SPECIAL MOBILITY STRAND

INVESTMENT DECISION IN RISK CONTROL ACTIVITIES
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Outline of presentation:

Risk control techniques:
Avoidance, prevention, reduction, diversification, duplication, separation

Investment decisions:
Cost-benefit analysis
Capital budgeting methods

Risk Management Steps

Risk Management is a process that identifies loss exposures faced by an organization/individual and select the most appropriate techniques for treating such exposures.
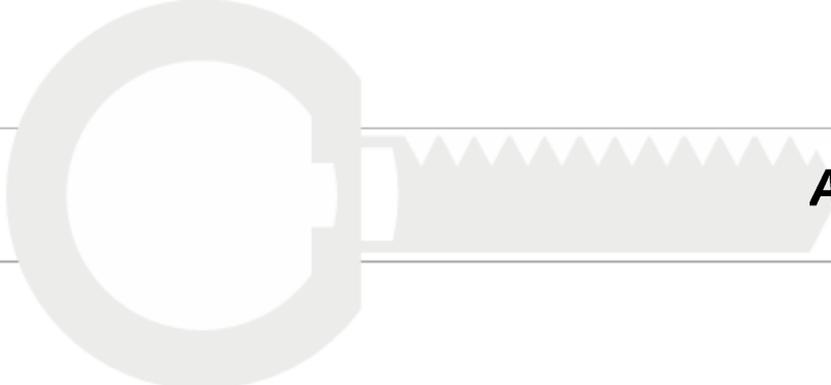

1. Identify

2. Estimate

Risk Management Proces

4. Monitor

3. Handle
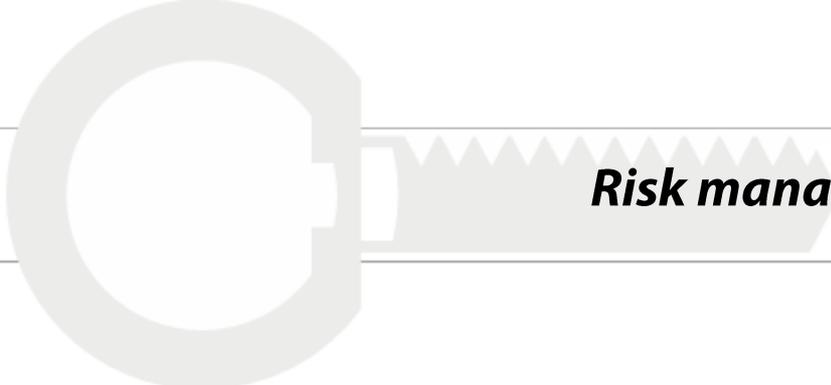
Risk management techniques

Risk Control *refers to the measures taken by an organization/individual that avoid a risk or reduce the severity or the frequency of losses.*

Risk Financing *refers to the measures that provide for the funding of losses.*
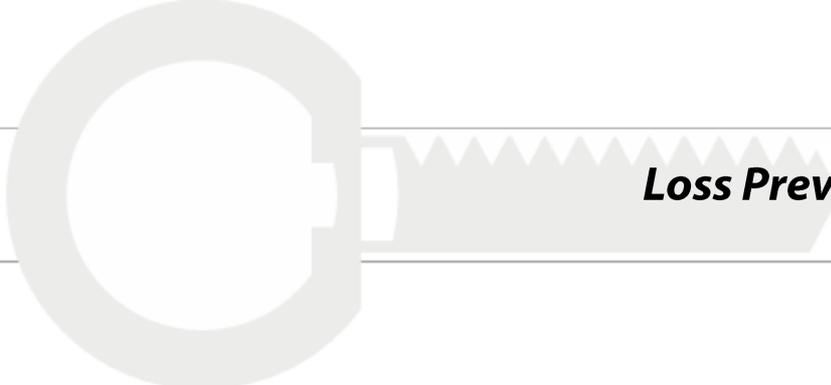
Avoidance

Refers to the decision of e firm not to exposure to a particular risk of loss.

❑*Interruption of the production of certain products with dangerous side effects;*
❑*Building a new plant on a well above floodplain;*

Proactive avoidance vs. abandonment

To use: frequency and severity of loss exposure are high

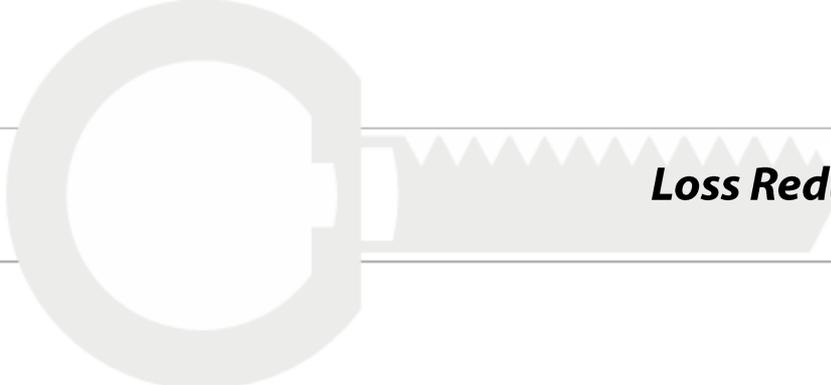**Loss prevention** refers to the measures taken to reduce the *frequency* of loss.

Measures that reduce the number of auto accidents:
•zero tolerance for alcohol and drug abuse,
•enforcement of safety rules;

Measures that reduce the probability of being suit under product liability law:
•careful product design,
•quality-control tests,
•using instructions and proper maintenance conditions,

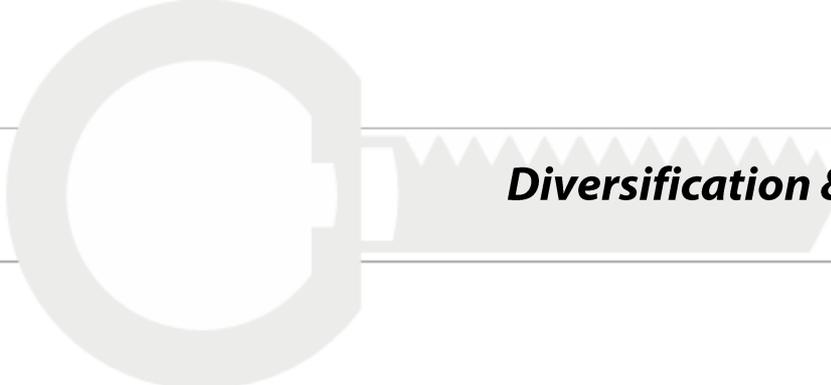## *Loss Reduction*

Loss reduction refers to the measures taken to reduce the severity of loss, after it occurs.

- Installation of an automatic fire-sprinkler system

- Installation of air bag system

- Maintaining limited amount of cash in premises

- Rehabilitation of workers with job-related injuries

Diversification & Duplication

Diversification refers to the measures taken to reduce the chance of loss by spreading the loss exposure across different parties (e.g., customers and suppliers), securities (e.g., stock and bonds), or transactions. - "Not putting all the eggs in one basket"

Duplication refers to the measures taken to keep backups or copies of an existing asset in reserve, to be used in case that the original asset is managed or destroyed.
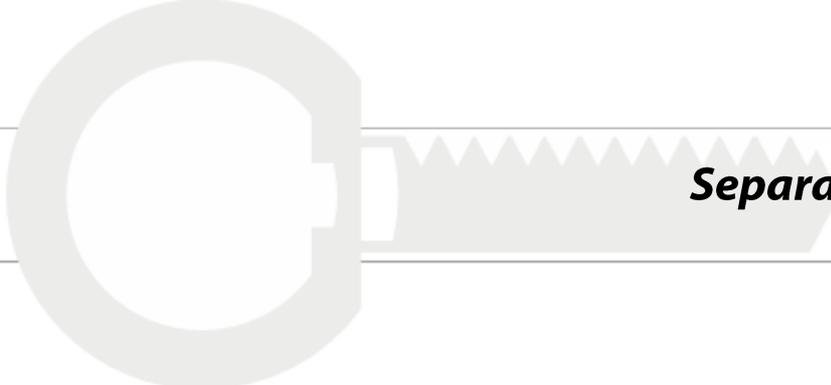
*Separation* refers to the measures taken to isolate the loss exposures from each other or to divide the assets exposed to loss in order to minimize the damaged caused from the loss.

Suppose an agriculture firm that cultivate strawberries would like to expand its activity. The risk manager has two alternatives: (i) to double the size of the existing greenhouse, which value amount to 100.000€; and (ii) to build a new greenhouse in another location, which has the same value as the first one. By building another greenhouse in another location, the risk manager tends to control the losses from the floods. Assume that the floods in each location are independent events and the probability of flood in each location is 1%.
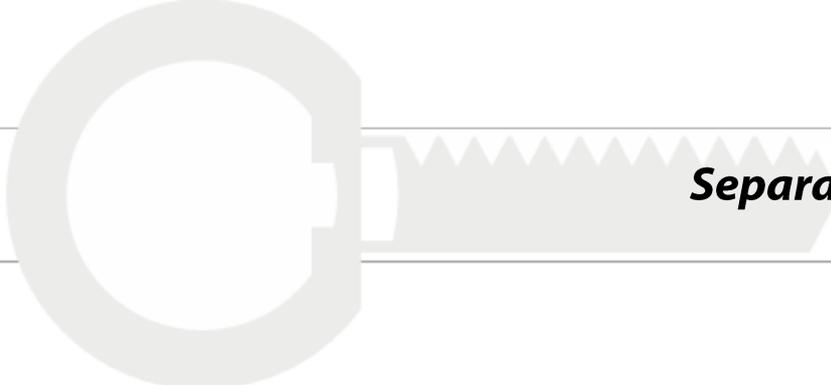
Alternative I:
Probability = 1%
Severity = 200.000 €
Expected direct loss =2.000 €

Alternative II:
Probability = 1,99%
Severity = 100.502,5 €
Expected direct loss =2.000 €
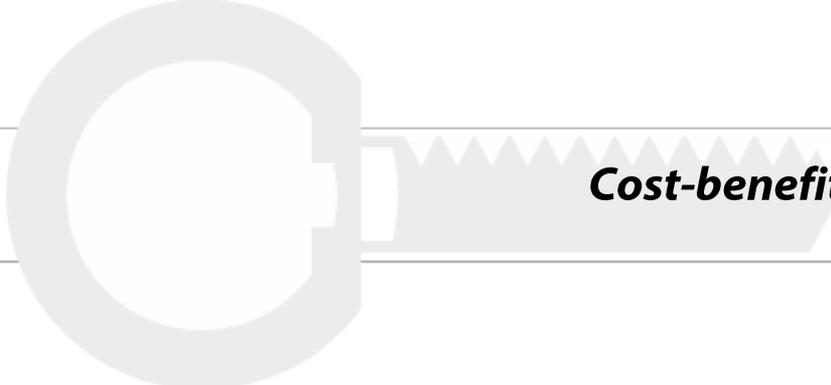
Suppose that one company must decide how much to spend on the safety equipment for its plant. Risk manager has evaluated that if the company spends nothing on safety equipment, the expected number of the injured workers will be 20; if it spends 25.000 € the number of the injuries will be decreased to 16; if the firm spend 25.000 € more, the number will decrease to 13, and so on as the columns 1 and 2 of the Table shows.
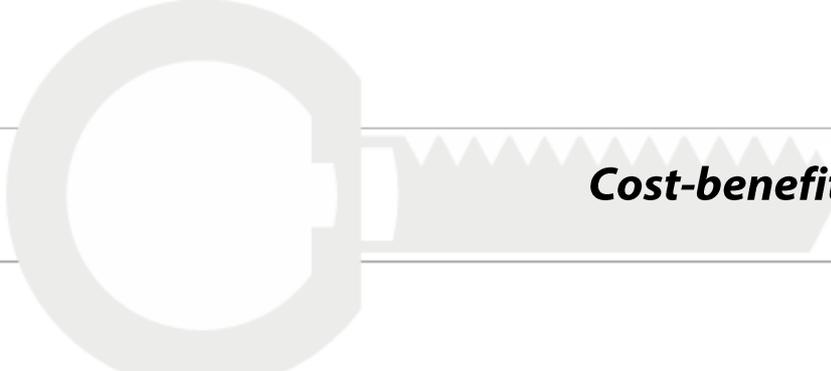
Cost-benefit analysis

Investment Cost (1)	No. of injured workers (2)	Indemnification payment (3)	Marginal Cost (4)	Marginal benefit (5)
25.000€	20	200.000€	-	-
50.000€	16	160.000€	25.000€	40.000€
75.000€	13	130.000€	25.000€	30.000€
100.000€	11	110.000€	25.000€	20.000€
125.000€	10	100.000€	25.000€	10.000€

Capital Budgeting

Capital budgeting is the process which analyzes the investment alternatives and selects the most appropriate investment(s) that should be undertaken.

This technique is useful when the cash inflows and/or outflows have been distributed over a period of time.

The discounting CB techniques: the Net present Value, the Internal Rate of Return.
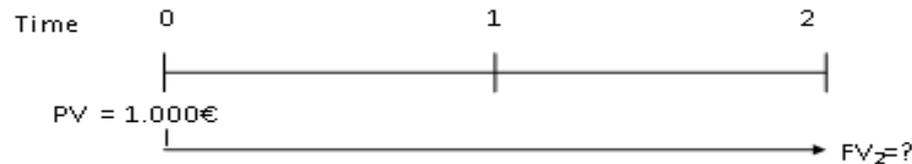
Capital Budgeting Methods

Time Value of Money.:

It is generally agreed that:
(i)   more money is better tha less money, and
(ii) money today is worth more more than the same amount of
      money received in the future.

Time Value of Money

- **Lump Sum** – PV, FV_n

Time   0   1   2

PV = 1.000€

FV_2=?

- **Annuity (A)** – Series of equal annual payment that last for a certain period of time

Year   0   1   2   3   4

Cash flow   100€   100€   100€   100€
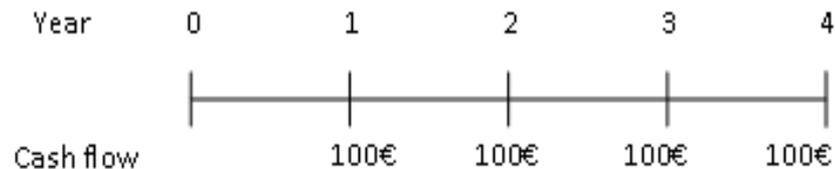
Time Value of Money

Future Value:

$$FV_n = PV \times (1+i)^n$$

Present Value:

$$PV = FV_n \times \left[\frac{1}{(1+i)^n} \right]$$

Time Value of Money

Future Value of an Annuity:

$$\text{FVA}_n = A \times \frac{(1+i)^n - 1}{i}$$

Present Value of an Annuity:

$$\text{PVA} = A \times \frac{1 - (1+i)^{-n}}{i}$$

Net Present Value

The net present value (NPV) is the sum of the present values of future cash inflows minus the present value of the investment's cost (cash outflows).

The present value of the cash flows is usually calculated by discounting them at the firm's weighted average cost of capital (WACC).

$NPV \geq 0$ → *Investment is accepted*

$NPV < 0$ → *...ent is refused*

Internal Rate of Return

The internal rate of return method determines the rate of return which equates the present value of the cash inflows and the present value of the cash outflows of the investment.

Present Investment Cost = Present value of the Cash Inflows

$IRR \geq k$ → *Investment is accepted*

$IRR < k$ → *Investment is refused*

Capital Budgeting analysis

Suppose that the risk manager of a pharmaceutical firm would like to reduce the number of liability lawsuits from the clients. He discovered that one of the reasons it is the untrained workforce. In collaboration with human resources office, they developed a training program with a training agency. Training program costs 20.000 euro, and the risk manager has calculated that the expected indemnification for the next five years would be reduced by 5.000 euro. If the weighted cost of capital is 6%, should the risk manager accept the investment?

Capital Budgeting analysis

According to NPV:

$$PV = \frac{5.000}{(1+0.06)^1} + \frac{5.000}{(1+0.06)^2} + \frac{5.000}{(1+0.06)^3} + \frac{5.000}{(1+0.06)^4} + \frac{5.000}{(1+0.06)^5}$$

PV = 21.062 €

NPV = 21.062€ − 20.000 € = 62€

NPV > 0

Investment is accepted

Capital Budgeting analysis

According to IRR:

$$20.000 = \frac{5.000}{(1+r)^1} + \frac{5.000}{(1+r)^2} + \frac{5.000}{(1+r)^3} + \frac{5.000}{(1+r)^4} + \frac{5.000}{(1+r)^5}$$

IRR = 7,3%

IRR > WACC (6%)

Investment is accepted

Conclusions

In deciding upon the proper loss control activities, the risk manager must compare the costs of loss control measures and the benefits expected to be derived.

Only when the benefits exceed the costs, the control activity must be undertaken.

For this purpose, risk manager can employ the cost benefit analysis and the methods of capital budgeting process.

Both methods compare the amount of benefit from reducing the risk and the amount of money needed to carry out the technique. The methods of capital budgeting can be used when the costs and benefits are spread over a period of time in the future.

Thank you
for your attention
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Knowledge **FO**r **R**esilient so**CiE**ty