



Safety Highlights for Future Engineers

- Unintentional injuries are the leading cause of death among children. During 2014-2016, the U.S. Consumer Product Safety Commission (CPSC) had reports of **320** deaths involving nursery products among children under age 5. In 2018, there were an estimated average of **60,900** emergency room treated injuries associated with nursery products among children under the age of 5.
- The Consumer Product Safety Improvement Act of 2008 imposed new safety regulations, for many, but not all products. Seventy-three children have died in infant inclined sleep products which don't have a mandatory standard. Some have been recalled, but many are still in homes and in stores.
- Even mandatory standards can't address all hazards. We look to future engineers to enter the workforce with a greater consciousness of designing for safety and the importance of testing.
- In the design stage, considerations include potential hazards of a product, if/how the design addresses the hazard, and if product failure and subsequent injury are possible. **Can the product be designed better?** Engineers must ask these questions, so parents won't have to.
- Standards and hazard analysis must account for human factors. How will the product be used? What is its intended use, likely use, foreseeable use, and foreseeable misuse?
- Product design must consider foreseeable use, along with the manufacturer's suggested use. Parents often are looking for convenience, looks, or status of a product—which does not always imply safety. Product design must work to account for curious, growing children and distracted parents, who will both push the boundaries of intended use.
- Designing a safer product includes looking to anthropometric data, developmental information from pediatricians, injury data from similar products, and research by testing labs to consider all dimensions of use and risk.
- Testing standards assure both conformity and safety but can be voluntary or mandatory. Standards encompass both performance requirements and test methods. However, they represent **minimum** requirements only, and must keep up with new types of products.
- Testing methods must be very specific and address specific problems. Consider what problems may arise, and test for that issue. In-house testing and independent testing are viable options, along with the appropriate testing means, methods, and questions.
- When designing for safety, should you find a hazard, determine if you can 1) design it out, 2) guard against it, or 3) use warnings—as a last option. Overlooked hazards may lead to a product recall. Recalls fail to reach over 80% of a product's consumers, leaving unsafe products in the home.
- In summary, designing for safety means designing for efficient manufacturing, assembly, robustness, environment, real life use, and profit.

Resources

- Regulations, Laws & Standards as well as injury data
www.cpsc.gov
www.saferproducts.gov
- Code of Ethics for Engineers
<https://www.nspe.org/sites/default/files/resources/pdfs/Ethics/CodeofEthics/NSPECcodeofEthicsforEngineers.pdf>
- Basic Elements of Product Safety Engineering
<http://www.hazardcontrol.com/factsheets/pdfs/basic-elements-of-product-safety-engineering.pdf>
- Design Hazard Analysis
<http://www.intertek.com/risk-management/design-hazard-analysis/>
- ASTM International- Students page
<http://www.astm.org/studentmember/index.html>
- Kids In Danger TEST Program
<https://kidsindanger.org/test-program/>