

Find Your 'Hidden' Capacity before Spending Capital

You can get more production from your operation in two ways. You can expand the operation and put in new plant to increase capacity, or you can find more capacity from your existing plant by overcoming production losses and getting it working at higher production rates for longer. Justifying capital for new plant in a growing market is not too difficult. Provided there is secure, profitable business in future you can get money to invest.

The problem with installing new plant is the heavy cost in time, finances and resources. A larger operation means more staff, more employees, more facilities, more equipment to look after, more administration, more overheads and more utilities to pay. It's likely that a large project will take years to get operational. By the time the approvals come through, the design is completed, the equipment built and supplied, the plant constructed and operating, two or three years will pass. It's a long time to tie-up your money without a cent of income.

The alternative to investing large amounts of capital on new plant and equipment is to see what additional throughput can be got from the current operation. Before spending money on installing new plant to increase production, make sure that you have rung every cent of capacity out of your existing plant. If you have capacity in the current operation you can ramp it up in a matter of months, the capital expenditure is minimal, you use the same workforce, the infrastructure remains the same, you can stage capacity realisation as the market grows and keep your money free. You can get equivalent capacity increase from your old plant for as little as 20% the cost of a new expansion project, which makes for a phenomenal return on investment (ROI).

But how do you know that your operation has spare capacity? The first evidence that you have spare capacity is if the plant is producing less than current design nameplate rates. If you are running the plant for normal production hours, and on average you are getting below design production rates, it is very likely you have 'hidden' capacity in your plant. But the real evidence that you have spare capacity can be uncovered by graphing the hourly production rate for several consecutive weeks.

Figure 1 is a graph of the hourly production rates of a 24/7/365 industrial operation during eight consecutive weeks. It provides a lot of valuable information about the operation's capacity.

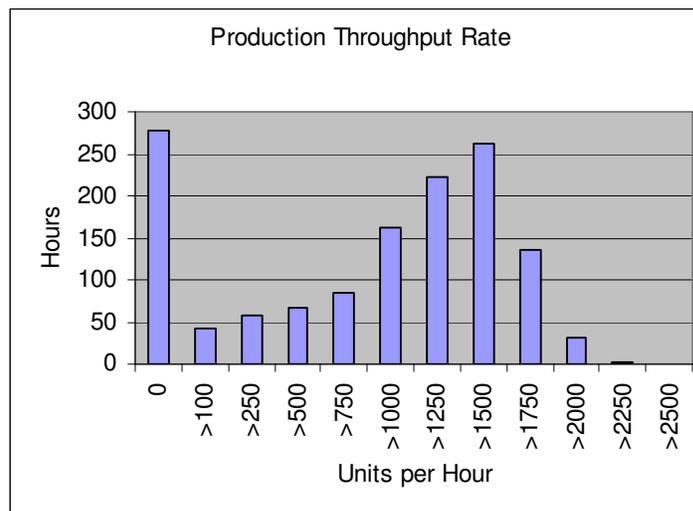


Figure 1 Production Rates

Eight weeks of production is 1344 production hours. For 275 of those hours it was not producing. That is, for 20% of possible production time the plant was standing still. The plant design capacity is 1500 units per hour. For 615 of the remaining hours it was running at under design rate. This means that for 57% of the time that it was operating it was making less than it was designed to be producing. The actual average production rate for the entire period is 1000 units per hour. This is two-thirds of design duty.

There are two more bits of useful information in the graph. Firstly, notice that for a significant number of hours the plant ran at above its design rate. The implication is that the plant can comfortably run at more than its design duty. There is a good chance that with minimal engineering changes the plant could run at 2000 units per hour, or 33% greater than current design production. Not only can capacity be recovered from the losses being experienced in the operation, more capacity can be gained by re-engineering the plant to work at higher rates.

The second useful piece of information comes from the same section of the graph. It is this. What went right? How did production get above the design rate for so many hours? You need to find out what was happening, or not happening, during those times of increased throughput. If the plant can produce at higher rates by accident, then how good can it get if you did the same intentionally? There is probably more value in knowing what went right in this part of the graph than knowing what went wrong in the lower part. If you can work-out what went right you might be able to get a substantial capacity increase without spending any money at all!

The total 'lost' capacity represented by the stoppage time and the slow throughput plus the 'hidden' capacity from higher production rates means that this operation has plenty of opportunity to deliver a large production increase without significant capital investment.

By conducting root cause investigations as to why the losses are occurring, along with a detailed engineering and operational review to analyse how to address them, plus a thorough engineering investigation on how to boost production above design, you could save yourself a major capital upgrade. Instead of building new plant to make an additional 50% production, you might get the same from your old plant by fixing the production losses and re-engineering it to run at faster rates. The return on investment should be unbelievable.

To construct a graph like that in Figure 1 requires collecting the hourly production figures for a couple of months. The figures should show random performance around a mean value. The spread from lowest to highest will indicate if there is spare capacity available. If the spread is tight about the mean and you are averaging design rates then your operation is running well and is performing as good as it probably can. But if, as in Figure 1, the spread is wide then the plant has 'hidden' opportunities to improve its production performance and efficiencies.

When you see production graphs with a wide spread of production rates, there is potential to increase capacity by removing the operating losses and doing some minor engineering upgrades. Before you expand capacity by investing more capital to increase the size of your operation, find all the 'hidden' capacity in your current plant first.

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