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MUSIC UP AND UNDER

NARRATION (VO) :

Manufacturing Insights, Manufacturing engineering magazine's video series for
Process improvement.

In this program, we will examine lean manufacturing at Miller SQA,* a
manufacturer of office furniture in Holland, Michigan.* We will see how
Miller SQA has applied Lean principles in a mass customization operation.

We will see how three key factors have enabled Miller SQA to reach
unprecedented order-to-delivery speed while maintaining high quality.

a strong commitment to customer service,

lean manufacturing,

and the use of advanced information technology in all phases of production.

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To better understand lean manufacturing at Miller sqa,* it will help to know
about recent changes at the company. Miller SQA emerged from TradeX and
Phoenix, two earlier subsidiaries of the parent company Herman Miller. Trade-
x and Phoenix served small businesses who needed functional and modestly
priced furniture, quickly.

Miller SQA is a new subsidiary - an independent,* just-in-time producer of
new office furniture that targeted the same market as its predecessors, but
served that market more effectively. This new company is now expanding at a
rate of 30% a year.

In 1995 Miller SQA moved into a new manufacturing facility, called The
"Greenhouse." * Indoor environmental quality * has been emphasized * to
reinforce a positive work attitude of its 700 employees.

usually the sale and design of an office system takes 1 to 2 months. * since
Most manufacturers of office furniture offer many options, the number of
choices further complicates and lengthens the process. *

Assembling an order can also be slow and error-prone, requiring and
additional 6 to 8 weeks for completion.

Miller SQA operates on a dramatically different timetable. Sales and design

take only 1-2 days. * Production is finished in 5-6 days, and * installation is completed in 1-2 weeks. At miller, SQA stands for Simple, quick and affordable.

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NARRATION (VO) :

Miller SQA has successfully met the challenge of satisfying customers by using a mass customization approach to production. * "Mass customization" means making customized products in "mass production" quantities.

At Miller SQA, mass customization is supported by * the principles of lean manufacturing.

The trade-off with mass customization is in variety. Even so, Miller SQA offers 408,000 * combinations of furniture based on components, sizes, and colors.

Richards (01:04:32 - 01:04:50):

"I think most of the industry operates in the 6-8 week lead time because that's all that's ever been offered. The approach that we are taking here at Miller SQA * is to offer the customer more of what they really want, which is speed, convenience, and reliability."

Richards (01:05:23 - 01:05:40):

"The traditional method of producing product with a long lead time, it really is costly because you have material in the pipeline that you have paid for but it hasn't been used to produce a product, so you aren't getting paid back from the customer for that..."

Richards (01:05:50 - 01:06:03):

". . .if you build to market forecast, you're probably going to guess wrong, so it's better to build to customer order, build to what they want and when they want it, and you don't have a lot of waste. The waste is minimized."

NARRATION (VO) :

Miller SQA has a clearly defined business model based on the total value chain from initial contact with the customer * to delivery and installation of the furniture.

Ensing (02:19:25 - 02:19:56):

"So what we really focused on is the service piece of the organization. There's tons of furniture companies out there, but what we wanted to have was something that was unique from a service perspective, in other words, reliability, 100% on-time shipment days, speed, and flexibility. So, as we

moved from Phoenix into SQA, that really became the goal, the vision, the strategy for the organization. Then all the other things that fell underneath that, like lean principles and so on, were really the process and path to get us there."

NARRATION (VO) :

The manufacturing business at the greenhouse is strictly assembly: GLUING,* screwing, * stapling, * covering with fabric, * and bolting.

The products are modular and include wall panels, ergonomic seating, desks, and credenzas. since products are built to order and not to stock, inventory turns per year are 200, compared to the industry average of 8.

Ensign (02:24:55 - 02:25:03)

"We make money by building components and putting widgets together, if you will, office furniture. That's where the money is, not in inventory sitting on the floor."

NARRATION (VO) : deleted

By using advanced information technology Miller SQA can build to customer order and deliver direct.

Specialized software called "Z-Axis" allows each salesperson to prepare an order on a computer collaboratively with a customer.

As the customer chooses options, the salesperson configures a 3-D visualization of the office.

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When the order is complete, the transaction and a materials list are transmitted over the internet using SupplyNet, an on-line system.

Customer order information is available immediately to miller sqa's suppliers, showing actual dates required to meet customer demand. suppliers can manufacture the materials needed by miller sqa according to orders, not FORECAST.

a potential source of delay is material supply, so management of the supply chain system is critical. recently, Miller SQA has consolidated its supply chain by contracting only 30 suppliers to provide 80% of its components.

Suppliers are selected only after extensive review of their capabilities.

Miedema (03:03:19 - 03:03.56)

"To become an original supplier of Herman Miller or Miller SQA, we basically do a review . . .

First of all, they have to have a core process in order to provide the product necessary . . .

Do they have quality plans in place? . . .

Do they have engineers that can support what we need to have done? . . .

Miedema (03:04:17 - 03:04.25)

What has become really important is do they have the information systems, the IT, to be able to work with our company?"

NARRATION (VO) :

At SQA incoming materials are expected to be only the highest quality. Therefore, no inspection is necessary.

Miedema (03:09:58 - 03:10:10)

"We don't actually have official, formal certification process. What we have is expectations or goals out there for a supplier..."

Miedema (03:10:21 - 03:10:25)

Right now what we tell our supply base is we expect you to be 99.5% or better."

NARRATION (VO) :

Suppliers ship to the Production Metering Center or (PMC). * This is a separate warehouse operated by a third party, Menlo Logistics. By using this Production Metering Center and lean manufacturing practices, * Miller SQA has freed floor space and practically tripled its assembly capacity.

since the Suppliers own the inventory until it is delivered to the assembly plant, there is incentive to keep inventory low. However, suppliers are penalized if they stock out of needed parts. *

because of the wide variety of parts, Inventory records are maintained at the component level rather than at the final product level.

Suppliers can see electronically what is warehoused, and they can distinguish the real demand from safety stock in real time. levels are updated three times a day so the supplier needs to check often for new customer demand.

this supplier relationship helps keep miller sqa lean. Suppliers focus on managing their inventory at the PMC, and Miller SQA focuses on the assembly of office furniture.

Using software called The "SYNCHRONIZER", an order is automatically scheduled for production when it is entered into the system. Capacity, lead times for parts, and other variables are taken into account, and an available time slot for assembly is reserved.

the SYNCHRONIZER software sends a separate pick list for each order to the Production Metering Center.* A pick list sent at 8:00 A.M. will be delivered at 10:00 A.M.* and be consumed by the work center by noon.

Meidema (03:08:54 - 03:09:05):

"So if you walk out on our floor at a given time, the product that you will see is raw material that will probably be built on our floor within the next couple of hours."

NARRATION (VO):

Components and parts are brought right to the work center. The goal is to have all necessary materials within the assembler's reach.

The assembly plant is paperless, and information regarding materials and inventory * is available at the computers in each work station.

Parts are supplied to the assembly plant from the PMC in two hour intervals.* Each Pick has a bar-code label. The scanned bar-code also provides important information for the suppliers,* telling them when the inventory at the PMC has been depleted and needs to be replenished.

The shop-floor workers operate in a team ENVIRONMENT, and The employees are involved in the improvement process.

to symbolize the company-wide objectives of precision teamwork and speed, An 8 person rowing shell hangs in the cafeteria.

To better understand the production process, managers spend time learning and doing assembly work. by performing each task in the workcells* managers realize first hand what it takes to make quality products.

Teams of 12 employees are introduced to the principles of lean manufacturing during week-long "lean events." * The team members are selected from each shift in the targeted department, and supervisors are included.* Other team members are chosen from other departments such as scheduling, maintenance, accounting, or engineering.

Kuhn (02:02:55 - 02:03:01) "What we try to do with a lean event is make a big jump in a one-week time frame, where we vastly improve the work center."

Richards (01:12:19 - 01:12:32)Tight audio edit out

"We use a lot of simulations. We take people out of the environment on the floor, bring them into a classroom, use Lego's to teach concepts like one-piece flow and standardized work..."

NARRATION (VO):

One exercise is called "Make One, Move One."

Kuhn (02:04:13 - 02:04:35)

"What we try to do with that is show why you want to do a one-piece flow, the benefits of a one-piece flow. You also can see through the exercise that once you do a one-piece flow, you reduce your inventories, which saves you a whole bunch of money because you don't have so much capital tied up in inventory, and it helps you reduce your total lead times from raw material to finished

product."

NARRATION (VO) :

The assembly plant is organized by work center, Each dedicated to a product or product family. * This eliminates queuing of Work In Process and promotes the smooth flow of materials.

Dean (01:23:10 - 01:23:23)

"We have a lot of different components that go into office furniture. We have the tables, the chairs, panel systems and flippers and tack boards. Each of those components is broken into a work center."

NARRATION (VO) :

A team of production workers operates each work center. A visual display board in each work center shows planned and actual production for the day.

Kuhn (02:13:20 - 02:13:37):

"We have what we call hour-by-hour charts. As far as our takt time goes, we know what we're supposed to be producing in a given hour. We post that out on the floor. * Every operator knows where they're supposed to be in a given hour, and if they're behind schedule, they can pick it up during the next hour hopefully and get caught up."

NARRATION (VO) :

Performance metrics include on-time shipments, average lead-time, and quality. Quality is measured as defective parts per million (or ppm).

Dean 01:21:33 - 01:21:43 (Low audio - boost)

"We're always striving for 100% on-time shipments. I think this past year we had 129 days where we had 100% on-time shipments, and that's measured 3 times a day. So it's very customer-driven."

NARRATION (VO) :

Another important measurement is reduction of lead time (or cycle time).

The practice of ASSEMBLING one order at a time reduces cycle time from order start to order finish.* The assembly process takes approximately 12 hours, and orders are shipped within 24 hours of completion.

Kuhn (02:09:49 - 02:10:02)

"We try not to focus on other measurements such as parts per person ...we try to focus on what it is to satisfy the customer, which would reduce our lead times, get them the product as quickly as possible."

NARRATION (VO) :

Quality is also a critical measure at Miller SQA, with a goal of less than 1000 defects per million.

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NARRATION (VO) :

in a lean manufacturing environment, nothing is "good enough" if it can be improved, and improvement is on-going at Miller SQA.

Dean (01:25:17 - 01:25::28):

"We continually keep going back around and just keep hitting each department and making improvements. I guess that's why we call it continuous improvement."

Dean (01:27:21 - 01:27:29):

"I've seen more quality improvement come out of lean manufacturing than I ever did as a quality engineer with some of the quality tools that we used to use"

NARRATION (VO) :

future goals are: 48 hours elapsed time, from order entry, to ready-to-ship. This will allow delivery to the customer 5 days after the order has been entered into the system.

Today the cycle time from initial assembly to ready-to-ship is 10 hours; the goal is 2 hours.

99.9% on-time and complete deliveries are the threshold of excellence at Miller SQA, with 100% as the goal.

their business STRATEGY is clear...

#1: Miller SQA has established a business goal - to satisfy the customer.

#2: Its manufacturing strategy is aligned with their business goal and is based on the principles of lean manufacturing including continuous improvement, pull production control, one-piece flow, cellular manufacturing, just-in-time supplier management, visual management, *takt* time and line balancing.

#3: Advanced information technology is used to communicate and to minimize delays in supplying, coordinating, and scheduling.

every day Miller SQA pursues higher levels of customer satisfaction. Its success using lean manufacturing and mass customization reveals important lessons that extend to any industry.

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