

Enhancing Global Citizenship Through a Senior Design Project

I.N. Tansel, A. Yenilmez and Hari K. Adluru
Mechanical and Materials Engineering

OUTLINE

- Engineering education
- Global operations
- Engineering in Global operations
- Expectations from engineers
- Conclusion

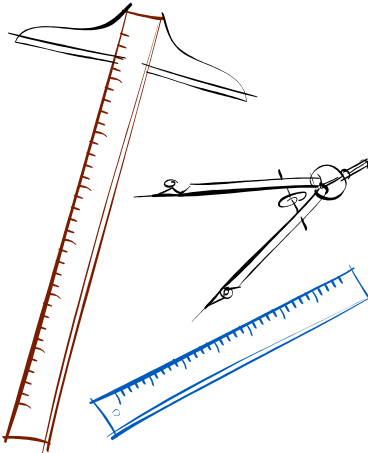
Engineering Education 1900 -2010



Computers are integrated into engineering education



Students are **TECHNICALLY** well prepared for industries' needs

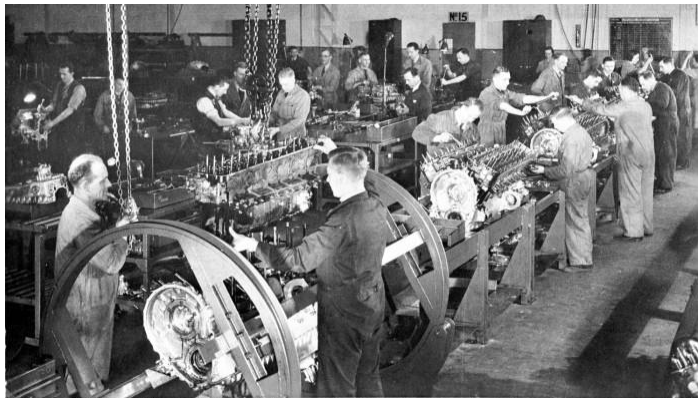


Global operations 1900 -1940



Local manufacturing.

Engineering education to prepare trained workforce these companies.



Limited shipment of the products

Global operations 1960 -2010



<http://www.cameraquest.com/NRFOne.htm>

International trade increased

Establishment of voluntary trade limits

Growth of independent suppliers in the developing countries



<http://permiantoyotablog.com/2013/01/23/toyota-marks-corollas-45th-anniversary-by-revealing-its-future/>



<http://blogs.wsj.com/searealtime/2012/12/20/hon-hai-eyes-expanding-to-indonesia/>

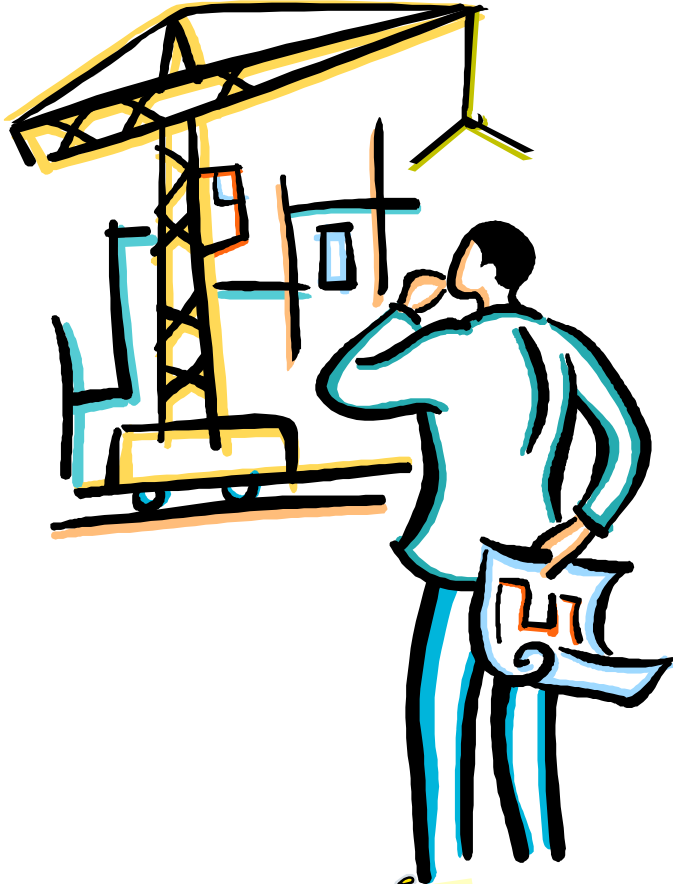
Global operations - Engineers



http://www.boeing.com/news/releases/2008/q1/080122d_nr.html



Expectations from engineers



- Demand for cost cutting
- Increasing legal and regulatory requirements
- Decreasing development times
- Global competition
- Automation – isolation from the operation
- Capital movement to software and health care



Expectations from engineers



Toyota's 'unintended acceleration,' instances
“Toyota Motor Corp. agreed to pay about **\$1.1 billion** to settle a class-action lawsuit stemming from complaints of unintended acceleration in its vehicles that soured its reputation for quality and undermined its sales globally.”

<http://online.wsj.com/article/SB10001424127887324669104578203440990704994.html>



Deepwater Horizon oil spill:

“BP will pay **\$4.5 billion** in fines and other payments (to US federal government)”

“According to [The Wall Street Journal](http://www.wsj.com) the U.S. government and Gulf Coast states have prepared an offer to BP for \$16 billion settlement.”

http://en.wikipedia.org/wiki/Deepwater_Horizon_oil_spill

Conclusion

- Engineering is a very demanding profession
 - Reduce cost
 - Develop products in very short time
 - Satisfy continuously increasing legal regulatory and ethical expectations
- Preparation of students for the today's global engineering operations is a challenge
 - State restricts the number of credits students can take
 - Many technical courses are required to prepare the students
 - Faculty has no time and experience to include broad aspects of global operations
- Global Learning helped us to prepare our students better for their professional life.