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# ***Integrated Product Safety***

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Manufacturers often focus on the safety warnings on their products. What hazards should have warning labels? Where should the labels go on the product? What should they say? But on-product warnings are just one piece of a comprehensive safety system—collateral materials such as marketing brochures or instructions for installing, operating, and maintaining the product are equally important. Here are three rules to make sure that all the parts of your safety system work together to protect your users—and reduce your company's liability exposure:

1. Make safety part of the product.
2. Make product literature consistent.
3. Make the manual a safety resource.

## **Make Safety Part of the Product**

A comprehensive safety system is not something that can be tacked on at the end just before the product is shipped. Safety must be engineered into the product from the beginning. The best way to ensure safety-conscious engineering is to conduct a hazard analysis at each phase of product development. When your analysis identifies a hazard, the best response is to design it out. If it cannot be eliminated by design, the next best choice is to provide a guard to prevent the user from encountering the hazard. Rely on a warning only for those residual hazards that cannot be eliminated by design or guarding. (Note that even with a guard, a warning may be desirable—to serve as a reminder to keep the guard in place during operation or to warn the user if the guard has been removed.)

Must you have an on-product warning for every residual hazard? In many cases, doing so would be impractical—and too many warnings can detract attention from the most critical ones. How do you decide what to warn about? The best approach is to focus on two questions:

- How likely is it that someone will encounter the hazard?
- If someone does encounter the hazard, how serious an injury will result?

Here is an example of how a hazard analysis can help a manufacturer keep customers safe—and improve a product at the same time:

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*A manufacturer of an industrial wet vacuum (to be mounted on a 55-gallon drum provided by the customer) conducts a hazard analysis and identifies six potential hazards associated with use of the product:*

- ***Slip-and-fall injuries*** from operating on wet floors
- ***Electrocution/electric shock*** hazard if appliance is not grounded (the unit features an attached 3-prong plug for use with the customer's extension cord)
- ***Motor damage*** resulting from voltage drop if used with an extension cord that is too long or not of adequate gauge
- ***Fire or explosion*** hazard if unit is used to clean up flammable liquid spills
- ***Tipover*** hazard if product is not mounted on the wheeled base provided
- ***Toxic exposure*** if unit is used to clean up hazardous material or if the drum previously contained hazardous material

In analyzing these hazards, the manufacturer might make the following decisions:

- The slip-and-fall hazard is open and obvious—if the wet vacuum is being used to clean up a spill, the user knows that the floor is wet, and wet floors are generally known to be slippery. Open and obvious hazards ordinarily do not need warnings. The hazard could be addressed in the accompanying instructions.
- The electrocution/electric shock hazard should be addressed in a label on the product. The likelihood of this hazard occurring is high (people are known to use adaptors or to cut off the grounding plug) and the consequence is severe. Additionally, a partial design solution to the hazard might be to provide an attached power cord of sufficient length that the need for an extension cord is reduced.
- The voltage drop could be addressed in the instructions, since the consequence of the hazard is damage to the motor, rather than personal injury.
- The tipover hazard can be designed out, by providing the drum and attaching it to the wheeled base. Doing so would also eliminate the potential of the customer using a drum contaminated with hazardous or toxic material.
- The fire/explosion hazard and toxic exposure hazard could be combined in a label warning against using the wet vacuum to pick up flammable or hazardous materials. While the likelihood of this hazard occurring is

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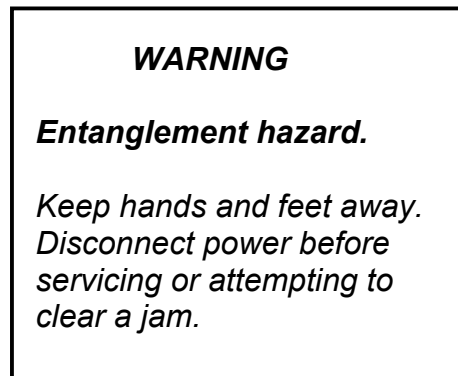
probably less than the unit's being plugged into a non-grounded receptacle, the consequence is severe.

The manufacturer ends up with a safer design—and only two labels on the product. Both labels can be large and visible—and therefore more likely to be seen and heeded.

### **Make Product Literature Consistent**

All product literature should convey the same safety information. If there are discrepancies, it can spell trouble for the manufacturer. Here's an example:

*A manufacturer of a grain auger puts a warning label on the product near the rotating auger that reads:*



*The label complies with ANSI Z535.4, and includes a pictorial of a hand becoming caught in an auger.*

*In the accompanying manual, in the section that describes how to clear a jam, the following text appears:*

*Danger! Do not attempt to clear a jam while the auger is running. Your hand and arm could get caught. Always turn off the power to the auger before cleaning or removing stuck material.*

Is there a problem? Absolutely. If someone becomes injured and sues the manufacturer, the plaintiff's attorney will pounce on the inconsistency—particularly in the signal words used. ANSI Z535.4 *Product Safety Signs and Labels* defines the signal words DANGER and WARNING as follows:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not

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avoided, could result in death or serious injury.

If the same hazard is addressed in two different places—such as an on-product label and the owner’s manual, the same signal word should be used in both. In this example, the plaintiff’s attorney will certainly try to make it seem that the manufacturer was attempting to downplay the seriousness of the hazard in the on-product label, knowing that a potential buyer would see the auger itself before buying it, but would not see the instructions. What was probably in actuality a simple matter of innocent oversight—or different people designing the labels and the writing the manual—will look like a deliberate attempt to hide a serious hazard.

Even marketing literature can cause a problem. Here’s another example:

*The instruction manual for a circular saw includes a warning to wear safety glasses when using the saw. But the photo on the packaging shows a man using the saw without safety glasses.*

Plaintiff’s attorney will argue that the visual image on a box that the buyer *must* have seen is much more compelling than words in an instruction manual—that the buyer (particularly one familiar with circular saws) might not have read.

What’s the answer? Make sure that every aspect of product literature works together. Sometimes this effort requires reconciling competing agendas. Engineers and technical writers may want to include specific hazard information that marketing fears will make the product seem unduly dangerous. Or the legal department wants to write warnings that cover all possible eventualities, and thereby become so vague that they are neither compelling nor helpful to the user. Approaching product development as a team venture is critical.

### **Make the Manual a Safety Resource**

Product manuals have many functions: to instruct about how to use the product properly, to provide maintenance and troubleshooting information, to give service and parts-ordering information, to provide product specifications, and so on. One of the functions of a product manual is to provide safety information.

Many manuals include a “safety page” or “safety section” at the beginning. The idea is that if you put all the safety information at the beginning, the user will be sure to see it. The difficulty with this approach is that people do not read manuals like novels—from beginning to end. Instead, they use them more like a cookbook, to look up a particular “recipe” or procedure. The safety page is easily missed. A better practice is to embed warnings within the instructions wherever they are needed—but a word of caution is in order. *“Embedding” warnings does not mean camouflaging them as ordinary instructions.* Embedded warnings

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should still be formatted in a way that distinguishes them from ordinary instructions, without interrupting the flow of text more than necessary.

Merely ensuring that the manual contains adequate safety information is not enough—the manual must work hand-in-hand with on-product warning labels. While it is usually not necessary (or desirable) to include an on-product warning label for every hazard discussed in the manual, the reverse is not true. The manual *should* address every warning that appears on the product itself. In most cases, the manual should go into more detail about the hazard.

On-product warnings are necessarily concise. If they're too long, they are likely to go unread. Typical word messages in warning labels read like these:

*Moving parts can crush and cut.  
Keep hands clear while operating.*

*High voltage inside.  
Lockout power before opening.*

*Rotating blade can cut.  
Do not remove guard.*

While these are certainly concise, in many cases, the user needs more information. For example, where should my hands be when operating the machine (other than where they can be crushed or cut)? How is the power to be locked out? Don't I have to remove the guard to change out a dull blade? Consider using the on-product label to direct the user to the manual for full safety information. For example, this warning appears near the controls of a hydraulic liftgate:

**WARNING**

*Liftgate hazards can result in crushing or falling.*

*Keep hands and feet clear of pinch points.*

*If riding liftgate, make sure load is stable and footing is solid.*

*Read and understand all instructions and warnings before use.*

Here the user is put on notice that more information is available on the hazards and how to avoid them—while keeping the label concise and readable.

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Taking an integrated approach to product safety pays big dividends in the long run. Early identification of potential hazards permits finding design solutions that reduce the risk of injury and manufacturer liability. Providing consistent safety information throughout all product literature prevents users from being confused about proper and safe use of the product—and denies plaintiff’s attorneys easy grounds to attack. And including references to the instructions on warning labels ensures that users are made aware of full safety information for the product, without compromising the effectiveness of the labels.

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