

**Work Zone Fatality Reduction Strategies**  
**Webinar Transcript**  
May 23, 2012

**Jennifer Symoun**

Good afternoon or good morning to those of you to the West. Welcome to today's webinar on Work Zone Fatality Reduction Strategies. My name is Jennifer Symoun and I will moderate today's webinar

Before I go any further, I do want to let those of you who are calling into the teleconference for the audio know that you need to mute your computer speakers or else you will be hearing your audio over the computer as well. For those of you calling into the phone line, please note that your phone lines are listen-only.

Today's webinar is scheduled to last 90 minutes, with the first 60 minutes for the presentations and the final 30 minutes for audience question and answer. We will start with an introduction given by Tracy Scriba of the Federal Highway Administration Work Zone Mobility and Safety Program. She will then be followed by presentations from Joe Jeffrey of Road-Tech Safety Services, who will be speaking about California's work zone fatality reduction efforts; Stefanie Maxwell of the Florida Department of Transportation; and Steve Kite of the North Carolina Department of Transportation.

If during the presentations you think of a question, please type it into the chat area. Please make sure you send your question to "Everyone." Presenters will be unable to answer your questions during their presentations, but the questions typed into the chat box will be addressed following the presentations. If we run out of time and there are unanswered questions, we will attempt to get written responses from the presenters that will be emailed to all attendees.

The PowerPoint presentations used today are available for download from the file download box in the lower right corner of your screen. The presentations will also be available online within the next few weeks, along with a recording and a transcript of today's webinar. I will notify all attendees once these materials are posted online.

We're now going to go ahead and get started with our first presentation, given by Tracy Scriba of the Federal Highway Administration Work Zone Mobility and Safety Program.

As a reminder, if you have questions during the presentations, please type them into the chat box and they will be addressed following each presentation. I'm now going to turn it over to Tracy Scriba.

**Tracy Scriba**

Thank you, Jennifer. I'm going to start us off with a national snapshot of the status of work zone fatalities and where we've been over recent years, and then our presentations at the State level will be the focus of our session today.

In 2010, there were 576 fatalities in U.S. work zones. I think we all know that work zones can be hazardous places. Lives are lost in our work zones every year; 576 is not just number, but it is a representation of lives lost in work zones. According to data from our Fatality Analysis Reporting System (FARS), the 576 fatalities that we experienced in 2010 were a 13.6% decrease from the prior year, when there were 667 fatalities. This continues the trend of decreasing work zone fatalities that has been occurring since 2002: a 10-year downward trend from when fatalities peaked at 1,186 in 2002.

This is the lowest number of work zone fatalities in 30 years – since 1982 – when there were 489 work zone fatalities. This is all very good news; the number of fatalities is certainly moving in the right direction, and there are more lives saved each year. However, there are still 576 lives lost, and we need to continue to work to reduce that loss of life.

This is a pictorial representation of the number of fatalities over the last 15 years or so. You can see it increased for a little while, but since 2002 we've been on a downward trend, with an even greater decrease since 2006. This slide shows a different representation of the same data to show the trend line.

One thing that's interesting to look at is whether work zone fatalities have decreased because of reasons not having anything necessarily to do with the work zones. For instance, are roads getting safer out there? Are there better devices in cars that help preserve lives? If we look at how work zone fatality data tracks against some other data, we see that work zone fatalities have decreased at a greater rate than overall fatalities during a time when VMT have increased and during a time when more work is being done under traffic. It is interesting to look at those pieces of data and realize that even though there's more traffic on our roads, even though cars are safer, and even though we have more work on our roads, we are still seeing a positive trend in work zones that goes beyond what we see in the other areas of data.

This slide shows that if you look at work zone fatalities compared to overall highway fatalities, work zone fatalities have been decreasing at an overall greater rate than highway fatalities. This graph shows the percentage of work zone fatalities as a percentage of overall fatalities, and you can see the trend has been downward. Work zone fatalities were about 1.75% of all roadway fatalities in 2010.

If we look at work zone fatalities compared to overall VMT, we see that total annual VMT between 2002 and 2009 increased by a small percentage, even with depressed levels of traffic in some areas of the country due to the economy. Yet work zone fatalities in that time period decreased by 44%, so it is not likely due just to less traffic on our roads.

If we look at the amount of roadwork, we see that it has actually increased overall. This shows you the overall trend – the red is maintenance, and the blue is capital outlay for construction. Work zone fatalities have decreased, even at a time when we've seen an overall increase in roadwork most years.

The next slide shows another representation of the amount of miles underway, and you can see that generally it is an upward trend, particularly in recent years with some of the Recovery Act

spending that was added into the mix. More of this work is being done under traffic. Resurfacing work is the orange bar, and that is certainly done on roads that are currently carrying traffic. Added capacity and reconstruction are some of the other bars, and reconstruction with or without added capacity are some of the higher bars. You can see that a lot of work is being done where there's traffic already on our roads. It makes our job more challenging having to manage the traffic, but it also means that we are having some success when we see the decrease in fatalities along with additional work.

We're focusing on fatality data today, but we need to keep in mind that it is one measure of safety in our work zones; it's a starting point to understand what is going on in work zones. We need to look at other data, such as crashes, injuries, and worker fatalities. Today we are going to focus a little bit more on the fatality data picture, though. We do have some more data available on our website; I put the website address on this slide if you want to check it out later. There are four categories of data on our site, and one of them is fatality data.

In essence, as we all know, work zones can be dangerous places, but we are seeing some significant improvements in work zone safety through the efforts of many in the transportation industry. What are some possible contributing factors from the macroscopic, national level? I think we are doing earlier, more comprehensive planning for work zones. We're looking at the impacts up-front and earlier and doing more comprehensive planning to manage traffic during construction. I think we are seeing greater emphasis on work zone management strategies for better handling traffic and communicating with the public. I think we are also seeing some growing use of data to better understand and identify what issues we have out there and where we need to focus our attention. Those are at the macroscopic level. We're going to hear more specifics from our upcoming speakers. I think a number of those things are attributed to the additional attention that has been paid to work zones with the issuance of the Work Zone Safety and Mobility Rule in 2004 that became fully effective in 2007. I think that drove additional attention to relooking at policies and practices in work zones and has continued to bear some fruit. We do need to continue our efforts; 576 fatalities mean 576 lives lost, and that's certainly something to be working on.

I will turn it over to our three speakers, who are going to talk about efforts going on in three different states and how they've worked to make their work zones safer. These states have all seen significant reductions in work zone fatalities over several years, so they have some valuable practices to share with us.

### **Jennifer Symoun**

Thank you, Tracy. Our next presentation will be given by Joe Jeffrey of Road-Tech Safety Services, who will be speaking about California's work zone fatality reduction efforts.

### **Joe Jeffrey**

Thanks, Jennifer. For the most part, my experience has been involved in our State's Strategic Highway Safety Plan (SHSP). I sit on our steering committee and am one of the two co-chairs of our Work Zone Safety Committee. My focus this morning is going to be more on the SHSP and where I believe that's contributed to the reduction. I think you will get a lot more of the other stuff from the other two speakers.

To tell you a little about our SHSP, it was originally started back in November 2005. We had more than 300 stakeholders on our team from the beginning, and we still do. Most people look at that and think it is kind of big and unwieldy, but it has actually worked very well. The plan was approved in September 2006. We started to work on an implementation plan with different actions, and that was completed in April 2008. We had a total of 16 challenge areas – we're up to 17 now – and 152 actions. With one or two exceptions, all of those actions are completed now. I want to talk a little about the actions. Everybody looks at 152 actions and says there's no way you can handle all that; there's no way you can keep focused. They are actually spread over so many different people and so many different agencies and even non-agencies (e.g., industries, such as myself) that it was very easy to do. I won't say all of them were simple, but we were able to get just about every one of them completed.

The SHSP is data-driven. We wanted all of our actions to be focused on identifiable problems where we knew we had an issue, and we wanted to be able to measure the effectiveness of countermeasures. The original goal for the work zone challenge area was by 2010 to reduce fatalities in California work zones by 10% from the 2004 level of 109. What this doesn't show is that in 2005, our fatalities actually jumped up to 155, so right off the bat we had quite a number to overcome. For each action, we wanted to have something that was attainable, measurable, and focused on a known problem area, as I said.

All of them are complete now in the work zone area. I will run through each one. We originally had about 30 actions we identified as something we thought would really contribute to this. We narrowed that down to 14, and these are in order of importance, so action 14.01 is the one we thought was most important and the one we most wanted to complete. That was joint work zone training for California Highway Patrol (CHP) and Caltrans. Like most states, we use law enforcement in our work zones, and it is very effective. We thought we could make even better use of that by educating everyone involved in the process, so a program was put together to train both sides of that equation. Most importantly, when we conducted this training, it was done with all of them in the room. The training material was good, but what really worked well was the conversation back and forth between CHP and Caltrans. Now we make much better use of law enforcement in work zones. It is an ongoing process and we have a lot more of it to do, but it has been good.

Action 14.02 is to improve the collection and analysis of work zone crash data. This is probably something you're going to hear a lot about today. We knew from the beginning how many work zone fatalities we had and how many injuries we had. What we didn't know was where that happened in the work zone. We didn't know what kind of traffic controls were in place. We didn't know what kind of work was going on. We didn't know much. We really wanted to work on getting that done, and we have University of California Davis going through all the different accident reports and figuring out the answers to those questions.

Action 14.03 was to use dynamic merge systems to reduce end of queue collisions. One of the few really good nuggets of data we had was that 26% of all fatalities in work zones in California were a result of end of queue collisions, so that's something we really wanted to focus on.

Action 14.04 was to permanently fund our “Slow for the Cone Zone” campaign. This is something that Caltrans has been doing for quite a few years now, and it has been very successful. It was done through a grant process through the Office of Traffic Safety, which means that each year they had to reapply for new funding. In order to reapply, they had to create a new program, so even if they had the perfect way of reaching drivers out there and convincing them to be more alert in work zones, they couldn't repeat that the following year because they had to invent a new way of going about the same thing. Now we have permanent funding for that campaign.

Action 14.05 was to encourage the use of more and better mobile barriers and attenuators. We used attenuator trucks, but we had some notable crashes where drivers came in ahead of that TMA and ran into workers or equipment. We wanted to increase the protection from that side of the lane rather than just from the back.

Action 14.06 was to increase work zone training for all workers. Through a Federal training grant and other work that Caltrans has been doing, we were able to train quite number of them. Action 14.07 was to encourage the use of full closures. In California, they don't think much about closing down a busy freeway, so it's something we really haven't done much. We are now doing quite a bit more of it, and it has been very successful, not just in terms of safety, but in terms of buy-in from the public. Everybody has actually been pretty pleased with it.

Action 14.08 was to develop a lane closure data system. One of the other data holes we ran into when we started this process was that we realized we didn't know how many lane closures we had. We didn't know where they were or how long they were out there. So, we developed a real-time online lane closure data system so we can really track this stuff. It's tied in with the 511 system in most areas so motorists are able to get this information right away as well. It's all working together.

Action 14.09 was to encourage the use of Safety Edge, which as most of you probably know is a tapered edge to the side of an asphalt lift when you are doing an overlay. This is important on the side of the road so that when material pushed in next to that is somehow worn away by people running off the road, it doesn't leave an abrupt edge that might cause people to lose control of their vehicles. We also wanted to use this during the overlay process so that as you overlaid and had the lift in one lane, rather than having an abrupt edge from that to the next lane, there would be a tapered edge so drivers would maintain control within the work zone.

Action 14.10 was to evaluate work zone language in our driver handbook and recommend changes. In California, that means the driver test will also reflect that new language. It wasn't bad before, but we wanted to bring it up to speed on some of the new things going on, like the danger that work zones pose to drivers and their passengers.

Action 14.11 was to change the new product evaluation system. There are a lot of great new products out there, and we wanted to get those out on the road faster. We wanted to make it easier for vendors to understand how to get through our process and to get their products out there.

Action 14.12 was to develop typical drawings and guidance for bikes and pedestrians in work zones. I'm proud to say we are the first State in the nation that has typical drawings and guidance like this for not just for pedestrians, but bicycles as well.

Action 14.13 was to develop project-specific websites. We thought that by bringing attention especially to major projects, we'd raise awareness of the work zone and help drivers know about upcoming changes or anything they'd need to know about their daily drive that would help them be more alert and aware of what was going on in our work zone.

Finally, action 14.14 was to develop best practices for purchasing new technology. California has a very difficult time buying you sole-sourced products or new inventions. It might be the most life-saving device out there, but because of a lot of the hoops that Caltrans people have to jump through to get that done, it can be difficult, and so we are trying to make that easier to do.

That covers the 14 actions. How did they work? The latest data shows that in 2010, we show 41 fatalities in our work zones, which equals a 62% reduction from our 2007 levels. I want to put an asterisk here because we've had some data accuracy the issues; this is a new number and it could be possibly as high as 50, I suppose. No matter how you look at it, it's still a significant reduction. The number of fatalities has fallen every year since we started this process in 2007.

It is a little early to get into this yet, but we are starting to collect the work zone crash data on the actual accident reports. They've done three of the twelve districts right now and are starting on two more. They have about 5 years for each of those districts. As I said, these are preliminary numbers, but so far, our data suggest that most of the crashes are occurring in or near the activity area and not in the transition area, as we suspected. It looks like about 60% are in the activity area. Of those, data seems to suggest that most of the crashes are due to improper lane changes – jumping from lane to lane quickly as traffic slows down – or following too closely – excessive speed. I think all of these are some form of distracted driving, so as we get more information this way, we are going to be able to target our efforts even better.

I want to talk about what I thought worked. For the HSIP program, an SAIC study showed that the program has contributed to reductions in fatalities nationwide overall. More importantly, it has the SHSP requirement as a component. That's what we really need to focus on here. What worked in California as far as the SHSP is the importance of collaboration. I've been doing this for quite a few years, and I've found that 4 E's are essential. You start talking about an engineering solution, for example, something I might come up with for work zones, and the input from others like law enforcement, emergency medical people, and others has made each of these actions that much better along the way. We've had a lot of participation from non-agency people, too, and I think that's really critical. Industry people bring new technology and that sort of thing to the table. One I was really impressed with was the community stakeholders. Things like those bike typical drawings were made a lot better by help from our community bicycle groups and pedestrian groups. The whole thing led to a plan that everybody was committed to, and therefore moved forward a lot faster.

Another really important item was buy-in from leadership. From the very beginning, each of the agency directors – Caltrans Director, DMV Director, and CHP Commissioner – committed the

money and the manpower up-front to see these actions were accomplished. They stayed on top of each of those actions as we moved forward. In some cases, multiple agencies worked together; maybe Caltrans couldn't justify the cost of everything to get something done, but CHP would jump in and help with part of that.

The other thing I thought was important was that as problems were encountered, in the past, it'd be some mid-level manager that was working on this and maybe they'd get frustrated and run into something that would hold them up. In this case, leadership was asking about this on a monthly basis and they'd find out about whatever the problem was and would bring a lot more pull to the table than the mid-level manager could bring to see that they found a way around the problem. It really did make it go a lot smoother and a lot faster. Finally, some of the actions were possible that simply would not have been possible without the SHSP. Because it was in the plan, we had to get it done, and that's why multi-year funding for the "Slow for the Cone Zone" campaign happened. Also, interagency actions are a lot more cooperative. I think they worked together well before, but one was generally the lead and the other was asked to help out, where here, both or multiple agencies are committing up-front to working together to make something happen, so therefore, they're all there and excited about making it happen. For example, training for law enforcement in work zones was a good example of how well the system works that way.

What's next? We've got one new action approved, which is a work zone toolkit for engineers and designers from cities and counties that maybe don't work with the stuff on a daily basis, so they can find out what latest and greatest devices and systems are available out there. We have a few other actions in development. We are not waiting for the next highway bill on this. One of them is transverse rumble strips in advance of flagger stations to wake drivers up and slow them down. Another is to continue working on data collection because the more of that we have, the better we are going to be able to target our resources later. We're looking at speed reduction techniques for maintenance. We're doing that in construction right now where we'll have reduced speed limits in some construction zones. In maintenance, we don't have all the guidance, so we are trying to develop guidance to help them with that. On top of all this, what I think is most important is this detailed data. I think we are going to have some real surprises from this as we move forward and certainly as we do, we will share that with all of you.

That's what I've got to cover. Jennifer, I will turn it back over to you.

### **Jennifer Symoun**

Thank you, Joe. We are going to take a few questions right now so that everything is fresh in everybody's minds. Joe, the first question for you is: are you reviewing the work zone locations as well, such as advanced warning area, actual work area, etc.?

### **Joe Jeffrey**

I will be honest with you –I'm going to be weaker in this area because I'm not coming from the DOT side of it, but I do know that they go through a quality control process at Caltrans where they are reviewing different work zones. It varies district-to-district how that process is handled, but there are processes in place.

### **Jennifer Symoun**

Can you briefly repeat the summary of action 14.06: training?

**Joe Jeffrey**

We wanted work zone training for the workers in the work zone – the people putting the traffic control in place – and for short-term work zones, where it might be utility or law enforcement. Federal Highway Administration had a grant to the American Traffic Safety Services Association to provide quite a bit of training, so we leveraged that as much as we could. Caltrans did quite a bit of training for their own people as well.

**Jennifer Symoun**

Could you briefly provide more detail on the dynamic merge system?

**Joe Jeffrey**

The idea was not really to use it as a dynamic merge system, which normally measures traffic speeds and, as speeds change, tells people to move over into the open lane or to wait until the last minute to move over, depending on how the system is used. We weren't worried about that. We were worried about traffic stopping. As sensors picked up speeds slowing down at the taper or farther upstream, it would warn people on changeable message signs about the fact that traffic was slowing or stopped ahead. It gives them extra preparation that way.

**Jennifer Symoun**

Can you please go over the details of action 14.02: collection and analysis of work zone crash data?

**Joe Jeffrey**

The University of California, Davis is going through what we call 555 reports, which are our crash reports here in California. Students from the school are looking at each and every one of them and pulling out every bit of data they can, including the type of traffic control in place and the diagram showing what happened. They look at different causal factors, but they are also looking at everything else – the time of day, the type of weather, you name it – so we've got a really rich data source, so we can search a lot of different directions and get a feel for what combinations of things might be contributing to more crashes than others.

**Jennifer Symoun**

We will take two more questions and if we have time we will go back to the others at the end. Have you improved accident reporting so data mining does not have to occur by hand in the future?

**Joe Jeffrey**

Part of the SHSP in California is working on a system that's going to be a little easier to use for everyone. I think it is already down at the State level, but getting down to the cities and counties is a step-by-step process. We're slowly getting others online as well.

**Jennifer Symoun**

Is California looking to use positive protection, like the mobile barrier, to protect workers and motorists?

**Joe Jeffrey**

We are experimenting with it. I think some of it is going to depend on the lessons learned and the way they use it, but they are trying to figure out what type of applications make the most sense to begin with, where they should be occurring more, and other locations where it is not necessarily practical because of the time involved in deploying it.

**Jennifer Symoun**

Thank you. If we have time at the end, we will go back to these questions that Joe didn't get a chance to address. We are now going to move on to Stefanie Maxwell of the Florida Department of Transportation (FDOT). Stefanie, you can go ahead when you're ready.

**Stefanie Maxwell**

Thanks, Jennifer. My name is Stefanie Maxwell and I work for the State Construction Office. I'm going to go over some of Florida's work zone fatality reduction strategies. For years, Florida has been one of the top three states with the most fatalities in work zones, and this is one category in which Florida is not proud to be number one. A few strategies that we've implemented in the past few years may have contributed to a reduction in fatalities, and we are going to go over four different strategies: the motorist awareness system; the use of temporary raised rumble strips for flagging operations; more in-depth process reviews, which includes training; and the use of public service announcements.

I will start by explaining the motorist awareness system (MAS). In 2003, Florida reviewed fatalities, and it revealed that about 45% of the fatalities were attributed to excessive speed in the work zone, so we thought that if we could reduce the speed in work zones, it would also reduce the fatalities. The MAS is the addition of five components to our standard lane closures setup. The goal of the MAS is to achieve the same respect for work zones that Florida school zones currently receive, and Florida school zones have received very high compliance to the speed limit. We felt the keys to achieving this respect were to discontinue the blanket speed limit reduction in the work zones, increase enforcement, remove the MAS when the conditions requiring it no longer existed, restoring the speed limit within the limits of the project back to the posted speed limit. Specifically, the MAS components would be activated when there was a lane closure set up, and then deactivated when the lane closure was taken down.

When do we use the MAS? All of these conditions must be met. There are four conditions, and the first condition was that it had to be a multi-lane facility. The second condition was that it would be a high-speed work zone facility posted at 55 miles per hour or greater. The third condition was that the work operation required a lane closure, and the fourth condition was that the workers had to be present.

What devices are used in the MAS? The next few slides will explain a little more of the devices. The first additional device that is used in the MAS is changeable message signs. This is an appeal to the motorist reduce their speed because workers are present, and it would only be for 3 miles.

Where do we actually place the changeable message signs? We place them 1,000 feet in advance of our roadwork 1-mile advanced warning sign, so it's the first thing you see. The portable changeable message sign is a trailer-mounted device used to warn motorists that workers are present ahead and that the speed is reduced for the next 3 miles. The maximum lane closure is 2 miles; however, it takes about 1 mile in advance of the lane closure to reduce the speed, hence the 3-mile reduction in speed.

The next device used in the MAS is the portable regulatory sign (PRS). Because the system is used for multi-lane projects, we use two PRS. One is placed in the median, and the other is placed directly across on the outside shoulder. The PRS are trailer-mounted regulatory speed limit signs with flashing lights used to inform motorists of the new speed limit for the work zone. The speed is reduced 10 miles per hour below the posted speed limit, but not below 55 miles per hour.

Where do we place the PRS? We place those between the roadwork 1-mile sign and "speeding fines double when workers present" sign.

The last device that is used is the radar speed display unit (RSDU). As mentioned before regarding the PRS, because the MAS is only used on multi-lane projects, we also use two RSDU. One is placed in the median, and the other is placed directly across on the outside shoulder. The RSDU are also trailer-mounted devices. They contain radar that detects and displays the speed of motorists as they approach the lane closure.

Where do we place the RSDU? They're placed 500 feet after the right-lane closure half-mile advanced warning sign.

The next slide is on the MAS for the speed and law enforcement officers. In addition to the five components mentioned, speed and law enforcement officers are used randomly to enforce the reduced speed in work zones.

Now we are going to discuss the costs of the MAS. These are the past 6-months average costs for the devices Florida uses for the MAS. The average cost is \$12.30 per day for the changeable message signs. We started out paying \$45 per day, per sign. The PRS, of which there are two used per day, is \$6.03 per day, per sign. We started out paying approximately \$40 for those signs per day, per sign. The RSDU are \$6.31 per day, per sign, and we use two of those. We started out paying \$35 per day, per sign. I mention what we started out paying because we implemented this all at once, on all projects, beginning on a certain day, and we supplemented contracts to reflect that. We started out paying a little bit more than what is currently being bid.

The next slide is on research. Florida has conducted research that concluded that when using the MAS, an average 4 to 5 miles per hour speed reduction was achieved in work zone. Here's a link to that research. The next slide is going to give you the actual design standard for Florida and the memo that we used to implement the MAS.

The second strategy that we used is temporary raised rumble strips for flagging operations. These rumble strips have been used to supplement the advanced warning signs. Here are pictures that

show the two different kinds of rumble strips used in Florida. The left picture is the removable polymer rumble strip, and it's required to be 0.25 inches thick, 4 inches wide, and 11 feet long. The right picture shows the molded engineered polymer rumble strip, and it is 1 inch high, 12 inches wide, and 11 feet long. It weighs 100 pounds. It doesn't require anchoring and it is usable. Both of these are reusable.

The next slide shows our design standard that we use in Florida. When using the removable polymer rumble strip, which is the top right, we actually use four sets of four. When using the bottom set, which is the molded engineered polymer rumble strip, three sets of three are required.

The next slide shows when temporary raised rumble strips are used. They are used if additional alertness is needed: for example, at limited stopping sight distance at horizontal and vertical curves. The picture shows a vertical curve.

I'm going to go to the third strategy, which is that Florida has recently implemented and is performing in-depth process reviews, which also include training. FDOT's process review team consists of a specialty engineer from our Design office, our Construction office, and the Florida Division FHWA office. The team reviews three projects per district. We review half of the districts per year and we have eight districts. Conducting the process reviews provides insight into where the districts need more focus and where we find the need for the training. We are currently focusing on crash cushions, and here are a few pictures from some of the training we've conducted. In addition to going out on the individual projects and performing the process reviews, we conduct hands-on training for large groups while we are in the district doing the process reviews. We have received extremely positive feedback from all of our districts and industry. The training is free for FDOT employees, consultants, contractors, etc.

The fourth strategy is the use of public service announcements. Each year, the FDOT Safety Office creates tip cards for Work Zone Awareness Week, and here's an example of one of the tip cards we've used. The tip cards, along with the USDOT work zone safety posters, are distributed to all of our District Public Information offices and the Community Traffic Safety Team, and they're posted on the FDOT Work Zone Safety website, which is the link at the top. The Public Information Office also develops a public service announcement (PSA), which is posted on the same website. The PSA is also played on a loop at all of the State of Florida welcome centers. The Public Information office also sends out a statewide press release for Work Zone Safety Week. We'll play the PSA video that FDOT uses for Work Zone Awareness Week. The video has people from Florida who show pictures of their lost loved ones who were fatalities in work zones.

This slide is on the fatality analysis reporting system. You can see in this table that in 2005, Florida work zone fatalities were at 162. This is when we implemented our MAS. In 2010, we dropped down to 43 fatalities, so there has been a significant drop.

Here is my contact information and that of my design counterpart, Ezzeldin Benghuzzi. He's here to help me answer some of the questions.

**Jennifer Symoun**

Thank you, Stefanie. We will go ahead and take a few questions for you. When you refer to rumble strips, are you talking about RoadQuake?

**Stefanie Maxwell**

Yes, RoadQuake is one of the products we have on our qualified products list.

**Jennifer Symoun**

Similar to that, what manufacturers of portable rumble strips do you have in Florida?

**Stefanie Maxwell**

We have Plastic Safety System, Inc. and ATM. I'm not sure what ATM stands for, but we have a couple of them on our product list.

**Jennifer Symoun**

I'm not sure what state the next person is from, but the question is: we were directed not to use temporary rumble strips at night. Do you have any comments about that?

**Stefanie Maxwell**

Florida does not restrict the use of it to daytime only; we allow the use of it at nighttime as well.

**Jennifer Symoun**

California found that having a police officer in the work zone works multiple times better than this setup. Can you comment on that?

**Stefanie Maxwell**

I'm not sure what this setup is referring to, but we do use law enforcement with the MAS.

**Tracy Scriba**

I believe the question is asking whether you've found using the MAS in conjunction with law enforcement to be more effective than using law enforcement alone. Any comments on that?

**Stefanie Maxwell**

We don't use law enforcement all the time; we have a random use of that. There's no doubt that probably makes an impact whether there's an MAS there or not. However, we studied it with the MAS alone and with a police present, and it did show a decrease in 4 to 5 miles per hour. Maybe it is only a small amount of miles per hour, but there was a change.

**Tracy Scriba**

It sounds like you're saying that you're able to have the MAS out there for a greater time period and more consistently than you're able to have law enforcement out there, given the random nature that you mentioned.

**Stefanie Maxwell**

Yes. In fact, on any high-speed facility that meets the conditions – multi-lane, 55 miles per hour, workers present, and a lane closure – it is a requirement, not an option, to install the MAS. It is an ongoing requirement.

**Jennifer Symoun**

How will a driver know that his or her speed is posting?

**Stefanie Maxwell**

As you are approaching the RSDU, it actually picks up the cars going through there. If there are multiple cars going through there, it goes from one speed to the other. So, if the person in front of you is going 75 mph and you're going 70 mph, it will quickly show 75 mph and then you will see it change to 70 mph. It is more for awareness, not necessarily for trying to see if it meets the speed showing on your speedometer. It is really trying to get drivers aware of their speed so they hopefully slow down because it is posted right there on the radar, whether it is your speed or someone else's.

**Jennifer Symoun**

Are you getting good compliance from contractors in turning on and off signs when workers are present or gone?

**Stefanie Maxwell**

We really have. We don't always get the best compliance on the portable signs that we place out there for just a lane closure, but for the MAS we do. I guess that may be because they are trailer-mounted devices, and we have emphasized that they are to be removed as soon as they are no longer in need, because they are not crash-worthy devices. We only are putting them there when they are absolutely needed and then we take them away when we no longer have the lane closure.

**Jennifer Symoun**

How is Florida addressing motorcycles in the use of portable rumble strips?

**Stefanie Maxwell**

We install a placard with a motorcycle warning on the advanced warning sign. We have just started using that this year. We started to rumble strips just last year, so hopefully that's going to be helpful. Our Traffic Ops worked a lot with our motorcyclists and that's one of the things they requested, so the placard is one of the things we use.

**Jennifer Symoun**

What is the maximum speed at which temporary raised rumble strips can be used?

**Ezzeldin Benghuzzi**

The rumble strips are tested at 40 mph to make sure they aren't going to move. One of the concerns was that the rumble strips will scoot away from the roadway, but because of their weight, it functioned very well when we tested it at 40 mph.

**Stefanie Maxwell**

We allow it for all speeds and we haven't had any problems with it at the higher speeds.

**Jennifer Symoun**

Thank you, Stefanie. We are now going to move on to our final presentation, given by Steve Kite of the North Carolina Department of Transportation.

### **Steve Kite**

Thanks, Jennifer. Those presentations were excellent, and you're going to hear some similar information in this one. It is interesting about the rumble strips as well. We've had two fatalities in work zones in 2012 involving flagging operations, and we've started looking at utilizing portable rumble strips to help with advanced warning. In answer to the question about motorcycle awareness and helping them understand they are getting ready to encounter rumble strips, the motorcycle agencies in North Carolina said tell us whatever the condition is and we will adjust for it, so just notifying them or posting a sign that says rumble strips ahead is all that's required, at least according to the motorcycle agencies.

North Carolina is on the East Coast, about halfway between New York and Florida. We have over 80,000 miles of State-maintained roads and over the 1,000 miles of interstate. Our state is roughly 400 miles wide and 200 miles tall, and we have three distinctly different geographic regions. To the right – I-95 to the coast – is a very flat and rural coastal region. From I-95 over to I-77 is our Piedmont area where the vast majority of our traffic volumes are located between Raleigh, Greensboro, Charlotte, and Winston Salem. West of Winston-Salem and west of I-77 toward the Asheville area is our mountain region. So we've got quite a challenge in North Carolina just due to the geography between the coastal region that has little traffic, but typically higher speeds; the metropolitan areas, where there are higher densities of traffic and any kind of roadwork becomes a major nightmare; and the mountain regions where it can be very difficult to maintain traffic.

The question is: why are we seeing a downward trend in work zone fatalities? Florida and California have both seen dramatic drops in their work zone fatalities. That is obviously impressive that they've had those kinds of drops. You've heard different types of strategies and processes that they've implemented to try to drive the numbers down. What have we done in North Carolina?

Do we see better drivers in North Carolina than any other state? I would say probably not. Are we seeing fewer drivers? You will see in a couple of slides what our VMT numbers are looking like; we are seeing fewer vehicles on the road, and certainly that equates to less miles and less opportunities for work zone encounters. Are we seeing better engineering and better TMPs? I'd like to hope so, but I'm not sure if that's driving down the numbers. Are we seeing fewer projects? After the economy crashed in 2009, we saw fewer projects because we had less funding, but those are all back on the uptick again. As we have more projects on the ground, will we see more work zone fatalities? Are we seeing fewer "significant" projects – significant projects meaning larger projects or projects around larger cities or areas where there are higher traffic volumes? We have seen fewer significant projects. We've had a lot more rural projects, a lot more bridge replacement projects, but we are starting to pick up a few larger jobs in our design-build programs, and I will talk to that in a couple slides. Do we have more law enforcement? Is that what's creating the fewer number of work zone fatalities? We'd like to think that helps. Are we getting more of it? We are getting a little bit more participation, and there's HAWKS a program that we've implemented over the last 3-4 years that I think is definitely

helping as well. How about better outreach and public information? Clearly, the more information you can get out on the street, the better off you are, but is it really effective? That's the thing that is really hard to measure: is your outreach reaching the people it needs to in order to be meaningful, and in what format is the information? Our Public Information Department has really adopted and embraced all forms of technology. They adopt the standard forms of PSAs and radio announcements and press releases, but they've really wrapped their arms around the Facebook and Twitter, and our homepage is much more interactive, with photographs and videos of the major projects that you may encounter along the major interstate network. How about better coordination with our partners? There are multiple partners: trucking agencies, law enforcement agencies, emergency services personnel that respond to crash scenes, and contractors. There's no doubt that we've worked really hard to improve coordination. In Joe's presentation you heard about collaboration, and there's absolutely no doubt that collaboration between partners improves work zone performance.

This slide shows our total crashes in work zones. As and as you can see, from 2008 to 2012, there's clearly a downward trend in the total number of crashes on North Carolina roadways. The 2012 number is projected from the crashes we've had as of March 31<sup>st</sup>.

What about work zone crashes? It looks like work zone crashes are trending back upward. Obviously, if you have to make a choice, you would hope to have fewer fatalities than you do crashes, but that's not a trend that we hope will continue. Hopefully we can start driving work zone crashes back down as well.

Let's look at North Carolina fatal crashes. In 2008, they were as high as 1,466, and in 2012, it is projected that there will be 996. That's definitely headed in the direction we like to see

We reached an all-time low in work zone fatal crashes in 2010. In 2007 it was 31, and 2011 we had 12. Somewhere around that single digit to the 10-12 range is where we would like to see it kept, or below. However, as of last week, we've have six work zone fatalities in North Carolina in 2012, so it looks like through the summer season, where we typically get more travel and the crashes go up and the fatalities go up, we may see an uptick in 2012. Why is that? I will speak to that in a couple slides.

This is a bar chart that shows the amount of vehicle miles traveled, represented 100-million vehicle miles. I want you to look at the part of the chart that's between 2005 and 2007; we had a dramatic increase in mileage driven, and then in 2008-2009 it flattened out. We had a little bit of a spike in 2010, and in 2011 it was back to 1,015. I think that's reflective of the economy; the housing bust occurred in 2008, fuel prices spiked, and therefore, we had fewer people driving due to loss of jobs and increase in fuel costs.

What factors are contributing to our work zone fatality reductions? The main thing is that there isn't a silver bullet out there; there's not one unique solution or strategy. It is a combination of multiple strategies and processes, and I think what you've heard so far in the webinar is exactly what you're going to hear in this presentation. It takes the education and training of your staff and law enforcement. You saw in Stefanie's presentation where they have rumble strips and the

set-up to help reduce speed in work zones. That's exactly what we believe is happening in North Carolina as well.

Let's face the reality: you have to have some good luck along the way as well. Some years you will have more fatalities than you will in others. You can have the very same TMPs or even better TMPs; the circumstances are just what they are. Because there are so few work zone fatalities, sometimes they get quickly dismissed. If you're a work zone engineer then they mean a lot to you, but from a safety engineer's perspective, they are a lot more concerned about the other 1,500 fatalities they are having on the other statewide networks. My point in saying that is you have to be diligent. It does matter and you do have to keep up with it and check in on it.

What are we doing about work zone planning? Is anything we are doing better than what we've done in years past? The first thing we are doing a better job of is identifying what our significant projects are in the scoping process. In years past, we knew what the significant projects were (although we may not have called them that), but we didn't discuss it with all the other players: the planners, the roadway design team, the division engineers, and folks like that who are involved with the projects, but may not be involved with them this early.

The second thing that has helped in the planning process is that we are investigating more "accepted" traffic management strategies. There are different ways you can handle traffic. You don't always have to handle it – you can pull a road closure, but that has a significant impact if you choose to use that strategy. The last part of that is to reduce project duration. That is one of the things that we strongly feel contributes to more crashes, and more crashes lead to more fatalities. It's a fact that every single day work zone is out there is one more day of exposure. For every day we can expedite it, we feel we are definitely making our North Carolina roadways safer.

The last thing in the planning process is using more innovative contracting approaches for the significant projects. For most of the people listening today, there will be no new ideas. You've heard of design-build, A+ B, and incentive payments, which are some of the things we are doing as well. The main topic I'm going to talk about today is the design-build.

Going back to the identification of significant projects in the scoping process, is it a coordinated effort between our section, planning engineers, and the divisions, and it does begin at the scoping timeframe. The last bullet is the most important one. It initiates the conversation, and I think Joe brought that up in his presentation as well. There is nothing more important than having the players in the room and having that conversation, especially when you start rolling off full or partial road closures or crossover strategies on interstates. These are things that are typically different than what we have done in the past, which was stage construct everything. For many years, we thought we had to maintain traffic in its existing geometry and we had temporary pavement or temporary structures or whatever we needed to maintain traffic. We had some decent results, but again, you do increase cost and you do increase project duration. There's a definite strategy involved that connects the traffic management strategy to the project duration, and those two things need to match it. If you're going to choose a strategy that's a major impact, then you need to be selecting a project duration that can handle that maximum impact.

I think I alluded to investigating more innovative strategies to reduce project duration, but cost is also a big deal. Everybody that's involved with highway construction knows that budgets are slim, revenues are down and everything is being scrutinized to the penny. Full road closures are being talked about, as are partial road closures, crossover strategies, and system-wide improvements. Sometimes, if you get out of the limits of your work zone and make a few tweaks on your system, then that may allow the full road closure take place or a crossover strategy or partial road closure to work well. If you don't invest in your system, then you may not be able to implement your strategy successfully. The last bullet is utilization of more department owned assets, such as permanent ITS and IMAP services. In North Carolina, IMAP is service patrols that cruise up and down the interstate helping people with flats or any kind of mechanical problems, trying to keep traffic flowing. As you're well aware, when your roadways are at or near capacity, it doesn't take very much of an incident – just somebody stopped on the shoulder – to create a backup. In work zones in particular, IMAP patrols are Godsend because a lot of times we don't have the shoulders we had before the work zone, and a lot of the broken-down motorists are partially in the lane, which obviously creates problems. Being partially in the lane is an absolute problem when it comes to crashes because the approaching driver cannot tell if they are completely on or completely off, so at the last-minute they make a lane change and either they don't completely make the lane change before they run into the back of the person or they smack the person beside of them because they didn't take enough time to check their mirrors. We can talk hours on end about problems with not enough room in work zones, but those IMAP services are really critical for us to keep vehicles off the shoulders and out of the work zone.

Number three: using more innovative contracting approaches such as design-build, letting larger projects instead of a series. Design-build is nothing new, but in years, past if we had a major interstate or corridor capacity improvement, we were liable to let that in a series of two, three or four projects, whereas now we will let that as one design-build project. That one design-build project may only take 3 years or less, whereas in years past we had overlapping lettings. You may have encountered a roadway project over a 10-mile stretch of I-85 for a decade. That in and of itself has improved work zone safety in terms of reducing project duration. The second thing is utilizing the contractor and private engineering team to deliver these projects faster with innovative designs. Whenever you have a contractor teamed up with a firm, the firm is in-tune to the contractor's design approach and can produce a traffic management plan that matches the contractor's strategies, but if you do it in-house, you have to guess at the way the contractor is going to go about building a project. We feel like that definitely has helped. The other bullets are accelerated construction to match the strategies, such as full closure; A+ B, which it is nothing new; and incentive payments for early completion.

What are we doing in work zones? What kind of work zone management practices are seeing? The number one thing that we feel has really helped is utilization of a project coordination team. We had a project engineer set this up on a project we had several years ago on I-40, and it was really successful. Since then, we've utilized project coordination teams on our major significant projects. They consist of incident management personnel, State Highway Patrol, construction personnel, contractors, the Work Zone Traffic Control Section, and division traffic engineers. Those groups collectively work really well because they you able to share the information; crash data coming in, concerns about the latest traffic shift, signage, or anything else that's a problem

or could be a potential problem in the work zone is to be debated and discussed right there in the meeting.

The second thing is the utilization of our HAWKS program to increase law enforcement in our high-risk work zones. It uses off-duty State Highway Patrolmen to work the work zones.

The third thing is the access to and availability of work zone crash information. We are starting to get that in a regional timeframe to be able to analyze crash data and make recommendations.

The fourth thing, as I mentioned earlier, is public information outreach efforts and the technology we are using. The fifth thing is the enhancement of our speed reduction criteria to allow for short-term speed limit reductions. One of the last things in Joe's presentation was that California is starting to look at speed reduction for maintenance operations, and this is what the short-term speed limit reduction does. We can use it for maintenance or construction. It is for lane closures of 30 days or less.

I've already spoken to the project coordination teams and I feel strongly that these are indispensable. If you have a major significant project, putting something like this together immediately begins paying dividends, because it is not just the department's personnel discussing this with the contractor – it is law enforcement and incident management, too. Everybody can hear the different perspectives and it is not just coming from one group. It carries a lot of weight when a State Highway Patrolman in the meeting says they've responded to 40 crashes in the work zone in the last month and 28 of them were at point X. It carries a lot more weight than one engineer beating on a drum in a meeting. It is more of a collaborative effort.

These teams meet monthly to discuss the ongoing issues and trends in the crashes and congestion and any potential or upcoming traffic shifts. These things are well planned and they give our public information people an opportunity to prepare the different modes of public information, whether it's a tweet, posting something on Facebook, or getting a webpage updated. The whole idea behind it is being prepared instead of being reactive to traffic shifts.

What is the HAWKS program? It stands for Helping All Work Zones Keep Safe. It is made up of off-duty highway patrolman. It is a program that's 80% reimbursed by FHWA. It is coordinated with the Resident Engineer's Office to alert the local district captains when their services are needed. You only need to use them when you really need them. If you have night work going on or a traffic shift going on or you've got some issues, then you can notify them and they are on-site. They are dedicated to the work zone and it works really well. There was a question earlier about law enforcement in Florida's program. I'm not aware of what Florida has going on, but I would almost guarantee you they have the same problem we do. There are only so many resources out there, and Highway Patrol is included in that. They don't mind sending somebody through the work zone, but they cannot staff somebody all day long in the work zone. If they get an accident call, they have to go, and there's nobody they can send it to your work zone. By contrast, the HAWKS program is a dedicated office. That's an off-duty highway patrolman who is being paid overtime to oversee the work zone, and unless there's a major incident, they are going to be dedicated to that work zone.

Projects are selected based on their prior crash history and historical data related to speeding. We have to have some rhyme or reason as to which projects we are selecting to utilize for the HAWKS program. The first thing is accident data. If you had a crash history on this stretch of highway before the work zone, the work zone is not going to make that better. That's obviously a red flag. In addition to the crash history, we also look at speeding tendencies. If it is a high-speed corridor or it has a lot of truck traffic, they get shifted and prioritized to the top of the list, whereas two-lane highways, though they may have some crashes history, it is probably more along the lines of run-off-the-road crashes, and highway patrolmen may not be effective in reducing a run-off-the-road crash.

The third thing is improving the access to and availability of work zone crash data. It is actually becoming available. For years, it is been really difficult to get our hands on data, but we are collaborating with our safety engineers down the hallway and we now co-located in the same building. It still isn't that simple; it isn't necessarily an automatic thing just because you're co-located in the same building with the folks who are getting crash data. It is a work in progress, but we also have Highway Patrol and other law enforcement supplying accurate information. As we are getting the work zone crash data, we are sharing it internally, and on major projects, it goes directly to the next month's meeting to be discussed and analyzed. In a lot of these meetings we are getting the officer who has actually worked the crashes to attend. They are able to validate the data and share their insight as well. The next two bullets talk about more specifics about where those crashes are occurring, what's going on, and what they believe will fix it. Everybody has a different opinion, but just because they are law enforcement and not traffic engineers, they ride the roads a lot, so we put a lot of stock in what they have to say. These recommendations can be provided to the resident who's in charge of the job as well as the division in trying to get these recommendations incorporated.

Outreach efforts: we are leveraging the rulemaking to increase our public information through our local media outlets. Our public information folks are definitely getting more videos and more public service messages out by using technology. The technology is where a lot of folks are getting their information now, such as Facebook and Twitter. We are also looking at increasing and improving the use of our changeable message signs. That doesn't mean just putting more of them out, although we will be putting more of them out; it is more along the lines of getting better, more appropriate messaging on these boards so we can actually communicate what it is that's happening in the work zone or the conditions that we need the driver to look out for, not just "Work Zone – Stay Alert." We're trying to get away from general messaging to more specific messages.

The last thing is enhancement of speed reduction criteria. We've established separate criteria. We have two: one is for long-term work zone speed limit reductions where you have the black on white signs installed and displayed continuously; the other is for short-term speed reductions. We are getting a lot of good feedback on the short-term criteria. We primarily lower the speed limit with portable changeable message signs and/or just portable speed limit signs, much like you saw in the Florida presentation, other than that we haven't used them on a trailer, just a portable sign stand. We also have \$250 speeding fines in the work zone when they are displayed. One of the main things I want to make sure everybody is aware of is that these things are not taken lightly. There are specific criteria for each of these techniques – short-term and long-term – and

an ordinance has to be written and signed by the State Traffic Engineer, so it is very important that criteria are analyzed and we are following up and making sure that the signs are going to match where the ordinance was written so we don't have to deal with all the hoopla of trying to adjudicate speeding tickets.

The last bullet is what I want people to really pay attention to. We are getting better enforcement. Initially, law-enforcement did not want to enforce the speed limit reductions on these changeable message signs, but we've done training and education and we are getting more enforcement with that. The main thing is compliance. The folks driving up and down the interstates are starting to see these, and when they are seeing the work zone speed limit 55 mph or whatnot, they are paying attention to it, because just like Florida, you have to have a lane closure in place. You're not just going to put number on a changeable message sign if there's nothing is going on. There's something going on that necessitates the speed limit reduction, and when the lane closure is removed or the activity is no longer being worked on, the signs go off and the original speed limit is displayed. We feel strongly that we are getting better compliance because we are getting better applications of our speed limit reductions.

Can we really maintain the current trend of keeping our fatalities low and driving them down? No one knows for sure, but you know and I know that as the economy improves, ridership and crashes are going to increase. We will probably see VMT in our state going back up again. We feel strongly that our biggest threat to not only work zone safety, but overall highway safety, is distracted driving through the use of cell phones and other gadgets. Technology has improved so much the cell phones that it is not just a gadget that you have a conversation with. You can check your Facebook accounts, your Twitter, your e-mails, or you can send somebody a text. That's problematic because that's exactly what we are hearing from our law enforcement when they are responding to work zone crashes. I know we have a major work zone in the Charlotte area where there have been multiple crashes monthly, and the number one reason for the crashes is distracted driving, following too close. My guess is that as traffic begins to slow in the morning, folks pull the cell phones out, send a text to the office, check their email, and they look up and the car in front of them has stopped and they have a little bump-up. When that happens and you are at or over capacity, you have residual rear-end classes, or, likewise, crashes on the opposite side of the roadway from just rubbernecking. What will we do to combat these ongoing issues? Today I don't have an answer. We want to continue to work hard on our public information, but it is going to be an uphill fight with this distracted driving deal. I think work zones are definitely better signed and maintained, but with the distractions that are in the car today, it is going to present a monumental challenge to keep our crashes down and our work zone fatalities on the downward trend.

**Jennifer Symoun**

Thank you, Steve. We have two questions for you. What Federal funds are being used for the HAWKS program?

**Steve Kite**

I'm not exactly sure. I will have to get back with you. That's a program that we don't implement. Another group is in charge of the funding for that. If they shoot me an e-mail then I will get that information to them.

**Jennifer Symoun**

I'm not sure if you can answer this next question, but it is: how much money is spent annually with your HAWKS program?

**Steve Kite**

Correct, I won't be able to answer that right now, but if they give me an e-mail then I will get the information to them. It is not brand new. It has been around for a few years. It is one of those deals where it is an 80-20 reimbursement from FHWA.

**Jennifer Symoun**

If you do get it and want to shoot it to me, I can send it out. Since we are out of time and we have a number of unanswered questions for Joe and Stefanie – and any additional questions anyone wants to type in for Steve – I will send the questions out to all the presenters for written responses.

In the meantime, we're going to end for today. I want to thank all three presenters and everybody in attendance for your great questions today. The recording and presentations from today's webinar will be online in two to three weeks, and I will send out an e-mail to all who registered once they are available, as well as the answers to the questions we didn't get to. Thank you, and enjoy the rest of your day.