ABSTRACT
Simple automation with jig & fixture in manufacturing factory

Generally actual machining time is less than 50% in the machining process, the other time is used in loading and unloading of workpiece, controlling of machine and inspection of part etc. In case of milling machine, the loading time and clamping time are about 60% in total process. Therefore the automation with jig & fixture (JF) is very important.

The concept, requirements and rules of simple automation for low cost and high efficiency in a machining process and assembling process of manufacturing factory will be explained. And the requirements and clamping methods of JF will be introduced.

Finally various simple automation examples using JF will be discussed. It would be mentioned that the operator himself is the best designer for simple automation with JF, because he has a lot of experiences.

ABSTRACT
Advanced Manufacturing Technology for Auto Weight Reduction – Application of Al Alloy & Friction Stir Welding

Weight reduction of vehicles has been highly required for environmental protection and energy saving. Production of light body consists of uni-material such as high strength steel, aluminum or magnesium alloy is one of the answers contenting this requirement. However, several problems such as high cost, insufficient formability and poor corrosion resistance of magnesium parts still remain unsolved. Another reasonable method for weight reduction is the so-called “multi-materials concept of structural body.” This is the intent to accomplish weight reduction of the vehicles by selecting the most adequate materials for each need with the minimum cost increase. The development of a new welding and joining technology is essential for the advanced materials like aluminum alloys. In this lecture, Friction stir welding (FSW) process will be introduced as one of the promising welding methods for automotive aluminum alloys. The principal, performance, microstructure and application will be presented.
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ABSTRACT
Case Studies of Industrial Application Using DED type AM Process

Laser aided Direct Metal Tooling (DMT) process is a kind of Additive Manufacturing processes (or 3D-Printing processes), which is developed for using various commercial steel powders such as P20, P21, SUS420, H13, D2 and other non-ferrous metal powders, aluminum alloys, titanium alloys, copper alloys and so on. The DMT process is a versatile process which can be applied to various fields like the mold industry, the medical industry, and the defense industry. Among of them, the application of DMT process to the die and mold industry is one of the most attractive and practical applications since the cooling channel cores of an injection mold and a hot stamping die can be fabricated at the slightly expensive cost by using the hybrid fabrication method of DMT technology compared to the part fabricated with the machining technology. The main objectives of this study are to provide various characteristics of the parts made by DMT process and prove the performance of the AM parts such as injection molds, a hot stamping die and trimming dies which are fabricated by the hybrid method of DMT process.

Key Words: Directed focused deposition (DED), Directed metal tooling (DMT), Additive manufacturing (AM), Dies, Molds, Metal 3D printing

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ABSTRACT
Improvement of Productivity and Efficiency in a Manufacturing Process

Small and medium enterprises (SMEs) have concerned to increase productivity and efficiency for their competitiveness in manufacturing process. Recently, however, the international community requires for a response to heightened awareness and regulations on the environment. The needs of eco-friendly SMEs on global environment issues have emerged to reduce the environment waste and greenhouse gases. In this situation, Austria’s ECOPROFIT program was introduced to Korean government for regional sustainable industrial development through a partnership between central and local government, and corporate business. ECOPROFIT is program supporting SMEs through the integrated environmental technologies to increase the productivity and reduce the environmental problem for government, companies and citizens. This presentation introduces the objects, strategies, and successful cases of ECOPROFIT program in Korea to improve the productivity and efficiency of a manufacturing process.
Chan Park, Ph.D.

Daniel F. and Josephine Breeden Professor
Department of Industrial and Systems Engineering

Chan S. Park is currently a Daniel and Josephine Breeden Distinguished Professor of Engineering at Auburn University. He received his Industrial Engineering degrees from Purdue University (MS) and Georgia Institute of Technology (PhD).

Over his 30-year academic career, he has been actively involved in a variety of research, teaching, and professional consulting on the topic of engineering economic systems. He authored or co-authored over 90 publications in books and refereed journals including several leading textbooks such as *Fundamentals of Engineering Economics, 3rd ed.* (Prentice Hall, 2013), *Contemporary Engineering Economics, 6th ed.* (Prentice Hall, 2016), and *Advanced Engineering Economics* (John Wiley, 1990). As a leading authority on engineering economic systems, his work has been recognized internationally in the fields of engineering economics, energy economics, risk analysis, manufacturing and production economics, and financial engineering (real options valuation).

Abstract:

*Price Advantage*

The price advantage is not that a company has a product with a low price relative to competition. We think of price advantage as a superior capability to use price as a source of real competitive advantage that at the end of the day makes your company more successful. We’ll often hear companies talk about their other advantages. They’ll talk about a purchasing advantage or a cost advantage or an innovation advantage or a distribution advantage or a service advantage. What about having a price advantage – which they price better than their competitors do. The purpose of this short presentation is to introduce the concept of the price advantage introduced by the consultants at McKinsey & Company and explore the possibility of applying the concept to the auto industry.
Trenholm State Community College

A. Developing a Pipeline of Industrial Maintenance Technicians for Automotive Supplier Industry

Henry F. Tylicki, Sr.
Adjunct Instructor, Trenholm State

Mr. Henry F. Tylicki, Sr., retired after teaching full-time at Trenholm State for 25 years and several years prior to that in vocational-technical education at the secondary school level. He has a Bachelors’ degree in Industrial Engineering and a Masters’ degree in Adult Education. He has extensive experience in development and instructional phases of training programs for multi-craft mechanics in Industrial Maintenance. Particularly since his retirement, he has helped build pipelines for workforce development in Butler, Macon and Monroe Counties of Alabama.

B. Quality Control in Auto Manufacturing and Machine Tool Technology

Michael Barnette
Automotive Manufacturing Instructor, Trenholm State

Mr. Michael Barnette is full-time instructor / coordinator of Automotive Manufacturing Technology program at Trenholm State for past 7 years. He started working with Albany International in 1990, was promoted to Quality Systems Manager in 1999 with responsibilities for development of Lean Manufacturing, Process Improvements and customer satisfaction. He led Corrective Actions, Process improvements and safety committee’s for the North American Corridor which involved three facilities in the United States. His credentials include Bachelor of Science degree from Auburn University, Six Sigma Green Belt, and Certified OSHA instructor.

Mr. Danny Carden has more than thirty years’ experience in the metalworking/manufacturing environment. He graduated in Machine Tool Technology from John Patterson State Technical College (now a branch campus of Trenholm State) in 1989; and started working at National Industries Inc. as machinist, then as designer, and finally as die maintenance supervisor until 1996. Thereafter, he worked at Nypro Alabama as injection mold designer/draftsman and then went to work for STERIS Corporation as a tool designer. Since 2006, he has been teaching full-time at Trenholm State as the Machine Tool Technology instructor/program coordinator.

C. Workforce Development for the Automotive Supplier Industry from a College’s Perspective

Lee Ammons
Academic Dean, Trenholm State

Mr. Lee Ammons started his career in the Alabama Community College System as a student over twenty years ago. Over the past 15 years, he has held positions at three Alabama Community Colleges as an adjunct instructor, financial aid counselor, speech communication instructor, chair of language arts department, and associate dean of academic services. Mr. Ammons specializes in Program Evaluation, Faculty Development, and Organizational Communication. Ammons is a graduate of Enterprise State Junior College (A.S.), The University of Alabama (B.A. and M.A.), and is currently pursuing a PhD from Auburn University in Higher Education Administration.

Mr. Wilford Holt, currently the Dean of Workforce Development, was a lead instructor in Machine Tool Technology at Trenholm State.
and has 21 years teaching experience. He holds a Master’s degree and has extensive experience in working with automotive industry. He is certified by National Institute for Metal Working Skills in all areas of machine tool technology; holds NOCTI credentials; and, is a member of SME. In addition to overseeing the overall workforce development activities of the college, he has directed a number of training projects for developing automotive supplier industry workforce.

Dr. Suresh Kaushik holds a Master’s degree in Physics from Panjab University and a postgraduate diploma in Solid State Physics from Indian Institute of Technology, Delhi. He received a Master’s degree in Applied Science and a Master’s degree in Adult Education from Montana State University, and a Doctor of Education degree in Higher Education from Utah State University. During his 44-year career in higher education, he has written successful grant proposals totaling over $100 million and has directed a number of workforce development projects.