Automation Systems Diagnostics: A Profit Center in Maintenance Operations

Industrial maintenance operations are typically treated as cost centers for operations managers. This leads to difficulty achieving optimum uptime, since procuring the right tools for proper maintenance becomes a challenging give and take between management budgets and operations realities. This white paper introduces a frame which can be used to show that proper maintenance tools lead to increased profit, offsetting the initial cost.

Operations managers carry a mindset of ensuring their operations keep at or under increasingly tight yearly budgets. This more often than not leads to decisions leaning more toward initial cost, than longer term benefit. The manager now views their budget as a series of terms discussed as a capital investment verse maintenance expense. The metrics used to judge success of a capital investments is based on the Return on Investment (ROI). Where the judgement of success for maintenance is typical cost avoidance.

During PROCENTEC’s normal business operations we understand this relationship exists between management and in the field operations. We work every day to overcome the perception that investing in maintenance is a cost, not a capital event which carries a ROI. Understanding that providing clarity as to why these investments can be a profit center is the first step refocusing the discussion on lost opportunities which exist in most operations.
Step #1: UNDERSTANDING WHAT IS INCLUDED IN THE COST OF DOWNTIME

The first step is correctly determining what is the non-personnel cost of downtime. Some factors which through experience commonly are:

- Lost Revenue from non-production
- Cost of removing product in current production from line to make unscheduled repairs
- Cost of lost raw materials or damaged products.
- Lost opportunity cost, until the production process is fixed
- Cost of emergency personal to determine the underlying issue

Others can be added to this list depending upon they type of operation and product structure. The goal is to include the bulk items which are lost and cannot be replaced.

Step #2: UNDERSTANDING THE TRUE COST OF REPAIRS

The second step is understanding the true cost of the repairs. According to experience, true cost van be:

- Cost of labor per hour for maintenance resource
- Cost to labor time to trouble shoot the underlying cause
- Cost in labor to make the repairs
- Cost of material to make the repairs

During the period of the unscheduled breakdown, a maintenance resource must be deployed to the area where the breakdown occurred. Once at this location the maintenance resource must then determine the right tool to quickly assess the situation, with a focus of providing clarity regarding the failure. Proper clarity will then allow for a determination of where and what is necessary to make the repairs. Other than the obvious cost of the personnel, the amount of time a solution can reduce in creating clarity of the situation is very valuable. Any solution which allows for increased efficiency in this area has a high and immediate return on investment.

Step #3: DETERMINING THE UNSCHEDULED DOWNTIME

The last step to this process is to simply understand the aspects of time within your organization. The factors for time are:

- Normal operating hours
- Percentage of scheduled operational uptime
  - This is the limited time you are generating revenue
- Hours of unscheduled downtime.

With these 3 points, the final information is in place to create a model to visualize the return to be had with the proper diagnostic solution.

Model Conclusion

Once the individual has calculated the above information, it is necessary to correctly calculate the type of solution that is required. For that we propose the below model:
Model Explanation

Our definition of the model components are:

Y Axis: Typical total Investment amount required is either Decreased (Lower) to Increased (Higher).

X Axis: Typical Solution is used passively (Temporary or as needed only) and Active (Permanently installed in the operation)

Diagonal Axis: Expected amount of Return on Investment for installation in decreased downtime, time to identify underlying problem, and creation of profit

Investment Zones

Solution 1: Low initial investment per unit, typically used as needed. Traditionally a reactive solution.  
*Think: Digital Compass = Low Overall investment, used as need. Will point you in the right direction.*

Solution 2: Increased initial investment per unit, with passive or active use capabilities. Improved understanding, but it requires use of a “solution 1” product to create a clear picture.  
*Think: Digital Map = Indication of starting point, but still need compass.*

Solution 3: Higher typical initial investment. High understanding of operations, preventative in nature.
Think: Google Maps on Smartphone: Verbally tells you how to get to the location, instructs before you must turn, and time to get there, with different displays.

Cautionary Zones

Zone P  Perfect Product rarely exists that balances everything exactly for every operation.

Think: Coffee Maker Robot which always makes perfect coffee, cleans itself, fills itself, delivers your mug to your desk/table whenever you want and self powers.

NGI  NO GO INVESTMENT: An expensive tool, which only works when YOU use it. A large initial investment that sits on the shelf rarely benefits anyone.

NGA  NO GO ACTIVE: An inexpensive active tool, with no clarity.

White Paper Conclusion

The conclusion that can be gained from this framework is that once a proper understanding of an operation is understood, you can quickly determine what is the proper diagnostic solution. The solution should be a series of weighted options. On one side, the question is does the solution:

- Increase efficiency with identifying the problem.
- Act as a temporary reactive solution or as a fixed preventative solution.
- Create a clear understanding of the whole operation.

On the otherside of the equation is:

- What is the cost of unscheduled downtime?
- What is the potential gained profit for reducing unscheduled downtime?
- What is the upfront cost of the solution?

With these inputs a manager can then balance the desires of Engineering/Maintenance verse the operational realities of management. Having this balance allows for a clear understanding of the benefits to the operation. At PROCENTEC we have sale engineers we spend time with customers figuring out the right solution for each operation.

About Matthew Dulcey

Matthew Dulcey is the Global Sales Manager at PROCENTEC's head office in The Hague. He is an American with a Finance degree from Drexel University and a MBA from RSM Erasmus University. Professional experience includes work in the chemical, water and electrical generation business through various positions. At PROCENTEC, Matthew enjoys using his experience in international business to bring solutions to the industrial automation field globally.

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