

## Fortunes Realised with Operational Risk Reduction

*Let a Plant Wellness Way EAM System-of-Reliability End Your Business Risks Forever*

### Abstract

*Fortunes Realised with Operational Risk Reduction* – Adverse risk is the multiplication of the chance of a bad event times the cost of the event when luck goes against you. As risk is lowered money is recovered into additional profits. If you can gauge the size of any risk reduction you can also gauge the size of the money you will get from the effort.

Keywords: business risk reduction, risk management, risk analysis, risk matrix

Luckily, we are good at identifying risk. Not many of us will walk into the middle of a busy street if it is not safe to do so. For the people that work in engineering, maintenance, reliability, and operations risk aversion is a characteristic you want to be employing for. You do not want brazen entrepreneurs in maintenance and production running around trying unproven ideas and changing things when they feel like it. That is way too risky to be successful for long.

I've got nothing against new ideas; they are critical for future success. It is just that you can't afford to find out the idea is wrong by destroying your business in the effort to prove it works. Before you try things, you ought to know if it is even worth the effort. Luckily, risk is useful to help us calculate what we will get back for the effort that needs to be put in.

Risk is commonly described by the equation below.

$$\text{Risk} = \text{Frequency of Occurrence (/yr)} \times \text{Consequence of Occurrence (\$)} \quad \text{Eq. 1}$$

Risk is equal to the frequency of an event occurring multiplied by its cost, should it occur. Frequency is the number of times an event happens during a period. Usually, a year is used. An event that happens every five years has a frequency of 0.2 times a year. The consequence of an occurrence is the total business-wide financial impact of the event – its Defect and Failure Total (DAFT) Costs. You can learn more about the DAFT Costs that send companies broke from our article titles, 'The Instantaneous Cost of Failure from Breakdowns is Huge'. By calculating the frequency of an event per year, and counting consequence of an occurrence in monetary value, the equation measures the annual cost of risk. It is a means to quantify the yearly cost to the organisation of every event it suffers, good or bad. It provides a figure to gauge one risk against another and so allows the setting of priorities for addressing risk.

Equations of the loss from risk type are power laws<sup>1</sup> and take the general form  $x = z \cdot y^n$ . For the standard risk equation, the exponent 'n' is assumed to equal 1. When the exponent is '1' the risk curves look like those in Figures 1 on linear axes and Figure 2 on a log<sub>10</sub>-log<sub>10</sub> plot. The actual exponent for an operation in a business can be calculated by using the failure history from the operation. By plotting the log of event frequencies per year and the log of the DAFT Costs of the events, the slope can be calculated and the risk equation exponent that applies to an operation identified. This is the quantitative approach to identifying risk and it uses statistical and probability mathematics.

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<sup>1</sup> Robinson, Richard M., et al, 'Risk and Reliability: An Introductory Text', R2A Pty Ltd, 7<sup>th</sup> Edition

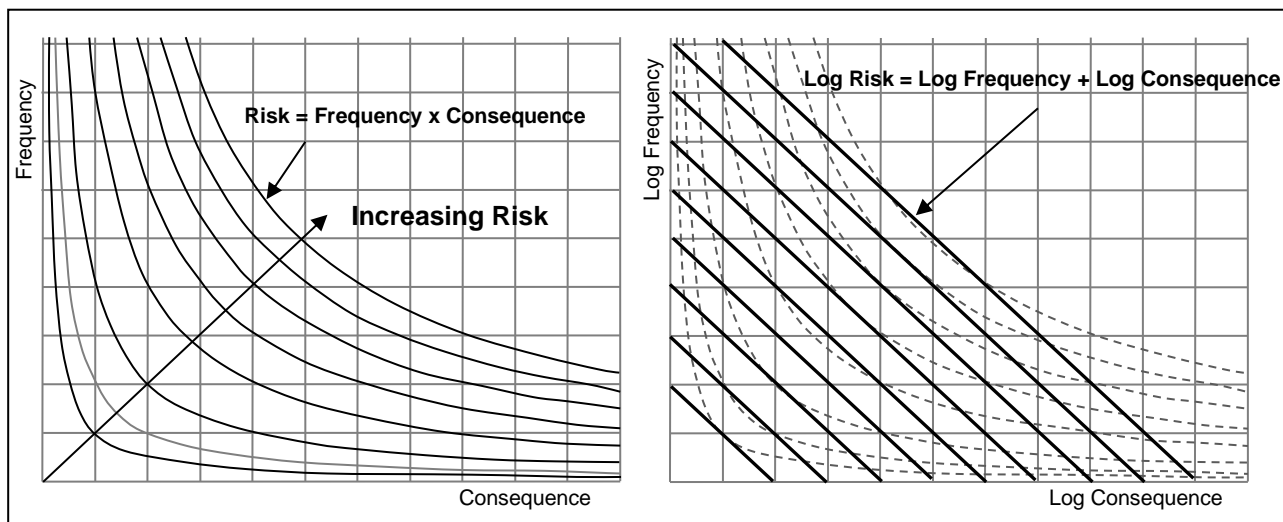


Figure 1 - Risk Curves on a Linear Graph

Figure 2 - Risk Lines on a Log-Log Graph

A risk matrix can be developed that does not use mathematics, but instead uses worded descriptions to explain the frequency of an event; this is the qualitative approach to risk analysis. A common form of the risk matrix is shown in Figure 3.

<div>RISK MANAGEMENT PHILOSOPHY</div> <div>E – Extreme risk – detailed action plan approved by CEO</div> <div>H – High risk – specify responsibility to senior manager</div> <div>M – Medium risk – specify responsibility to department manager</div> <div>L- Low risk – manage by routine procedures</div> <div>Extreme or High risk must be reported to Senior Management and require detailed treatment plans to reduce the risk to Low or Medium</div>			Business-Wide Consequence					
			People	Injuries or ailments not requiring medical treatment.	Minor injury or First Aid Treatment Case.	Serious injury causing hospitalisation or multiple medical treatment cases.	Life threatening injury or multiple serious injuries causing hospitalisation.	Death or multiple life threatening injuries.
			Reputation	Internal Review	Scrutiny required by internal committees or internal audit to prevent escalation.	Scrutiny required by clients or third parties etc.	Intense public, political and media scrutiny. E.g. front page headlines, TV, etc.	Legal action or Commission of inquiry or adverse national media.
			Business Process & Systems	Minor errors in systems or processes requiring corrective action, or minor delay without impact on overall schedule.	Policy procedural rule occasionally not met or services do not fully meet needs.	One or more key accountability requirements not met. Inconvenient but not client welfare threatening.	Strategies not consistent with business objectives. Trends show service is degraded.	Critical system failure, bad policy advice or ongoing non-compliance. Business severely affected.
			Financial	\$500	\$5K	\$50K	\$500K	\$5,000K
				Insignificant	Minor	Moderate	Major	Catastrophic
			Historical Frequency:			1	2	3
Event will occur at this site annually or more often	6	Certain	M	H	H	E	E	
Event regularly occurs at this site	5	Likely	M	M	H	H	E	
Event is expected to occur on this site	4	Possible	L	M	M	H	E	
Event occurs from time to time on this site	3	Unlikely	L	M	M	H	H	
Event occurs in the industry, and could on this site, but doubtful	2	Rare	L	L	M	M	H	
Event hardly heard of in the industry. May occur but in exceptional circumstances	1	Very Rare	L	L	L	M	H	

Figure 3 – A Typical Risk Matrix

Figure 4 is a risk matrix designed to show the quantum of money recovered by risk reduction efforts. The scales must follow log<sub>10</sub>-log<sub>10</sub> numeration<sup>2</sup>. The matrix shows this company's risk boundary as being \$10,000 per year per event. If a failure has a DAFT Cost of \$300,000 its consequence is C9 and if it occurs every 10 years, its likelihood is L7. The annual cost of risk from such an event is  $0.1 \times \$300,000 = \$30,000$  per year. Though the event historically happens only every decade and costs the whole company \$300,000 when it happens, the annualised cost is \$30,000.

Figure 4 – A ‘Money Recovery’ Risk Matrix

Even small failures that occur often can be justified for improvement. Say a repetitive failure occurred about every month and its DAFT Cost was \$3,000; a risk of  $12 \times \$3,000 = \$36,000$  per year. That is a lot of money lost to the business year after year. You could justify spending a small fortune in risk reduction to get the problem down to once per year. If you successfully dropped the risk to once a year it would then cost only  $1 \times \$3,000 = \$3,000$  per year, a huge saving of \$33,000 per year, less the cost of doing the mitigation. Any ideas that did that for a company would put a big smile on the faces of a lot of people.

3

The risk matrix is a tremendously powerful risk management decision making tool that is quite easy for non-technical and non-financially literate people to use. It has a very practical business improvement use when it comes to deciding whether to do risk mitigation or whether to just live with the risk and pay for it when your luck runs out.

My best regards to you,

Mike Sondalini  
[www.plant-wellness-way.com](http://www.plant-wellness-way.com)