

**MANUFACTURING INSIGHTS**

An Introduction to Lean Manufacturing

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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 TAC Manufacturing".  
TAC MANUFACTURING is an automotive supplier, who uses Lean manufacturing  
principles to create a truly world-class manufacturing environment.

What distinguishes TAC from other successful automotive suppliers? Part of  
the answer lies in its **just-in-time** strategy based on the Toyota production  
system. \* additional reasons are **confidence in suppliers**, and tac's use of a  
**pull production control** system. other success factors are its **quality policy**,  
its reliance on **visual management**, and a **team-based workplace culture**. \*  
However, What is most important is how TAC has integrated these lean  
manufacturing principles throughout its entire operation, resulting in a  
fully coordinated production system.

In today's MANUFACTURING environment, Automotive suppliers are under pressure  
to deliver parts to assembly plants just in time. for economic reasons most  
Assembly plants keep inventory levels low. They prefer to receive parts from  
suppliers daily or, in some cases, several times A day.

But The material requirements of most automotive assembly plants rise and  
fall on a weekly or even a daily basis. How can automotive suppliers cope  
with this variation? Traditionally, suppliers have used inventory to buffer  
against this. but TAC, on the other hand, chose a different approach. Let's  
see how they do it.

TAC is a subsidiary of the Japanese company, Tokai Rika. Located in Jackson,  
Michigan, The factory opened in 1991 with a staff of 100 people.

Initially TAC had only two product lines: steering wheels and airbags for the  
Toyota Corolla. Product lines now include horn pads, cruise controls, and  
shift levers for Toyota and Nissan.

(George 13:01:59 - 13:02:35)

"In the beginning there were about seven of us from the production side that  
went to Japan, spent about a month over there going over the Toyota  
Production System, actually learning what we were going to be building here  
at TAC. . . (AUDIO EDIT)

We came back and tried to instill that into all the associates we hired, as far as the kanban system, the just-in-time system, build only what the customer wants when the customer wants it rather than having a whole warehouse of inventory you pull from. . ."

**NARRATION (VO) :**

At TAC, individual managers are responsible for entire value streams accounting for everything from raw materials to finished goods. this also includes, production scheduling, and customer service.

This type of RESPONSIBILITY encourages a cooperative relationship based on supplier confidence.

**NARRATION (VO) :**

Lean manufacturing requires that suppliers communicate frequently. It also requires that they be capable of meeting expectations, specifically, the on-time delivery of high quality components.

(Sara 8:07:15 - 8:07:35)

"one of the things that we do is try to communicate and have a very good working relationship with our suppliers, so we give them our expectations up front. . ."

(Sara 8:07:53 - 8:08:05)

". . .we work with them to explain exactly what we want, when we want it, and when they're going to miss that delivery we also expect that they're going to communicate with us. . ."

**NARRATION (VO) :**

pull production control is One of the key principles of lean manufacturing. In a pull system, material is produced or delivered **only to replenish** what has been consumed by a downstream process or customer. TAC makes effective use of pull systems to control production and the amount of work-in-process inventory (or WIP).

(George 13:07:14 - 13:07:28)

"We're down to two-hour picks on the line, where we're taking finished goods away every two hours, bringing fresh parts to the line to replenish those products on a two-hour basis. . ."

**NARRATION (VO) :**

In addition to being easier to manage, pull systems are self-adjusting and self-correcting. They also reduce the impact of a quality problem.

(George 13:09:10 - 13:09:48)

"if there is a problem, you don't have a week's worth of inventory to go through in the warehouse to ensure that no bad product is going to get out to the customer. . .

So there are some real benefits for just not having a lot of inventory sitting around."

**NARRATION (VO) :**

the STREAMLINED production flow reduces cycle time, and as a result, inventory is reduced as well.

TAC does use inventory strategically by keeping some safety stock in case of equipment failure.

(Sara 8:03:37 - 8:04:10)

"TAC manufacturing has a philosophy that we will build some safety stock to keep it for malfunctions of equipment. However, on a daily basis our inventory is probably about 1 to 1 1/2 days' of inventory. . .

Do we have 2 or 3 days' stockpiled? No, we don't."

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**NARRATION (VO) :**

Lean manufacturing recognizes single-piece flow production along with pull systems are the most efficient way to process material through a factory.

At TAC, Work Cells are organized by product family. within each work cell production takes place one piece at a time rather than in batches.

Practicing "Quality at the source", workers check their work before it goes down the line. The advantages are: fewer defects, easier problem solving, less disruption to downstream operations, and lower production costs.

(Chuck 11:10:35 - 11:10:52)

"we promote one-by-one assembly. It's a continuous flow where any employee at any stage of the assembly line has the right to shut the line down because something is not right. Either a component part is defective or a machine malfunctions."

**NARRATION (VO) :**

When there is a problem on the line, maintenance and engineering, as well as shop floor workers, react immediately to find a solution. Excess inventory is not used to hide production problems.

(Chuck 11:02:55 - 11:04:05)

"Our goal is 15 ppm for defects, which is very demanding. . .

We react to every complaint immediately, no more than 24 hours. . .

We will try to get the part back as quickly as we can so we can do actual analysis and determine what happened, and then we'll take corrective measures."

TAC makes use of Visual Management to control production throughout the factory. rather than relying on information technology, TAC uses Production boards to post hourly and daily goals and actual production.

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**NARRATION (VO) :**

visual management is EXHIBITED in many forms at TAC. It includes organization of materials, plant floor layout, product marking and many specific charts and boards. Color coding is also used EXTENSIVELY to identify appropriate materials and prevent errors.

(Osvaldo 10:09:34 - 10:10:16)

"We keep it as simple as possible. . .

We do have an integrated MRP system, but we are more geared toward visual control. We use kanban to replenish inventory, and that's about the extent of our use of technology here."

**NARRATION (VO) :**

Successful visual management requires a clearly defined Plant layout and conscientious workplace organization.

(Osvaldo 10:07:55 - 10:09:25)

" . . .When you have low inventory, you have to be able to see abnormalities. For example, we plan for how much space is needed for a particular part number, so if I walk around the plant and that area is always empty, I know something is wrong. The planning is wrong or the space we set up for it is too much. On the other hand, if we have an area that is overflowing with material, it brings our attention right to it. . .

We all need to be able to see abnormalities. . .

The layout does a lot for visual control, and that's what we live and die for here at TAC."

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**NARRATION (VO) :**

TAC's human resource policies encourage a strong team-based culture.

when new associates start, they go into an area, rather than to a particular team or a specific job. when a Team is formed, the leader gives serious consideration to the personalities involved and attempts to keep compatible workers together. These policies lend stability to staffing and team composition.

The function of the team leader is to support and direct the team and hold brief team meetings every day. \* Team members are self-directed. \* they balance their work load and help each other maintain that balance in order to meet production goals.

TAC does not distribute bonuses, \* Yet, the associates work at an impressive pace and absenteeism is a low 2%. What motivates employees to be so conscientious?

interdependence and peer pressure provide part of the motivation. in a team-based environment workers rely heavily on each other. \* absent or slow-paced workers affect the team's ability to meet its goals.

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Another source of motivation is the company-wide awareness of performance measures and public acknowledgement of outstanding performance. \* For example, TAC gave watches to every employee in 1998 to symbolize a year of perfect "on time" delivery to one major customer.

the Primary performance measures at TAC are quality, delivery, safety, and inventory.

(Chuck 11:13:43 - 11:13:54)

"bottom line is still we want to make a profit, but we want to supply the best quality possible and meet the customer standards."

**NARRATION (VO) :**

TAC is committed to CONTINUOUS improvement with the full participation of all associates. This is a defining characteristic of lean manufacturing.

(Osvaldo 10:16:01 - 10:16:32)

"very small ideas from people on the floor make a big difference when you put

them all together. . .

Nobody knows better than they do what needs to be done to improve. . ."

**NARRATION (VO) :**

even though CONTINUOUS improvement efforts may result in lower manpower requirements, associates at TAC are assured of job security.

(George 13:10:55 - 13:11:42)

" we are evolving, and I say that because in 7 years we are not there yet. We have a ways to go to get better, but that's part of it - the continuous improvement. . .

As we change, our customers change; as we grow, they'll grow. It will be constant change and a constant strive for improvement."

**NARRATION (VO) :**

TAC has succeeded as an automotive supplier by integrating the principles of lean manufacturing throughout its entire operation. \* the result is near-perfect customer service, superb product quality, and highly motivated associates.

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