Standards in Engineering Education

Integrating Standards into Engineering Education

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National Institute of Standards and Technology
“Roughly 80 percent of global merchandise trade is affected by standards and by regulations that embody standards.”

(Source: National Institute of Standards and Technology Testimony before the House Committee on Science, Subcommittee on Technology, September 13, 2000.)
What are standards?

- Design, product, system and/or process specifications
- Management system standards (quality and environment)
- Standards for health, safety, and protection of the environment
- Marks (labels)
- Test methods, inspection and certification procedures, etc.
Reasons for Standards in Engineering Education

• Standards form the bedrock of trade and commerce – interoperability, safety, performance
• Product design is a core function of engineers
• Compliance with standards and technical regulations from markets around the world is critical for product acceptance in the global marketplace
• Integrating these technical requirements into the product design process is a key to success
Industry needs

• Efficient development of products that meet global requirements
• Technical requirements included as design input in product development process
• Effective participation in key standards development activities to facilitate inclusion and acceptance of technologies
• Understanding of conformity assessment processes and requirements

Related manufacturer’s perspective

• A medical device manufacturer’s product development process has 6 phases
• Each time a technical regulatory requirement is not addressed in an earlier phase the “cost of compliance” increases by an order of magnitude
• A $1 compliance issue in phase 1 can cost $100,000 in phase 6
Engineers that are prepared for standards

Will:

- anticipate the needed standards, technical requirements and conformity assessment early in the product development process and save their companies money, time, resources and reduce customer disappointment
- be able to effectively represent their companies/industries needs in standards development activities
- be able to effectively interface with regulators and conformity assessment organizations to facilitate their product’s market access and acceptance
My Introduction to Standards

- Undergraduate courses in physical metallurgy – steel standards
- Graduate courses - use of standardized test methods, use of reference materials and Standard Reference Materials for instrument calibration
- Opportunities to participate in round-robin tests that led to standards development activities
- Collaborations with international colleagues – the need to agree upon test methods