

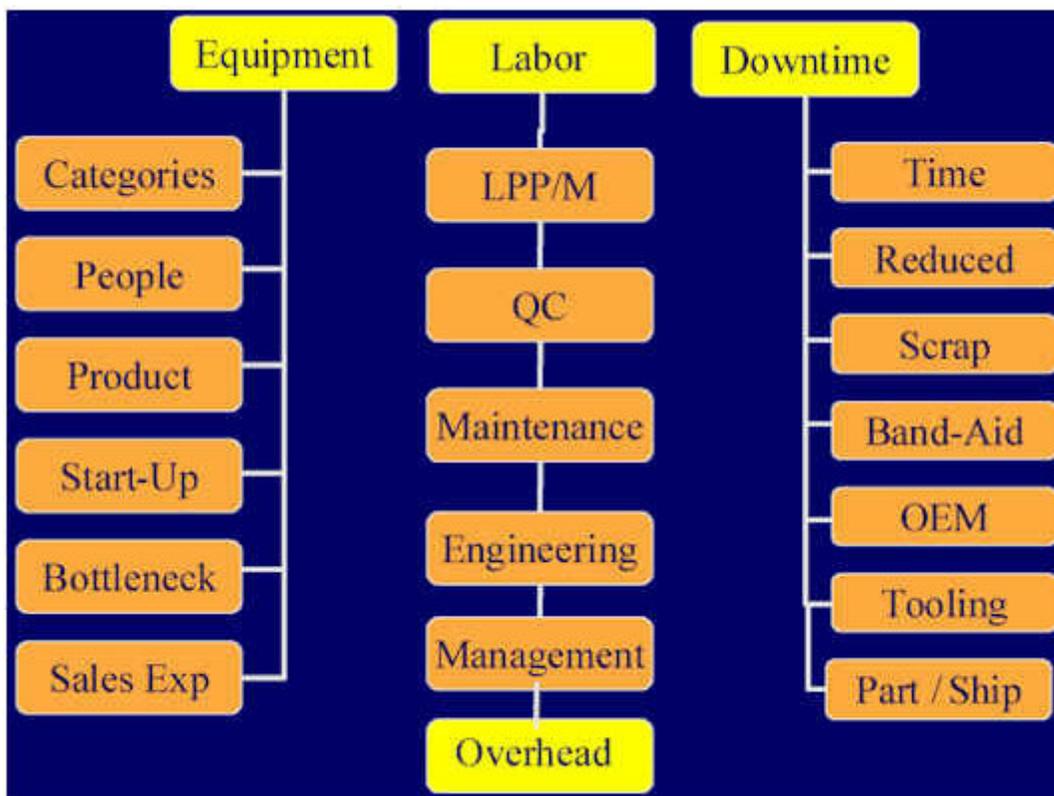
TDC - True Downtime Cost

Definition:

- A method of recording and analyzing all significant cost metrics associated with equipment downtime in a building or manufacturing facility.
- TDC provides a way to assign time and/or monetary value to previously considered “non-tangible” cost of downtime.
- Also TDC includes downtime factors commonly overlook to arrive at a more true value for the cost of downtime.

In viewing the Cost Factors below, one might think micro-analyze, but the fact is, most of this data is already being collected, and exist in your computer systems today.

Below is an overview of the cost factors



With all these categories, it may appear to be too much to monitor and analyze. Feel free to momentarily review the "Data Overload" section to see why there is no need to sound the "[Data Overload](#)" alarm.

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TDC, a closer look at Equipment

Categories

- Use MIMOSA, machine, priority, type, cell, line, Notes, etc.

People

- Number of Direct and in-direct idle workers

Product

- Cost per unit at that stage in production
- Units per hour

Start-Up

- Electrical surge cost, Set up, % reduced till start/stop
- Equipment fatigue
- Scrap produced, is it recycle able

Bottleneck

- List other downstream equipment, and % effected

Expected Sales

- % effect on product out the door.

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TDC - Data collection categories.

- What you measure is what you'll get!
- Ultimately must be able to accurately track failure rates and allocate costs
 - individual machines (location, asset)
 - machine categories (motors, pumps)
 - components (bearings, seals)
- Major benefits can be attained with current technology -- more effectively applied
 - lower cost data collectors

To accurately track cost...

How to select and implement CMMS software

Please view this article online - [How to prioritize production layout and categorize within CMMS](#). (The CMMS article at DowntimeCentral.com was donated by non-bias CMMS consultants - Perspective CMMS who specialize in how to select and implement CMMS software.) Note they did not overlook plant wide bottlenecks like the powerhouse, steam, air, vacuum and emergency power. After viewing the online article, you can return here and read the example below.

Some areas like Tooling often falls into the category "too small to analyze", even if **MTBF** is high. Once you adapt **TDC** methods of monitoring and analyzing downtime cost, you will be amazed at the potential savings in what was once thought to be an insignificant category.

In the example of "Tooling", TDC shows us much larger categories that add to the cost. When a tool breaks, it's not just a couple dollars to replace, plus five minutes of time (labor). Each time a tool breaks or needs replaced, there is cost of lost production (amplified by possible bottleneck), scrap, quality, start-up cost, indirect labor (such as maintenance, quality, engineering, supervisors, etc.). There is also risk of higher cost such as Safety, damage to equipment etc.

After considering all the **TDC** metrics outlined on this web site, it becomes apparent that ten cents you saved on cheaper tooling could cost you hundreds or thousands times what the whole tool cost. Especially when you are monitoring frequency of toll defect such as **MTBF**.

Ease of Data Collection and Analysis

As stated by John S. Mitchell and the [MIMOSA.org](#)  organization, your facility data must be readily available, easily exchanged and clearly understandable for everyone with requirements throughout the enterprise. Open exchange of equipment information between condition monitoring (assessment), maintenance (**CMMS**) and control (**DCS**) systems.

Providing an open exchange of conventions will assure vital information to define the status and condition of process, manufacturing and production equipment is readily available and produces greatest value for users throughout the enterprise.

Require your vendors to adhere to MIMOSA standards of being capable of automatic communication and (non proprietary or non specific) information exchange. Software links can make system access of information, resident in programs from different suppliers without special software.

Be aware of **TDC** and MIMOSA categories, and insure they are in all your systems. To learn more about these open standards, please visit [MIMOSA.org](#) 

TDC - Bottleneck-Factor Category

This category is a 'one time' entry of a constant, updated annually. Most have not identified all the bottlenecks in their systems, and the percentage of each affects their production. Your existing method of calculation need only meet the **TDC** recommendations below.

- **Bottleneck**
 - Identifying bottleneck cost can save thousands
 - Example: an industry accepted cost of a corrugator is \$10,000 per hour (varies by facility).
- List other downstream equipment, and % of affect on downstream and upstream equipment.
 - Other Bottlenecks in this example of a corrugated facility...
Boiler, Glue system, Air compressor, Strapper, Facility Power, etc.

After visiting 100s of paper plants, I have seen the same misconception. It is well known that the corrugator is a **bottleneck**, because the entire facility is it's downstream. So much so, they will run at top speed (not necessarily most efficient speed), with speed indicator in the production manager's office.

In many of those facilities, all material will flow through a single strapper, or conveyor, but these do not get a tenth of the investments of resources that the corrugator does. With this example the facility becomes a push production process, with storage, scrap, multiple handling, labor, etc., being the buffer and profit loss. With **TDC**, the question would no longer be "how can we have record production rates off of the corrugator while having reduced sales, quality, safety, and profits?"

The other bottleneck examples above, like an air compressor, are not realized in the day to day management decisions, until the unrecognized bottleneck shuts down the facility, or a large portion thereof.

As time goes by after a bottleneck makes itself know, it once again drops out of the spotlight in the daily decisions. Actually a bottleneck should be identified and classified, hopefully before a failure, but a least afterwards. This is one of the key advantages of the **TDC** method, and one of the greatest cost savings too.

Ironically, TDC represents the final bottlenecks to a fully integrated and auditable approach to maintenance strategy development / justification.

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TDC - Management Labor Category

This category is a one time entry of a constant, updated annually, exported from your existing computer systems. Your existing method of calculation need only meet the **TDC** recommendations below. As with all labor categories, cost should be net cost (insurance, SSC, benefits, etc.), not just base salary.

As with all the labor categories, your accounting software is a good source to export or link all the various Management wages to your downtime cost reporting software. Tracking this manpower cost in relation to downtime cost can be automated through I.D. tags, or typical work order reports.

- **True hourly cost of Managers**
 - from accounting software
- **Track time associated with downtime support**
 - visiting downed equipment
 - related meetings and calls
 - related administrative and decision making research

When equipment breaks down, we all realize the area supervisor will be there insuring necessary actions are taken. Requesting maintenance, redirecting operators, reporting to upper level management, altering production schedules/flow, administrative tasks, etc. Fifty percent of the time a machine is down can be extra tasks a supervisor is required to perform.

What isn't tracked in today's facility is the time upper level management is tasked, related to a machine breakdown. The production manager, plant manager, general manager's time, can cost the the company several times the supervisors cost. Not just the time they may visit out on the floor to see how it's going, but other behind the scene tasks such as arranging meetings, making phone calls and other administrative tasks, to name a few.

As with all the other labor categories, procedures must be put in place to track these cost and assign to the appropriate cost center. **TDC** reports will point out what task may be better performed by less expensive employees.

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More accurate reporting of times related to occurrence will bring your focus on known major cost factors...

- **90% of the time is spent finding the problem and how to fix it, 10% actually replacing the fuse.**
- **Who or what technical support will be available to take care of an end user whose production line is down at 2 a.m. on the week end?**
- **One company, seen automation of lubrication points on just two lines translated into 30 to 60 hours of additional machine time and profit gains of £60,000 to £120,000 annually.**

Learn by example; one of [VersaCall's](#)  customers:

The USPS determined the operational cost of the entire facility to be between \$135.00 and \$160.00 per minute. They further determined that they could conservatively save ten minutes per 16-hour workday by installing a VT400 system to reduce the down time lost. Data collected and reported by the VT400 system showed that they were, on average, saving a combined 10 minutes over two shifts. This amounts to \$1350.00 to \$1,600.00 per day, or over \$6,750 per 5-day workweek.

As with all the other maintenance data entry categories, procedures must be put in place backed by the support and understanding of management. Neglecting this vital communication function will provide less than acceptable results. A system is useless unless data collection is a well-defined process. A CMMS lives on data.

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Your shipping cost have a default value...

- | |
|---|
| <ul style="list-style-type: none">• Shipping Standard \$20.00• Shipping Express \$50.00• Shipping Emergency \$700.00 |
|---|

Looking at the example shipping cost above, it's clear that emergency shipping should be considered carefully. But if your equipment is down, most often your hands are tied.

See also...

[UPS Quick Cost Calculator](http://wwwapps.ups.com/servlet/QCCServlet) (<http://wwwapps.ups.com/servlet/QCCServlet>) 

[Do your parts procurement the Intelligent Internet way](http://www.mcsolutions.co.uk/dti/Dean_Foods.pdf)

(http://www.mcsolutions.co.uk/dti/Dean_Foods.pdf) 

[Using the Internet as a universal networking standard, business partners can create seamless, automated supply chain systems, learn from GE.](http://www.cio.com/archive/061597/commerce_content.html) (http://www.cio.com/archive/061597/commerce_content.html)



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Standards for Downtime Factors



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** ([www link](#))

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, cost thousands to millions.

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.

See also the article on **Data Collection** included in this e-book.

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