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TECHNICAL MEMORANDUM

TO: DFW Connector Executive Committee
Sam Swan, P.E. – DFW Connector Project Manager

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SUBJECT: Findings of Driver Distraction Survey within DFW Connector Project

EXECUTIVE SUMMARY

The Texas Transportation Institute (TTI) developed this memorandum as part of Task 7 of the interagency contract (IAC) entitled *Highway Planning and Operations for the Receiving Agency's Fort Worth District – Phase X*. It documents the methods and results of driver distraction survey measuring the use of hand-held cell phones by drivers conducted within the DFW Connector construction project.

Overall, 12% (1 of 8) of drivers within the DFW Connector construction project were observed using a hand-held cell phone during daytime hours. Applying the National Highway Traffic Safety Administration (NHTSA) proportion of hands-free to hand-held cell phone use, TTI estimates combined hand-held and hands-free cell phone use within the DFW Connector construction project at 21% (1 of 5) of drivers. Previously in 2000, TTI measured hand-held cell phone use at 5% on Dallas County highways.

The use of hand-held cell phones within the DFW Connector construction project is double the 2009 NHTSA National Occupant Protection Use Survey regional estimate of use (12% vs. 6%). This higher use may be attributable to causal factors that were not investigated. One causal factor is the proximity to D/FW International Airport may induce higher cell phone use as airport passengers may make more calls as they approach or are leaving the airport. Another causal factor may be differences between the NHTSA and TTI methodologies (lower speeds vs. higher speeds) and the change in perceived risk by drivers in engaging in distracting tasks.

One major conclusion was drawn from this study. It appears that some drivers do not accurately perceive the safety risks involved with engaging in tasks distracting from the primary driving task within the construction work zone resulting in higher cell phone use compared to national and regional observations. Or viewed from the drivers' perspective, it appears some drivers feel that they are able to safely navigate a complex work zone while engaging in tasks that divert attention away from the primary driving task so they voluntarily choose to engage in those distracting tasks.

1.0 METHODS

Observations of traffic for the driver distraction survey were made during daylight hours on March 15 and 16, 2011, a Tuesday and Wednesday. Data were collected at two locations noted in Figure 1. One location was on SH 121 from the Mustang Drive bridge. The second location was on SH 114 from the Northwest Highway bridge. At each location both directions of travel were observed concurrently with separate teams of observers for each travel direction.

Observers were located on the bridges. For each lane of travel, one observer was assigned to view into the oncoming vehicle's windshield to determine if the driver was using a handheld cell phone. Figure 2 shows observers collecting data. Observers were instructed to key on drivers' hand positions that mimicked use of hand-held cell phone to one's ear as displayed in Figure 3 or were visible in the drivers' hands near the steering wheel. In the latter case, the drivers' act of texting, reading a screen, or otherwise manipulating the device was neither distinguished nor classified.

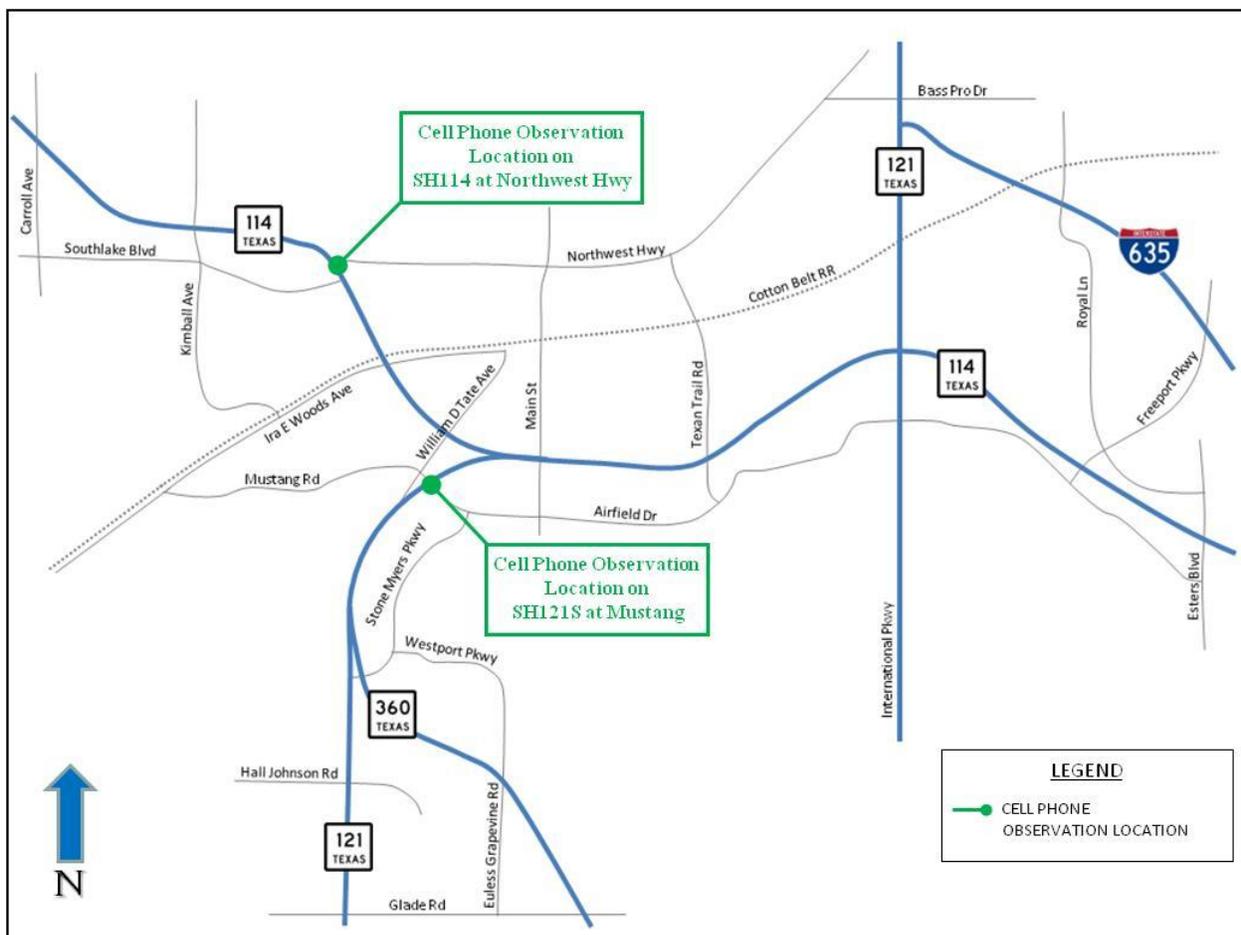


Figure 1. Locations of driver distraction observations.



Figure 2. Photos of observers recording data.

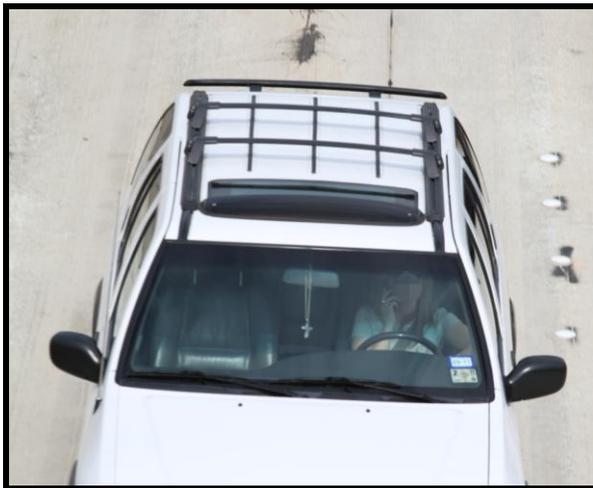


Figure 3. Example of observed hand-held cell phone use by driver.

Data were collected for four time periods on each day of observation:

Period	Time (HH:MM)
AM Peak	07:30 - 09:00
AM Off-peak	10:00 - 12:00
PM Off-peak	13:00 - 15:00
PM Peak	16:00 - 18:00

The AM Peak time period was less than two hours due to Daylight Savings Time occurring March 13, 2011. The shift in clock time resulted in the 07:00-07:30 period being in darkness where data were not able to be collected.

Observers were instructed to record their observations at 15-minute intervals as YES, NO, and MAYBE/UNKNOWN. In data processing at the office, the MAYBE/UNKNOWN counts were included in the NO category for analysis. Use of the MAYBE/UNKNOWN category allowed for removal of some collector bias or data error in hopes that the YES category represents strong visual confirmation of hand held cell phone use.

2.0 RESULTS

The National Highway Safety Administration (NHTSA) annually collects data on hand-held cell phone use. NHTSA collects this data at STOP or signalized intersections during daytime hours. Their observation of traffic at STOP or signalized intersections is in low speed conditions that allow NHTSA to collect other data including demographic data of cell phone users. NHTSA reported in 2010 [NHTSA, 2010] that national hand-held use among drivers was 5% and that 0.6% of drivers were observed manipulating hand-held devices. The same study reported that hand-held use among drivers was 6% in south U.S. that includes Texas. These observations were made as part of the 2009 NHTSA National Occupant Protection Use Survey. NHTSA also estimates the total national use of hand-held and hands-free cell phones by drivers at 9%. The proportion of hands-free to hand-held cell phone use is (45/55) 0.8182. This proportion was observed from the 2007 NHTSA Motor Vehicle Occupant Safety Survey and was applied in this study to estimate total cell phone use within the DFW Connector construction project. [NHTSA, 2010]

For the current driver distraction survey, 73,252 vehicles were observed in the four time periods during daylight hours. The summarized data are provided in Table 1. Observed hand-held cell phone use ranged from 7% to 14%. Use in the combined peak periods was 11% and in the combined off-peak periods was 12%.

Table 1. Observed Hand-held Cell Phone Use Within DFW Connector Construction Project During Daylight Hours.

	SH 121/Mustang Drive					
	Northbound			Southbound		
	YES	TOTAL	%	YES	TOTAL	%
AM Peak	381	4,264	9%	254	3,530	7%
AM Off-peak	521	3,891	13%	364	4,188	9%
PM Off-peak	598	4,192	14%	517	4,652	11%
PM Peak	660	4,669	14%	830	6,907	12%
TOTAL	2,160	17,016	13%	1,965	19,277	10%

	SH 114/Northwest Highway					
	Eastbound			Westbound		
	YES	TOTAL	%	YES	TOTAL	%
AM Peak	425	4,211	10%	365	3,705	10%
AM Off-peak	547	4,262	13%	431	3,415	13%
PM Off-peak	530	4,445	12%	461	4,385	11%
PM Peak	711	5,827	12%	863	6,709	13%
TOTAL	2,213	18,745	12%	2,120	18,214	12%

Overall, 12% (1 of 8) of drivers within the DFW Connector construction project were observed using a hand-held cell phone. In 2000, TTI measured hand-held cell phone use on Dallas County freeways during the afternoon peak period at 5%. [Crawford et al, 2001] The current measurement represents an increase approximately two times the previous use rate. Applying the 2007 NHTSA proportion of hands-free to hand-held cell phone use, TTI estimates combined hand-held and hands-free cell phone use within the DFW Connector construction project at 21% (1 of 5) of drivers.

Observers noted other driver distractions that were not recorded for this study. Those other distractions included eating, drinking, reading, texting, putting on makeup, and wearing headphones.

Recent naturalistic driving research for NHTSA has determined the odds ratio of near-crash/crash likelihood. [Klauer, 2006] Table 2 shows these ratios for selected types of driving inattention. Interpreting this table, dialing a hand-held device increases a drivers' chance of a near-crash/crash 2.8 times greater than normal, baseline driving. Talking or listening to a hand-held device increases a drivers' chance of a near-crash/crash 1.3 times greater than normal, baseline driving. It is important to note that these odds ratios do not distinguish between work zones and non-work zones.

Table 2. Crash odds ratios of driver inattention. [Klauer, 2006]

Type of Inattention	Odds Ratio of Crash Likelihood
Reaching for a moving object	8.2
Looking at external object	3.7
Reading	3.4
Applying make-up	3.1
Dialing hand-held device	2.8
Inserting/retrieving CD	2.3
Eating	1.6
Reaching for non-moving object	1.4
Talking/listening to hand-held device	1.3

The same NHTSA study also determined that near-crash/crash risk increased 2.3 times greater than normal, baseline driving when drivers' eyes were off the forward roadway for more than 2.0 seconds, excluding eye glances to center, right and left rear-view mirrors. [Klauer, 2006] This particular risk can be associated with dialing cell phones, reading email, or Internet searching while driving, where these tasks may require glances longer than 2.0 seconds to the device and away from the forward roadway. The current driver distraction survey did not collect data for glances from the forward roadway; the naturalistic driving findings are presented here to relate the increased risk of tasks associated with hand-held cell phone use or manipulation.

Driving simulator research of driver distraction in work zones due to hands-free cell phone use has shown that distracted drivers are more likely to not check their mirrors before executing a lane change and are slower at responding when a vehicle in front of them slows down [Muttart, et al. 2007]. The study authors state "the results strongly suggest that cell phone use reduces driver awareness and will increase the two major types of crashes in work zone activity areas, which are rear end and sideswipe collisions" [Muttart, et al. 2007].

3.0 CONCLUSIONS

The use of hand-held cell phones within the DFW Connector construction project is double the NHTSA regional estimate of use (12% vs. 6%). This higher use may be attributable to causal factors that were not investigated. One causal factor is the proximity to D/FW International Airport may induce higher cell phone use as airport passengers may make more calls as they approach or are leaving the airport. Another causal factor may be differences between the NHTSA and TTI methodologies. Where the NHTSA methodology captures data at low-speed conditions at

or near controlled intersections, drivers at or near those conditions may choose to direct more of their attention to the driving task because of the complex interaction with many other drivers. Whereas the TTI methodology captured data at high-speed conditions on controlled-access highways, drivers on these facilities may choose to direct less of their attention to the driving task because they perceive a lower safety risk.

One major conclusion was drawn from this study. It appears that some drivers do not accurately perceive the safety risks involved with engaging in tasks distracting from the primary driving task within the construction work zone resulting in higher cell phone use compared to national and regional observations. Or viewed from the drivers' perspective, it appears some drivers feel that they are able to safely navigate a complex work zone while engaging in tasks that divert attention away from the primary driving task so they voluntarily choose to engage in those distracting tasks.

4.0 REFERENCES

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