**Excerpts from… *“Understanding the Distracted Brain by The National Safety Council 2012”***

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**In January 2004, at 4:00 p.m., in Grand Rapids, Michigan, a 20-year-old woman ran a red light while talking on a cell phone.** The driver’s vehicle slammed into another vehicle crossing with the green light directly in front of her. The vehicle she hit was not the first car through the intersection, it was the third or fourth. The police investigation determined the driver never touched her brakes and was traveling 48 mph when she hit the other vehicle. The crash cost the life of a 12-year-old boy. Witnesses told investigators that the driver was not looking down, not dialing the phone, or texting. She was observed looking straight out the windshield talking on her cell phone as she sped past four cars and a school bus stopped in the other south bound lane of traffic. Researchers have called this crash a classic case of inattention blindness caused by the cognitive distraction of a cell phone conversation. **(Page 2)**

**Inattention Blindness** – Distracted drivers experience inattention blindness. They are looking out the windshield, but do not process everything in the roadway environment necessary to effectively monitor their surroundings, seek and identify potential hazards, and to respond to unexpected situations. Vision is the most important sense we use for safe driving. It’s the source of the majority of information when driving. Yet, drivers using hands-free and handheld cell phones have a tendency to “look at” but not “see” objects. Estimates indicate drivers using cell phones look at but fail to see up to 50 percent of the information in their driving environment.48 **(Page 9)**

**Brain researchers have identified “reaction-time switching costs,”**26 which is a measurable time when the brain is switching its attention and focus from one task to another. Research studying the impact of talking on cell phones while driving has identified slowed reaction time to potential hazards are tangible, measurable and risky (page 10). Longer reaction time is an outcome of the brain switching focus. This impacts driving performance.

The cost of switching could be a few tenths of a second per switch. When the brain switches repeatedly between tasks, these costs add up.27 Even small amounts of time spent switching can lead to significant risks from delayed reaction and braking time. For example, if a vehicle is traveling 40 mph, it goes 120 feet before stopping. This equals eight car lengths (an average car length is 15 feet). A fraction-of-a-second delay would make the car travel several additional car lengths. When a driver needs to react immediately, there is no margin for error. **(Page 6)**

Vision is the most important sense we use for safe driving. It’s the source of the majority of information when driving. Yet, drivers using hands-free and handheld cell phones have a tendency to “look at” but not “see” objects. Estimates indicate drivers using cell phones look at but fail to see up to 50 percent of the information in their driving environment.48 Cognitive distraction contributes to a withdrawal of attention from the visual scene, where all the information the driver sees is not processed.49 This may be due to the earlier discussion of how our brains compensate for receiving too much information by not sending some visual information to the working memory. When this happens, drivers are not aware of the filtered information and cannot act on it. **(Page 9)**

**Slower Response Time and Reaction Time** – Response time includes both reaction time and movement time. Reaction time involves attentional resources and information processing, while movement time is a function of muscle activation. Cell phone use has been documented to affect reaction time.58 Due to the “attention switching” costs discussed earlier, it makes sense that driver reactions may be slower when using cell phones. For every information input, the brain must make many decisions: whether to act on information processed, how to act, execute the action and stop the action. While this process may take only a fraction of a second, all of these steps do take time. When driving, fractions of seconds can be the time between a crash or no crash, injury or no injury, life or death.

Numerous studies show delayed response and reaction times when drivers are talking on hands-free and handheld cell phones (Appendix A). Reaction time has shown impairment in a variety of scenarios:

• A University of Utah driving simulator study found drivers using cell phones had slower reaction times than drivers impaired by alcohol at a .08 blood alcohol concentration, the legal intoxication limit.59 Braking time also was delayed for drivers talking on hands-free and handheld phones. **(PAGE 10)**