

# Developing and Using Risk Matrices

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## Introduction

Risk Matrices have long been adopted in parts of the systems safety community as a simple means of categorisation of risk, yet they are often developed and used incorrectly leading to confusion and poor safety management.

This paper seeks to cut through to the essential elements and help the reader avoid the common pitfalls. It focuses on system safety risks to people, but could be similarly applied to environmental safety assessment too.

Throughout this paper the term “Equipment” will be used to mean some item of plant, platform, process, system or indeed equipment within the boundary of study.

The experiences recounted in this paper relate primarily to the application of risk matrices in the Defence industry but have, I believe, a wider relevance.

The treatment of topics surrounding risk matrices in the paper are not intended to be comprehensive; simply sufficient to keep the central subject matter of risk matrix development in context.

## Risk Matrices - Overview

Risk, as a combined measure of severity and likelihood, is an established concept, which I am taking the readers fore-knowledge of for-granted. The concept of a risk matrix can therefore be immediately introduced:

		Severity	
		High	Low
Likelihood	High	1	2
	Low	2	3

Table 1: Sample Risk Matrix

Each cell in the 2x2 matrix of Table 1 represents a level of risk. For simplicity we might say that:

- The (High, High) cell represents High Risk, marked “1” in Table 1;
- The (Low, High) and the (High, Low) cells represent Medium Risk, marked “2” in Table 1;
- The (Low, Low) cell represents Low Risk, marked “3” in Table 1.

A series of risks identified can each be placed by some means (judgement, estimation, formal assessment) in one of Table 1’s cells, but not before some definition of what “High” and “Low” Severity and Likelihood mean.

For example, in an assessment of business (rather than safety) risks we might say that High Severity means “a cost to the business above £10,000”. We might say that High Likelihood means “expected to happen in the next 12 months”. Because the above matrix is only a 2x2 matrix the definitions of “Low” are obvious; in this instance everything that isn’t “High”.

To establish some formality however we draw up tables of likelihood and severity definition:

Likelihood Category	Likelihood Definition
High	Expected to happen in the next 12 months
Low	Not expected to happen in the next 12 months

Table 2: Sample Likelihood Category Definitions

Severity Category	Severity Definition
High	A cost to the business greater or equal to £10,000
Low	A cost to the business less than £10,000

Table 3: Sample Severity Category Definitions

Any business risk can now have its likelihood and severity assessed against these criteria, be placed in the matrix, and by so-doing be categorised for action. We might even formalise what level of action is merited in each case, as in Table 4.