Traffic Control

WE KNOW THE BASICS, NOW WHAT?
PIERCE COUNTY ROAD OPERATIONS 2016
JOHN BAIR, TRAINING COORDINATOR / SAFETY
Let’s talk Numbers, WAC, MUTCD, Questions?

Table 6C-2. Stopping Sight Distance as a Function of Speed

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>115</td>
</tr>
<tr>
<td>25</td>
<td>155</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>305</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
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<td>50</td>
<td>425</td>
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<td>495</td>
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<tr>
<td>60</td>
<td>570</td>
</tr>
<tr>
<td>65</td>
<td>645</td>
</tr>
<tr>
<td>70</td>
<td>730</td>
</tr>
<tr>
<td>75</td>
<td>820</td>
</tr>
</tbody>
</table>

Table 6C-4. Formulas for Determining Taper Length

<table>
<thead>
<tr>
<th>Speed (S)</th>
<th>Taper Length (L) in feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph or less</td>
<td>( L = \frac{W S^2}{60} )</td>
</tr>
<tr>
<td>45 mph or more</td>
<td>( L = \frac{W S}{6} )</td>
</tr>
</tbody>
</table>

Table 6C-1. Recommended Advance Warning Sign Minimum Spacing

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Distance Between Signs**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Urban (low speed)*</td>
<td>100 feet</td>
</tr>
<tr>
<td>Urban (high speed)*</td>
<td>350 feet</td>
</tr>
<tr>
<td>Rural</td>
<td>500 feet</td>
</tr>
<tr>
<td>Expressway / Freeway</td>
<td>1,000 feet</td>
</tr>
</tbody>
</table>
Training in the safe way for workers to do their jobs well is an investment that will pay back over and over again in fewer injuries and illnesses, better morale, lower insurance premiums and more.

“Did the employee receive adequate training to do the job?”
Control types

- Work zone traffic control
- Event traffic control
- Emergency traffic control
- Construction, off loading equipment
- Disaster traffic control, earthquake, flooding, etc.
Pilot cars

- What do pilot cars do?
  - They are the communication between flaggers
  - Control traffic speed
  - Keep traffic together
  - Make the work zone safer
Traffic control

- Slow down
- YOU
- SONS A BIT

Prepare to be awowed
MUTCD and WAC Rules

- Taper lengths, lane widths
- Cone maximum spacing numbers
- Sign distance charts
- 85% Rule
- Device sizes, different needs
- Sign size, 30 inch, 36 inch and 48 inch
- Multiple lanes, traffic control
- Night time rules
- Buffer space
What are we running into?

- Traffic not paying attention
- Distracted drivers
- More and more traffic
- Traffic willing to drive through fresh oil and cones to get through the work zone
- More need for law enforcement participation
Communication? Take it seriously.
50’ taper?
What should it be? Signs?
Clear communication? Three signs and a taper. What’s wrong? What should it be? Taper length, sign spacing.
Flagging at guard rails

- What are we doing?
- What does the rule say?
- The “Traffic Control Flagger Certification” handbook states:
  - “Do not have any type of barrier, guardrail, parked vehicles etc. between you and your escape route”.
- Reviewing the WSDOT, “Work Zone Safety Bulletin” states:
  - Flagging stations with no escape route are not allowed unless positive protection is in place at the flagger station.
- What does this mean?
- When I contracted with Disney... Answers were quick and to the point...
ANSI traffic control. Escape path.

- ANSI traffic control standard: **5.4 Escape Path.** Flaggers shall establish an escape path whenever possible. When work zones provide no means for flaggers to escape from external motorized traffic, one or more positive protection measures shall be implemented.
Think ahead

- While flagging in a rural setting, always use the “Stop” side facing traffic, when no traffic is present.
- What has happened?
Cone spacing recent changes in the MUTCD

- 25/30mph 20’ 40’ Taper/tanget
- 35/45mph 30’ 60’
- 50/70mph 40’ 80’
Cone adjustment, Why?
What’s the minimum? Bigger is better!
Proper tapers, Bright, clean equipment. Easy for public to navigate. Safer zone.
Good or Bad? Are we looking at what could happen?

Where is your escape route?

All road users have equal access.
Escape route?
What could happen here?

Can we use the advanced warning signs for our taper? What about spacing? Are we OK? What is the minimum spacing between signs? Anywhere? Why?

What happens when we shorten the sign spacing? Who is going to get blamed?
Rules, really?

- Why do we need that much taper, we won’t be here that long.
- Where is the: “We won’t be here that long rule”?
- Why are rules created?
What Could Happen?
No, When it Happens.

- We need to think, When It Happens.
- Need to know what is going to affect us
- What is around the corner? Busy retail, hospital, school?
- How will it impact our work zone?
- The base rules? Then what?
Traffic Control

- Today we have a list of requests to go out and fill pot holes.
- What about traffic control? It’s just “pot holes” what does it matter?
- Damn right! Where are we going? What is the speed limit?
- What is the traffic count? Do we need a TMA or a SST, or shadow vehicle? Do we need to use a Sheriff?
- Stop! Step out of the circle and think about the proximity of the crew to the dangers!
- What could happen?
Traps:

- There is not much traffic. I think we will be OK.
- We have been doing it this way all week.
- We don’t have enough signs, let’s just hurry and get it done and get out of here.
- Nobody turns down this road.
- If we sign this up right, we will need more signs.
- And the down-side is what?
Time of day risk?

- Friday night? What could change?
- Morning commute? Is there a better plan?
- Special event going on? Can we reschedule?
- Weather? What do we have to do today?
- Competing construction zones?
We know the core rules, what are we going to do next?

- What can the people see, when can they see it?
- Drive through the work zone so you know what the public is seeing or not seeing.
- Correct as needed.
How can we make this work zone safer?

- Would a Truck Mounted Attenuator (TMA) with a high speed arrow board make the zone safer?
- Would cones a little closer help?
- Would barrels be a better choice with this amount of traffic and speed?
- Would a Sheriff with red and blue lights flashing, with a badge, gun and a taser make a safer work zone?
- Would performing this task at a different time of day make the work zone safer? Huge benefit!
Traffic Control, Where is it on your list?

- We want to be safe, we don’t want to pay for it. If we are not doing it safe, we will pay for it. Everyone will “pay” for it.
- As a employer, we are responsible for our employees safety and training right?
- Are we doing our job?
- Are we making sure employees assigned to a task have been trained?
- Are we promoting “team” safety?
- Are we having our pre-con’s?
Public Excuses:

- I didn’t see your signs
- I was tending to the baby in the back seat
- The sun glare was blinding
- I needed to turn there
- I’m late for work
- The bad guys are trying to kill me
- They wouldn’t let me in
It was set up the right way, what happened?

- When things go “Bad” they go bad really fast. We need to slow down and “walk the talk”
- The old days of “Let’s just hurry up and just get it done” are long gone.
- We won’t do any job, that we can’t do safely. We will stand behind that.
- We use the WAC and the MUTCD for the basic guidelines, then take a step back and ask our team, “What can we do to make this work zone safer?”
- Next question, “Why don’t We”
We followed the MUTCD and the WAC rules.

We still had traffic trying to cut through our work zone.

Distracted drivers watching us, not the traffic stopping in front of them.

Drivers texting, eating, reading books, shaving, putting on make-up, tying their shoes, watching a movie on the dash board, eating cereal in a bowl, with milk and a spoon?

How are we going to keep the work zone safe for our workers and the public?
What can we learn from this?

- Work zone set up with extra cones, longer tapers and TMA’s. Still had a problem?
- What can we do next?
- Check traffic counts, larger devices, Law enforcement taking an active roll.
- Move work task to a different time of day, or different day of the week. Less exposure, less risk?
Here is six incidents/accidents that have happened in our work zones in the past few years.

We set up approximately 5200 work zones per year with 162 FTE’s.

We are having about 1 or 2 incidents per year.

One worker with minor injuries. Mainly equipment damage.

One accident/incident is too many.

If one happens, we need to learn from it.
Accident at Pioneer and 72nd. Date: 6-2011. Time: 9:24 AM. Work zone: Shoulder crew

Accident was just north of the intersection with employee flagging. There were 5 cars stopped for the flagger when the 6th car ran into the 5th car stopped.

MPH on three legs was 35 MPH. South bound was 40 MPH. Traffic on all legs seemed to be traveling faster than the posted speed limit.

Spacing of the signs was at: 578, 650, 497, 524, 459, 606, 540, 680, 560, and 600. Minimum spacing should have been 350’ but with the added speed of the vehicles, it would be justified to put them at least 500’ apart with adding extra length for hills and curves.
Flaggers had on class 2 PPE’s with hard hats and a 3 or 4 cone flagger taper for added visibility.

Flagger on the north end was using a 6 cone traffic taper (100’) to direct traffic to the left lane.

The rest of the crew was using top lights and 4 way flashers for visibility.

Crew was not working in the intersection.

Sheriff was on site to help control traffic.

The job was a day time, 4 hours at that address. No need for a traffic plan as per MUTCD.
Shoulder crew

- Speed limit at 35 and 40. Traffic moving at about 45 to 50 MPH.
- Set signs at 500 to 600’ with the 85% rule and due to hills and curves.
- Crew moving with the “shoulder crew”. Flagger had stopped 5 vehicles and 6th car (16 year old, new driver) while documented “texting”, rear ended the 5th car.
- Sheriff on site investigated accident. Ticket issued.
- What can we do to make work zone safer? Why don’t we!
- Electronic flares? Larger signs? Rumple strip?
- Time of day? This happened at 9:24 AM, after the commute had slowed down.
#2 176th and Canyon Road May 2015 Weeding center median.

- Work zone with 40 MPH on Canyon road and 35 MPH on 176th Street.
- 28” cones at 6’ on tapers, and max 40’ on target, some at 15’
- Rule, cones at 30’ and 60’
- Good signs, 36X36” at 350’ to 400’
- Used a SST with high speed arrow board in closed lane.
Traffic traveling too fast and too close.
First car noticed they needed to turn into the Safeway at last minute, slammed onto brakes.
Truck following too close behind with dash cam, rear ended first car.
Next car following too close rear ended truck
While the aid car was making a “U” turn to assist the first car’s injuries, 4 more cars collided into each other.
Pulled work zone and looked at when/what to do to make the zone safer.
#2 176th at Canyon Road May 2015

- Looked at traffic counts. Numbers were at around 3000 to 4000 ADT, Canyon road at 25,000 ADT.
- Decided to just look at working between 3:00 AM and 10:00 AM on Saturday and Sunday when traffic counts were below 1000 ADT with 6 lanes.
- Switched to only using barrels for all tapers and gore points.
- Used two TMA’s with high speed arrow boards attached.
- Ended up getting job done safer and faster. Win win!
#2 176th at Canyon road. May 2015

Two TMA’s with high speed arrow boards
Vehicle should have accessed turn pocket at entrance of turn pocket.

Vehicle tried to access the turn pocket at store exit, causing the accident.

Vehicles from accident.
View of work zone at Canyon road 5/2015

View of crew weeding median at Canyon road

Road Operation have updated policy to require traffic barrels to be used at all tapers and gore points. Weeding to be done only early morning on Saturday and Sunday when traffic counts are around 1000 ADT.
Grinding crew working on east side of Canyon road. Two lanes coned off with 28” cones, extra long tapers.

Sheriff on site directing traffic where needed. Three additional flaggers assisting at business entrances.

Only east bound lanes effected.

About 1:00 PM a Sheriff in response to a domestic violence call, drove past our work zone (west bound) at proximity 100 MPH with lights and siren activated.

Crew concerns, big wake-up call. Emergency vehicle guide lines.

Good advice from Tacoma Rail: If you don’t have to stand between the tracks, don’t. Same with our work zone: If we don’t have to stand in the roadway, don’t! Especially for lights and sirens.
Shoulder crew, good sight distance. Speed at 35 mph. Eight 36 inch signs with good spacing. Six more pre-staged. Cones and tubular markers used.

Car traveling westbound, with infant in car seat. Driver admitted she was turned and paying attention to the infant and did not see the work zone. Driver drove past the flagger with the STOP paddle facing the car and using other hand in the Stop mode.

Flagger had to step back towards curb to keep from getting “clipped”

Driver hit the back of the mower/broom without touching brakes and pushing broom approximately 40 feet forward. Broom had top lights and 4 way flasher operating.
Good sight distance for moving work zone. Good visibility. Flagger in position with STOP paddle facing vehicles with hand motioning to stop. Vehicle drove so close, flagger had to step back.
#4 200th street at 50th Ave. March 2016

- Lack of skid marks
- Point of impact with broom
#4 200th street at 50th Ave. March 2016
Good visibility, moving work zone. Moderate traffic.
Crew working at about 156th. 10:30 AM. Overcast, dry, 48 degrees. 45 MPH zone.

Work zone using 28 inch cones, TMA with high speed arrow board. Message boards set out 3 days prior to pre-warn traffic.

Signs on Canyon Rd. and side streets at 500’ spacing. Tapers at 500’ with cones at 6 to 8 feet apart. Target cone spacing at 40’. Rule at 30’/60’.

Sheriff on site with red and blue lights flashing. 200’ roll ahead / buffer space between TMA and crew.

Car in right lane plowed through approximately 100 to 150‘ of cone taper, then forced their way into the next lane, scattering cones across 4 lanes of traffic and onto the side walk and fence in front of myself and our Sheriff. Three cones still under the vehicle. She stated “no one would let her in”.

What can we do to make the zone safer?

Traffic counts / time of week and larger devices (barrels)
#5 Cone taper with point of impact with taper, northbound traffic

Point of impact with taper.
#5  Northbound, Canyon at 156th

- Crew working on basin lid
- TMA with high speed arrow board
- 28 inch cones at 6 to 10’ apart
- MUTCD max at 30’

11/09/2015
Shoulder crew working on a low volume 2 lane road.
Work zone using two flaggers with radios, six signs, good visibility and sign distance as per MUTCD.
Grader and Broom taking one lane.
Job going well all morning. Traffic responding well.
Sky clouded up and heavy rains for about 10 minutes. Then the sun came out.
Glare on roadway was immediate from wet surface due to rain storm.
Two vehicles approached from north, both talking on cell phones.

Flagger presented the “STOP” paddle and motioned with free hand to Stop!

First car did not notice or comply to flagger directions until right at flagging station.

This did not allow any forewarning for the second vehicle that was also on his cell phone.

Both cars collided. Drivers were “OK” and both vehicles were towed off.
What could we have done?
- Recognize hazard and re-dispatch crew to new function.
- Talked about the need to pull the work zone off of the roadway until the glare on the roadway has dissipated.
- Placed advanced cone on center line a fair distance before work zone.
- Placed flashing electronic flares at work zone signs
Hazard Assessment

- Look at the work function.
- Look at the risk to the crew from the traveling public.
- What will we do to eliminate the hazard?
- We need input from the workers that perform that function.
- We need to talk about, when and what could happen, how are we going to prevent it?
Can management help?

- Prepare traffic plans?
- Update equipment with cameras so operators can have a clear view of what is going on in blind spots.
- Premark all tapers and sign installation points before crew is sent out.
- Have a “Pre-Con” the day before or the day of to make sure nothing was missed on the more complex work zones.
- Whenever the TMA’s or the SST’s are sent out, have a training or “refresher” with the crew on the manufacture’s instructions on that piece of equipment. How and when to set up the machine.
Jersey Barriers? Category 1 or 3?

- NCHRP Report 350: Devices in Work Zones - Category 3 (National Cooperative Highway Research Program)
- Barriers, crash cushions, TMAs
- Water filled longitudinal channelizing jersey barriers
- Portable concrete "Jersey" barriers
- Crash cushions and TMAs
- This category also includes ground-mounted signs
- Full NCHRP Report 350 testing applies
- Category 3 devices are subject to the full crash testing requirements of NCHRP Report 350. For Test Level 3 this means a 25 degree hit at 100 kmh with a 4400 pound pickup, and a 20 degree hit with an 1800 pound car.
Jersey Barriers, empty and Water filled – Category 1/3
Temporary Traffic Barriers (MUTCD)

- Support:
  Temporary traffic barriers are devices designed to help prevent penetration by vehicles while minimizing injuries to vehicle occupants, and are designed to protect workers, bicyclists, and pedestrians.

- Set up all equipment as to manufacture requirements.
SST what is it?
TMA Read the Manual! Know your equipment!
Learn from Tacoma Rail

- Call and check for train traffic when working around the train tracks.
- If the employee does not have to be standing between the rails, Don’t.
- Same with the work zone. If we don’t have to be in the roadway at this particular moment, Don’t!

**Cones will not protect you from a vehicle that is not paying attention.**
Build with the basic’s or core rules

Step back, look at what is affecting the work zone, what could affect the work zone. What can the public see? When can they see it?

Don’t short cut proper equipment. If you don’t have it, rent it.

The time to put the proper protection in place is not after something went wrong.

We are running into more vehicles, traveling faster. Vehicle’s paying less attention to the work zones.

As per the ODG, (Official Disability Guidelines) states: the average worker receiving a back fusion, has less than a 10% chance of ever returning to work.
The “sheep affect”

When the first vehicle makes a mistake, what will the next 3 vehicles do?

We need clear directions for the public. If they are confused, we have not done our job.

Why do a job that you cannot do safely?

David Sarkus stated at the Governor’s safety last year, “It only takes 60 seconds to decide if your going to do the job safe or not. Choose the “Safe” way! Your family will be happy you did!”
Our Job

- We are responsible for our employees' safety and training.
- We are also responsible for everyone's safety.
- We owe it to our employees to go home in the same shape they came to work in the morning.
- What can we do to make our work zones safer?
- Why don't we?......
Questions?
John Bair

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- Road Operations
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