

CRAFTSMAN'S CRIBSHEET

NUMBER
59

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Overall Equipment Efficiency

Busy machines and production lines are good, but even better are busy machines and production lines that are making the right product and making the product right. This is one perspective on OEE – Overall Equipment Efficiency.

What is OEE? Availability, Performance and Quality. As a percentage of your equipment's ideal values, each of these factors plays a role in determining your shop's OEE. When I looked at OEE for my plant, I found that we were definitely not getting the productivity that our equipment was capable of achieving. Here are three equations to help you determine your OEE:

1. Availability

Availability in my shop had two components: running time (time the machines were actually producing product) and scheduled time. Availability (A) is the ratio of running time (RT) to scheduled time (ST).

$$A = RT/ST$$

Compare this availability factor to total operating time and identify the differences: idle time due to operator coffee, smoke and meal breaks, setups and change-overs, breakdowns and mechanical issues, delays waiting for first piece approval, gaging setups or crane availability. Once these are identified, prioritize them for improvement.

2. Performance

Performance is the ratio of the time the machine is actually running and the theoretical time. The difference between theoretical and actual is the time lost because of tool changes, raking out chip bird's nests, emptying the chips, loading new barstock, or slowing the machine down because of perceived technical issues. Performance (P) is the ratio of output achieved (OA) divided by the theoretical output (TO).

$$P = OA/TO$$

This is often a factor that is more often identified when comparing two shifts or operators on the same process. It can also be affected by changes in tooling or methods from the initial quote.



3. Quality

Production foremen might think that machining is about making the production numbers, but shops that remain in business know that it is making parts with the quality needed that keeps the parts shipped and the invoices paid. Quality (Q) was simply the ratio of good parts (GP) divided by the total parts (TP) produced.

$$Q = GP/TP$$

OEE is now determined by multiplying A, our availability term; P, our productivity term; and Q, our quality term. What if you are at 90 percent for each of these terms?

$$OEE = 0.90 \times 0.90 \times 0.90 = 0.729 \text{ or } 73\%$$

What does a 1 percent improvement in each of these do for you?

$$OEE = 0.91 \times 0.91 \times 0.91 = 0.754 \text{ or } 75.4\%$$

What does 100 percent quality (zero defects) get you with the other two factors at 0.90?

$$OEE = 0.90 \times 0.90 \times 1.00 = 0.81 \text{ or } 81\%$$

So what are you going to work on today in your shop?

All Craftsman's Crib sheets are available for viewing and download at short.productionmaching.com/cribsheets.