



M253 Resource Sheet

Risk and contingency planning

1 Overview

We all take risks and make contingency plans accordingly. We have written this Resource Sheet in order to help you to think about and identify risks to your project and team, and to plan what to do should 'the worst' occur.

2 Introduction

People often treat 'Murphy's Law' ('If anything can go wrong, it will.') as something of a joke. In fact, it is a useful first step in identifying the risk of something going wrong and taking steps either to ensure it does not, or if it does, ensuring that the result is not catastrophic. (*Every human activity carries some risk.*) In more formal terms, this is known as risk identification (the process of finding out what can go wrong), and risk management (taking steps to prevent failures or limit damage). Between the two steps is a process called risk analysis: once risks have been identified they need to be analysed in terms of their likely impact on performance, cost, schedule and quality, and in terms of the probability of the risk occurring.

Who was Murphy?

Capt. Edward A. Murphy was an engineer working in 1949 on a US Air Force project designed to find out how much sudden deceleration a human body can withstand (for example, in the event of a crash). It is said that one day he found a transducer wired wrongly and cursed the technician responsible, saying: 'If there is any way to do it wrong, he'll find it.' The contractor's project manager had been in the habit of keeping a list of 'laws', and he added that one to the list, calling it Murphy's Law. The 'law' had, in fact, been around for many years in a more basic form, but adding to the project list gave a name to it. The name gained wider currency after Dr. John Paul Stapp rode a test sled to a stop, surviving unhurt a deceleration of 40g, and gave a press conference in which he said the project's good safety record was due to a firm belief in Murphy's Law and the necessity of trying to circumvent it.

3 How to find risks: risk identification

Probably the most basic step in identifying the risks associated with any activity or project is first knowing *what the desired or correct outcome of the activity or project is*. If you start thinking about risks in any project or complex activity, your thinking will be focused on the whole project or activity. Whilst this can be useful, one problem with it as a technique is that you will inevitably miss something: it could be something key to the successful outcome of the project. For that reason, it is always wise to think about the smaller activities that make up what you are trying to achieve.

The Resource Sheet *Planning a project* describes the technique of developing a *work breakdown structure* (a decomposition of a complex activity into a series of much simpler steps). A good work breakdown structure chart is an excellent place to begin when seeking to identify risks, because already the complex network of tasks has been laid out in a way that assists simple brainstorming or allows people to draw on their past experiences of similar tasks or situations.

In many situations there exist *risk checklists* that planners can use (but Murphy's Law should tell us that the lists are never, ever exhaustive). If there is no pre-existing list, a combination of brainstorming (asking yourself and your team-mates: 'What can go wrong with this?') and drawing on your own and others' experiences of similar situations is the most useful way of drawing up your own list

Example 1 Identifying risks

Suppose two hospitals are being merged. One hospital has existed for decades in a site which is now inadequate: the buildings are antiquated and increasingly difficult to keep in good repair, and the layout of operating theatres, wards, and so on, is based on medicine as it was practised a century ago. Not far away exists a newer, more modern hospital on an amply large site. The project is to expand the new site with additional operating theatres, laboratories, wards, and so on, and when this is complete, to 'move' the old hospital's staff and their equipment, etc., onto the new site.

This is a major project likely to take a few years from planning to execution, and there is much to think about in terms of risk. But for the moment let's imagine that the day when the first operations in a new theatre is Monday of next week. The last remaining tasks are those of finishing off the new operating theatre: painting, tiling, any remaining wiring, lighting and plumbing, and furnishing it. The list below gives a flavour of some risk factors that might mean that the new operating theatre can't open on time, or if it does, might cause serious problems for the staff or patients using it in its early days.

Table 1 Risk areas and risks

<i>Items</i>	<i>Associated risks</i>
electrical fittings	not complete not correctly wired inadequate to needs
plumbing	not complete not easily accessible in room layout inadequate to needs not working correctly
lighting	not complete wrongly placed inadequate to needs not working correctly
furnishings	not delivered delivered but not installed not properly installed or placed
ancillary equipment (autoclaves, etc.)	not delivered delivered but not installed not properly installed not easily accessible in room layout

Of course, this list is not exhaustive!

Whether it is worth trying to draw up a more exhaustive list will depend on one of two other factors: if you miss identifying a risk, is it a risk that is likely to jeopardise the outcome of what you are trying to do (its impact)? And, how *likely* is it to occur (its probability)? Since the next step in the process looks at those two aspects of risk, just be aware that at the next stage (analysis) you may want to repeat part of the first stage (identification) because something has occurred to you that needs to be put on the risk list. Exercise 1 will give you a flavour of this.

Exercise 1

Suppose you are going abroad for a key business meeting. You plan to fly, and your company has obtained your tickets and booked accommodation. Spend no more than five minutes and list some items that are key to getting to the meeting, and some associated risks. Do not try to be exhaustive.

Discussion

My list looks like the following table. (Yours may differ.) Mine is based on personal experience either of things I have done myself, or that people I have travelled with have done. Yours may be based on your own experiences or experiences of friends or colleagues, or some items may have resulted from a bit of 'brainstorming' about what can go wrong. (More than one comic cinematic sequence is based on problems like these.)

Table 2 Getting to the meeting: risks

<i>Items</i>	<i>Associated risks</i>
documentation	forgetting passport passport expired without my noticing picked up wrong passport at home when leaving passport renewal applied for but new passport isn't returned to me on time (or lost in the post) missing necessary visa for travel to my destination forgetting to take the tickets with me
transport to airport	car breaks down booked taxi fails to pick me up get lost on the way to the airport go to wrong airport or terminal traffic jam or accident delays me public transport fails
baggage	left at home by the door left in taxi, car, bus or train stolen from me on journey to or at airport lost in baggage handling contains forbidden items and is confiscated
key papers for meeting	forgetting to pack them forgetting to take them having them stolen whilst getting a cup of coffee in the departure lounge
money	forgetting wallet wallet stolen by pickpocket in airport took money out to count it at home and forgot to put it back in wallet took wrong wallet when leaving home

4 Analysing risks: how likely? how bad?

Murphy's Law tells us that *everything that can go wrong will*. This is a controversial aspect of the law (though sometimes it seems all too true!) because *will* means that the probability of something happening is 100%! In truth, there is another 'law' worth recalling: Benjamin Franklin's dictum that 'nothing in life is certain except death and taxes'. For our purposes, it is the first part of the sentence that is important: *nothing is certain*. Risk analysis involves making an estimation of how likely a risk is and what its impact is likely to be. Doing so enables the planner to move to the third phase: *risk management*.

Example 2 What risk assessment might tell us

In Table 1, one possibility regarding electrical fittings is that they might not be completed in time. Let us argue for now that the schedule of building and equipping the new operating theatre is not too tight, and there is every reason (we think) to assume that the electricians will not be so rushed that they are unlikely to complete the work. That seems straightforward enough, but other things can happen! For example, a key person can go away on holiday, or be called to another job before work is complete, and then *forget* to come back to complete the work; or the plumber could disconnect something for safety reasons whilst he is working, then forget to connect it again.

What would be the impact of the electrical fittings not working? Modern surgery is very dependent on an ample and constant supply of electrical power: for lighting, power to monitors, computers, ventilation, and so on. Although surgery might just be possible in the absence of electrical power, it would likely be very dangerous to the patient!

So we can say that the *impact* of a risk that means electrical power is not available or seriously inadequate is very high: possible loss of life or serious harm could result.

Then we have to look at the probability of this risk occurring. With adequate quality checks and testing, given adequate time, the risk probability is likely to be low. But note that we have identified some provisos: adequate checks and adequate time! Thus, the more pressured the installation is, the more the electrician in charge has to divide his or her attentions between multiple projects, the more often key checks must be delegated to less experienced people, the higher the risk that the electricians will not be 'right on the night'. We have not quantified the probabilities here, but we can derive a low, medium or high assessment of the probability of a risk based on factors such as the amount of time available, the skills of the staff, the adequacy of procedures, and the ability of staff to give attention to the work.

For most risk identification and assessment in projects or activities that are not likely to be critical to human life and health, or to major financial commitments, simple methods of identification and ranking are likely to be adequate.

What we have not said is how this can usefully be documented. A simple method is to draw up a list of risks (based on examining the work breakdown structure), and rank these roughly, according to their impact and probability. The following exercise will give you a flavour of this and is based on your list from Exercise 1.

Exercise 2

Choose two or three risks from the list you produced as part of Exercise 1. Now rank these for their impact and probability. You don't need to be any more accurate than the estimations shown in Table 4 in the discussion to this exercise. Use Table 3 to complete your own risk assessment using the risks you chose.

Table 3 Risk assessment exercise

<i>Risk</i>	<i>Impact</i>	<i>Probability</i>	<i>Notes</i>

Discussion

Table 4 shows my answers to one area of risk in my trip abroad. All of these have happened to me at various times!

Table 4 Sample risk assessment: transport problems to airport

<i>Risk</i>	<i>Impact</i>	<i>Probability</i>	<i>Notes</i>
car breaks down	medium	low	had recent service
Booked taxi fails to pick me up	medium	low	use reputable firm
get lost on the way to the airport	medium-to-low	low	check maps ahead of time, plan route
go to wrong airport or terminal	low	medium	check which airport and terminal before leaving sign-posting at Heathrow confusing
traffic jam or accident delays me	medium-to-high	high	depends on time of day
public transport fails	medium	low	unless trapped I can get taxi

The next step is to *manage the risks*. Of course, in most cases the work involved may outweigh any benefit, so it is important to tackle risks in a particular order:

- 1) high-impact, high probability
- 2) high impact, low probability
- 3) low impact, high probability.

It is probably not worth expending much effort on low impact, low probability risks (for example, 'the car may need more petrol before we get to the airport, but I filled the tank yesterday').

5 Managing the risks

There are many different ways in which to manage risks.

- Avoid the risk: this may mean changing a task or a design to eliminate the risk.
- Reduce the risk: for example, to reduce the risk of arriving too late for my flight because of a traffic jam, I can allow plenty of extra time to travel to the airport.
- Transfer the risk: essentially this is the equivalent of taking out travel insurance that pays me if I miss my flight due to, say, car breakdown or failure of public transport.
- Accept the risk: I do not ignore the risk, but remember to review the situation from time to time to determine whether the risk (a) has an increased probability of occurring, and (b) whether the impact it would have has changed.
- Make contingency plans: come up with a 'Plan B' *before* a risk occurs so that, if it does, "Plan B" can be put into action immediately. In my example, 'Plan B' for, say, public transport failing me may be 'take a mobile phone and be prepared to call, and pay, for a taxi to complete my journey.

Contingency planning involves identifying some alternative options that provide acceptable strategies for recovering in the event of a problem. In the case of failure of public transport, note that I have mentioned taking sufficient cash to pay for a taxi ride. Here are some general contingency strategies.

- Do nothing (but this must be a conscious, positive choice, not just what happens because you have not thought of anything else).
- Draw up alternative plans and procedures or alternative ways to proceed from the point at which the risk hazard occurs.
- Make reciprocal arrangements with others to provide specific help or resources in the event of a problem.

Exercise 3

Take one item that you identified in Exercise 2 and spend a couple of minutes thinking about what you would do if this happened. Write it down.

Discussion

I chose getting caught in a traffic jam. Even if I try to reduce the risk by leaving plenty of time, a bad traffic jam can still delay me long enough for me to miss my flight. Having thought about that, I have looked at a map and drawn up some plans about where I could leave the motorway and make my way across country to the airport by alternative back roads.

6 Summary

Anything that human beings do involves the risk of something going wrong. It is important to identify risks, then to analyse these according to their impact and their probability of happening. Once that is done, one can work from high impact, high probability risks to low impact, high probability risks to manage those risks. (It is probably not worth attempting to manage low impact, low probability risks.) There are a number of ways to manage risks. One is to draw up contingency plans. One thing you should never do is *ignore* the risks. If you decide to accept them and do nothing, at least this should be a positive choice.