Globalizing Manufacturing Engineering Education

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Outline

• Manufacturing engineering education in context

• Global manufacturing trends 1971-2000

• Need to acknowledge global nature of manufacturing in education
Manufacturing Engineering In Context

• Society of Manufacturing Engineers (SME) began as Soc. of Tool Engineers (1932)

• Worldwide SME membership ~40,000

• First U. S. degree programs began in late 1960's

• Approx. 20 accredited U. S. programs today
Global Manufacturing Trends

• Statistics on manufacturing employment (not engineering employment)

• Obtained from International Labor Office (UN agency)

• Covers period 1971-2000
Total U. S. Population

- 208 million in 1980
- 282 million in 2000
Percentage of U. S. Population Employed in Manufacturing

- 1960: 8.8%
- 2010: 6.5%
Manufacturing Employment in Asia-Pacific Rim

Total manufacturing employment (millions) for:
  - Indonesia
  - Malaysia
  - Singapore
  - South Korea
Prognosis for 2020

**Good News:**

- Global manufacturing volume will grow
- High-tech manufacturing will spread throughout Asia-Pacific Rim, other regions
- Overall demand for manufacturing engineers will increase
Prognosis for 2020

Bad News (for U. S. schools):

• U. S. manufacturing will decline as % of total employment

• Mfg. engineering jobs located in U. S. will stagnate

• Non-U. S. production of manufacturing engineering graduates will increase
Survey of U. S. Manufacturing Engineering Programs

• Reviewed curriculum requirements posted on WWW for 16 programs

• No courses or special requirements related to global aspects of manufacturing found

• Some programs require internship (domestic or international)
Recommendations

• Foreign language requirement/option (possibly intensive summer class)

• International co-op experience

• Exchange student program with country at comparable socio-economic level

• Emphasize global aspects in management courses
Conclusions

• Manufacturing engineering education meets a growing global demand for high-tech manufacturing

• U. S.-based demand for graduates will remain flat

• Growing international demand for graduates, but graduates of non-U. S. schools will compete

• Global manufacturing trends have implications for traditional engineering education
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