

High Growth Job Training Initiative SGA-Advanced Manufacturing

Applicant Name-Shiloh High School
Industry Focus-Manufacturing

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Problem

Due to the advancement of technology, the individual's security in the workforce is best achieved by providing a foundation of practical education based on the knowledge and skills needed by businesses, industries, and communities in our society. Unfortunately, many high schools across the nation have not advanced with the changes in technology or the society of industry. Instead, they continued to teach antiquated curriculum with old methodologies, outdated equipment, and industry irrelevant skill sets. Not only is this in and of itself not meeting the needs of industry, society, and students, but it is further compounding the problem by high schools around the nation closing their technology programs altogether.

Solution

These changes prompted Shiloh High School to; address workforce challenges identified by Industry, employ progressive goal oriented methodologies, and adopt a motto that has become the underpinning philosophy of our decision making paradigm, “Linking Education with Industry”. This led to exceptional educational opportunities at SHS such as; Industry recognized skill set certification, School-Based-Enterprise which simulates the business/manufacturing environment manufacturing value-added products for consumers and industry and dual credit with local community colleges. This dynamic shift reinforced for the student the impact education has on their future careers. SHS believes it’s presently addressing many of the core workforce challenges such as; developing a pipeline of young workers, keeping workers abreast of rapidly changing

skills, developing innovative learning methodologies, and providing career guidance. The goal presently being addressing is expanding the capacity of our educational facility by offering this educational experience to; surrounding high schools, student-teachers, and Industry trainees.

Timeline

January 2007- securing architect and contractor to expand the current training facility.

February-May 2007-notification of local high schools, community colleges, universities, and local industries of new training center. Defining of educational relationship between Shiloh High School and other high schools, colleges, and industry.

March 2007-order manufacturing equipment that needs lead times for timely delivery and beginning of exterior work for expanding facility.

June-August 2007-traing facility shut down for expansion, and new equipment installation, restructuring manufacturing layout and preparation for new school year.

September 2007-May 2008-first year of new training center will involve the training of high school students from surrounding high schools, student-teachers, and local industry workers. Classes will be expanded for computer design and computer integrated manufacturing. Details on working relationship with other high schools, colleges, and industry will be further refined by Superintendent, Principle, School Board members, and

teacher. Tracking of student progress, internships, job opportunities, and Industry donations and relationships will performed throughout the year.

June-July 2008-Summer internship program begins for qualifying student.

June-August 2008-Advisory council will meet to evaluate current needs and direction, hiring of additional staff to meet the increase in student population, student-teachers, and industry trainees. Meeting with local high school principles to evaluate working relationship and make adjustments. Participant follow-up for performance outcomes evaluated.

September 2008-May 2009- second year of new training center will involve the training of high school students from surrounding high schools, student-teachers, and local industry workers. Classes will continue teaching computer design and computer integrated manufacturing. Details on working relationship with other high schools, colleges, and industry will be further refined by Superintendent, Principle, School Board members, and teacher. Tracking of student progress, internships, job opportunities, and Industry donations and relationships will performed throughout the year.

June-July 2009- summer internship program begins for qualifying student.

June-August 2009- Advisory council will meet to evaluate current needs and direction, hiring of additional staff to meet the increase in student population, student-teachers, and

industry trainees. Meeting with local high school principles to evaluate working relationship and make adjustments. Participant follow-up for performance outcomes evaluated.

September 2009-May 2010- second year of new training center will involve the training of high school students from surrounding high schools, student-teachers, and local industry workers. Classes will continue teaching computer design and computer integrated manufacturing. Details on working relationship with other high schools, colleges, and industry will be further refined by Superintendent, Principle, School Board members, and teacher. Tracking of student progress, internships, job opportunities, and Industry donations and relationships will performed throughout the year.

June-July 2010- summer internship program begins for qualifying student.

June-August 2010- Advisory council will meet to evaluate current needs and direction, hiring of additional staff to meet the increase in student population, student-teachers, and industry trainees. Meeting with local high school principles to evaluate working relationship and make adjustments. Participant follow-up for performance outcomes evaluated. Grant closure-out activities will be performed at this time.

Abstract

Changes in society and technology have prompted Shiloh High School's Industrial Technology program to address workforce challenges identified by industry, to prepare students for career pathways by progressive goal oriented methods, and to adopt the motto "Linking Education with Industry". Joining these forces in our society lead to unique partnerships, which have produced exceptional educational opportunities at Shiloh High School. The Industrial Technology program utilized many partnerships to develop curriculum that addresses four basic needs of industry: personal management, academic, workplace, and industry-wide technical competencies. The curriculum includes units ranging from personal management skills to industry-driven technical skills; college preparedness for engineering and manufacturing related fields, and nationally recognized industry certification. The curriculum is delivered to students through pre-engineering lab activities designed around CNC equipment, School-Based-Enterprise based on contract work with local and national companies developing manufacturing and business skills, and internships with local and national industry supporters. The program has a variety of post-secondary collaborations including: dual credit with two community colleges, overseeing student teachers, participating on college curriculum committees, facilitating student teacher discussion panels, and providing instructor in-service opportunities. The students have direct links with industry leaders using web cams and industry awareness by trade shows attendance. Shiloh's Industrial Technology program's depth of curriculum is due to the continual support of the local community, school administration, industry partners, associations, trade journals, WoodLINKS USA, Eastern Illinois Education for Employment System, University of Illinois's Super Computing

Center, and various individuals. (See pages 10-15) This partnership of education and industry has led to student success in the workforce and post-secondary opportunities, the implementation of this model at other high schools, a training location for industry, in-services for community colleges, This partnership has also contributed to the success of the program by donating funds used for shop repairs and student trips to industry trade shows, materials for student design and prototyping, CNC tooling for student use, CNC equipment at greatly reduced prices or donated at no cost, computers to help with the growth of software requirement, computer software, upgrades, and in-house technical training, 3D models and CAD/CAM programs for student projects, and our “School-Based-Enterprise”. (See pages 10-15) It is the goal of SHS to expand the Industrial Technology program thereby creating a learning center so this learning opportunity would be available to surrounding high schools, local industry, and local community colleges. The center would be instrumental in training student teachers, providing teacher-in-service, and offering WoodLINKS USA teacher training. The curriculum model has been successful and there is a need for it to be available to a larger population. The expansion would also enable the model to be tested on a larger scale that could be duplicated by other rural areas. In order to meet this goal the current classroom and lab facilities would need to be expanded creating additional room for more equipment and students. Additional equipment, material, staff would need to be secured, and expansion of advisory council would need to take place in order to ensure continued involvement of the industries being served, and strengthen educational collaborations.

Advanced Manufacturing Grant-Budget Narrative

To continue meeting our present goals and meet our new goal of expanding the capacity of our existing educational site we need to make changes to the facility, hire additional staff, and purchase additional equipment. The facility will need to be expanded to increase the floor space in the manufacturing lab and the classroom for two reasons; 1. We will be enrolling additional students from other school districts, hosting teacher-services, and conducting industry classes. 2. We will be adding additional equipment to increase our capacity to teach high-tech industry specific skills. The facility of shop and classroom addition will cost \$250,000.00. To increase our capacity to teach workplace and Industry technical skills we will need to add additional manufacturing equipment, engineering computers, and CAD/CAM software. Teaching manufacturing processes, production, maintenance, supply, quality control, safety, team work, listening and following directions, adaptability, customer relations, problem solving, will necessitate the need for additional equipment such as; CNC router, panel saw, planer, edge bander, horizontal boring machine, and miscellaneous support tools. These tools will cost \$425,895.00. The classroom will need increased computer and software capability to teach applied science, basic computer skills, applied mathematics, reading for information, business writing, locating and using information, and speaking skills. Specific computer software programs taught will be Autodesk Design Academy; AutoCAD, Mechanical Desktop, Inventor, and Studio Viz 3D. Also, Mastercam Mill, Mastercam Router, Mastercam Lathe, and Mastercam Art by CNC software, Artcam by Delcam, and eCabinets by Thermwood, Inc. The computers and software programs will cost \$356,610.00. We will need to hire additional staff with grant money until tuition

from enrollment makes this sustainable. This will cost \$150,000.00. Administrative costs will be \$40,000.00 to run the construction project, make presentations to school board, acquire all teaching equipment, tools, computers, and software, set up the classroom and manufacturing facility, test all equipment, software, and systems, develop articulation agreements with local high schools, mentor student teachers, track student progress in internships, industry certification, career , and post secondary educational opportunities

Education/Industry Partners

- Accessa www.accessa.com
- Accurate Technology, Inc. www.proscale.com
- Amish Crafters www.amishcrafters.com
- Architectural Woodwork Institute www.awinet.org
- Arthur Distributor company
- Association of Woodworking and Furnishing Suppliers www.awfs.org
- Baer Supply company www.baerco.com
- Beachy's countertop
- Blum, Inc. www.blum.com
- Cabinet Maker Magazine www.cabinetmakeronline.com
- Carve3D www.carve3d.com
- Castle USA www.castleusa.com
- Central Illinois Manufacturing Extension Center
- Certainly Wood www.certainlywood.com

- CNC Software www.mastercam.com
- CNC Software-MasterCAM www.mastercam.com
- Custom Service Hardware www.cshardware.com
- Custom Woodworking Business Magazine www.iswonline.com
- Das Holz Haus
- Delcam International, Inc www.delcam.com
- Eastern Illinois Education for Employment System www.eiefe.k12.il.us
- FDM www.fdmonline.com
- Ferrari America www.ferrariamerica.com
- Fox Valley College www.foxvalley.tec.wi.us
- Franklin International www.franklininternational.com
- Horizon Home Center
- House Lumber, Inc.
- International Wood Products Association-Imported Wood Magazine
www.iwpawood.org
- Klingspor Abrasives www.klingspor.com
- Kramer Tool and Mfg. Co. Ltd. www.kramertool.com
- Laguna Tools www.lagunatools.com
- Lakeland College www.lakeland.edu
- Laser Machining, Inc. www.lasermaching.com
- Leitz Tool www.leitztooling.com
- Marcus Cabinets
- Masterbrand Cabinets www.mbcabinets.com

- Microvellum www.microvellum.com
- Mirka Abrasives, Inc. www.mirka.com
- Modern Woodworking www.modernwoodworking.com
- Modern Woodworking Magazine www.modernwoodworking.com
- National Detroit, Inc. www.nationaldetroit.com
- Northern Harvest www.northernharvest.com
- Onsrud Cutter www.onsrud.com
- Paint Pockets www.paintpockets.com
- Parkland College www.parkland.edu
- Paul's Machine and Welding www.paulsmachine.com
- Ramco, Inc. www.tannewitz.com
- Rayner & Rinn-Scott www.rrswood.com
- Riverside Door
- Saint-Gobain Abrasives www.sgabrasives.com
- Shimerz
- Simonton Windows www.simonton.com
- Steve Coffee
- Stevens Industries, Inc. www.stevensind.com
- Surface and Panel Magazine www.certainlywood.com
- Swiss Invis www.swissinvis.com
- T. H. Snyder company
- Tech Directions www.techdirections.com
- The Paris Beacon www.parisbeacon.com

- The Suppliers Edge www.awfs.org/awfs/newsletter
- The Tuscola Review
- Thermwood, Inc. www.thermwood.com
- University of Illinois Dept. of the National Center for Supercomputing
www.trecc.org/ed-kc
- Veneer Tech www.veneertech.cm
- Vortex www.vortextool.com
- Wood and Wood Products Magazine www.iswonline.com
- Wood Craft Magazine www.woodcraftmagazine.com
- Wood Digest www.woodworkingpro.com
- Wood Shop News www.woodshopnews.com
- Wood Shop News www.woodshopnews.com
- Wood Shop News Magazine www.woodshopnews.com
- Woodline USA www.woodbits.com
- Woodline USA www.woodline.com
- WoodLINKS USA www.woodlinks.com

List of Leveraged Resources

Shiloh High School 2004-2005 Industrial Technology Program

1. **Wayne Sutter** and **Bill Thompson** of **Woodline USA** have continued to give us a lifetime supply of Router Bits-\$300.00 this year. www.woodbits.com

2. **Leslie Banduch** and **Isabel Leonard** of **Onsrud Cutter** have continued to give us a lifetime supply of CNC Router Tooling-\$8,000.00 this year.
www.onsrud.com
3. **Emory Luth** had another article about his desk published in **Wood Craft Magazine** by **Sarah Brady**. www.WoodcraftMagazine.com
4. **Stephen Gilbert, Jon Kincaid, Ryan Walton, Dan Dewitt, Jared Earl, Kyle Prouse, Adam Carrington, Mark Gilbert, Mark Smith, and Linda Smith** will be attending the 2005 **AWFS** this summer.
5. **Stephen Gilbert, Kyle Prouse, and Dan Dewitt**, will be entering their projects in the **Student Design Contest** at the **Association of Woodworking and Furnishings Suppliers Show** out in Las Vegas, NV. The AWFS is headed up by Dale Silverman.
www.awfsfair.org/awfsfair/attendee_information/studentDesignContest.asp
6. We completed one cabinet job for a customer in the Barrington area raising \$2,000.00 to be used towards the purchase of our Thermwood CNC Router. We have one payment left which we will make next year.
7. **Susan Hanfland** of the **Eastern Illinois Education for Employment System** purchased 10 AutoCAD Lt. 2005 upgrades-\$900.00, and a new 36" Surfacing Sander-\$5,125.00. www.eiefe.k12.il.us
8. **WoodLINKS USA** has helped with curriculum, teacher training, funds for lodging and travel to the AWFS show-\$1,000.00. www.woodlinks.com
9. **Thermwood** has given us \$1,000.00 toward the AWFS trip.
www.thermwood.com

10. **Keith Marcus** of **Marcus Cabinets** has given us \$250.00 towards the AWFS trip.
11. **Ed Cler Jr.** of **Paul's Machine and Welding** has given us \$250.00 towards the AWFS trip.
12. **Northern Harvest** has given us about \$8,000.00 worth of material which we will use in our program and donate about \$6,000.00 to the summer program.
www.northernharvest.net
13. **Stevens Industries** donated \$500.00 worth of medium density fiber board that we use for prototyping. www.stevensind.com
14. **CNC Software-Mastercam** has given technical support and donated 3 seats of Mastercam Art to be used in designing of projects-\$1,500.00.
www.mastercam.com
15. **Microvellum** has donated a manufacturing program-\$64,000.00.
www.microvellum.com
16. **Stephen Gilbert** will be taking the **WoodLINKS USA Certification Test**.
17. **John Varner** and **Jane Wharton** of **VeneerTech** have donated \$500.00 worth of veneer for use on student projects. www.veneertech.com
18. **Catherine Heishoj** of **Laguna Tools** donated \$15,870.00 in discount on a new 36" Surfacing Sander. www.lagunatools.com

**Shiloh High School 2005-2006
Industrial Technology Program Supporters**

19. **Anthony and Alice Lynn and Stephen Lockert of Castle USA**-donated a \$3,000.00 Pocket Hole Machine. www.castleusa.com
20. **CabinetMaker** of Watt Publishing Company has donated a year subscription-\$60.00. They also ran an article about our program and the wooden sunglasses. www.cabinetmakeronline.com
21. **Catherine Heishoj of Laguna Tools** donated \$3,000 worth of repair to existing machine. www.lagunatools.com
22. **CNC Software-Mastercam** donated two updated seats of Mastercam Art and has given technical support by Dan Newby coming down from Washington State - \$1,500.00. www.mastercam.com
23. **David Wentworth of Paint Pockets Company**-donated a box of spray booth filters-\$90.00. www.paintpockets.com
draft material to cover our down draft tables.
24. **Ed Fiantaca of Accurate Technology** repaired our Pro Panel measuring tools for free and donated a Digital Fence for our sliding Miter Saw, a total value of \$900.00. www.proscale.com
25. **Ed Cler Jr. of Paul's Machine and Welding** donated \$92.00 worth of down draft table covering, and \$50.00 for a stainless steel screen.
26. **FDM** of Watt Publishing Company has donated a year subscription-\$60.00.
27. **Gary Swanson of National Detroit, Inc.** repaired one of our air sanders at no charge-\$50.00. www.nationaldetroit.com
28. **Greg Engle** of Certainly Wood, Inc. donated \$2,500.00 worth of veneer.

29. **Holli Coffin of Klingspor Abrasives** donated abrasive materials to our program-\$204.00. <http://www.klingspor.com>
30. **International Wood Products Association-Imported Wood** of Bedford Falls Communication, Inc. has donated a year subscription-\$25.00.
www.iwpawood.org
31. **James Booth of Carve3D** donated 30 3D models for CNC carving worth \$800.00
www.carve3d.com
32. **Jane Wharton of VeneerTech** has donated \$300.00 worth of veneer for use on student projects. www.veneertech.com
33. **Leslie Banduch and Isabel Leonard of Onsrud Cutter** have continued to give us a lifetime supply of CNC Router Tooling-\$200.00 this year. www.onsrud.com
34. **Modern Woodworking of Randall Publishing, Com.** has donated a year subscription-\$60.00. www.modernwoodworking.com
35. **Surface and Panel of Bedford Falls Communication, Inc.** has donated a year subscription-\$50.00.
36. **Swiss Invis**-gave a \$400.00 discount on their Invis Kit. Also over \$100.00 in discounts. www.swissinvis.com
37. **Tech Directions of Prakken Publishing, Inc.** has donated a year subscription-\$30.00. www.techdirections.com
38. **Wayne Sutter of Woodline USA**-has donated \$90.00 worth of router bits to our program. www.woodbits.com

39. We completed one cabinet job for a customer in the Hume, IL area raising \$2,000.00 to be used towards the purchase of our Thermwood CNC Router. We have paid off the Thermwood CNC Router this year.
40. **Wood and Wood Products of Vance Publishing Company** has donated a year subscription-\$55.00. www.iswonline.com
41. **Wood Craft Magazine of Dovetail Media, Inc.** has donated a year subscription-\$19.95.
42. **Wood Digest of Cygnus Business Media** has donated a year subscription-\$60.00. www.wooddigest.com
43. **Wood Shop News of Soundings Publications, L.L.C.** has donated a year subscription-\$35.95. www.woodshopnews.com
44. **Wilf Torunski of WoodLINKS USA** has helped with curriculum, teacher training, funds for lodging and travel to the AWFS show-\$1,000.00. www.woodlinks.com
27. **Leonard Beachy of Beachy's Counter Top** has donated \$500.00 worth of countertop material for fixtures and jigs.
28. **Delcam creators of ArtCAM** wrote 2 articles about our program. www.artcam.com
29. **Dennis Englert of Thermwood Corporation.**-donated 10-3-Axis CNC Programming workbooks at an estimated cost of \$500.00. **Kevin Horney** of Thermwood, Inc gave \$1440.00 discount on a new vacuum pump for our CNC Router.

45. **Susan Hanfland** of the **Eastern Illinois Education for Employment System**

purchased 10 AutoCAD 2006 sites-\$8,000.00. www.eiefe.k12.il.us

46. **University of Illinois Dept. of the National Center of Supercomputing**

Applications has donated a web camera for videoconferencing-\$30.00.

www.trecc.org/ed-kc

Shiloh High School 2006-2007 Industrial Technology Program Supporters

1. **George F. Lange** of **Saint-Gobain Abrasives** donated \$1000.00 worth of abrasives. www.sgabrasives.com

Budget List

Facility Expansion

Lab and Classroom-\$250,000.00

1. Lab-increased square footage, dust collector moved, electrical addition, compressed air line addition, additional lighting, additional heating, new roll-up door entrance, and new bathroom.
2. Classroom-increased square footage, additional lighting, and additional seating.

Facility Equipment

1. Dust Collector Piping-\$20,000.00
2. Electrical-\$10,000.00
3. Air Lines-\$10,000.00

4. CNC Router-\$260,000.00
5. CNC Laser-\$45,000.00
6. 24" Planer-\$17,000.00
7. Edbander-\$10,000.00
8. Panel Saw-\$8,000.00
9. Horizontal Boring Machine-\$6,000.00
10. Edge Sander-\$6,000.00
11. Mortising Machine-\$4,000.00
12. 12" Sliding Miter Saw-2 @ \$600.00 = \$1,200.00
13. 5" Air Sanders-10 @ \$200.00= \$2,000.00
14. ½ Sheet Sanders-10 @\$180.00 = \$1,800.00
15. 18 Volt Cordless Drills-5 @ \$170.00 = \$850.00
16. 1-1/2 hp Router-5 @ \$150.00 = \$750.00
17. Jig Saw-2 @\$150.00 = \$300.00
18. Router Bits-2 Kits @ \$200.00 = \$400.00
19. CNC Tooling-50 @\$100.00 = \$5000.00
20. Abrasives-15 belts @ \$35.00 = \$525.00
21. Wide Belt Abrasives-15 @ \$70.00 = \$1,050.00
22. Drill Bits-5 Kits @\$60.00 = \$300.00
23. Forester Bits-2 Kits @\$100.00 = \$200.00
24. Scotch Brite Pads-30 @ \$1.00 = \$30.00
25. 5" Disc Abrasive-10 @ \$35.00 = \$350.00
26. 5 gallon Spray Gun-1 @ \$2,000.00 = \$2,000.00

- 27. 5 gallon spray pot-1-@ \$4,500.00
- 28. Finish 5 gallon-5 @ \$120.00 = \$600.00
- 29. Thinner 5 gallon-5 @ \$25.00 = \$125.00
- 30. Extension Cords-5 @ \$15.00 = \$75.00
- 31. Finish Guns 1 Quart-2 @ \$400.00 = \$800.00
- 32. Band Saw-2 @ \$3,000.00 = \$3,000.00
- 33. Drill Press-2 @ \$1,500.00 = \$3,000.00
- 34. Computers-30 @ \$7,000 = \$210,000.00
- 35. Drafting/Computer Desks-30 @ \$2,000.00 = \$60,000.00
- 36. Autodesk Design Academy-unlimited seats = \$25,000.00 + 3 year upgrade =
9,000.00 = 34,000.00
- 37. Mastercam/upgrade-30 seats @ \$520.00/seat = \$15,600.00 (\$36,000.00 dis.)
- 38. Artcam Pro-30 seats @ \$351.00/seat = \$10,510.00 (\$34,400.00 dis.)
- 39. eCabinets-30 seats-no cost (estimated dis. of \$30,000.00)
- 40. Micorvellum-30 seats-no cost (\$64,000.00 donation) Post Generation-\$2,500.00
- 41. Corel Draw-30 seats @ \$800.00 = \$24,000.00
- 42. Additional Staff-\$150,000.00

Industry Focus-Advanced Manufacturing Grant Narrative

There are three obstacles facing the manufacturing sector in Illinois today; graduation requirements for high school students are on the rise decreasing the number of electives

students can take, students are being guided away from manufacturing related classes towards classes that will help pass state mandated evaluation exams, and less funding towards technical skills at the high school level resulting in fewer students being encouraged to pursue an education in the area of manufacturing. The result of this trend can be seen at the high school level, community college, university, and Industrial sector. Students who would normally take manufacturing classes in the Industrial Technology department are now being funneled into other classes in spite of their natural ability for grasping technological ideas and techniques. Fewer students are going to the community college pursuing manufacturing technology and related fields because they are getting less exposure in high school. University bound students are being effected by less exposed in high school to the opportunities found in the manufacturing sector, and a decrease in preparing teachers to teach Industrial Technology at the high school, community college, and university level. This trend has impacted local high schools in three ways; enrollment in manufacturing classes dropping resulting in less funding for the program which can and does lead to program closure, increased difficulty in finding Industrial Technology teachers to run the program, and local manufacturing firms coming to us for education because there is no one locally to show them how to run a piece of equipment or software. This trend can be seen nationally and locally. Over the past ten years I have read articles about program closings in other parts of the country and have personal seen four high schools close their Industrial Technology programs all within 10-40 miles of Shiloh High School. After a program has been shut down, equipment sold, and teacher let go it is almost impossible to secure the funding to reopen. On some occasions the program was shut down because they could not find a teacher to continue

running the program. This withering of educational capacity directly affects the manufacturing industries ability to find employees with advanced manufacturing skills and groom future industry leaders. Shiloh High School has companies calling both locally and nationally for students that have advanced manufacturing skills to can come and work for them.

Shiloh High School's Industrial Technology program is addressing this problem of attrition in the manufacturing sector by; developing a pipeline of young workers with foundational skills in math, science, and language, developing post-secondary training alternatives such as apprenticeships, helping students and workers keep up with the rapid pace of changing skills and requirements due to innovation and technology, developing new and innovative learning methodologies, and providing career guidance information and tools to students. This is being achieve by Industry driven curriculum, Industry driven certification, web casts with Industry partners, pre-engineering lab activities, school-based-enterprise, Industry internships, summer internship program, trade show attendance , Manufacturing Summer Camp, technical support from Industry partners, Industry supporters speaking with student population via phone, email, and classroom presentations, advisory council, using Industry trade journals, and Industry donations.

Curriculum

I100-Industrial Education Orientation (2 semesters, 1 credit, no prerequisite)

This course is a series of units in Production Technology, Transportation Technology, Communication Technology and Energy Utilization Technology. Each unit will cover the

resources, technical processes, industrial applications, technological impact and occupations encompassed by that system. It also covers personal management skills such as; integrity, motivation, dependability, willingness to learn. Academic skill such as; basic computer skills, applied science, applied mathematics, reading for information, business writing, listening and following directions, locating and using information, speaking and presenting information. Students will use the internet and email to contact experts outside the school to learn about new ideas, materials, equipment, processes, and major manufacturing trends. Students will use hands on activities to learn team building and self management skills.

- **Sub-units under production include product design, materials and processes, tools and equipment, safety procedures, corporate structure, management research and development, production planning, mass customization production, nesting, art-to-part manufacturing, JIT manufacturing, and marketing and servicing.**
- Sub-units under Transportation include material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation.
- Sub-units under Communication include design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.
- Sub-units under Energy Utilization include conversion of energy, electrical fundamentals, solar energy resources, alternate energy resources, fossil fuels, nuclear power, energy conservation, and computer uses in energy technology.

I230-Introduction to Drafting/CAD (2 semesters, 1 credit, prerequisite I100 or concurrent enrollment in I100 or consent of instructor)

This course is designed to provide students interested in a career in drafting with information and practical experience need for the development of job-related competences. The course content includes planning and organizing activities, researching information coordination work and performing other general office procedures preparing various sketches (freehand, isometric, oblique), performing basic layouts, and detailed drawings such as sectional and isometric views, using various reproduction techniques and using CAD software to produce both mechanical and architectural drawings.

I250-Introduction to Manufacturing (2 semesters, 1 credit, Prerequisites I100 & I230 or concurrent enrollment in I320 or consent of instructor)

this course offers a series of learning experiences which are designed to develop competences needed for employment in a variety of manufacturing occupations. Safety practices will be studied along with units on selection materials, performing bench work operation, performing precision measurement, CAD/CAM skills from previous classes are employed to create CNC programming, machining, and prototyping, performing housekeeping and record keeping activities, and operating a variety of tools used for separating, forming, and combining materials.

I332-Manufacturing IA (2 semesters, 1 credit, prerequisites I100, I230, & I250 or consent of instructor)

This course offers a series of learning experiences which are designed to further develop competences needed for employment in a variety of manufacturing occupations. Safety practices and principles will be studied along with in-depth units covering selection of materials, performing precision measurement, performing bench work operations, performing layouts and operating a variety of tools used for separating, forming and combining materials. CAD/CAM skills from previous classes are further employed to create CNC programming, machining, and prototyping. The course is designed to follow Manufacturing IA and will explore all the previous course units in depth.

I320-Drafting/CAD I (2 semesters, 1 credit, prerequisites I100 & I230 or consent of instructor)

This course continues the learning begun in Drafting/Computer-Aided Drafting I and emphasizes the areas of performing presentation techniques such as various graphs, producing architectural drawings, drawing light commercial building plans, interpreting codes, and constructing structural working drawings, producing mechanical and electrical/electronic working drawings, producing civil engineering drawings, using CAD software and producing CAD drawings.

I434-CAD/CAM (2 semesters, 1 credit, prerequisites I100, I230 & I250 or consent of instructor)

This course is a basic introduction to computer operations regarding principles of manufacturing design, and engineering. Major units of instruction include computer generated layout, simulation of manufacturing processes, diagnostic routines, nested

based manufacturing techniques, CAD/CAM software exercises, programming by hand, basic CNC machine operation and maintenance, and quality control functions.

I435-CAD/CAM II (2 semesters, 1 credit, prerequisites I100, I230, I250 & I434 or consent of instructor)

This course builds on concepts introduced on CAD/CAM I by further developing computer operations regarding principles of manufacturing design, and engineering. Major units of instruction include computer generated layout, simulation of manufacturing processes, diagnostic routines, nested based manufacturing techniques, CAD/CAM software exercises, programming by hand, basic CNC machine operation and maintenance, and quality control functions.

I336-Industrial Production I (2 semesters, 1 credit, prerequisites I100, I230, & I250 or consent of instructor)

This course is designed to reinforce and understanding of manufacturing and construction technology. Students learn safety, design, estimating, material selection, advanced manufacturing processes, finishing of products, business fundamentals, teamwork, adaptability, flexibility, marketing, planning, organizing, problem solving, decision making, and applied technology. In addition, students are exposed to many career opportunities in the field of industrial production and manufacturing. Students will gain knowledge in methods of joinery, finishing methods, and selection and installation of hardware. In addition to developing hands-on skills, students also participate in the

management process including exposure to the concepts of corporate structure, management, research and development, production planning, mass production, marketing and servicing. production projects are developed throughout the school year which are managed, manufactured, and installed by students.

I320-Drafting/CAD II (2 semesters, 1 credit, prerequisites I100, I230, & I320 or consent of instructor)

This course continues the learning begun in Drafting/Computer-Aided Drafting I & II. emphasis is placed on further development of detail drawings and representations. Professional quality drawings are produced. Architectural drawings, commercial building plans, mechanical and electrical/electronic working drawings, and civil engineering drawings are developed using industry recognized CAD software. Individualized projects are developed to allow each student to pursue their interests and develop portfolio work to assist with post high school work or school placement.

I334-Manufacturing IB (2 semesters, 1 credit, prerequisites I100, I230, I250, & I332 or consent of instructor)

This course offers a series of learning experiences which are designed to further develop competences needed for employment in a variety of manufacturing occupations. In addition to safety practices and principles, students continue to develop skill in working with materials, performing precision measurement, performing bench work operations, performing layouts, problem solving, determining order of operations, and operating a variety of tools used for separating, forming, combining, and coating materials. students

develop managerial skills working with manufacturing team members and further develop manufacturing skills to include machine set-up and operation, numerical control machining, and maintenance and repair of machinery. The course is designed to follow Manufacturing IB and may be taken as an independent study.

I415-Industrial Production II (2 semesters, 1 credit, prerequisites I100, I230, I250, & I336 or consent of instructor)

This course further reinforces an understanding of manufacturing and construction technology with additional managerial components. Students continue to practice and develop skills in the areas of safety, design, cost estimating, material selection, machine woodworking, and finishing of products. In addition, students take on additional responsibilities for contacting clients and managing fellow team members to insure quality workmanship. Each year, new production projects are developed, managed, manufactured, and installed by students. Additionally, students develop portfolios and examples of their work to assist in post high school work and school placement.

All students must meet prerequisites to advance in the Industrial Technology program. They must first take Industrial Education Orientation, which is described above, where they are introduced to the many areas of technology and get to experience the methods, and equipment used to teach Industrial Technology at Shiloh High School. The next class that opens to them is **Introduction to Drafting/CAD** which teaches them the basics of drafting and AutoCAD. This class will give them the skills to take ideas that only

exist in their minds and begin to realize them on paper. Shiloh High School has dual-credit agreements with Lakeland College (www.lakeland.cc.il.us) and Parkland College (www.parkland.cc.il.us). The dual-credit agreement is for Intro to AutoCAD. The Industrial Technology Program wants to better prepare the student who plans to go to a 2 year college or 4 year university. One of the ways we have achieved this is by implementing the dual-credit program with Lakeland College and Parkland College. What is dual-credit? Dual-credit is the effort by the high school and local colleges to teach a subject without overlapping curriculum, the college course building on the high school course, and offering college credit at the high school level for work that meets college requirements. This gives high school student college credit while still in high school. The student will not have to take the class in college which he/she received dual-credit for at the high school level. Introduction to AutoCAD also leads to all other Drafting/CAD classes as well as the Manufacturing Classes.

Industry Certification

The Industrial Technology student has the opportunity to take the knowledge and skills learned at Shiloh High School and apply to take an Industry recognized certification test. This test is generally taken during the junior or senior year of school. The test is composed of two parts; a multiple choice test that asks general questions about industry

and a skills evaluation check list. The student takes all the knowledge learned previous to the test and fills out a study guide. A date is set with the student to take the test and the test is ordered. The test costs \$50.00 to take, if the student passes the test with 70% or better the Industrial Technology/Industry supporters program pays for the test. If the student scores below 70% the student fails the test and pays for the test. Once the test is taken the teacher fills out the skills check list give the student a 1-5 on each item with 5 being the best and mails the test to the appropriate certification center. After center looks at test and verifies the student passing grade a certificate is mailed to the school and giving to the student.

Web Casts

The Industrial Technology program has joined with the University of Illinois's Department of Super Computing to use the World Wide Web bringing industry partners into the class room to speak with the students. The students are able to see first hand the latest process, material, and equipment, being used in industry today. This provides students the opportunity to see and ask questions of Presidents, CEOs and technicians they would not normally meet. Because we have Industry partners all over the United States, the web cam allows students to go places on virtual field trips that would be too far away to attend in the traditional fashion.

Pre-engineering lab activities

Lab activities are used to develop student design, communication, computer modeling, and prototyping skills, chip removal processes, finishing processes, and assembly

processes. Students will use trade journals, online articles, inspiration from design contests, original ideas, and existing designs to sketch original drawings. Once the sketches are completed and teacher approval is gained the student then emails or calls the appropriate industry support to check and verify designs, manufacturing processes, material selection, finishing applications, and assembly techniques that are beyond our existing knowledge base. The student then creates the envisioned design with AutoCAD to create shop drawings, ArtCam if needed to create any 3D models that might need to be machined on the CNC machine, and Mastercam to create any tool paths for parts cut on the CNC machine. If student needs advice on creating any 3D model, surface, or design that is beyond our present expertise he/she will email or call the software technicians to gain the necessary knowledge to complete the project. Once the project is completed pictures are taken and storyboards are created, then the student if they want, enter their projects in national design competitions. As the student enter the next Manufacturing class the level of difficulty and independent work increases as well.

School-Based-Enterprise

The Industrial Technology program has addressed one of the major problems facing programs today, funding. How to generate money needed to maintain a program that needs lots of equipment, tooling, and materials. Though the Industrial Technology program receives many donations of materials, equipment, computers, software, training, tooling, and funding, a large portion of money needed to maintain the Industrial Technology Program (other than what is budgeted by the school) comes from the

"School-Based-Enterprise" in our Industrial Production class.

We have found markets in the Kitchen Cabinet Industry, contract CNC work, and a joint venture with iWood Ecodesign which sells wooden sunglasses. The students involved in the "School-Based-Enterprise" have taken Industrial Education Orientation, Introduction to Drafting/CAD, and Introduction to Manufacturing to develop the skill set necessary to complete the actual work we get hired to do. This class reinforces previously learned personal management, academic, and industry technical skills with work place competencies. This not only brings in extra money to the program, it also gives the student an excellent experience in the real life pressures of designing, prototyping, manufacturing, team work, quality control, deadlines, delivering, and working with the public.

Industrial Internships

The experience the gained in the Industrial Technology program opens another opportunity for the student, internships with companies while still in high school and during post secondary educational experiences. We have companies both locally and nationally calling and emailing us about sending our students to work for them during the summer break. This opportunity is generally for students getting ready to start their senior year in high school and students in college. The training received at Shiloh High School makes our students sought after by companies like Frasca which makes 3D Flight Simulators, Enkeboll which makes high end carvings for the luxury wood manufacturing industry, Andersen Corporation and Simonton Windows which manufactures windows

for the residential industry, Shape Masters which makes parts for the sail boat industry, and Master Brand, Inc which manufactures cabinets for the residential sector. We usually have more companies calling than students to fill internships.

Industrial Technology Program's Summer Internship

The high school like many institutions repairs existing items and requisitions new items for use by the people they serve. The Summer Internship Program allows the student to sharpen the skills learned in the Industrial Technology program while saving the school district money on repairs that would normally be hired out and on items normally purchased else where. The most recent example of this is the teacher and student computer desks being built this summer during the Summer Internship. The school received a grant to turn 4 classrooms into "Smart Classrooms" with computer technology. This grant would require the purchase of many items such as teacher computer desks and student computer desks. Normally a high school would requisition these items from some company and what for their delivery, but with the Summer Internship in place the student can participate on a team that generates CAD drawings of desired products, CAM drawings used for tool pathing, CNC code to cut parts, surface preparation, assembly processes, finishing techniques, and installation methods. The Summer Internship program has allowed the school to maximize the use of its funds while providing another learning opportunity for the Industrial Technology Students.

Industry Trade Shows

The Industrial Technology program provides the student with the opportunity to attend Industry Trade Shows every summer. This opportunity is designed to give the students a number of skill building experiences. The student will learn how to speak with members of Industry, how to thank the Industrial Technology program supporters in a professional manner, and how to make presentations about the Industrial Technology program to members of Industry. The student will learn how to network with program supporters to find summer internship opportunities, how to generate material and financial support for the program with existing and new supporters, and make team presentations at Industry meetings. The student will also learn about the manufacturing industry first hand from Presidents, CEOs, and technicians on the show floor, by attending equipment demonstrations, and by experiencing the latest software Industry is using. During this whole process the student is employing personal management, team building skills, and using Industry specific terminology learned in class to do all of the above mentioned activities. The student can attend up to two shows during their high school stint and one show during their year of college. The student who is attending the first time is learning show protocol from the student who has already attended the previous year. The student who is attending their second show leads one of the show teams and helps the new students learn show protocol. The college student in their third show attendance helps chaperon the trip, meets with Industry supporters to talk about internship opportunities, and helps market the Industrial Technology program to new supporters.

Manufacturing Summer Camp

The Industrial Technology program students have the opportunity to attend a manufacturing camp every summer at North Carolina State University. The camp consists of classroom scientific exploratory activities that deal with materials and tooling. Students would engage in manufacturing activities in the manufacturing lab testing materials and tooling. Students would generate ideas for manufacturing, and problem solve to overcome obstacles with materials and manufacturing processes, and then manufacture it in the manufacturing lab. The camp would culminate by the students touring manufacturing facilities that are high tech, innovative, and eco-friendly. The camp lasts for one week. Students have the option of contacting Industry supporters to generate funding for airfare and meals.

Industrial Technology Program Advisory Council

The Shiloh High School Advisory Council was formed to help generate direction, support, and ownership among the school, community and industry leaders. The council is made up of school administrators, board members, community members, students, industry leaders, and college instructors and administrators. The advisory council helps the Industrial Technology program find guest speakers, demonstrators, new curriculum, and any other need facing the program and its students. Not all advisory council members are located near the school, so are consulted via phone, email, and correspondence.

Industrial Technology Industry Supporters

The Industrial Technology program is addressing the issues faced by Industry and education by linking education and Industry in another way, financially. The Industrial Technology program has a well developed Industry support network including manufacturing companies, manufacturing suppliers, associations, Industry trade journal editors, community college instructors and administrators, and university instructors and administrators. This partnership was created through email, trade journal articles, newspaper articles, T.V. news spots, radio, phone, mail, and attending Industry Trade shows. All student accomplishments are documented and sent out on a regular basis to all of our industry support partners. Any time an industry support partner donates anything to the Industrial Technology program an update is sent out to all of the industry support partners including the Industry trade journals, local newspaper and T.V. stations. Articles in Industry trade journals, local newspaper, and T.V. has written or carried over 60 stories and the program and student accomplishments Throughout the years the Industrial Technology program has had thousands of dollars of donations made to the program consisting of; materials, machining equipment, surface preparation equipment, assembling equipment, finishing equipment, digital measuring equipment, computers, software, software training, software upgrades, 3D models, equipment repairs, and money (see appendix C for complete listing of donations). Our Industry support partners had made possible what we do in the Industrial Technology program.

Expanding the Capacity of Educational Institutions

We believe we are doing everything we can to address the needs of education and Industry except expand the capacity of our educational institution. With the Advanced Manufacturing Grant moneys we would be able to expand the current manufacturing facility, increase the manufacturing facilities high tech equipment line, and increase student enrollment coming from other high schools. We would be able to draw more student teachers into the area of manufacturing using the state-of-the-art facility and collaboration with local universities, increase Industry training opportunities, and make the facility available for community college teacher-in-service activities. And use the manufacturing facility to update the skills of current Industrial Technology teachers.

Expansion of the current facility and high tech line of equipment would allow for more students from other schools with no Industrial Technology program to safely attend classes at Shiloh High school. Other high schools have already enquired about attending the program, but space has been a limiting factor. Expansion would increase the number of students being exposed advanced manufacturing skills and the manufacturing world in general. The present student exposure is already having positive impact on the manufacturing world with our students going straight to work, to the community college, or the university in areas of engineering and manufacturing. Collaboration with community colleges and universities would increase due to the increase in student enrollment, quality of high tech education, and eventual increase in enrollment at the community college and university. The Industrial Technology teacher is on Industrial Technology committees such as the Illinois Industrial Technology Education Advisory

committee, the AWFS College of Knowledge committee, has supervised student teachers from Illinois and Indiana. An increase in the quality of educational facility would facilitate greater participation of these organizations. An increase in enrollment in the Industrial Technology program would also lead to an increase in students going into the teaching field in the area of manufacturing. This would help the three major universities in our area grow their Industrial Technology departments. The expansion would also allow for an increase in Industry training and teacher-in-service opportunities to keep industry and teachers abreast the latest theories, processes, materials, tooling, equipment, and environmental issues.

Outcomes and Impact

Shiloh High School's Industrial Technology program can be expanded to its full potential in three years. The first year will the manufacturing facility will be added onto, the facility will rearranged and new equipment installed, and enrollment agreements will be drawn up between the Shiloh High School and the other participating high schools.

Documentation tracking of student enrollment and progress after high school, community college, university graduation, or work placement will take place by the Industrial Technology Teacher. Industry supporters will state what the nature of their involvement will be. The second year agreements between the high schools will be refined if necessary and adjustments made to curriculum and lab activities to better serve the high school student. The Industrial Technology program will also facilitate an increase in use of the program by student teachers, high school and community college teacher in-service

programs. Industry supporters will also be given the opportunity to increase or change how they are participating as supporters of the program. Additional staff will be hired at this point to handle increased student enrollment. The third will be much like the second; possible increase in student enrollment, additional staff hired, greater Industry participation, revising of curriculum and lab activities, greater use of facility by high school and community college teacher in-service, increase in student teacher supervision, and continued tracking of student enrollment and progress after high school, community college, university graduation, or work placement.