

by DR SUN J CHANG

Better quality products through Total Quality Management

This issue of The Business Mind examines some of the issues that manufacturers have when creating a great product.

In the last column, I mentioned that a manufacturer must produce a better product at a lower cost with faster delivery and superior services. In this column I will tackle the first element – producing a better product.

The key to manufacturing is to produce a better product consistently. Thus a better product has two components, **quality**

measures and their **consistency**.

Total Quality Management (TQM) provides an effective way to accomplish both. It involves three steps - Define, Improve and Measure.

The quality issue

First and foremost, you must define what a quality product is. This is by far the most important step. Keep in mind that how you define a quality product must coincide with what your customers care most about. Define quality the wrong way and you will waste precious time chasing after the wrong thing.

In addition, the quality must be quantifiable. If the definition is not quantifiable, you cannot measure the quality nor can you improve the product quality.

Of course, with TQM you don't just measure the quality of the product at the very end of the manufacturing process. Along the entire production process, at each machine center, the definition of quality for the output must be defined, measured, and improved upon to support and contribute to the overall quality measurement.



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A case study

Instead of talking in the abstract, I will use an actual case to explain the process. I had previously helped a company improve the quality of their particle board.

First, I learned that what matters most to the customers is the strength of the board measured in terms of Modulus of Elasticity (MOE) and its consistency expressed as its standard error. The company wanted to produce boards that were stronger and more uniform without using any extra glue to control production cost. As such, the company had well defined quality which could be measured.

Remember, to implement TQM, the output of each step of the entire production process must be defined, measured and improved on.

Identify the problems

Upon further inquiry, it became apparent that while the quality of the product was well defined, the definitions of quality for several of the machine centers along the production process or their measurements were missing.

Starting from the chipper, there was no definition for quality wood-chips - their length, width, and thickness. Not surprisingly,

no samples were taken to measure them for quality control. After the wood-chips were screened and dried, no samples were taken to measure the moisture content of the dried chips. Without uniform wood-chip thickness, it is difficult to dry chips to a consistent moisture level.

While laboratory tests were run on properties, such as its solid content and viscosity of the glue used, there was little understanding of how these measures of glue quality affect the performance of the glue sprayer. Furthermore, the glue sprayers in the blender room were not regularly tested for the size and spatial uniformity of the droplets.

Not surprisingly, the boards produced had very irregular MOE due to large variations in chip size, with uneven chip moisture content and disparate size of glue droplets.

Clearly, the problem of poor product quality had its root in the entire production process.

Create effective solutions

In order to fix the problem, the issues at each of the machine centers had to be addressed, and the best place to start was at the very beginning with the wood-chips.

A target size for the wood-chips was established. In order



to improve the quality and consistency of the wood chips, dull knives at the chipper were replaced quickly when the variations in the chip sizes exceeded a pre-determined level.

In the last column, I mentioned in passing the importance of mastering quick machine set-up time. This topic will be dealt with in a later column.

Once the dimensions for the wood chips became consistent, the moisture content of the wood chips after drying also improved in consistency.

Similarly, the ability to replace the nozzles of the glue sprayers quickly when the size and spatial distribution of the glue droplets were no longer acceptable, ensured that the glue was spread evenly in the wood furnishes.

As a result, instead of applying more glue to improve the MOE which increases the production cost, applying TQM to the entire production process resulted in a much better and more consistent product without swelling the production cost.

A continuous process

It must be pointed out here that TQM is a never ending process. Once the quality of the product is improved, new challenges will always appear.

For example, the MOE of the board must be further enhanced. This would entail revisiting the definition of the output quality at each of the

machine centers. Then the entire TQM process of define, measure, and improve starts all over again, thus forming a continuous product improvement circle.

As a result of this continuous effort, even a commodity, like a particle boards, could be transformed into something like a product in the minds of your customers.

This allows you to command a market premium in good times, and you'll be still be able to sell when others cannot.

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