# Current Issues in Warnings: Selected Case Studies and Applications

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## Abstract / Introduction

Warnings and warnings-related issues continue to be an important focal point of litigation in the U.S. Many personal injury cases, for example, revolve around questions associated with residual hazards in products, facilities, or user environments – and the steps the manufacturer of a product, or the parties responsible for the safe operation of a facility or environment have taken to mitigate people's exposure to those hazards. If hazards are not eliminated through design and/or guarding, then warnings and other types of precautionary instructions are commonly used to alert, inform, and remind people about the hazard(s) and to tell them what they should do to avoid or at least minimize injury.

A significant body of published HFE / Warnings literature over the past several decades has addressed a myriad of issues associated with the proper design, fabrication, and application of warnings and warning systems. However, the continuing stream of warnings-related cases being litigated in courts across the country, serves as an important reminder that warnings issues are not merely abstract and theoretically interesting topics of discussion, but are rather items of concern that can have a significant, real-world impact on the conduct of our daily lives.

The four HFE forensic professionals in this panel discussion session provide different but related perspectives on warnings-related applications and case study examples drawn from their respective professional practices. These discussion topics help to provide greater insights into the ways in which warnings-related research and theoretical constructs are translated into warnings experts' opinions in actual court cases. The following are brief summary descriptions of each discussant's presentation.



## The Virginia Tech Shootings: A Human Factors / Ergonomics Expert Witness Perspective

**Kenneth R. Laughery, Discussant**

At 7:15 a.m. on April 16, 2007, Seung Hui Cho shot two students in a dorm room on the Virginia Tech (VT) campus. At 7:20 a.m. the Virginia Tech Police Department (VTPD) received a phone call regarding the shooting, and an officer arrived at the room at 7:24 a.m. At 7:51 the Blacksburg Police Department (BPD) was contacted, and by 8:00 a.m. the VTPD and BPD investigation of the shootings was underway.

At 7:57 a.m. the Office of the VT Executive Vice President was notified of the shootings. A meeting of the university's Policy Group began at 8:25 a.m., and their agenda included deciding how to respond, including how and when to notify the university community.

Classes on the VT campus began at 8:00 a.m. At 9:26 a.m. the VT administration sent an email to campus staff, faculty, and students informing them of the dormitory shooting. The specific message in the email was:

> "A shooting incident occurred at West Amber Johnston earlier this morning. Police are on the scene and are investigating. The university community is urged to be cautious and are asked to contact Virginia Tech Police if you observe anything suspicious or with infor-

> mation on the case. Contact Virginia Tech Police at 231-6411. Stay attuned to the www.vt.edu. We will post as soon as we have more information."

At 9:15-9:30 a.m. Cho was inside Norris Hall, a classroom building. He chained the entrance doors shut. At approximately 9:40 a.m. Cho began shooting in Norris Hall. During this time, he killed 30 people, wounded an additional 17 people, and then killed himself.

The families of two of the deceased students sued the University/State of Virginia. A major focus of the plaintiffs' contention was that the University failed to provide safety information, warnings, to the campus community in a timely matter, and that the information that was provided failed to represent the seriousness of the situation. Specifically, more than two hours lapsed between the VTPD becoming aware of the two dorm shootings and the email message being sent out to the campus. Further, the message underplayed the severity of the hazardous situation.

The lawsuit went to trial. On March 8, 2012 Kenneth R. Laughery testified as an expert witness addressing human factors, safety communications, and warnings issues. The jury subsequently reached a verdict, awarding each of the plaintiffs four million dollars.

The discussion of this case includes a summary of the issues addressed and positions taken in the expert testimony.

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## Application of a Warnings Adequacy Assessment Tool

**David R. Lenorovitz, Discussant**
**Edward W. Karnes, & S. David Leonard, Co-authors**

Many HFE Forensic cases involve assessments of warnings or warning systems offered as a means of remedying or mitigating hazard(s) present within a given product, facility, or work environment. In such cases, HFE experts / warnings experts are often retained (by either the plaintiff's or defendant's attorneys) to consider those warning(s) and to assess their adequacy. From the plaintiff's perspective it is often the contention that a warning was needed but not provided, or that a provided warning was inadequate for its intended purpose. From the defense's perspective it is often maintained that a warning was not needed, or that a provided warning was indeed adequate.

Irrespective of which "side" may have retained the warnings expert, it is generally incumbent upon that expert to analyze the relevant evidence and materials, and to render an opinion about the warning(s) involved. Further, these experts must not only express their opinions, but they must also describe the bases for those opinions.

The authors presented a paper at the most recent IEA Congress proposing a prototype warnings adequacy checklist tool that could be used by HFE Forensic professionals (i.e., warnings experts). The intent of this tool was to help such experts organize and document the bases for their opinions about the warnings in any given case (Lenorovitz, Leonard, & Karnes, 2012). In doing so, the authors identified a set of 15 features or factors of warnings adequacy drawn from warnings research published in the HFE literature over the past 30-40 years. For each such feature/factor included in the checklist (e.g., conspicuity, clarity, explicitness, placement, or cost-of-compliance), a brief description of that particular feature was provided. Additionally provided were at least three literature references that discussed or exemplified that feature, as well as a means for rating each feature as having been deficiently, adequately, or exceptionally well-handled within the precautionary information being evaluated.

Over the past year, this checklist tool was used in several different warnings-related cases to develop a kind of adequacy "report card" for the specific warning(s) at issue. Two such cases involved the adequacy evaluation of: 1.) an on-product warning label appearing on a high school football player's helmet; and 2.) a combination of on-product warnings, users' manual instructions, computer information display screen(s), and (discardable) original packaging instructions for both a CNC vertical milling machine, and a specialized hole-drilling tool intended to be used in conjunction with that milling machine.

The above-described warnings adequacy checklist was used in both of these cases to organize and present the bases of the warnings expert's findings

and conclusions. In both instances, the provided warnings and/or warnings systems were determined to have been inadequate. These determinations were based upon warnings deficiencies that included: the provision of incomplete hazard descriptions; use of inexplicit (understated) consequence statements; failure to indicate what should be done (as well when it should be done, and by whom it should be done) if someone suffered harm as a result of encountering the hazard – i.e., failing to clearly state how to respond, treat, react, or care for a victim of the hazard so as to minimize or mitigate the extent of any sustained injury or damage; targeting the warning to the wrong audience; having inconsistencies between multiple instances of the same or similar warnings; offering less-noticeable (low-conspicuity) warnings; ineffectively placing or locating warnings; and failing to conform with published warnings standards and recommended practices.

In each of these cases, the adequacy evaluation checklist provided the warnings expert with a useful framework within which to develop an opinion and to discuss the adequacy (or lack thereof) of the various items of precautionary information that were (or should have been) provided.

## Practical Problems Associated With Inadequate Warning Placement

**S. David Leonard, Discussant**
**Edward W. Karnes, & David R. Lenorovitz, Co-authors**

In a recent paper Lenorovitz, Leonard, and Karnes (2012) discussed literature pertaining to characteristics of warnings that were relevant to the usefulness of those warnings. In practice, two of the important features of warnings are the conspicuity and placement of the warnings. Over the years, there have been a number of legal cases in which these factors have played an important part. For example, several cases in which the present author has been involved had warnings that were not presented in a fashion such that the individuals would ordinarily encounter them at a time and/or place when they are most needed. Examples are the need to avoid using the telephone under stormy conditions, the importance of avoiding inhalation of various substances (Karnes, Leonard, & Lenorovitz, 2013), and avoiding performing common acts that could cause electrical sparks around situations where explosive gases were present. These sorts of circumstances have, in many instances, resulted in serious injury accidents.

It is also the case that research studies have provided significant information about problems in the perception and the likelihood of seeing and attending to warnings of various sorts. For example, in one study of warnings on cleaning products many of the participants failed to notice warnings on the face of the products. One factor involved in these scenarios was that information intended to influence a buyer to select (or not select) a given product at the time of acquisition might have been directing one's attention to some specific aspect of the product label – and away from adjacent warning information.

A recent study concerning warnings about hazards involved in the use of automobiles (Leonard, Karnes, & Lenorovitz, 2013) found that placement of warnings in the owner's manuals failed to inform a majority of the participants about several important situations or highly risky behaviors that users might be expected to encounter or perform. Some of these warnings instructed users to carry out tasks that most of them were unable to perform.

This presentation addresses these kinds of factors and considers how changes can be made to improve the usefulness of warnings in such situations.

## Insufficient Warnings for Alcohol-based Fuel-Gel used in Fire Pots

**Michael S. Wogalter, Discussant**
**Kenneth R. Laughery & Christopher B. Mayhorn, Co-authors**

Fire pots are small ceramic pots without a wick that produce a decorative flame by igniting fuel that is an alcohol-based gel formulation. These decorative fire-based products were introduced to the consumer market in or around 2010. However, almost immediately after their introduction there were reports of explosions and serious burns occurring in a variety of scenarios. The most frequently-reported instances occurred during refueling, when people

attempted to add more fuel when they (mistakenly) believed the fire in the pot had been extinguished. This presentation describes human factors' issues involved in using a product that has resulted in multiple cases of severe burn injuries.

Fire is a known hazard, but there are some particular characteristics of this type of product that make its combustion unique. The fuel-gel product itself appears harmless. It is often clear (transparent) and has the consistency of common pourable gel products such as liquid soap or shampoo. It is frequently sold in clear plastic bottles shaped like water bottles. Previous research (e.g., Wogalter, Laughery, & Barfield, 1997) has shown that shapes like this one are perceived to have a low associated hazard.

The product was being sold by large "big-box" retailers, which in itself suggested some basic level of safety. Frequently, the gel pots were sold with no attached label or other ancillary materials (e.g., no instructions sheet) – they were commonly displayed in stores with no packaging at all.

Labels on the fuel-gel product containers almost always failed to mention important hazard-related information necessary for safe use. Although the warnings on the label did generically address some refueling aspects, e.g., stating not to add fuel when the pot is hot or has a flame, the labels failed to warn that the flames that the product produces may not be visible. Alcohol-fueled fires burn very cleanly and sometimes are practically invisible, particularly in brightly lit environments. Thus people may look into the pots, not notice any flame, and they may think that additional fuel can be added safely. If it could be seen, the presence of a flame could serve as a warning or cue not to add more fuel.

The fuel-gel products were marketed as being "clean and safe," because (unlike many other fuels) they did not produce noxious emissions as they burned. However, there is still the potential problem that people (incorrectly) may interpret the term "safe" more broadly than can be justified.

Another significant human factors issue is what to do if the ignited gel were to explode out of the pot and onto people. Many people are familiar with the advice to "stop, drop, and roll" on the ground to put out the fire whenever the body or clothing becomes engulfed in flames (although during the excitement of the moment they may not remember this directive). The particular problem with fuel-gel is its "behavior" in these kinds of circumstances. It can stick to surfaces and, when patted down to try to put the flames out, the gel and the fire can spread to other locations. The drop and roll maneuver is often ineffective. Most fuel-gel product labels fail to tell their users what to do to extinguish the flaming gel if it gets on people and clothing. The unique characteristics of the fuel-gel and fire pot have spawned the creation of new fire extinguishing products, but most fuel-gel product labels do not mention them.

Because of the mounting numbers of serious injuries and the failure to warn issues mentioned above, the CPSC has recalled most, if not all, fuel-gel products. One remaining issue is whether warnings could be improved enough to make that type of product reasonably safe.

An argument can be made that some fuel-gel hazards cannot be effectively communicated via warnings. Even if the warnings were to be improved, there would still be cases where some people would not attend to or read the label on the product (possibly because they might assume the product is reasonably safe). And even if they do read the label, they may look into a pot and think there is no fire when there actually is one, albeit invisible. When evaluating the hazards against the potential benefit of the product – it must be noted that this is a decorative, optional item, in which there are safer substitutes including battery operated lights – the product is probably not suitable for sale in the general marketplace.

## References

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