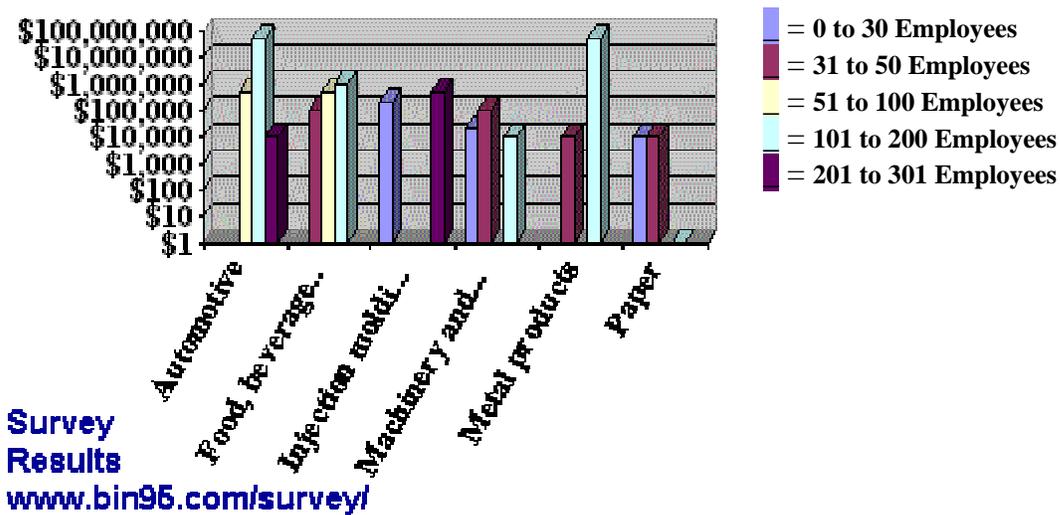


What is the True Downtime Cost (TDC)?

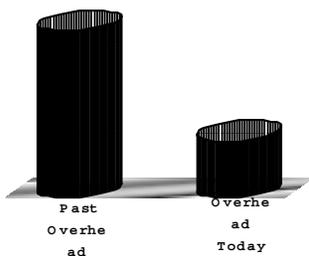
By Don Fitchett

(Feel free to copy and distribute as long as article remains unchanged in it's entirety with credits in tact and is free.)

The key to realizing greater savings from more informed management decisions is to predetermine the "True" cost of downtime for each profit center category. TDC is a methodology of analyzing all cost factors associated with downtime, and using this information for cost justification and day to day management decisions. Most likely, this data is already being collected in your facility, and need only be consolidated and organized according to the TDC guidelines.



Typically daily management decisions related to equipment downtime are made based primarily on labor cost. Of course, production demand is also at the top of the priority list too. The bottlenecks are taken into account in the decisions when they are realized. Some facilities overlook equipment as a bottleneck, like air compressors, boilers, and strappers out in the warehouse. The decision making balance to maintain is between production demand and "True Downtime Cost", not primarily production demand and direct labor cost.



Using a TDC methodology, the "Overhead" bucket becomes very small, making clear to all, the areas of greatest opportunity. In these times of economic turmoil, it is ever more important to look at the "True Downtime Cost" in it's respective categories, not only to see the greatest opportunity, but to profit from the valuable insight this methodology will bring. You will learn that many of the metrics with cost savings bottom line

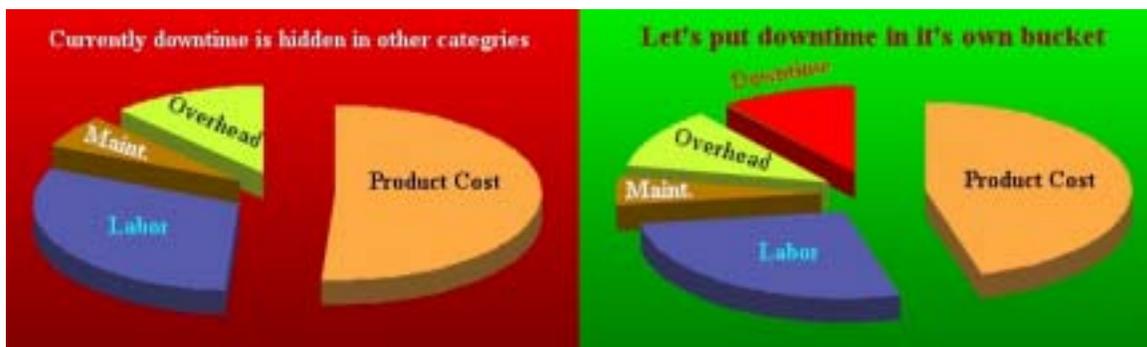
improvement opportunities, far outweigh the labor category and the immediate temporary gains of downsizing.

HIDDEN COST

Below is an example below of the hidden cost made relevant in just one of the proposed TDC buckets; labor. You will see the true cost of labor associated with the downtime scenario to be only \$295. That amount pales in comparison to the other TDC categories combined, which can be ten to a hundred times that amount depending on the particular downtime occurrence. So you can see how the TDC method can be a valuable cost justification and benchmark tool to maintenance managers. A great analysis asset to executive management and a great sales tool to those who provide service and products to manufacturers. (Especially ERP and CMMS vendors who are the consolidators of the data)

There are three main downtime categories proposed. The main category of “Equipment Cost” and “Labor Cost” are composed of metrics that are one time entry of constants, updated annually, exported from your existing computer systems. The main category of “Downtime Cost” contain the metrics that are "per downtime" occurrence entries, but most can be exported from your existing CMMS. The data being recorded from facility to facility, from software package to software package, vary greatly. I have done detailed analysis of each downtime cost metric, but the results are too great to mention in this article. Surprisingly some metrics have large cost savings opportunities and have been overlooked by the general industry.

Since labor cost is one of the most popular areas to first start seeking opportunities, let us take a look at just one method of the old school style of thinking. (Which also happens to be a primary concern in downtime decision making.) Labor, more specifically direct labor. For example you have six operators doing not so productive cleaning while a machine is down and two maintenance technicians doing the repair. The decision makers are thinking... “At \$10 per hour operator wage, \$20 per hour maintenance wage, that is \$100 per hour. Well, I know there is overhead involved too, but with so many categories it is too complicated to consider. Overhead is just a percentage of my man-hours anyway.”

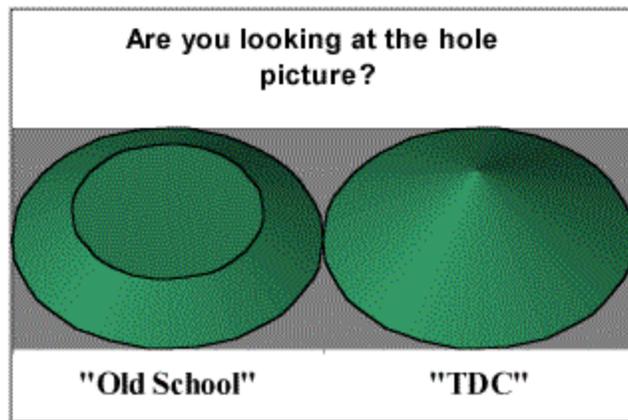


Now compare this to the true cost in just one TDC category; labor cost. First with the overhead bucket gone, the employees hourly cost is actual cost to the company. With insurance, retirement, training, admin, etc. double the hourly wage (\$200) is a safe figure. As long as you are not dealing with a bottleneck, we need only take into account the

indirect labor factor. Let's see in our example, there was a QC inspection at startup, the tool setup person, the line supervisor, maintenance supervisor, the plant manager, the parts procurer, to name the most apparent employees involved.

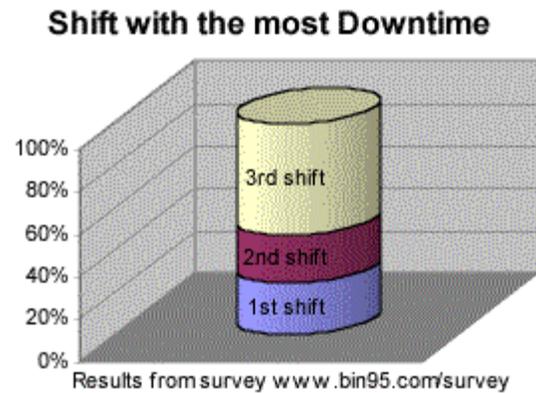
A little more detail into the scenario, and we can calculate the indirect labor cost. The 15 minute QC inspection (\$5), setup person also 15 minute (\$5), the supervisor was taken from his normal duties the entire hour (\$30). Doing what? Why supervising of course, well okay, he had logistics, reassigning employees, rescheduling, etc. For the sake of argument we'll say the production demand was high. This demanded two more high dollar employees, normally hidden in the overhead. The maintenance manager was summoned for coordinating, (\$30) and the plant manager was on the scene for 15 minutes to set the priorities and get the facts first hand (\$25).

The grand total of TDC for labor is \$200 direct labor + \$95 indirect labor, for a total of \$295. We all know in the industry, most would not bat an eye at \$295. There are two points to made by this example. One is the commonly overlooked "overhead" cost, which is hiding almost 66% of the true cost in the labor category alone. The other point known to upper management and accountants, is indirect labor, which is a large part of the picture, yet only considered on a daily basis by very few.



Above was a best case scenario. Consider a bottleneck with 20 downstream employees affected. Add in Engineering, material handlers, more management/supervisors, controller, safety personnel, accounting, secretaries, rework, and offsite QC inspections. You could include the offsite personnel cost like consultants, OEM techs, etc., but it is recommended to have those costs in their own category as they are so great. Think about if the entire plant was shut down. How much would the TDC labor cost alone, be? You may re-prioritize the main breaker switch or air compressor PM.

LOOKING FOR THE OVERLOOKED



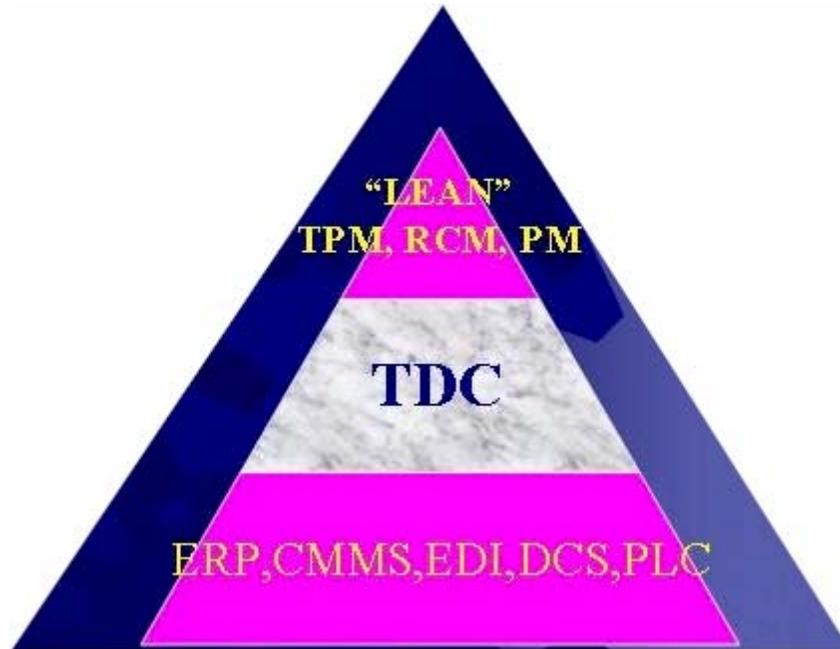
Details of the individual metrics within each of the main downtime cost categories would be out of the scope of this article. I hope you find the list below to have some useful information and tips. The object is to stimulate the creative thinking process and help you realize areas that might otherwise be overlooked. It is recognized that there is a great deal of uncertainty and scientific difference of opinion surrounding the metrics of manufacturing cost analyses.

This list is provided as a starting point for improving manufacturing cost analysis.

- **Equipment Cost Category** (constants)
 - Categories
 - Standardize your data collection categories, learn from MIMOSA.
 - People
 - Indirect labor cost can often be greater than the more apparent direct labor cost.
 - Product
 - Made up of two sub-categories. Cost per Unit, and Units per Hour.
 - Start-up
 - Every time you startup your machine, there is hidden cost.
 - Bottleneck
 - Using a process flow diagram, pre-determine a bottleneck factor for each asset.
 - Sales Expectation
 - Our goal is always to maintain a 100% capacity readiness.
- **Labor Cost Category** (constants)
 - LPP/M
 - Does your LPP/LPU calculations include indirect labor?
 - QC
 - Associate QC cost, re-work, etc. with actual downtime occurrence.
 - Maintenance
 - There is a substantial staff supporting those one or two who actually do the machine repair.
 - Engineering
 - Engineering costs to support troubleshooting and repair of machines can slip through the cracks.
 - Management
 - Requesting maintenance, redirecting operators, reporting to upper level management, altering production schedules/flow, administrative tasks, etc.

- **Downtime Cost Category (Occurrence)**
 - Time
 - Are you tracking when maintenance arrives at the scene, or when the machine actually went down?
 - Reduced Production
 - Time and percentage of full capacity equipment is running a reduced rate due to a malfunction.
 - Scrap
 - On continuous flow systems, scrap related directly with downtime can be a very significant cost.
 - Band-Aid
 - Please take note that band-aid time estimates, and amount of times needed to be done are usually under estimated.
 - OEM, Consulting, Contractor
 - Your interactions with OEMs can be a major cost factor in downtime as well as other areas.
 - Tooling
 - Often classified as a nuisance problem if allowed to continue, can really add up in cost.
 - Parts/Shipping
 - Out of the parts and procurement fields, the actual parts cost is the only value commonly tracked. What about shipping, locating, rentals?

REPORTING TRUE RESULTS



In the past, the philosophy was the less cost buckets I have to manage, the easier my job is. However today is the day of powerful computer tools and data collection technology. We now have the capability to have a computer manage all those buckets, and do it the way we want. This technology coupled with people type methodologies like TQM, TPM, RCM and Lean Manufacturing, enables us to spare our employees the hardships of downsizing and seek much greater opportunities such as equipment utilization.

When the world's top consultants are asked, "Why don't manufacturers realize the full potential of programs like TPM, RCM, or even their CMMS software?" you have no doubt heard some of the following standard replies. "The program was not endorsed from the top down", or "Lack of understanding of the strategy" or "Lack of measurable or quantifiable results". The last reply is the most accurate. With the realizing the true cost of downtime, will best quantify the results.

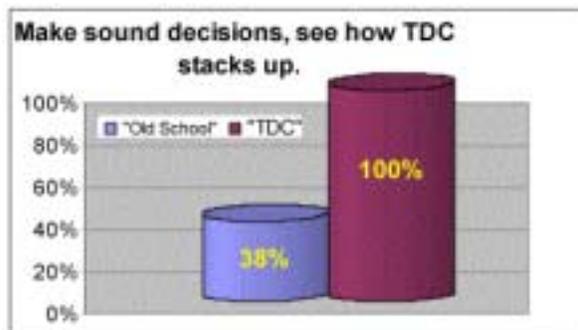
Hey, there is a lot of wisdom to that saying, "Money talks,". If what was believed to be a \$30K opportunity, is found to be a \$300K opportunity, endorsement form the top down and commitment to understanding will more likely follow. Just as the leaders who sell a program to the facility must be able to prove the true value, the mechanism must be in place to report the true results. TDC bridges the gap between data collection, software/hardware and an improvement program such as Lean manufacturing. I have outlined below some clear concise steps that will lead you to a world class status.

- Use a process flow chart and identify your bottlenecks
- Adopt information standards in your existing and future systems
- Predetermine the "True" cost of downtime for each profit center category

- Use OEE to benchmark and identify areas of opportunity

These guide lines are self sustaining. Most have identified their bottlenecks. Just make sure you haven't overlooked one hanging on a wall, in a back room, or outside the building. I have talked about identifying the True Cost, so the appropriate priorities are set. Next, I'll comment a little on adopting standards and using OEE.

STANDARDS



Actually a combination of two methods are used to bridge the gap between data collection and management technique. Strict usage of TDC metrics and data sharing standards like MIMOSA. Implementation of programs like TPM, requires the proper structure, measures, information and commitment. Only using vague, generalized tools like OEE to base day to day financial decisions on,

can cost thousands to millions. Build your facility on rock; build it on standards.

MIMOSA is more than an organization developing open exchange conventions. It is the enabling factor permitting integrated maintenance management, a connection to enterprise resource programs, and practical profitability-related operations and maintenance. Require your software vendors and program administrators to use TDC guidelines, and MIMOSA standards. This will reduce implementation cost, enhance benchmarking tools, and insure your success.

Overall Equipment Effectiveness

The overall performance of a single piece of equipment, or even an entire factory, will always be governed by the cumulative impact of the three OEE factors: Availability , Performance Rate, and Quality Reject Rate. When I was a speaker at an AFE convention in Las Vegas, to my amazement the group did not know what OEE was. I was in a major online chat session the other day where the guest speaker was Robert Hansen, the author of the book "Overall Equipment Effectiveness – A powerful Production / Maintenance Tool for Increased Profits". What was the question being asked of him? "What is OEE?"

Overall Equipment Efficiency

Availability X Performance X Quality = OEE

Availability - Measures the percent of time that the equipment can be used (usually total hours of 24-7-365 for equipment utilization, or scheduled production time to result in a reliability only measurement), divided by the equipment uptime (actual production).

Performance - The percentage of available time that the equipment is producing product at its theoretical speed for individual products. It measures speed losses. (e.g., inefficient batching, machines jams) If you can not obtain equipment specifications from OEM, use best recorded rate of pph/quality.

Quality - Determining the percent of the total output (i.e. all products including production, engineering, rework and scrap) that is good.

Terrence O'Hanlon, the host of that chat session had an excellent quote that gets to the heart of what I have seen, "They do not know what they do not know". With the knowledge and utilization of the OEE calculation, it is common to realize greater than 40% increase in your bottom line. If you're making a profit now, just think of the opportunity. More importantly, OEE is the glue that sustains other initiatives by enabling all to clearly see where to focus, and the results of their efforts. The exciting point is that OEE is a simple method of measuring, you can start utilizing it Today!

The world's leaders in the industry are mostly in agreement on how to implement OEE and why. I contribute this fact to its simplicity. Identify your bottlenecks and major cost centers to benchmark and monitor first. Most recommend using the calendar time metric (24/7/365) for your availability factor. As machine utilization will also indicate reliability performance, giving you the whole picture and immediately focusing your resources on the greatest opportunity. Also using OEE as a benchmarking tool would not work well if based on a variable such as production schedule. Benchmarks must be based on a constant to allow portability to similar industries and markets. The bottom line is the method of implementing OEE is irrelevant if you don't start utilizing it at all. It is very true what they say, "Do something is better than doing nothing at all".

My challenge to the industry is to Stop OEE Ignorance, and spread the word about this valuable tool. Joel Lenard's favorite topic is "What is the Cost of Ignorance?". I propose that in using True Downtime Cost, we will start to see. Below are the best resources I have seen to follow up on this article.

TDC – www.DowntimeCentral.com

Standards – <http://www.mimosa.org/othermod.htm>

OEE - <http://www.oeiconsulting.com/>

Also Overall Equipment Effectiveness – A powerful Production / Maintenance Tool for Increased Profits, *Robert C. Hansen-Industrial Press, 2002*

Don Fitchett is the Founder of Business Industrial Network, an internet based company that offers online technical support for equipment in all manufacturing industries worldwide. www.bin95.com
(If you would like a copy of this article in another format, please email webmaster@DowntimeCentral.com)