

RISK MANAGEMENT IN THE OIL AND GAS BUSINESS: PROBLEMS AND SOLUTIONS

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Risk management is practised by everyone, either formally or informally. A formal approach is preferable and if adopted can have substantial impact on bottom line profitability.

This paper explains the principles of risk management including risk analysis, loss control, contingency planning and loss funding options. Practical examples of the application of risk management are given to demonstrate risk management problems and their solutions.

Most, if not all, of the erudite dissertations on this subject are heavy on theory and light on practical. That's because being more an art than a science, it's possible to wax eloquently about risk management knowing that few will argue.

Firstly I'll describe what risk management is and perhaps, more importantly, what isn't. It isn't:

- (a) A way to stop losses from happening.
- (b) An alternative to insurance.
- (c) A management panacea.

Risk management is a very simple thought process with profound application; rather like a safety pin, to take a practical example. People look at it and say why didn't I think of that.

Risk management is a principle, a philosophy and an excellent management tool. A schematic of the whole process is illustrated in Fig. 1.

A better way, however, is to think of the principle as a circle of subject headings, all of which react to each other (Fig. 2). One can almost make a start at any point in the circle and go round the process and end up with the same final answer.

You begin, however, by establishing how much loss you can bear per event and in the aggregate per annum. This is the best first step because once you've worked out this item, then you can, of course, avoid wasting a lot of time examining irrelevancies, risks which can only cause loss which will obviously cost less than the amount that you've decided you can safely ignore.

The next step is to try to establish the risks faced.

Thirdly, work out how often the risks may happen and how much the losses may be under normal circumstances (all protection methods have worked) and under abnormal circumstances (Murphy's law has applied and everything that could go wrong has gone wrong).

You now know what the risks are, how often they might happen and how much they might cost. Next look to see

whether it's possible or economic to eliminate any of the risks. I'll come back to that in a moment.

As far as the residual risk is concerned, the theory now says that you should work up a system to reduce the risks, either in regard to their return period or their anticipated cost. That sends you back to the risk analysis because, of course, if you've reduced the risk you need to remeasure it in terms of probability and severity. This is typical of what I described earlier as being the circle of interactive steps.

What you are left with is a very good understanding of the risks faced and their anticipated cost. The final step is to work out the most economical method by which to fund it if and when it happens.

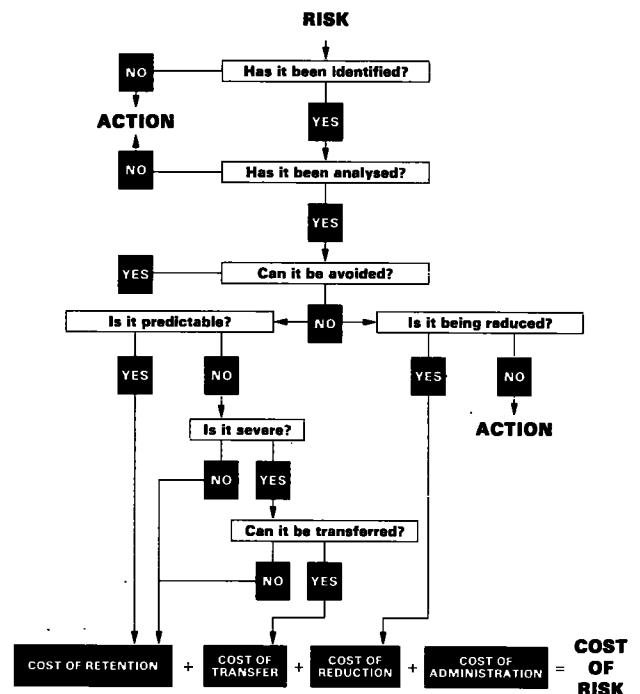
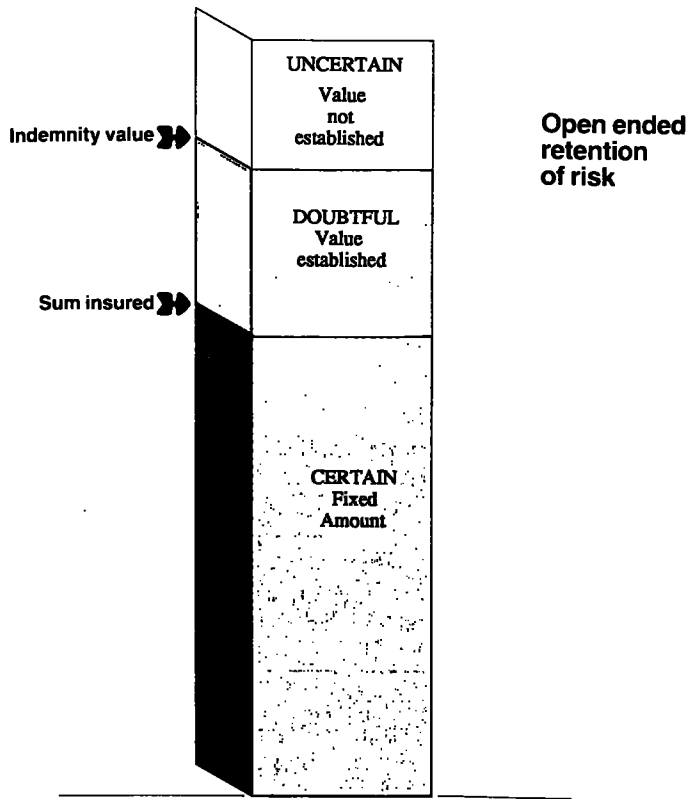


Fig. 1: The significance of risk analysis on the total cost of managing risk.

Replacement value →

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This method of retention provides very little financial security. A more secure method is to retain the lower layer of risk up to a fixed limit and to insure the more uncertain upper layers in full.

Fig. 2: Open ended retention of risk.

I have placed emphasis on pure or static risk because this is my background. Speculative risk can, however, be handled in precisely the same way.

I can now turn to looking at how the system works in practice.

RISK RETENTION

One man's meat is another man's poison or what is felt insignificant by some is unacceptable to others. However, rules of thumb have been developed and a weighted average of the following financial factors is at least a guide.

Bear in mind that the figure arrived at is in the aggregate per annum, not per event. Also, it is based on the past so does not consider future plans and financial commitments. It's preferable, of course, to calculate the amount against budget instead of the last annual report.

RISK ANALYSIS

It is absolutely imperative that risk analysis is done properly and exhaustively. There is nothing worse, having decided to adopt a risk-management approach, to find after the event that something was overlooked or was not considered to be a risk worthy of full examination.

Maximum possible loss →

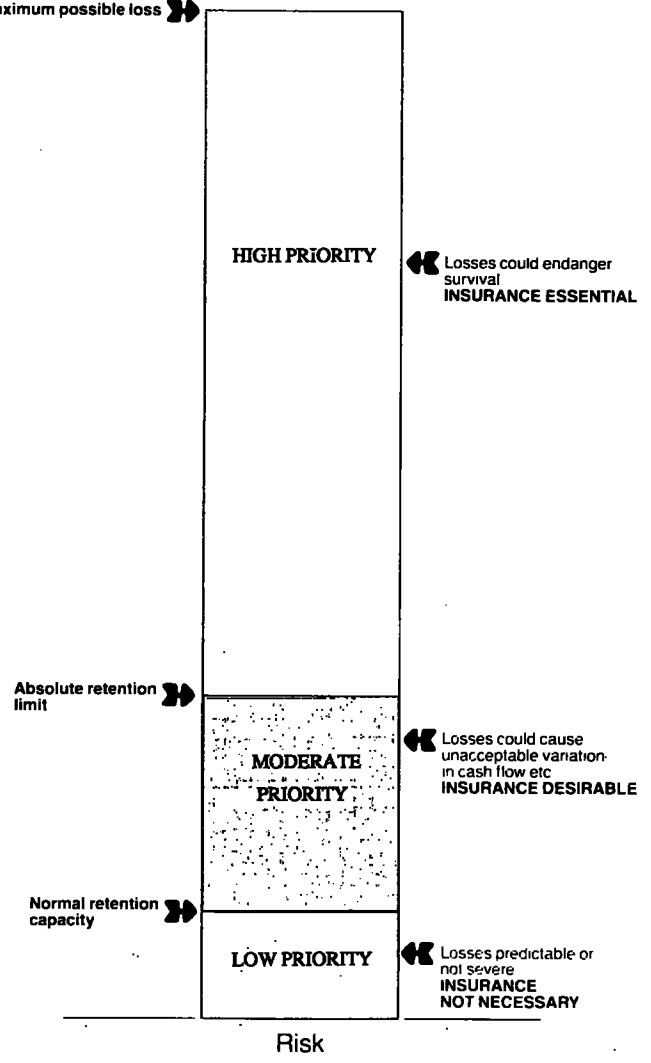


Fig. 3: Insurance priorities.

The process is simple: think through all of the issues as logically as possible. It will help if you have the guidance of a professional because of their experience. They will also bring risk analysis checklists which will have been developed over years of work (Fig. 3).

- The risks faced will vary in type and degree according to the business that you are in. In very broad form, however, I suggest that they will fall under these headings:
- (a) Loss or damage to assets owned or in custody.
 - (b) Legal liabilities.
 - (c) Business interruption and/or increased cost caused by (a) or (b).

The risk analysis process must be systematic. Record everything, particularly the conclusions reached and how they are arrived at. You will want to refer back to this very basic information continually in the future. Do not overlook hidden risks. These risks appear particularly in contractual situations or in business activities involving others.

Probability and severity

Many risks can now be quite accurately forecasted for return period and cost. And it is quite surprising to examine results of the analysis done. Guesswork and instincts are replaced with modelling and actuarial forecasts.

I shall explain how an analysis can proceed.

As a first and most important issue, it's essential that you establish what you own and what your future plans for the assets are. In other words, if the asset is destroyed, lost or damaged, how do you expect to react? You may discover redundancy or appreciation; whichever it is this, should be recorded as the base from which the severity calculations are made.

Earthquake loss expectancy can be assessed by reference to past experience: what is the maximum shaking that can occur, the geology/soil conditions of the site, the foundations of the plant or building, the seismic design of the plant or building?

Earthquake risk has two aspects, namely the shock damage (cold earthquake) and fire following (hot earthquake). Both these risks need to be examined. Often you will find that the risk of fire following earthquake is substantially more than shock damage alone. This is particularly important in the oil and gas industry where process piping can fracture, spilling hydrocarbons.

Fire The factors here include plant or building usage, construction, separation, the surrounding property, fire extinguishment/detection techniques (including hand held fire extinguishers, fire detectors and automatic sprinklers) and proximity to fire brigade and response time. The record in New Zealand for automatic sprinklers is 99.9% efficiency (sprinklers have only been overcome in three fires) and consequently one can say with some certainty that a sprinklered property should have outbreaks of fire contained to the outbreak area only.

Storm and flood Consider building construction, location and loss history.

Aircraft Is the building or plant on a flight path?

Material damage can be quite accurately defined. The conclusions that you reach should be used. If you conclude that the maximum possible loss you can sustain from fire in worst case scenario is no more than 10% of the total asset value, then that is all you have to find funds for when you get to the next stage of developing the best loss funding technique.

Legal liabilities

This is probably the most complicated area that you will have to consider. The problem is that a legal liability exposure is as long as the piece of proverbial string. The all-embrasive term also covers a wide range of risks including:

- (a) Injury or damage to the public by accident plus consequential loss. This exposure is often worldwide and protection given by the Accident Compensation Act is not always available.
- (b) Death or injury of employees. Liability from country of origin to expatriates cannot be ignored.
- (c) Liability arising from products, particularly those exported, including costs of replacement and recall.
- (d) Error or omission in advice or design which results in financial loss to a third party.
- (e) Libel and slander.
- (f) Deprivation and wrongful dismissal.
- (g) Punitive or exemplary damages.
- (h) Faulty workmanship.
- (i) Liabilities arising from contract.

In the oil or gas business one of the areas that presents some of the greatest difficulty is the last item listed. A contract negotiation is all about price for goods or services but underlying that is the question of the cost of risk.

So what is the exposure cost? *It all depends.* Exxon found out recently how much pollution liability risk it had and Union Carbide found out at Bhopal how much third party liability risk it also had. It's only by intelligent extrapolation of precedent to your own circumstances that you can make a reasonable estimate at what the exposure is.

Business interruption/increased cost

To work out the exposure here, you can uplift the risks that you've identified which may cause loss or damage to your assets and examine them for the effect that they will have on the continuation of the business with consequently either loss of gross profit and/or increased cost of working.

To these risks, however, have to be added risks of loss or damage outside your own business. I'm referring to:

- (a) Loss or damage at a supplier's or a customer's premises.
- (b) Loss of use of an important facility, for example transport, port.
- (c) Loss of supplies of water, electricity.
- (d) Prevention of access to your own facility due to surrounding disruption.
- (e) Disease.
- (f) Strike.

Most of the above can be quite accurately quantified in both terms of anticipated period of interruption by the risk factor and its cost effect.

As with the asset exposure, once having decided what the business interruption exposure is this should be carried forward in a logical manner to the loss funding programme. That is, if it is discovered that some risk scenarios show there could be a small amount of gross profit loss but at a substantially increased cost of working, then that is the form that the loss funding programme should take, not a kneejerk reaction purchase of a gross profit insurance policy.

Employee benefits

The risks here are both real and moral. They relate to the retention of good staff and the protection of the company from the loss of key personnel. There are some real risks and there are some good options which can be used to arrive at a solution.

In summary, let me remind you that contingency plans and elimination and/or loss control need to be kept in mind during the whole risk analysis exercise.

ELIMINATE OR CONTROL

Let me first discuss the very simple subject of elimination. I have seen many situations where, to my surprise, on being presented with a complete picture of the risks faced at a location or from a product and the cost of funding the probability of the loss, my client has made a very simple decision to move somewhere else or discontinue that particular line of activity. For example, there is I think going to be a disincentive to new business establishment in the Wellington region following the changes which are being made to the Earthquake and War Damage Act. The premium rate for earthquake insurance at the moment is 5c per cent.

I understand the true rate should be around 30c per cent. One eliminates the risk of earthquake and its cost in New Zealand if you site the business in a non-earthquake zone.

Now turn to loss control. It is human nature to try to cut corners. It is my experience that a well developed philosophy and loss control plan is the antithesis of human nature. Loss control talks about things being done in a careful, planned, well defined way and also by taking care of detail. However, loss control itself has a pitfall as it's always possible to spend more money controlling a loss factor than is economic.

Below are a few suggestions on how to construct a loss control programme:

(a) Whatever is going to be done has to have the backing of management. If it doesn't then the interpretation of the signal will be *They are only paying lip service so we need not bother.*

A well worded announcement from the Chief Executive is the most effective first step to launch the programme, together with real interest on his/her part in monitoring the programme's progress.

(b) I strongly recommend, in order that the programme does not get submerged in detail, that what needs to be done is divided up into *shoulds* and *musts*. By *must* I mean a decision is taken that:

- (i) We must act as a good citizen.
- (ii) We must comply with the law and we will not for any reason subvert our responsibilities.
- (iii) We must put sprinklers into the computer room because we've identified that as being the place where we are most vulnerable.
- (iv) We must put in an incident report system so that we can start tracking the small events which might be a manifestation of something larger to come.
- (v) We must add loss control to an employee's job specification in various divisions or locations and have that person go through a formal weekly inspection check regarding rubbish disposal, leaks, valves, etc.

The *shoulds* will also be listed but they are the items that can be put off either because they are niceties or for perhaps budgetary reasons.

(c) Don't overlook reciprocal agreements as part of the loss control process.

LOSS FUNDING

The total cost of risk is the sum of the following items:

Cost of retention	\$
Cost of transfer	\$
Cost of control	\$
Cost of administration	\$ _____
Total cost of risk	\$ _____

The objective of the Risk Manager is to juggle these four items so that the total cost is at the lowest figure but with long-term security.

An item of interest is the question of cost of transfer. I've deliberately referred to the item as a transfer of risk cost and not just insurance otherwise the conclusion, *buy insurance*, which most reach at this point will be fostered. In fact, all should have an open mind about the way that a loss might be funded if it occurs. Funds for loss, of course, can only come from two sources: either internal or external.

The sources of funds in these two categories are:

- (a) Internal: Repairs and maintenance
Self-insurance fund
- (b) External: Insurance
Borrowing
Contractual indemnification.

Generally, it will be the amount of risk which is going to be retained which is self-funded. Unfortunately the tax system in most communities does not encourage self-funding and that is why many organisations have set up their own insurance companies so as to make good use of their financial power.

Insurance is the most expensive form of funding because insurers, of course, do not put up risk capital for love. They are in the business of making a profit and they do so out of their underwriting account, their investment account and their tax deferral account.

Borrowing should not be overlooked provided, of course, that in arranging a borrowing facility this does not inhibit other financial arrangements which the company may wish to make.

And finally, I come back to that question again of contractual indemnity. Of course, contractual indemnity is a two edged sword and sometimes it will be economic to allow you as principal or contractor to bear risk on behalf of another and in other cases it will not. The point I want to emphasise, however, is that contractual indemnity is a loss funding technique and it should be viewed as such. Next time you are negotiating a contract and you get to the indemnity clauses, please realise what you are about to discuss: loss funding.

Two factors will often influence the outcome of negotiations on contractual liabilities. Firstly, where through past business practice do the liabilities usually lie and, secondly, who needs the contract to be completed most? Examine these areas from both sides. Don't overlook also that if you insist as a principal on receiving indemnity from a contractor, not only are you affecting the contract price but you may be doing so to your detriment. What you have to think about is whether you have an opportunity to improve the contract price by taking risk for your own account because you, in turn, can fund the risk at a lower cost than the contractor can.