

## Chapter 4: Reducing Risk

Having identified and assessed the risk you are in a position to consider ways of reducing it. **There are three basic approaches:**

- **Avoidance:** having identified the risk, you replan to eliminate it
- **Deflection:** you try to pass the risk on to someone else
- **Contingency:** you take no action in advance of the deviations occurring other than to draw up contingency plans should they occur.

**Pym and Wideman** use an analogy of a man being shot at. He can take cover to avoid the bullets: he can deflect them using a shield or divert the bullets by placing someone else in the firing line: or he can allow them to hit him and plan to repair the damage.

### Avoidance



## 4.1 Avoidance

The warehouse project above showed how to avoid the risk of snow holding up the preparation of the foundations, by starting the work early enough so that it is finished before the snow comes. **Under avoidance you change the plan for anyone of the five system objectives or any combination of them to reduce the risk or eliminate it entirely.**

### Deflection

## 4.2 Deflection

**There are three ways of deflecting risk:**

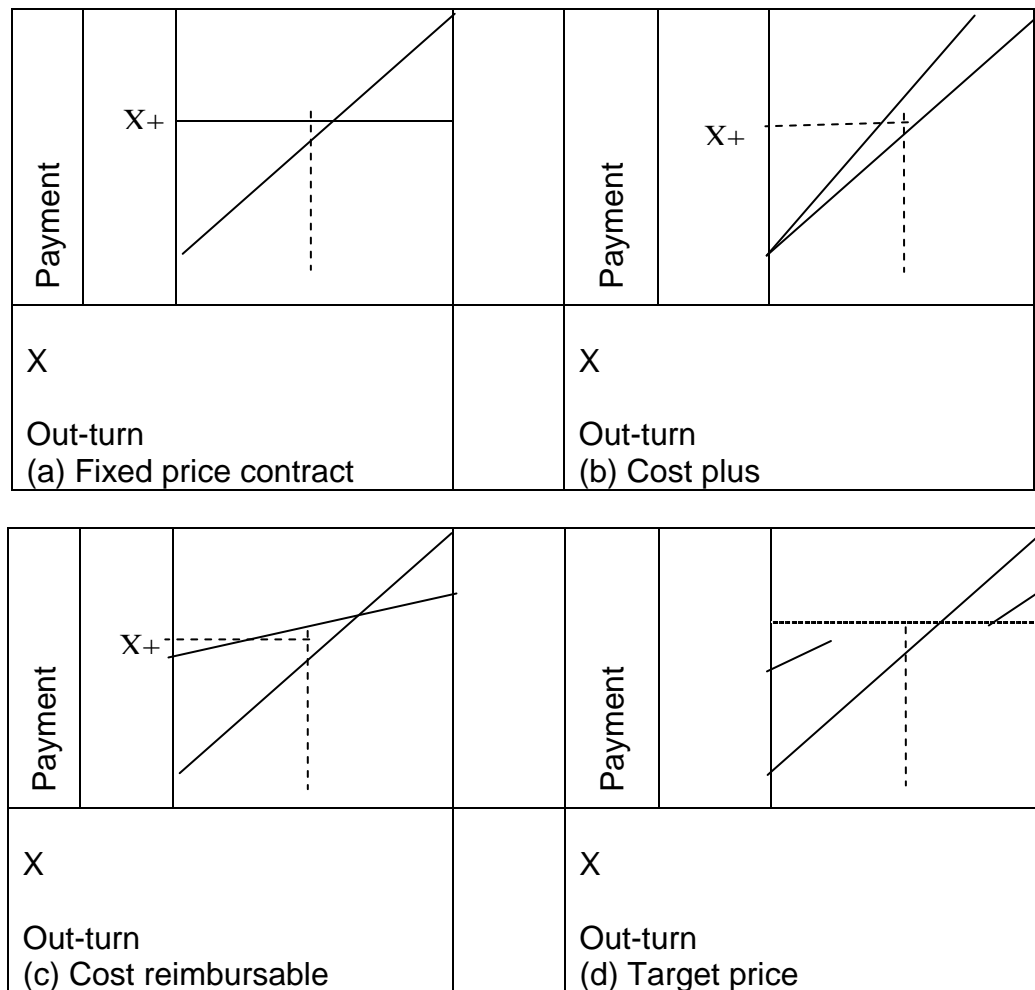
- **Through insurance:** by which it is passed on to a *third party*.
- **Through bonding:** by which a *security* is held against the risk.
- **Through the contract:** by which it is passed between *owner, contractor and subcontractors*.

1. **Insurance:** A third party accepts an insurable risk for the payment of a, premium, which reflects the impact of the risk and the likelihood combined with the consequence.
2. **Bonding:** One or both parties to a contract deposit money into a secure account so that if they or either party defaults, the aggrieved party can take the bond in compensation. This is a way of transferring the risk of one party defaulting to that organization.

3. **Contract:** Through contracts the risk is shared between owner contractor and subcontractors. *There are two common principles of contracts:*
- a) **Risk is assigned to that party most able and best motivated to control it.** There is no point passing risk onto a contractor or subcontractor if neither has the power or the motivation to control it. The Institution of Civil Engineers is currently revising its standard forms of contract around this principle. There are four styles of contract for different approaches to sharing risk:
    - Fixed price
    - Cost-plus
    - cost reimbursable
    - Target cost.
  - b) **Under fixed price contracts.** In Figure 4.1-a, the contractor accepts all the risk by taking a fixed fee for the work regardless of how much it costs. It is assumed that the owner has completely specified the requirements and as long as they do not change the contractor can meet a given price. This approach is adopted for turnkey contracts, where the contractor takes full responsibility and delivers to the owner an operating facility. The owner has no role in its construction. Often in fixed price contracts the owner and contractor haggle over every change arguing over which one of them caused it and whether it is within the original specification.

**When the owner cannot specify the requirements, the contractor should not accept the risk,** but it should be borne by the owner. The simplest way is through *cost-plus contracts*, Figure 4.1-b. The owner refunds all the contractor's costs and pays a percentage as profit. The disadvantage is that the contractor is still responsible for controlling costs, and yet the higher the costs the higher the profit. This is a recipe for disaster as the party responsible for control is not motivated to do it; in fact the exact opposite. It is possible to adopt strict change control and that passes responsibility for controlling costs back to the owner, but can lead to strife. Typically, cost-plus contracts are used on research contracts.

**Another way of overcoming the problem** is to pay the contractor a fixed fee as a percentage of the estimate, instead of a percentage of the out-turn. This is a *cost reimbursable contract*. Figure 4.1-c. The contractor can be motivated to control costs if paid a bonus for finishing under budget, or charged a penalty if over budget. However, the parameters for the bonus or penalty must be carefully set to ensure that the accepted risk is not beyond the contractor's control. Even without a bonus the contractor may be motivated to control costs, as that increases the percentage return.



**Figure 4.1: Four types of contract**

A related approach is target cost, Figure 4.1-d. The contractor is paid a fixed price, if the out-turn is within a certain range typically  $\pm 10$  per cent of the budget. If the cost goes outside this range, then the owner and contractor share the risk at say 50p in the pound. If the costs exceed the upper limit, the owner pays the contractor an extra 50p per pound of overspend and if the price is below the range the contractor reduces the price. This is often used on development projects where there is some-idea of the likely out-turn but it is not completely determined. The contractor may also share in the benefits from the product produced.

- c) *Risk is shared with subcontractors if it is within their sphere of control.* To achieve this, back-to-back contracts are used: the clauses in the contract between owner and contractor are included in that between contractor and subcontractors. In some instances, where the contractor feels squashed between two giants and accepts quite severe clauses from the owner to win the work but believes that the subcontractors will not accept them because they do not need the work. This often happens to contractors on defense or public sector projects. The way to avoid this is to try to get the subcontractors to make their contracts directly with the owner and use the owner's power to pull the

supplier into line. The supplier may not need the business from the contractor but may have a better respect for the owner.

### 4.3 Contingency

#### Contingency

The third response to risk is to **make an allowance for it by adding a contingency**. You can add an allowance to anyone of the five system objectives, but typically there are two main approaches:

- **Make an allowance** by increasing the time and/or cost budgets.
- **Plan to change** the scope by drawing up contingency plans should the identified risks occur.

### 4.4 Time and/or Cost

#### Time and/or Cost



You can either add the allowance as a **blanket figure calculated through a bottom-up approach as above or you can add it work element by work element**. Either way, the project manager should maintain at least two estimates, a raw estimate without contingency and an estimate with contingency. The former called the baseline is communicated to the project team as their working “budget” and the latter to the owner for the provision of money and resources. The project manager may also maintain two further estimates the most likely out-turn the figure to which they are working and the current estimate, which is the baseline with some contingency already consumed. The reason for giving the project team the baseline or current estimate as their working figure is that their costs will seldom be less than the estimate and will consume contingency if it is given to them. The reason for communicating the estimate with contingency to the owner is allow him to budget for the maximum likely time and cost.

### 4.5 Contingency Plans

#### Contingency Plans

**These are alternative methods of achieving the milestones** to be used in different circumstances. The alternative plans mayor may not cost more money to implement though, presumably, if they cost less, it would be better to follow them in the first place. On the extension to the steam system on the ammonia plant above, it was shown how alternative plans were available should the valve shut tight shut partially and not shut at all. The latter plans each would have cost more than the first which is the one we followed although the second would have only been marginally more expensive.

However, it is better to plan to eliminate the risk than to plan how to over-come it and it is better to plan how to overcome it than to increase the cost and extend the duration to pay for it.

Controlling  
Risk

## 4.6 Controlling Risk

Having identified ways of reducing risk, you can implement a plan to control the reduction. There are four basic steps in control:

- **Draw up** a plan
- **Monitor progress** against the plan
- **Calculate variances**
- **Take action** to overcome variances.

Risk  
Management  
Plan

## 4.7 The Risk Management Plan

The risk management plan identifies the risk associated with a project the means by which they have been assessed and the strategy for their reduction. A risk item tracking form provides a framework for recording the relevant information for each risk. The form which may be held in a spreadsheet or computer database describes:

- *Why* the risk is significant?
- *What* is to be done to reduce it?
- *When* the risk will have its impact on the project?
- *Who* is responsible for resolving the risk?
- *How* the reduction will be achieved?
- *How much* it will cost to resolve the risk?

Risk  
Monitoring

## 4.8 Monitoring Risk

The risks are then monitored on a regular basis (**weekly fortnightly monthly or at other predetermined intervals**) to determine how far each risk has actually been reduced. At each review the risk tracking forms are sorted into their order of current importance. *A list of the most significant risks usually the "top-ten" is produced giving rank this period rank last period and periods on the list.*

Risk  
Assessment

## 4.9 Risk Reassessment

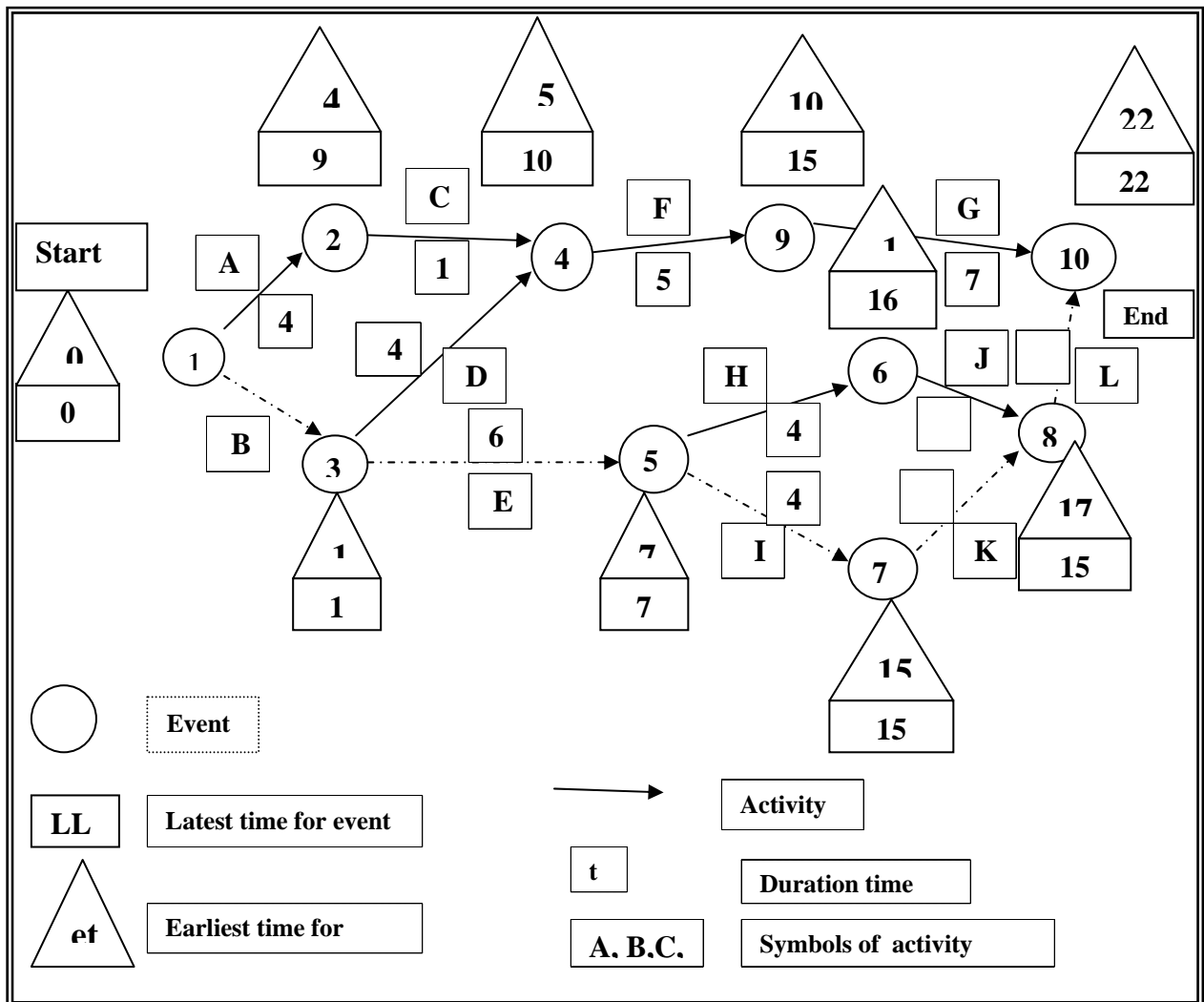
**Reassessment should be carried out whenever new risks are identified in the course of risk monitoring.** In addition, there should be explicit reassessment at key milestones in the project and at transition between stages. *The launch meetings for subsequent stages are ideal media for this reassessment.* All the above techniques are used for reassessment. It is always easier to improve on an existing plan but there is the disadvantage that new risks may be ignored. Figure 4.2 shows a risk item tracking form for TRIMGI communication BV company.

<b>TRIMAGI COMMUNICATIONS BV</b>		<b>RISK ITEM TRACKING FORM</b>		PAGE 1 OF 2
PROJECT		CODE		
WORK PACKAGE		CODE		
ACTIVITY		CODE		
RISK NUMBER	RISK IDENTIFIER			
NATURE OF RISK	EU/EP/IT/IN/L	TYPE	BUSINESS/INSURABLE	
SOURCE	CONTRACTUAL/MANAGEMENT		TECHNICAL /	
CATEGORY	PER SONNEL			
DESCRIPTION:				
IMPACT DATE:	LIKELIHOOD		LOW/MEDIUM/HIGH	
SUBSIDIARY RISKS				
ACTIVITY	RISK IDENTIFIER			
ACTIVITY	RISK IDENTIFIER			
RISK IMPACT				
SEVERITY:	VL/L/M/H/VH	SEVERITY SCORE	.../5	
UKEUHOOD SCORE	.../3	RISK SCORE	.../15	
		SS*LS=		
IMPACT AREA				
SCHEDULE				
COST				
PERFORMANCE:				
RISK MONITORING				
MONTH				
RANK				
<b>TRIMAGI COMMUNICATIONS BV</b>		<b>RISK ITEM TRACKING FORM</b>		PAGE 2 OF 2
CORRECTIVE ACTION		PROPOSED/APPROVED		
DESCRIPTION				
RISK	REDUCTION			
COST				
RESPONSIBLE	UKEUHOOD		LOW/MEDIUM/HIGH	
MANAGER				
REVISED DATE				
START DATE:	CLOSURE			
	DATE:			
REVISED IMPACT				
SEVERITY		SEVERITY SCORE	.../5	
VL/L/M/H/VH		RISK SCORE	SS .../15	
UKEUHOOD SCORE /3		*LS =		
IMPACT AREA :				
SCHEDULE :				
COST :				
PERFORMANCE :				
MONTH	ACTION	NEXT ACTION	BY WHOM	
	TAKEN			
ISSUE :	DATE :	AUTHOR :	APPROVED :	

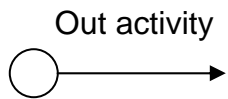
Figure 4.2: Risk item tracking form

**Example "How to reduce risks in projects?"**

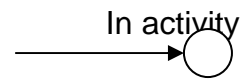
Activity	Immediate Predecessor Activity	Duration in Time Units
A	None	4
B	None	1
C	A	1
D	B	1
E	B	6
F	C,D	5
G	F	7
H	E	4
I	E	8
J	H	1
K	I	2
L	J,K	5




## Remarks


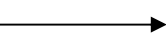


Beginning activity



End event

 Event does not occur except all it's in activities completed.

  Activity can not start before its beginning event does occur.