

Future of Manufacturing

Challenges, Solutions and How We All Can Get
Involved

Introductions

- ❑ Chief Technical Officer of AlliedStrand Corporation (an industrial “startup” company).
- ❑ Officially started AlliedStrand with my father, John in 2015 after many years of product design and welding process consulting work for primarily small and medium businesses.
- ❑ Became chair of SME Chapter 112 in September of 2016.
- ❑ Graduated with a BS in Mechanical Engineering from Purdue University, West Lafayette.
- ❑ Currently, I do more industrial software development than CAD work (but I still **love** design).

Overview

- ❑ Mainly a quick “skills gap” discussion but, **hopefully**, one which provides some new or less frequently discussed perspectives for thought.
- ❑ During the presentation (and especially after), focus on what you, the future leaders in manufacturing, can do to help to revitalize the industry. Some, not all, possibilities will be presented.
- ❑ An appeal for an **always** present “raising the bar” mentality in companies, educational institutions and individual participants within our industry.

Skills Gap Challenges

- ❑ Reimagining the manufacturing workforce and manufacturing businesses.
- ❑ Perception issues for people considering entering the industry.
- ❑ Exponential increases in product design and manufacturing process complexity.

Sources:

<http://www.themanufacturinginstitute.org/~media/827DBC76533942679A15EF7067A704CD.ashx>

<http://www.orlandosentinel.com/health/aging/os-aging-workforce-strain-manufacturing-20160801-story.html>

<http://www2.deloitte.com/us/en/pages/manufacturing/articles/public-perception-of-the-manufacturing-industry.html>

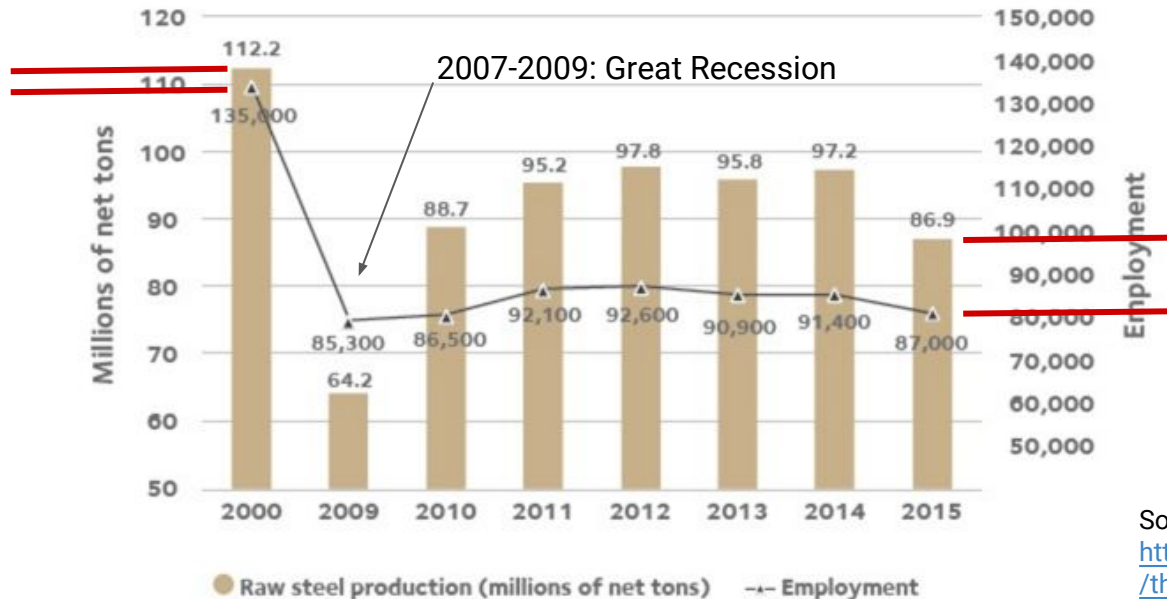
<http://www.nytimes.com/2016/10/09/magazine/why-are-politicians-so-obsessed-with-manufacturing.html>

Reimagining Manufacturing

- ❑ Do not just replace the aging workforce, make a new, better workforce.
- ❑ Companies need to emphasize progress and innovation.
- ❑ Wage growth, talent retention and increased process safety and cleanliness will be the result.

Complexity Challenges

- ❑ Process automation impact - workforce displacement and workforce training.



Sources: AISI, Bureau of Labor Statistics (Employment = NAICS 3311)

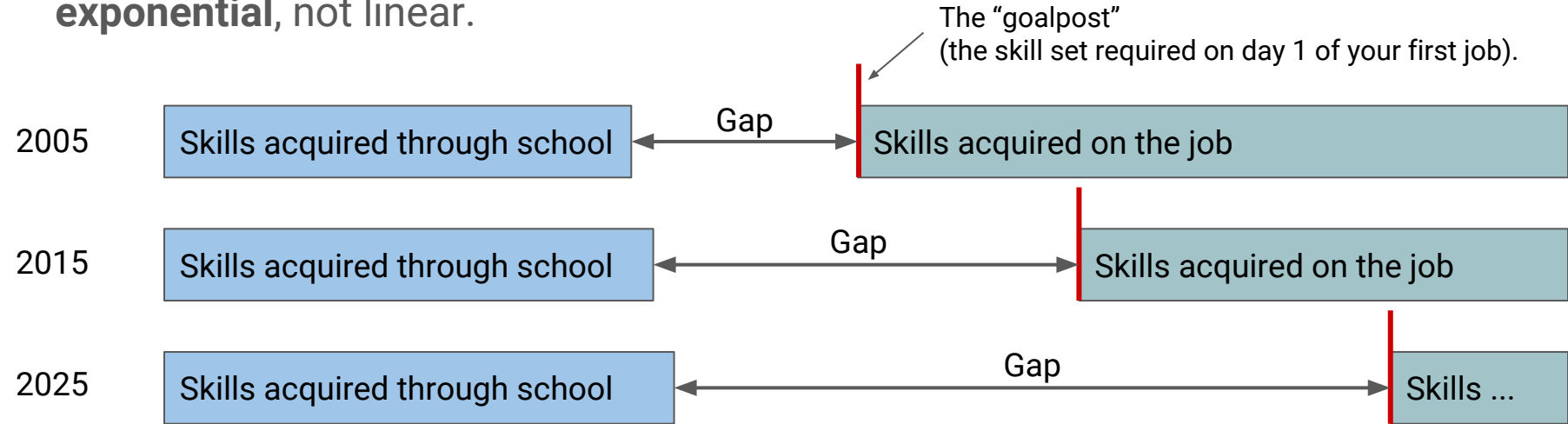
Note that the vertical difference between the gap between 2000 and 2015. That is automation.

Source:

<http://usa.arcelormittal.com/sustainability/our-business/the-steel-industry/industry-statistics>

Complexity Challenges

- ❑ Product complexity (the “moving goalpost”).
- ❑ AlliedStrand’s experience is that increases in product complexity are **exponential**, not linear.



Note that the dates given are purely hypothetical and the diagram is not drawn to any scale.

Possible Solutions

- ❑ Increased collaboration among manufacturing businesses - “bringing a box to the table”.
- ❑ Strive to build “open” companies.
- ❑ Reducing or eliminating complacency in older businesses.
- ❑ Community outreach to bridge companies, universities, high schools, middle schools, governments and individuals.
- ❑ Public school curriculum reform - the ever increasing need to “start earlier”.
- ❑ Individual commitment to always learn and to always teach.
- ❑ Educate local governments on industry “pain points” and talent competitiveness concerns.
- ❑ Supporting gender and racial diversity.

Recent Developments in Indiana and Chicagoland

- ❑ New workforce development efforts:
 - ❑ Digital Manufacturing and Design Institute (DMDII) in Chicago, Illinois, opened 2014.
(<http://dmdii.uilabs.org/>)
 - ❑ Purdue Commercialization and Manufacturing Excellence Center (CMEC) in Hammond, Indiana. (<http://centers.pnw.edu/cmec/>)
- ❑ mHUB in Chicago. Innovation center focused on physical prototyping.
(<http://www.mhubchicago.com/>).
- ❑ SME Chapter 112 new revitalization efforts.
- ❑ Some encouraging recent business development initiatives from Northwest Indiana local governments and economic development bodies.

Thank you. Questions?

Adam J. Cook

Chief Technical Officer of AlliedStrand

Chair of SME Chapter 112

adam.j.cook@alliedstrand.com

<https://twitter.com/AdamJosephCook>

<https://www.linkedin.com/in/adam-j-cook>

<https://github.com/adamjcook>

These slides will be published to my GitHub account by tomorrow.

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