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Lean Manufacturing Conference at MSU

Fall, 2001

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Furniture Highlights

From THE FURNITURE RESEARCH UNIT MISSISSIPPI STATE UNIVERSITY

LEAN MANUFACTURING: MERCEDES-DELPHI TOUR

*Duane Motsenbocker
Management Specialist
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Waste reduction, increased throughput, sequenced delivery, and workplace improvement are just some of the phrases used to describe "Lean Manufacturing". To see this concept in action, Mississippi State University (MSU) Extension Service and Forest and Wildlife Research Center sponsored a tour to Delphi Industries and Mercedes-Benz located east of Tuscaloosa, AL on March 20. Industry owners, managers, and engineers saw cockpits (dash and consoles) manufactured at Delphi and trucked 10 minutes down the road to Mercedes-Benz for installation into SUV M-class vehicles. Cockpits assembled during the morning tour of Delphi arrived at Mercedes "just-in-time" and "in-sequence" for installation into the SUV as it arrived at the appropriate assembly location.

Delphi assembles a cockpit every 2.5 minutes and Mercedes assembles a SUV every 2.5 minutes. The

Mercedes computer system notifies Delphi of the cockpit configuration requirements one to two hours prior to the time the cockpit will be installed in a vehicle. Delphi has a maximum two hours and a minimum one hour to assemble the cockpit from 15,000 combinations of components and deliver it to the line as the vehicle arrives at the installation point. Any error in assembly by Delphi has the potential to stop production at Mercedes.

The tour provided an educational experience which not only included information about Lean Manufacturing, but also provided an opportunity for Mississippi industries to network together and exchange ideas about manufacturing improvement. The tour was part of an ongoing program jointly sponsored by MSU Extension and Forest Products to bring the latest manufacturing techniques to Mississippi industry. Forty-seven executives representing seventeen manufacturers participated in the tour.



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WHAT IS LEAN MANUFACTURING?

Amy Garrard

Senior Research Assistant

Forest Products Laboratory

Lean Manufacturing is an operations approach derived from the manufacturing systems and processes of the Toyota Production System. The system focuses on eliminating wastes through continuous process improvements and reducing the costs of non-value added operations in manufacturing such as storage, transportation, and inspection processes.

Lean focuses on creating a flexible work environment built on work cells, worker empowerment, cross training of employees, and high standards of quality from parts suppliers.

Lean Manufacturing requires a transformation of company culture in which the emphasis is changed from large runs of the same product configuration to a more flexible production system which speeds delivery of the product to the customer and increases product quality. Lean Manufacturing uses a "pull" production system which means producing to customer order.

Larry Zimmer, Senior Program Manager at Manufacturing Engineering, in Columbus, Ohio discussed several elements of Lean Manufacturing in an article published in *Forming & Fabricating*, February, 2000 titled "Creating Flexibility and Profitability". Mr. Zimmer described key areas of Lean Manufacturing that focus on how to eliminate wastes in manufacturing.

1) Manufacturing Process Improvements eliminating inspection and rework by assuring quality of the product as it is produced. Lean Manufacturing may empower employees to stop production until a quality problem is corrected. Rigorous quality demands from suppliers is also an important element of product improvement leading to reduction of inspection times. Improving transportation might include changing plant layout away from a functional department layout to a product flow sequence layout. Storage of finished product is reduced also through the use of a pull

system.

2) Manufacturing Operation

Improvements include reducing set-up times which make small runs more feasible. This may reduce time from order to product shipment.

Equipment down time can be reduced through "Total Productive Maintenance" programs which emphasize improving equipment effectiveness, training machine operators for minor maintenance, and considering operator input to problem solving. Scrap is greatly reduced by improving supplier and product quality and reducing product defects.

3) Improving Labor Utilization may

mean cross-training employees on several machines, using multi-machine assignments, standardizing each job task, and/or using pre-automation devices that detect product abnormalities and shut down the machine until problems are corrected.

4) Producing to Customer Order reduces

finished goods inventories and warehousing costs as well as increases customer satisfaction by getting the product to the customer faster.

In today's increasingly competitive global economy, numerous manufacturers are turning to the Lean Manufacturing approach to help reduce manufacturing costs and increase profit margins. The key to Lean Manufacturing is reducing or eliminating waste. To reduce manufacturing costs, process improvements, operations management and improved labor utilization are employed. When manufacturing processes produce to order, inventory carrying costs are reduced, quality of component parts increased, scrap costs are reduced, and customer satisfaction improves. Finally, it is imperative that all employees are given power to create change within the company for this management strategy to be successful. The end result of successful implementation of Lean Manufacturing is increased product quality at competitive prices creating increased customer satisfaction and higher profit margins for manufacturers.

TOUR OF TOYOTA'S LEAN MANUFACTURING TECHNIQUES

Steve Bullard
Sharp Professor of Forest Economics
Department of Forestry

On February 26, a group of seven MSU scientists and administrators traveled to Lexington, Kentucky to tour manufacturing facilities using the Toyota Production System or TPS. The tour included Dr. Malcolm Portera, MSU President; Dr. Don Trotter, Associate V.P. of Strategic Initiatives; Dr. Wayne Bennett, Dean of Engineering; Dr. Lesia Crumpton-Young, Associate Dean of Engineering; Dr. Larry Brown, Head of the Department of Industrial Engineering; Dr. John Usher, Professor of Industrial Engineering; and Dr. Steve Bullard, Professor of Forestry and member of the Furniture Research Unit of the Forest Products Lab. Drs. Portera, Trotter, Crumpton-Young, and Usher toured the Toyota production facilities at Georgetown, while Dr. Bennett, Dr. Brown, and Dr. Bullard toured the McKechnie Corporation facilities (a Toyota supplier) in Nicholasville, KY. In the afternoon the entire group toured the manufacturing facilities of Summit Polymers in Mt. Sterling, KY (Also a Toyota supplier).

MSU administrators and scientists were provided a "first hand" look at the "Lean Manufacturing" techniques used by Toyota and by two of the corporation's suppliers. The tour will help facilitate on-going work at MSU in engineering, business, extension, and in the Forest Products Lab that is helping to

assess and, where appropriate, to implement TPS and similar systems in furniture manufacturing facilities in Mississippi. The primary goal of these techniques is to satisfy furniture customers' demands that today involve competitive prices, extremely high quality, and increasing variety. TPS and other lean manufacturing systems can help provide the flexibility and responsiveness needed to satisfy customer demands, while lowering production costs and reducing response times.



LATEST NUMBERS...

(FOR MARCH, 2001 from FEBRUARY, 2001 unless otherwise noted)

NATIONAL

*From U.S. Depart. of Labor,
 Bureau of Labor Statistics
 December 15, 2000*

CPI: **+0.1%**
 UNEMPLOYMENT RATE: **4.3%**
 PAYROLL EMPLOYMENT: **-86,000**
 AVERAGE HOURLY EARNINGS: **+\$0.06**
 PPI: **-0.1%**
 ECI: **+0.8% in 4th Qtr of 2000**
 PRODUCTIVITY: **+2.2% in 4rth Qtr of 2000**
 U.S. IMPORT PRICE INDEX: **-1.6%**
 SINGLE FAMILY HOUSING STARTS: **-4%**

MISSISSIPPI

*From Miss. Employment Security
 Commission, Mississippi Labor Market*

MS AVG WEEKLY EARNINGS -
 FURN & FIXTURES: **\$457.59**
 MS WAGE AND SALARY EMPLOYMENT
 FURN & FIXTURES: **28,600**

STUDENT NEWS AND ACTIVITIES

Trip to the Furniture Market at High Point, NC

Thirty-three students from the Department of Forest Products and the College of Business and Industry along with 7 faculty and staff members attended the High Point Furniture Market April 20-22, 2001. The students visited two large furniture retailers on Friday, April 20; attended the market on Saturday as well as a reception at the Furniture Discovery Center hosted by the AFMA; and visited several more showrooms at the market again on Sunday. The group returned to Mississippi State Sunday night.

This trip provided a great learning experience for forest products and marketing students to see first-hand how furniture is marketed and provided an opportunity for them to meet and get to know furniture industry executives from all over the U.S. Students were required to conduct background research before the visit to the market and to prepare reports for class after they returned home.

The next issue of the Furniture Highlights will include more details and photos of this trip.

A LOOK AT OUR STUDENTS

Each issue of Furniture Highlights profiles a graduate or undergraduate student in the Department of Forest Products. This feature tells you about a student's background, research goals, and future plans.

JONATHAN AGUIRRE, GRADUATE RESEARCH ASSISTANT

Jonathan is the son of Laura Hankins and Bart Aguirre. He is a graduate student in the Dept. of Forest Products, Mississippi State University under the direction of Dr. Phil Steele. Jonathan's research focuses on a roughmill computer simulation program that predicts lumber yields. In the summer of 2000,

he was employed as an intern with Bassett Furniture Corporation. Jonathan worked in all departments to become familiar with the upholstery processes of the furniture industry. After graduation in December, 2001, he hopes to secure a position with a furniture company in the North Carolina area.

You may contact Jonathan at 662.325.8287,
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Check out our web site!

Department of Forest Products
<http://www.cfr.msstate.edu/forestp/fphome.htm>

Forest and Wildlife Research Center
<http://www.cfr.msstate.edu/fwrc/fwrc/html>

Publications:
<http://www.cfr.msstate.edu/databases/abstract/search.asp>

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