluctuate over time at any given site. The randomness of crash occurrence indicates that short term crash frequencies alone are not a reliable estimator of long term crash frequency. DTSD typically uses 3-5 years of data to determine high crash locations, but this length of analysis is not possible in an I-39/90 work zone that changes yearly.  Rather than attempt to identify high crash locations, DTSD proposes to identify locations in the I-39/90 corridor where speeds are higher than the average for the corridor. These locations are areas where the risk of speed related crashes is the highest and would experience the greatest benefit from the reduction in speed associated with the speed trailers.  Studies have shown the speed trailers lose their effectiveness if they remain in the same location for 3-4 weeks. The I-39/90 Mega Team proposes moving the speed trailers monthly to other locations that have high measured speeds. The placement of the trailers are constrained by their size and visibility over the barrier. The I-39/90 Mega Team has identified 10 locations where the speed trailers can be placed and proposes to rotate the 6 available speed boards through those 10 locations. As data indicates, the team will continue to look for opportunities to add locations for the speed trailers. |
| 1. **Creative Signage** | |
| * 1. Orange “WORK ZONE” signs placed on top of the 55 mph speed limit signs.      1. It is designed to get a driver’s attention (See photo for example) | DTSD has installed this type of sign at the beginning of the reduced speed limit section of I-39/90. |
| * 1. Signs advising CMVs to travel in the left lane      1. Moving CMVs to the left lane prevents them from passing each other as often, keeps the entrance and exit ramps more visible to motorists and hopefully reduces the speed disparity at those exchanges. Suggested timeline – as soon as the signs can be placed. | Although restricting trucks to the left lane is common on projects that temporarily widen the shoulders and shift trucks away from the shoulders to prevent shoulder pavement failure, it has not shown to improve the traffic operations.  Nationally, there is mobility and safety research into truck lane restrictions. On freeways with less than 40,000 vehicles per day, crashes were reduced when the truck restriction was in place. On freeways with greater than 40,000 vehicles per day, crashes were higher than expected. Non-compliance is a significant problem on four-lane freeways and there is no significant impact to operating speeds with the truck restrictions. ([Virginia DOT](#fivebi))  The inside lane of I-39/90 operates 5 mph faster than the outside lane. If a truck restriction were put in place, the outside lane would likely operate 5 mph faster than the inside lane, which would require the merging to occur at a faster speed. |
| * 1. Use of DMS signage to indicate a work zone and reduced speed      1. Use portable message boards with creative messages indicating conditions are different and speeds reduced, the better the chances of reducing crashes. Messaging example could be: “1 MPH over limit = $200 FINE” or “Tailgating is for ball parks” Suggested timeline – as soon as message boards arrive. | DTSD has implemented similar messages on the DMS. Additional PCMS have been placed along the corridor with speed and safety related messaging. |
| * 1. More orange signs/lime green signs indicating motorists are in a work zone. This also includes signage to warn about distracted driving and following too closely. | Additional signage as per 1.b. and 5.a. have been implemented. Lime green (high-vis yellow) is reserved for school zones. |
| 1. **DSP resource allocation. Immediate implementation** | |
| * 1. Allocate and creatively schedule our mitigation resources to target visibility and/or enforcement efforts during the peak travel times and in the specific zones that are proving the most challenging.      1. We will attempt to add more resources to work zones, but they are limited. This would also require an increase in mitigation funds to cover the cost of increased resources. | DTSD is in strong support of having additional law enforcement presence throughout the Corridor. Mitigation funds are available, as in past years. Past annual allocations have not been fully utilized. |
| * + 1. Currently, we have 39 troopers per week assigned Sunday through Saturday to the I-39 project. We are adding 8 more four hour shifts per week for a total number of 47 troopers, an increase of 20%. Sergeants are allowed to work these shifts as well. | DTSD understands that DSP currently provides two 4-hour shifts per day (7 days a week) per segment (south, central and north).  DTSD would benefit from any additional enforcement DSP can provide. DTSD recommends adding four times as much law enforcement mitigation service to each corridor segment (e.g., an additional 24 hours per day per segment). Any coverage DSP is unable to provide may be supplemented with County law enforcement at a similar cost.   * Dane County (north segment) could provide 24 hours per day of law enforcement mitigation coverage. * Rock County (south and central segments) could provide 8 hours per day of law enforcement mitigation coverage (56 hours per week)   The current DSP cost for providing law enforcement mitigation services for all three segments is approximately $482,000 per year. If the level service were increased, the cost would be as follows:   |  |  | | --- | --- | |  | ~ ANNUAL COST | | 2X current coverage | $964,000 | | 3X current coverage | $1,450,000 | | 4X current coverage | $1,930,000 |   . |
| * + 1. Bring in teams of troopers from other regions to focus on patrol for one week (5 – 8 hr. shifts) at a time. Pros: Add more resources to the project. Cons: incurred hotel costs. | The concept of a dedicated troop was originally proposed to serve the corridor. This would have provided knowledgeable law enforcement personnel that is familiar with the entire 45-mile corridor; ongoing construction work and contractor practices; knowledge of construction project specific emergency access points; relationships with corridor-wide first responders, project staff, and local municipal staff; and dedicated service for five years or more for the duration of the construction project. Ultimately, DSP determined this strategy was not feasible due to recruit classes, statutory limits on the number of sworn officers, the inability to have more than one recruit class in any given year, and the inability of DSP to fill their vacancies in general.  As stated above, the concept of a construction troop is included in the Strategies Matrix, see #19.  Aside from this concept, DTSD has continually made requests to DSP for additional law enforcement mitigation services to increase visibility and law enforcement efforts. |
| * + 1. Increase radius for overtime call outs        1. Currently we are at 60 mile radius for call outs.        2. Extend call outs to 75 miles which would have to include extra cost for travel time to ensure maximum amount of time in the work zones. Currently, travel is not included for personnel within 60 miles. | DTSD understands this is a DSP policy issue per their current union contract. |
| * 1. Utilize inspectors in work zones more efficiently      1. With the closing of the SWEFs, inspectors can be assigned during normal shifts to travel the work zones providing a level of visibility as well as conducting inspections on CMVs at the various exchanges and off ramps throughout the work zones. | Similar to 6.a.iv. above, DTSD understands this is a DSP union policy issue. Further, the closing of the SWEFs was done by the Bureau of Highway Maintenance. |
| 1. **Aerial Enforcement. Immediate implementation.** | |
| * 1. Use aircraft to target erratic driving in the work zones during peak travel times and take enforcement action. | BTO removed aerial enforcement from the mitigation strategies worksheet. DSP has stated there are not suitable locations to perform enforcement activities along the I-39/90 corridor, but the I-39/90 team is willing to discuss locations such as crash investigation sites at interchanges. Finally, DSP has previously stated that there are not enough pilots to provide adequate aerial enforcement service.  The use of aerial surveillance technology is included in the Strategies Matrix, see #21 and #22. |
| * 1. Strategically place “Aerial Enforcement Detail” signs at the entrances to the counter-directional work zones to deter speeding. | The traveling public eventually becomes immune to the signs if not actively enforced, and this measure becomes ineffective. |
| 1. **Communicate with major motor carrier companies. Immediate implementation** | |
| * 1. DSP suggested this in 2017. Communications with companies will make them aware of the work zones, potential delays, narrow shoulders, the signage and afford them the opportunity to relay the information to their drivers who may choose a different route. | As a department, we continually push the 511 Wisconsin information in websites, social media, news releases, etc. TMC news releases include the 511 website and distribution to trucking companies.  6/15/2018 WisDOT Motor Carrier Services sent an email on behalf of the I-39/90 project to more than 9,000 trucking companies. |
| 1. **Freeway Service Trucks (FSTs)** | |
| * 1. Trucks (like the one pictured) are used throughout Dane and Milwaukee Counties and may give law enforcement additional opportunities for scene response and clearing including: | The truck referenced in the DSP suggestion 9.c. is the Dane County rapid response and incident management vehicle (e.g., Beltline Bob truck). These trucks do not have the ability to relocate vehicles. The truck is provided by the Dane County Sheriff’s Office and is limited to a specific segment along the Beltline; not on I-39/90. This is similar to the truck used by the Milwaukee County Sheriff’s Office. These trucks are funded by the respective counties.  Purchasing a truck similar to what is used by the Dane County Sheriff’s Office costs approximately $80,000 furnished. This truck could be outfitted to provide towing services such as adding a wheel lift or other equipment to relocate stalled vehicles at an additional cost. DTSD recognizes that vehcles cannot be purchased using mitigation funds.  As part of the I-39/90 Corridor Project, there currently are three FST trucks serving the segments to provide motorist assistance. FST trucks are specifically designed to relocate two vehicles at one time. Each truck provides 86 hours of coverage per segment per week for a total of 258 hours. The cost of this service for this construction season is $237,000 per segment for a total of $711,000 for the entire corridor.  The use of freeway service trucks is included in the Strategies Matrix, see #19 and #26. |
| * + 1. The ability to manipulate barriers quickly, allowing emergency vehicles to enter the opposite lane for easier access to a scene. Current conditions dictate emergency vehicles traveling to an exit to turn around and negotiate through stopped traffic or to travel against normal traffic flow; this delays response times and increases the danger potential. | 11 gate access points are available through the median barrier wall (see 3.a) in addition to numerous other temporary and permanent emergency access points.  As shown below, first responding agencies are using the emergency access points to safely respond to incidents via the work zone.  Emergency access on I 39-90 near County BN - May 2018 (2)  Emergency access on I 39-90 near County BN - May 2018 |
| * + 1. The ability to temporarily move disabled vehicles from traffic lanes allowing for traffic queues to clear. | Push bumpers would provide DSP the ability to safely and efficiently move disabled vehicles out of the travel lanes. DSP currently has a limited number of vehicles equipped with push bumpers. DTSD recognizes that push bumpers and other equipment cannot be purchased using mitigation funds.  The use of push bumpers on DSP vehicles was suggested as a tool in the Strategies Matrix (see #13). |
| * + 1. Provide better visibility for approaching traffic encouraging safer travel. | All I-39/90 FST trucks provide visibility via light bars, etc. |
| * 1. The trucks could be operated by law enforcement during their assigned mitigation period and would serve a better suited purpose than the traditional cruisers. The two vehicles in service are extended cab, four-wheel drive pickup trucks with special equipment to assist motorists and provide scene security. The vehicles are equipped with a changeable message sign, appropriate fluids, traffic cones and other equipment needed to assist disabled vehicles and warn approaching traffic. | DTSD is open to having DSP operate the FST however, the current I-39/90 FST are operated by professional tow truck operators. Providing the trucks similar to “Beltline Bob” would replicate what the FST already provides. |
| * 1. The photo below is a Dane County FST truck that moved the barrier wall on a recent crash. This allowed Fire and EMS to access the six car crash for extrication of two subjects.   IMG_0016 (002) | As noted in 9.a. purchasing a truck similar to what is used by the Dane County Sheriff’s Office costs approximately $80,000. DTSD recognizes that vehicles cannot be purchased using mitigation funds.  The I-39/90 FSTs are flatbed tow trucks that can relocate two disabled vehicles at once. The Dane County truck shown in DSP recommendation 9.d. can only push a disabled vehicle and is unable to relocate it from the incident scene. A picture of the I-39/90 FST is shown immediately below.  WisDOT-State Farm Safety Patrol truck |
| 1. **Oversize Load Restrictions. Immediate implementation.** | |
| * 1. Oversize loads wider than 12 feet should be prohibited from traveling through the work zone. When crashes occur, even if one lane remains open, their width makes it impossible for the load to pass the incident scene or traffic to get around the load to continue. The backup then stays in place until the scene is completely clear. | This issue has been evaluated by the Bureau of Highway Maintenance and clarification from the Administrator’s Office and the Secretary’s Office have stated that the current policy of allowing OSOW through the corridor will remain in effect. |
| * 1. ANY oversize loads should be restricted from traveling on a Friday, Saturday, Sunday or Monday of holiday weekends due to extraordinary traffic volume. | See 10a above; same response. |
| * 1. DSP, DTSD and DOT Permits can work together to provide clear and concise restrictions   IMG_0012 | See 10a above; same response. |

Sources:

Virginia Transportation Research Council, Evaluation of Truck Lane Restrictions in Virginia: Phase II

<http://vtrc.virginiadot.org/PubDetails.aspx?id=298099>