## A Focus on Planning and Design

# Facilitating Safety

Text and images by Michael Behm

When a family goes to a park or a playground, the expectation is for a fun filled day and not that someone will get hurt. Unfortunately, sometimes, someone does get hurt. In the United States, for example, the Consumer Product Safety Commission (CPSC) reports that each year, more than 200,000 children go to hospital emergency rooms with injuries associated with playground equipment. Most injuries occur when a child falls from the equipment onto the ground, followed by equipment type hazards, such as breaking, falling over, and design and assembly errors.

The focus of this article is to help people think about the design of the environment in which they play and to remind them of good pre-planning tips. While my particular background is in occupational safety, many methods for the problem solving of safety hazards are similar. Good design and smart planning help to facilitate safe productive work and safe fun play. Design is a science. For example, the American Society for Testing and Materials standard, Standard Consumer Safety Performance Specification for Playground Equipment specifies design criteria for public use to consider a range of users, encompassing the 5th percentile 2 year-old through to the 95th percentile 12-year-old. Playgrounds should allow children to develop gradually and test their skills by providing a series of graduated challenges (CPSC, 2010). Figure 1 shows a clear sign designating playground appropriateness by age. Figure 2 shows an access to an upper area at the 2 – 5 year old playground, whereas Figure 3 shows an access at the 5 – 12 year old playground. Note the differences in steps and areas for hand grabbing for the younger children.

Because play areas will change due to wear or weathering, a periodic inspection and maintenance programme should be developed for each playground. All play areas and their equipment should be inspected for excessive wear, deterioration and any other potential hazards (CPSC, 2010). This is part of a good planning and design programme.

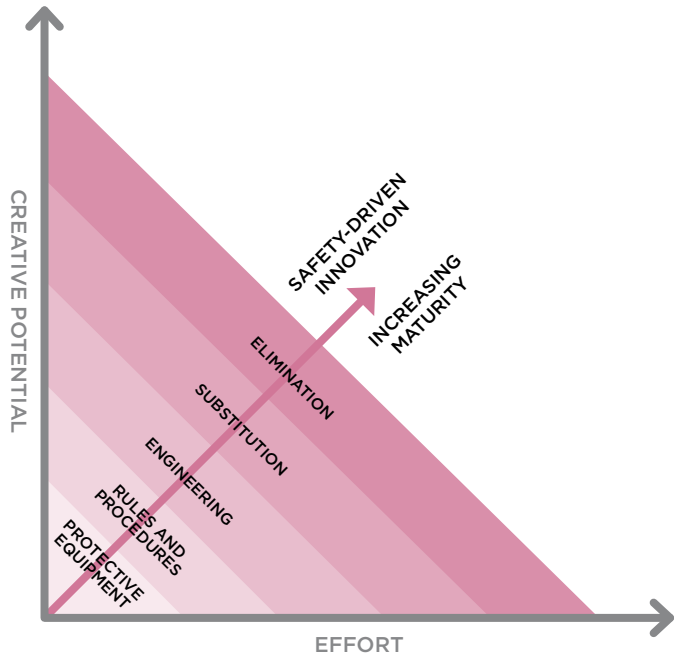
What does it mean to "be safe"? For many, being safe is about the end result and suggests that because you were not hurt or were not in an accident, therefore you were safe. However, this operational use of the word "safe" is not practical. Consider a drunk driver that makes it home without crashing his or her vehicle or striking someone in the street. Was that safe? Would you or most people in the general public feel comfortable if the same drunk driver performed this same act repeatedly? I hope not. The determination of whether something is safe or not should not be about the end result; often, there is no resulting accident, and the non-injury occurrence transpires simply due to chance. In reality, most injury producing accidents are indeed rare.

A more useful definition of safety is "when risks have been judged to be acceptable." In other words, we are safe when we are free from unacceptable risks. Sounds vague? Well, vague, yes, and also very subjective. What is judged acceptable to one person could very well be unacceptable to others. Each person brings their own unique experiences to the decision of what is safe and what is not. Just ask a group of people or your family which of these do they think is safer: flying in an airplane or driving a car. The "vagueness" issue makes designing for work and play a difficult job. It also means that communicating safety can be debatable. We try to make the subjective definition of safety as objective as possible.

"Risk" can also be defined: it is the probability of a hazards-related event occurring and the severity of injury if the event occurs. Our work and our thoughts need to be about risk. Managing risk is about decreasing the probability of an unpleasant event occurring and mitigating the severity of the injury should that event occur. Because most injury producing accidents are rare, many become complacent when faced with risks they should be defining as unacceptable. It is this normal phenomenon of complacency that makes design and pre-planning so important. The underlying theme whenever you are judging something,

BELOW Fig. 1. A clear sign designating playground appropriateness by age.
OPPOSITE Fig. 2. Access to an upper area at the 2–5 year old playground.

A more useful definition of safety is "when risks have been judged to be acceptable." In other words, we are safe when we are free from unacceptable risks.




SOURCE: JOHN CULVENOR, 2006; WWW.CULVENOR.COM

whether it is about being safe or unsafe, is to "learn more". Ask lots of questions. The more you learn, the more you can make objective and informed decisions, rather than rely on luck or chance.

Also, be careful of saying "be careful." What does it mean to be careful? This is also a rather vague term that means varying things to different people. Mostly though, it means to keep doing what you have been doing and just don't get hurt. As stated before, the end event status of injury or non-injury is really about chance, probability or even luck. Think of the times when you've told someone to be careful. What exactly did you mean, and do you think the other person knew what you meant? I suggest being more specific in your request. For example, "Please come down off that chair" or "please play over here away from the street" has a lot more meaning than "be careful". So, when you find yourself telling someone to be careful, think through what you mean and if necessary, learn more.

The foundation for safe design is that safety and health considerations be initiated as early as possible in the design life cycle of products, processes, technologies, services and in their refurbishment, rather than waiting until workers, users or the public gather at the site or use the product to begin thinking about how they can be safe and healthy. Hazards and risks need to be indentified and their interaction with people anticipated, such that the risks are eliminated or reduced to acceptable levels or, at minimum, communicated so that users can take precautionary measures. Problem solving to eliminate and reduce unacceptable risks is founded on the principles within the hierarchy of controls. We would rather eliminate risks than write a procedure or give someone personal protective equipment like safety glasses. It is much more desirable, from a risk management standpoint, to engineer risk reduction than to provide training to users to operate the design safely; eventually, users will have lapses in judgment or other operator errors that render the lower order controls ineffective. However, traditionally when these lapses occur we tend to blame the victim for not following a rule or behaving inappropriately.

That is why safe design is so important, whether it be with work safety, play safety, or everyday safety. James Reason, the famed English organisational psychologist, wrote that we cannot change the human condition but we can change the conditions under which humans work. It is much easier to try to manage the environmental and organisational conditions under which people work and play than to try to control the mind of every person who will interact and use the play area or work area. Human errors are usually indicative of something wrong within the system.

That same philosophy from reason, applied to work safety, translates to non-work activities as well. If the goal is to prevent injuries to children from falling from a playground, then we better put up guardrails at strategic locations and install a surfacing material that is forgiving if someone does fall. To use lower order controls would be a folly. A warning sign might remind the children temporarily, if you place it in a spot where they read it and if their attention is drawn to it. We certainly wouldn't use personal protective equipment. A full body bounce suit might be fun for a while but would interfere with the fun. Fig. 4 shows a freshly covered use zone around a swing using an approved loose-fill surface. This swing structure is located away from other equipment to help prevent young children from inadvertently running into the path of moving swings. Additional protection is provided by means of a low blockade (approximately 10 centimetres) around the perimeter of the swing area. The blockade is not an obstacle within the use zone of a swing structure, nor does it hamper supervision by blocking visibility. All of these are in accordance with CPSC guidance.

Designing a safe environment is difficult. However,

TOP LEFT Fig. 3. Access at the 5 - 12 year old playground.
TOP RIGHT Fig. 4. shows a freshly covered use zone around a swing using an approved loose-fill surface.
BOTTOM LEFT Fig. 5. A focus on design and planning does not mean to neglect supervision and warning signs
BOTTOM MIDDLE Fig. 6. A barrier protects against accidental falls from the platform; discourages climbing over.
BOTTOM RIGHT Fig. 7. A barrier protects against climbing through.

thinking about safety in new ways can generate creative and innovative thinking. Dr. John Culvenor, a safety engineering expert from Australia, has worked with numerous organisations on safe design. Culvenor has seen that not only can thinking about risk in new ways be good for safety, but it can also add unexpected value to the product, process, technology or whatever the item. He summarised the relationship in the diagram below. According to Culvenor, eliminating hazards, substituting less hazardous things and engineering hazards to reduce them demand a high level of thinking, but if applied, they have the power to drive creative thought and possibly arrive at not only a safer way, but a better way, of achieving a given outcome. This is very much a double-edged sword, on one hand helping to drive creativity and on the other being too easily brushed aside as farfetched. It is easier to provide warnings or write procedures, but these have no real creative potential. Innovative thinking in safety therefore requires:

- shifting the victim-blaming model;
- recognising broader spheres of influence; and
- making a creative effort.

According to the U.S. Consumer Product Safety Commission, general play safety considerations focus on planning and design. Important points include: selecting a site; playground layout; selecting equipment; surfacing; equipment and materials; and assembly and installation. Fig. 5 shows a play tunnel. Children can look through the tunnel, but the viewing hole is small enough that the child's head cannot go through to become entrapped. According to the CPSC, a barrier (Figure 6) protects against accidental falls from the platform; discourages climbing over; and protects against climbing through (Figure 7). A focus on design and planning does not mean to neglect supervision and warning signs (see bottom left of Figure 5). A holistic approach to safety recognizes the value of all appropriate risk control measures. Whether at work or at play, good planning should always be at your forefront. Have fun – don't recommend someone to "be careful"—don't blame victims—and learn more. CG

References:

American Society for Testing and Materials (ASTM) International (2007). Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, standard F1487 – 07a. West Conshohocken, PA. June 2007.

Consumer Product Safety Commission (2010). Public Playground Safety Handbook, CPSC Document #325. November 2010. Bethesda, Maryland, USA.

Culvenor, J. (2006). "Creating transformational change through innovation in risk management." Risk Management Research and Practice: An Educational Perspective, Welsh Risk Pool and University of Wales, Bangor, Trearddur Bay Hotel and Conference Centre, Holyhead, Anglesey, UK - March 30th & 31st 2006. *www.culvenor.com*