

Digital EMC signs and *Occam's Razor*

Many readers know that the USSC is currently finishing an in-depth review of a new report on Electronic Message Centers (EMCs) that some claim proves that EMCs are dangerous and a traffic safety hazard. This report was authored by Jerry Wachtel, a human factors researcher based in Berkeley CA, and is titled "*Safety Impacts of the Emerging Digital Display Technology for Outdoor Advertising Signs*"; publication date was April 2009.

At the outset, it is important to note that this new Report does not prove or demonstrate that Outdoor Advertising Signs with Electronic displays (DBB or EMCs or CEVMS) cause traffic accidents or create so much Driver inattention that there are crashes. As this report is circulated throughout the country, however, some sign companies may hear it used as a reference when opponents of EMC technology want to restrict and prohibit these signs.

The so-called "Wachtel Report" spends 194+ pages to say very little if anything new. What the report does is advance a theory that Drivers at times glance at EMCs for longer periods of time, thereby creating driver inattention or so-called "distraction"; and that this inattention, based on the glances at the EMCs, causes accidents. No research has been conducted that connects the two concepts mentioned in the theory, however:

1. Certain eye-movement studies have indicated that some Drivers under certain circumstances glance at EMC signs for 2 seconds or longer;
2. Other separate research has found that Drivers have a higher risk of being involved in an accident if they are inattentive or "distracted" (not paying attention to the road ahead) for a period of 2 seconds or longer;

At the same, Driver Distraction Research on driver inattention and accidents has consistently shown that Signs and EMC signs are not listed as a cause or reason for distraction or accidents. Signs are never listed in these reports.

In addition, research performed by respected universities and engineering professionals, specifically targeted at examining the claim that EMCs cause accidents, has shown that EMCs do not cause accidents – that there is no correlation between EMCs and accidents that occur along the roadway.

So, there is a dilemma, or a disconnect, between what the Wachtel report is suggesting theoretically and what the actual research is showing.

On the one hand, the Wachtel Report has advanced a theory that EMCs are dangerous from a traffic safety perspective, and ought to be more tightly regulated in the future.

On the other hand, researchers have shown that there does not appear to be an issue here with EMCs and traffic accidents and/or crashes, if one considers the actual research on EMCs, accidents and Driver Distractions, because no linkage has ever been found.

In this regard, the Wachtel Report appears to be fighting an uphill battle on several key points. It is fighting *Occam's Razor* in particular. *Occam's Razor* is both a scientific principle and philosophical tenet that has relevance to the entire subject matter of EMC signs, traffic safety, accidents, the 2009 Wachtel report, and research on EMC signs.

Occam's Razor can be stated as follows (the text and meaning have evolved over the years):

Of two equivalent theories or explanations, all other things being equal, the simpler one is to be preferred.

Further comments on *Occam's Razor*:

When competing hypotheses are generally equal, Occam's Razor recommends selection of the hypothesis that introduces the fewest assumptions while still adequately answering the question.

It appears that the Wachtel Theory (that the risk of accidents increases when Driver Inattention is 2 seconds or longer and Drivers sometimes look at DBB / EMCs for 2 seconds) requires a circumstantial leap of faith on the part of the reader; it requires that inferences and analogies be accepted; and excuses for lack of proof have to be embraced; otherwise, the Wachtel Theory fails.

At the end of the day, as per *Occam's Razor*, a direct linkage has to be demonstrated between EMCs and traffic safety / accidents / crashes. We live in a society that accepts the principles contained in the Scientific Method. Researchers in all fields live by and apply these principles in their endeavors. The Scientific Method is a means by which an inquiry is based on gathering objective observable and measurable evidence. One starts with a hypothesis and proposed conclusion, an objective method of testing the hypothesis is engaged that can be duplicated, the data is obtained, and then conclusions are drawn as to whether they hypothesis was in fact correct.

Fact: studies involving traffic accidents, traffic safety, real world analysis of traffic data, crash analysis, Driver distraction and Driver inattention analysis all are indicating that EMC signs play no part in so-called driver distraction resulting in accidents or accidents of any kind. The 2009 Wachtel Report refuses accept this fact, yet this is the simplest conclusion based on the evidence, as per *Occam's Razor*.

Instead, the Wachtel Theory wants the reader to take a circuitous path around existing studies on EMCs and traffic accidents and Driver Distractions, to avoid this information, in order to reach another plateau where the studies are immaterial and a construct based on theoretical conclusions serves as proof of the hypothesis.

In regard to proof, the Wachtel Report issues itself a pass on the whole idea of studying EMCs and attempting to "prove" the hypothesis, though this is a conclusion that state and local regulatory agencies are encouraged to adopt. In a professional document, it is surprising to see that requirement of proof so discounted (an EMC is often referred to as a Digital Billboard or DBB in the report):

Nonetheless, it is difficult if not impossible to design and conduct a research study whose results can be applied with confidence to DBBs as a whole. P 178

In short, the issue of the role of DBBs in traffic safety is extremely complex, and there is no single research study approach that can provide answers to all of the many questions that must be raised in looking at this issue. P 179

...we believe that it is unlikely that any agency, private organization, or public-private partnership will have the resources available in the foreseeable future to undertake such a study. P 178

Is the Wachtel Report claiming that money is all that is standing between the Report and proof of its theories? Does the reader have to accept the conclusion that, if not for the all mighty dollar, the Wachtel Report would have the proof that any scientist would require? The Wachtel Report also posits these gems:

If crash causation is the standard that must be met, we may never get there. P 182

This is not necessarily because DBBs are not a causative factor in crashes; it is, as most researchers believe, more likely that our research methods are not sufficiently sensitive to identify this linkage.

So, the reader is left to ponder these items:

1. EMC signs have not been found to be a causative factor in crashes.
2. But Wachtel and researchers, despite this evidence, believe EMC signs cause accidents because:
 - a. "our" research methods are not sensitive enough to find the linkage;
 - b. the issue (of EMCs and causation) is complex and those pesky post-hoc accident analyses studies are just so difficult to execute properly;
 - c. 80% of accidents are not reported to the police, so we must be missing some data; (Although this is a bizarre statement to make, as any crash along a highway where an EMC is located would be hard to hide or not report, given the type of roadway involved, congested traffic, witnesses, police officers regularly on patrol etc);
 - d. Drivers in accidents will not admit to having been distracted by an EMC (though they interestingly do seem willing to admit to a very long list of other very incriminating activities and distractions);
 - e. Drivers eyes are drawn toward EMCs even if the Driver does not want to look;
 - f. and finally, the *coup d grace* – Drivers look at the EMCs and have crashes but they don't remember or know they are looking at them and having crashes; it's all subconscious;

Again, one is reminded of *Occam's Razor*. There is a simpler explanation available here of course: EMCs don't cause accidents or crashes. And the rest of this hand-wringing about EMCs is generated by the subtext of the entire topic – Billboards and Advertising - and the very low esteem that signs

are held in. And painting with an even broader brush, On Premise signs are then lumped in with Off Premise Billboards in a sort of crusade against a technology that some people just don't like – in a subjective sense – and this feeling has to be given objective form in the guise of a “scientific theory” and then subsequent EMC regulations.

For all Sign Company members, the next time you hear about a new report out on EMCs by Jerry Wachtel that proves that EMCs are dangerous, I hope you are reminded of the principle of *Occam's Razor*, and total lack of evidence behind the Wachtel Theory.