

## *The Presidents Message*

### **Flow Manufacturing**

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You know, I'm always fascinated with the perception that some people think that "one piece flow" just isn't robust enough to meet their production requirements. As a result they can't consider using anything but batch manufacturing for their production needs. Well let's consider a few examples of why that viewpoint simply isn't valid.

Way back in the day the Ford Motor Company had a manufacturing plant located in Michigan in a place called Highland Park. They were on the leading edge of developing flow manufacturing to produce the Model "T". A fellow by the name of Charles Sorensen (who would later rise to the position of Vice President of Production for Ford) came up with the idea of the moving assembly line. The first time he tried the idea he took a rope and hooked it up to a chassis and then personally pulled the vehicle across the plant while teams of assemblers tried to see if they could assemble their sections while the car was moving. Strangely enough the idea worked.

The result was a flow production line that was able to produce 10,000 cars a day. I don't know about you but I have a hard time trying to wrap my mind around that number. That paced would deliver 3.6 million cars a year. *How can you possibly sell that many cars?* That would be over 400 cars in an hour or 7 cars in a minute. How would you line up enough trains to haul those cars away? It boggles my mind.

Interestingly enough Charles would have an opportunity to top that. As the nation moved towards war Ford was asked to be one of the producers of the B-24 Bomber. The originator of that aircraft (Consolidated Aircraft in San Diego) could manage to knock out a bomber a day. They wanted to know if Ford could match that? Charles had ideas on not only how he could match that but beat it by a good margin. His idea was to build a plant that would produce one bomber an hour. Amazingly enough that's just what he did.

The Willow Run bomber plant by the time it was up and running produced one bomber every 56 minutes. The plant ran two shifts of nine hours each which meant that Ford was kicking out 18 bombers a day, or 126 a week. That works out to over 500 bombers a month. If you want to win a war then that's the way to do that.

For this to really sink in you have to consider the complexity of such an undertaking. The B-24 had almost a half a million parts, some 30,000 assemblies, 24 major subsystems. In addition, during their two years of production they handled 1000s of running changes and 6 major engineering revisions. Try that on a production line delivering product at the rate of one an hour.

The B-24 would eventually reach production numbers of 18,482 (the most units of any U.S. military aircraft ever built) of those 8,800 would be built at Willow Run. Consider that there were four factories producing the B-24 and the other factories had been in production two years longer than Willow Run. In the end Ford produced half of all the B-24s built even though they were just one factory compared to the other three.

Yes, I suppose people can think that one piece flow just isn't robust enough for their purposes. However you know what? If you want to have a competition then I will do one piece flow to produce those 10,000 cars a day and you can attempt the same thing with your batch manufacturing and in the end you'll find that you can't even get close. What do you want to bet?

If the whole idea of one piece flow / Lean manufacturing sounds somewhat interesting then you should consider signing up for our next "APICS Lean Workshop" where we talk about these issues and a whole lot more. Check our website for details.