

Maintenance Business Case Development

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Background

One of the key considerations to the implementation of a maintenance program is to develop a business case. This is a challenge for any maintenance or reliability technician, supervisor or manager. Frequently, the business case for investing in maintenance is underestimated because the production impact is ignored. Evaluating the production impact usually requires a simulation model, something that most Maintenance and Reliability Professionals do not have. In addition, developing a detailed model typically requires at least 4 hours (if the data is available) to a few weeks (if data is not readily available). This puts maintenance and reliability initiatives at a disadvantage in competing for resources. Maintenance and reliability professionals need a quick way to build realistic business cases.

Building a Business Case

The Light Profit Driven Reliability Model (Light PDR Model) allows the Maintenance and Reliability Professional to quickly develop a preliminary business case for eliminating failures or shortening repair times. The Light PDR Model estimates the cost of failures using a 10 year average given user input. The steps to building a business case are simple.¹

Step 1. Create your base case input, being careful to select the *Base Case* option. This is input reflecting your current condition. If you need help in defining input just click on the *Help* button located on the left hand side of the screen (see Figure 1).

Step 2. Run the simulation. Figure 2 shows sample Base Case output.

Step 3. Input the anticipated improvement, being careful to select the *Improvement* option (see Figure 3).

A Maintenance and Reliability Initiative will accomplish at least one of the following:

- Increase MTBF (improving reliability by eliminating failures)
- Reduce % Major Repairs (Improving maintainability by finding a failure before it develops into a major repair)
- Reduce Time to Restore Production Critical Function (Improving maintainability by reducing time to restore).

For this example, I assumed the maintenance initiative would double the time between failures (MTBF) and reduce the % Major Repairs from 80% to 20%.

Step 4. Run the simulation. Figure 4 shows sample output.

Conclusion

Developing a preliminary business case for investing in Maintenance and Reliability can be quick. **A preliminary business case is a screen to rule out initiatives that can not be cost justified based on estimated payout.** The payout is estimated because the Light PDR Model does not directly calculate the effect of other types of failures, in-process buffers, storage tanks, or operating flexibility on payout. Instead, the PDR Light Model uses your current availability to estimate these effects on payout.² Consequently, the actual payout for a maintenance investment may vary based on these items. To include the effect of these items, you need the Basic PDR Model or the Expanded PDR Model.

¹ Sample input was obtained from Electrical Motor Diagnostics Business Case Development by Dr. Howard Penrose of ALL-TEST Pro (www.alltestpro.com) et. al.

² Watch "[Losing Uptime by Reducing Downtime](#)" at RonaMax.com to understand why production impact is devalued.

Light Profit Driven Reliability Model: Business Case Screen, Full Version

Profit Driven Reliability Model developed by



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Go to
(internet connection required)

Run Base Case
 Improvement

Stop

Help

View **Output**

Input

Base Case Availability: %

Cost of Maintenance Improvement (\$) =

Failure Type

Equipment count: (for this failure type)

NOTE: Complete optional input for MTBF estimate (see below)

MTBF (hrs):

Repair Times (hrs)

Minimum for MAJOR repairs

Maximum for MAJOR repairs

Average for MINOR repairs

% Major Repairs (High cost) %

% critical: %

Time to restore production critical function (hours)

Minimum

Maximum

Cost of Failure

Avg. Cost of Major Repair/Replace (\$) =

Avg. Cost of Minor Repair (\$) =

Production cost for 1 hour of downtime (\$) =

Optional input for Quick MTBF estimate

Annual Operating Hours (Uptime):

Annual number of failures: (for this failure type)

Figure 1. The Light PDR Model input screen for the Base Case



Figure 2. The Light PDR Model output screen for the Base Case.

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Go to www.ronamax.com
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Run Base Case
 Improvement

Stop

Help

View **Output**

Input

Base Case Availability: %

Cost of Maintenance Improvement (\$) =

Failure Type:

Equipment count: (for this failure type)

NOTE: Complete optional input for MTBF estimate (see below)

MTBF (hrs):

Repair Times (hrs)

Minimum for MAJOR repairs:

Maximum for MAJOR repairs:

Average for MINOR repairs:

% Major Repairs (High cost): %

% critical: %

Time to restore production critical function (hours)

Minimum:

Maximum:

Cost of Failure

Avg. Cost of Major Repair/Replace (\$) =

Avg. Cost of Minor Repair (\$) =

Production cost for 1 hour of downtime (\$) =

Optional input for Quick MTBF estimate

Annual Operating Hours (Uptime):

Annual number of failures: (for this failure type)

Figure 3. The Light PDR Model input screen for the improvement.



Figure 4. The Light PDR Model output screen for the improvement

Bio for Carol Vesier, Ph.D. ([Email Dr. Vesier](mailto:Dr.Vesier) or [Go to www.RonaMax.com](http://www.RonaMax.com))

Dr Vesier has a unique background that spans both the business and technical worlds. On the business side, she was a financial analyst for A.G. Edwards and Sons. Her accomplishments include:

- Receiving her Ph.D. in Chemical Engineering from Georgia Institute of Technology for her research in computational methods
- Developing simulation tools needed to minimize the profitability impact of unreliability, and
- Developing the Asset Management Analyst position at Rohm and Haas

As the Asset Management Analyst, Dr Vesier assisted the businesses in defining the profitability impact of unreliability and unpredictability. In this role, Dr Vesier defined the probable outcome of capital deployment, process improvement, maintenance, and supply chain strategies. This knowledge was key in achieving a 2% gain in RONA (Return on Net Assets). For Rohm and Haas at this time, a 2% RONA gain was equivalent to a 4.5% gain in ROE (Return on Equity) and a \$0.50 gain in EPS (Earnings per Share).

Upon leaving Rohm and Haas, Dr Vesier created Profit Driven Reliability[®] based on the work processes and tools that she had developed. Using Profit Driven Reliability[®], she has assisted her clients in improving their profitability in a variety of industries including chemical, durable goods, aerospace, petroleum, food, and semi-conductor.