

Digital Design: Creating On-shoring Opportunities

Dr. Emory Zimmers, Jr. – Director, Enterprise Systems Center - Lehigh University

Presentation Sequence

- Part I: Provide a perspective on the Enterprise Systems Center (ESC) at Lehigh University
- Part II: Present a specific company example:
 - On-shoring through use of digital design and supporting techniques



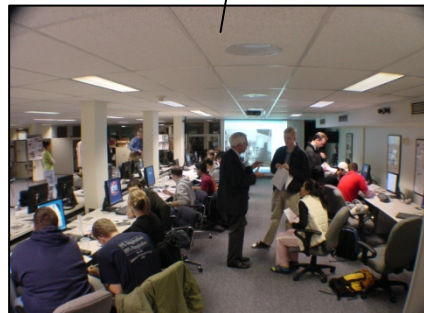
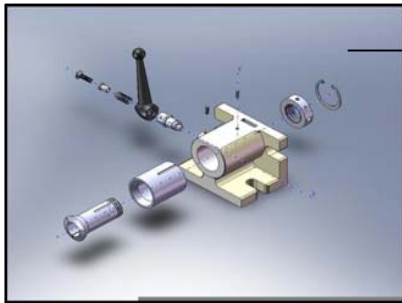
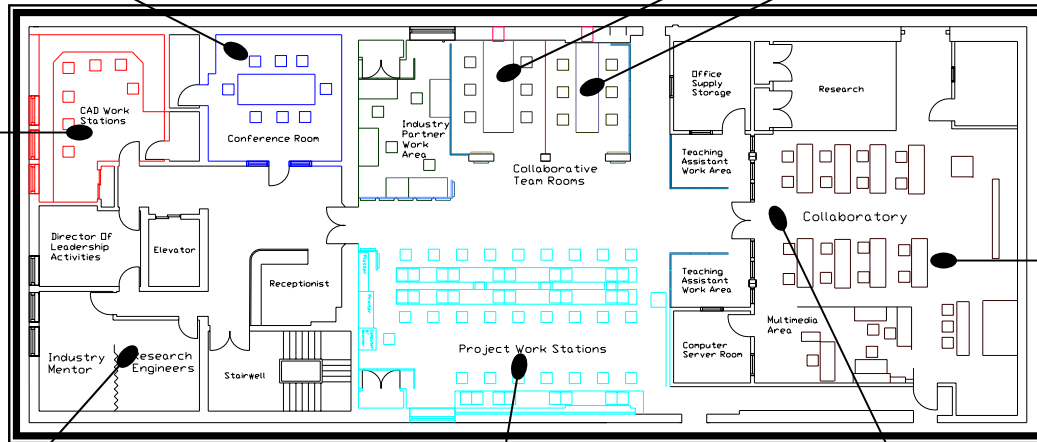
Part I: Perspective on the Enterprise Systems Center

“The Enterprise System Center is committed to helping students learn, while simultaneously providing value for our clients.

We believe that our research should be driven by industry needs and enabled by close partnerships and collaboration.”

Dr. Emory Zimmers, Jr.
Director, Enterprise Systems Center
Lehigh University

Enabling Facilities



Enterprise Systems Center

- Industry and Government Partners
 - Over 200 partners; 400+ projects since inception

- Customer Feedback

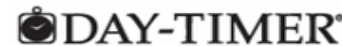
“The Enterprise Systems Center brought additional design resources that were invaluable to us as we strive to compete with lower cost plants. As a result we have been able to retain our facility’s 806 jobs.”

Plant Manager, Kraft Foods, Inc.



“With the completion of the design project with the Enterprise Systems Center we are now able to manufacture customized Personal Pages and generic Day-Timer planners at our facility, with reduced cycle time and reduced capital expense in a cellular environment.”

Vice President Manufacturing, Day-Timers Inc.



“The Enterprise Systems Center is a valuable partner in all our 15 pilots.” - PA Secretary of Transportation



Resources Valued by Our Partners

- Special skills and expertise



- Extra pair of hands

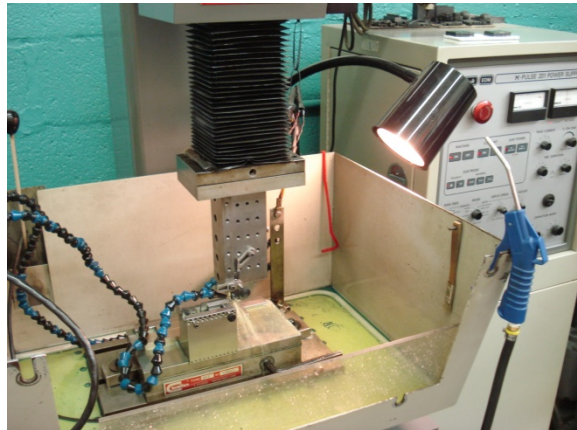
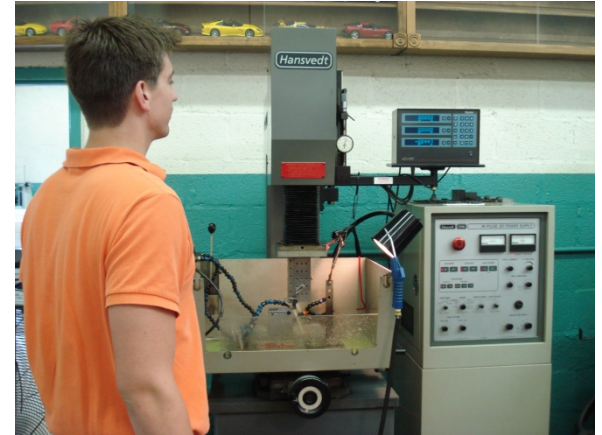
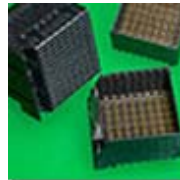
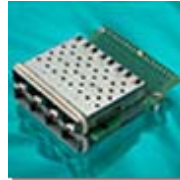
EXAMPLE: Students	Arts & Sci.	Bus. & Econ.	Engineering		Total
			IE	Other	
Graduate	2	8	8	3	21
Senior	6	6	20	11	43
Junior	2	3	6	3	14
Sophomore	1	3	6	3	13
Freshman		1	1	1	3
High School	7				7
Total	11	21	41	21	101

- Training and education



Part II: Specific Company Example

Advanced Plastix



Advanced Plastix Automation ladder approach

*Digital Design
Contribution*

1. Long-term commitments: Part family rationalization among suppliers	Sharing equip. capabilities & inventory database
2. Customer collaboration – design (e.g., joint review at progressively earlier stage of product development)	Design collaboration electronically executed
3. Standardize machine mounting tools (e.g., incremental increases in shared handling tools)	Electronic database permits this process
4. Redesign operator jobs to higher value-add (less and less operator monitoring of machine run time)	Work systems software interfaces with design software
5. Offline set ups loaded by robotics (e.g., allows reduction in operators for second and third shifts)	Scheduling software interfaces with digital product characterization
6. Shared success. (e.g., price allowance due to learning curve)	Amortizing digital design work effort.

Advanced Plastix Automation ladder approach

*Digital Design
Contribution*

*Human
Factors*

Agility

1. Long-term commitments: Part family rationalization among suppliers	Sharing equip. capabilities & inventory database	Trust vendor with quality, reliability and speed	Cooperate in Virtual Relationship
2. Customer collaboration – design (e.g., joint review at progressively earlier stage of product development)	Design collaboration electronically executed	Design & manufacturing engineers fully collaborating	Enabling Customer Enrichment
3. Standardize machine mounting tools (e.g., incremental increases in shared handling tools)	Electronic database permits this process	Accepting elimination of low-value work	Adaptive Organization
4. Redesign operator jobs to higher value-add (less and less operator monitoring of machine run time)	Work systems software interfaces with design software	Evolve from monitoring to set-up emphasis. Owner must be willing to delegate	Valuing People: skills, information, relationships
5. Offline set ups loaded by robotics (e.g., allows reduction in operators for second and third shifts)	Scheduling software interfaces with digital product characterization	Increased pay for productivity.	Valuing People: skills, information, relationships
6. Shared success. (e.g., price allowance due to learning curve)	Amortizing digital design work effort.	Different price for same part.	Enabling Customer Enrichment

Summary

- University centers should be used to help companies move forward in implementing sustainability, digital design, and advanced manufacturing.
- One approach is that used by the Enterprise Systems Center at Lehigh University which was described briefly for you and hopefully will provide some useful ideas.
- Advanced Plastix is a specific example where we are working to support their implementation of the “automation ladder” approach, which heavily utilizes digital design techniques. In addition, we have found that human factors and agility are complimentary in achieving the company’s goals of creating on-shoring opportunities.

Acknowledgements



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Agility Principles

- Enriching the customer
- Cooperating to compete (Virtual Relationships)
- Mastering change and uncertainty
- Valuing people and information

Student Feedback

■ Lehigh Students



“At the Enterprise Systems Center I learned not only design for manufacturing and complex finite element analysis but also **project management skills** through directing other students in a real life engineering project.”

Maurice James Gisler, Graduate student, Mech. Eng.

“Through the ESC, I got a better grasp on how to work both as part of a **team**, and as a **leader**.”
Brian Schellati, Senior, Ind. Eng.



“I have learned supply chain management and streamlining of production and manufacturing processes. I have also improved my

presentation, time management and leadership skills.”
John M. Grubor,
Graduate, Ind. Eng.



“In the Enterprise Systems Center I have learned how to apply classroom knowledge to real world problems. Now I have an insight into how the business world works.”

Giles Gomme, Senior, Ind. Eng. / Economics