

CHAPTER II

LITERATURE REVIEW

2.1. Theoretical Review

Risk or loss possibility is inappropriate with our desirable expectation or goal. Despite we feel safe, it is only limited at what it visible at the present. Every human kind wants to be safe and avoid loss; therefore we learn to face this reality in life. Risk cannot be avoided totally and it's been a part of this life, thus we have to develop a way to handle it (Williams, 1984, p.2).

2.1.1 Risk

Several risk definitions are as following:

- 1) Risk is a possibility variation of future events and it happens at the future (Silalahi, 1997, p.1).
- 2) Risk is variations of results that might occur in some periods (Williams & Heins, 1985, p.10)
- 3) Risk is an uncertain thing related to forecasting of a result (Lifson & Shaifer, 1982, p.168).
- 4) Risk is a probability of an event and an effect caused by that event (Hamilton, 1997, p.277).
- 5) Risk is a probability of loss or something that is unfair will happen (Pride, Hughes & Kapoor, 1993, p.639).
- 6) Risk is a chance of loss (Darmawi, 1997, p.19)

- 7) Risk is an uncertain thing that possibly can make loss (Thayono, 1999, p.6).
- 8) Risk is variations of a natural result at some circumstances (Fisk, 1997, p.225).

Definitions about risk are different each other, but basically it is the same things. The risk definition refers to an uncertain event at some periods where it may cause loss; either small loss that is not significant or big loss that may affect the life of a company.

Some of risk characteristics are as follows:

- 1) Direct, for instance: risk of damage or missing of some objects.
- 2) Indirect, for instance: in a burned plant situation, beside direct loss, indirect loss is suffered, which is loss because the company could not run temporarily or maybe forever.
- 3) Complaining, for instance: if a ready mix concrete company had done wrong in mixing and causing inappropriate specification desired by project planner, then the company has a responsibility or being complained for their bad product, even if no law violation happened.
- 4) Risk that caused by other party, for instance: if a contractor left the project (without finished it), or a debtor didn't pay their credit back, thus it could cause some losses.

According to some literatures, there are kinds of risk as follows:

- 1) Williams (1984, p.4) divides risk into two, which are:
 - a. Speculative risk, is a risk that can give people either a profit or a loss, for instance: in stock or foreign exchange, broker is dealing with a risk. He or she could make either good profit or loss. He or she might have studied about technical analysis and fundamental analysis before he or she makes a decision. After all, he or she still needs luck to do their work.
 - b. Pure risk, is a risk that cannot give any profit, and always give loss. For instance: fire, work accident, etc that sometimes happen in a company. This kind of risk is the core of risk management.
- 2) Kerzner (2004, p.666) said risks in business context, where there are two types of risks, which are:
 - a. Business risk, is risk that has chance of profit or loss, for example: bad weather or inflation.
 - b. Insured risk. Risks that are included are risks that only give chance of loss, such as fire, material and equipment defect, unattractive design, mixing error, and implementation failure.
- 3) Trieschmann and Gustavson (1995, p.6) proposed risk types as follows:
 - a. Pure Risk and Speculative Risk

Pure risk, is a risk where loss might happen and no possibility of getting profit.

Speculative risk, is a risk where there is uncertain condition that possibly can make either profit or loss.

b. Static Risk and Dynamic Risk

Static risk is a risk that comes from unchanged economic condition or in a stable condition.

Dynamic risk is a risk that comes from changing of economic condition, such as new technology development, changing of government policy, price changing, money crisis, etc.

c. Subjective Risk and Objective Risk

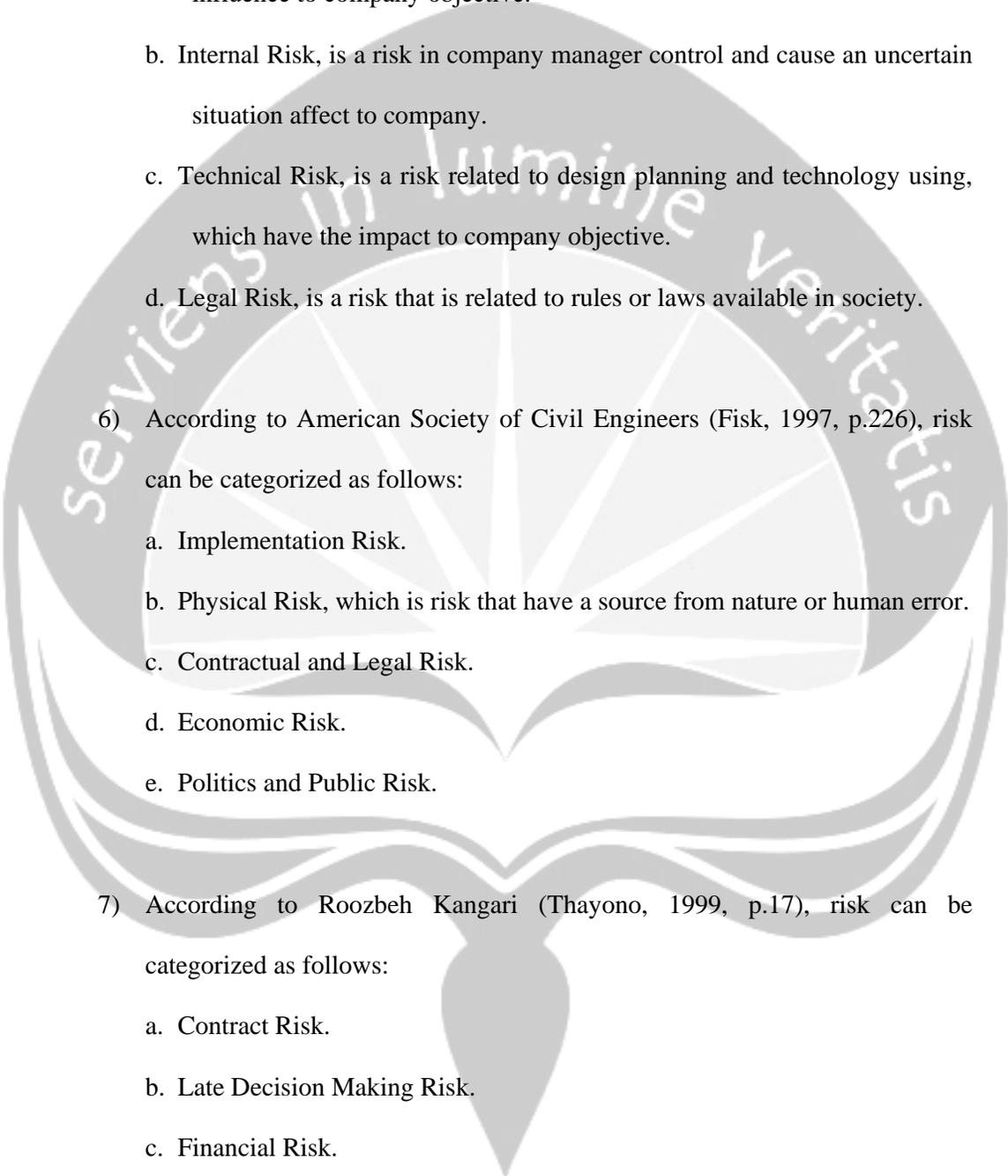
Subjective Risk is a psychological uncertain situation that appears from mental behavior or people's mind situation, it means someone may have the same knowledge toward loss, while the other person may feel more uncertain about the same event.

For example: two companies of ready mix concrete deal with the same possibility of materials defect they are stocked. The first owner does not realize the possibility, so it will not be any subjective risk, while the second owner is certain about the possibility, which could make them loss.

Objective risk is reality variation that might happen from forecasting experience. This risk is caused by imperfect knowledge of a human. For example: weather forecast says that tomorrow might probably to rain.

The word 'probably' shows an uncertain in making forecast, while in nature there are no doubt or uncertain. This situation is called objective risk.

- 4) According to Stephenson (Thayono, 1999, p.15), risk can be categorized as follows:
- a. Contract Risk, it's a risk that is related to a contract or agreement, made by two companies involved, before deal to do a work is taken.
 - b. Late of decision making Risk, it's a risk that happens when there is an unwitting problem in a company; therefore decision is made somewhat late. This is a risk that can cause loss on a company.
 - c. Financial Risk, it is a risk that is related with funds, either comes from inside the company or outside of them.
 - d. Personnel Risk, it is a risk that is related with labor factor involved in a project. Problems related to labor are very complex; starts from human resources, employee's salary, until work safety, which directly or indirectly will cause risks to a company.
 - e. Operational Risk, it is a risk that is related to design and the use of technology which can influence the company goal.
 - f. Force Majeure Risk, it is a risk that occurs out of human control and unforeseenly.
- 5) According to Project Management Institute (Kerzner, 1995, p.887), risk can be categorized as follows:

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- a. External Risk, is a risk beyond company manager control yet have an influence to company objective.
 - b. Internal Risk, is a risk in company manager control and cause an uncertain situation affect to company.
 - c. Technical Risk, is a risk related to design planning and technology using, which have the impact to company objective.
 - d. Legal Risk, is a risk that is related to rules or laws available in society.
- 6) According to American Society of Civil Engineers (Fisk, 1997, p.226), risk can be categorized as follows:
- a. Implementation Risk.
 - b. Physical Risk, which is risk that have a source from nature or human error.
 - c. Contractual and Legal Risk.
 - d. Economic Risk.
 - e. Politics and Public Risk.
- 7) According to Roozbeh Kangari (Thayono, 1999, p.17), risk can be categorized as follows:
- a. Contract Risk.
 - b. Late Decision Making Risk.
 - c. Financial Risk.
 - d. Technical Risk.
 - e. Operational Risk.

f. Unforeseen Risk.

8) According to Al-Bahar and Crandall (Thayono, 1999, p.16), risk can be categorized as follows:

- a. Physical Risk.
- b. Politics and Environment Risk.
- c. Design Risk.
- d. Financial and Economic Risk.
- e. Natural Disaster Risk.

2.1.2. Risk Management

Risk management is an application from universal management that is related to many activities which can cause risks. Risk management is not a standard work field just like accounting or financing; neither a quality management. It has variations special task and function, and also wide since of specific category from different risks on a project or company, and it goes wider based on the more bigly and complex situation. Risk management is wide not only focused on insurance retail but also it has to manage all organization risks (Ritz, 1994).

There are many definitions about risk management said by expertises, some of them are:

- 1) Risk management is an introduction, measuring, and manner to a potential accident loss that occurs; it almost always in a situation where the possible

result is loss and no changing in status quo. Risk management is a make sense effort to reduce and avoid consequence of loss or injury (Williams, 1984, p.10).

- 2) Risk management can be meant as function of executor leader in managing specific risks that are dealt with in business world (Silalahi, 1997, p.17).
- 3) Risk management is an understanding of important uncertainty about acceptable performance level of a project (Chapman & Ward, 1997, p.7).
- 4) Risk management is an important element needs to be complemented from a management project (Kezbom & Edward, 2001, p.352).
- 5) Risk management is a process where the possibility of risk or result that occurs in a project can be reduced (Turner, 1993, p.236).
- 6) Risk management is an asset and liabilities (claim and obligation) management to minimize loss different at cash flow in the future from outside attack (Claessens, 1999, p.1).

There are many different definitions about risk management, but basically risk management is related to ways that are used by a company to prevent or solve a risk involved. Those risks possibly can be insurance at commercial insurance company and so does the opposite, it cannot be. To become a risk manager, it is needed an rational persuasion and needs to consider all aspects, either short term or long term, of a company where he or she works.

Siagian and Sekarsari (2001, p.42) explain the process of risk management is almost the same with risk assessment which is the basic activity of

risk management. It is a simple and systematical persuasion as a step in risk management process of construction project.

According to Mark S. Dorfman (2000, p.47), process in risk management basically divided into three main parts, which are:

- 1) Identification and evaluation (to measure frequency and result) from each risk occurs

The main and the most important phase in dealing with risk is to identify it. Many decision makers believe that good principle in risk management comes from identification phase instead of analyzing phase. This is because risk identification includes details of company strategy examination; by which potential risk that can be found and its possibility to arrange response (Uher, 1996).

To identify risks is based on risk sources in a company, while to analyze risk is based on previous identification result and then analyze how large its frequency and how far those risks can influence a company.

- 2) Choosing methods and to implement it

Based on analysis result, thus it can be taken several alternative ways to handle it, such as to avoid risk, to prevent risk, to minimize risk, to encounter risk, and to transfer risk. Those method choosing rely on policy that is used in a company. After development and methods choosing, it is need a handling that has to be done, all of it can be appreciate from appropriate budget allocation as needed so those risks can be handled.

- 3) Controlling risk management from comparison between plan and actual

It is to control on all previous phases, so that correction can be done more. What it called as controlling is to compare between plan and actual event. From there, it can be appreciate whether risk management process in a company is doing well or not.

2.1.3 Ready Mix Concrete Company

Ready Mix Concrete is a concrete where the mixing is done automatically in a place and then be transported to costumer in an instant form (ready to be used), in this case to a construction project, in an area or in such a distance limitation. It is made in a plant (a specific place that is used to process ready mix concrete), on the way to project site, or it can be right on the construction project site (Neville & Brooks, 1989, p.619).

Because of its economical and quality, it makes costumer will feel comfort to use. At the heart of the matter, to make it really useful, ready mix concrete has to be in some distance or close to a project.

In a general way, management of ready mix concrete business is not quite different with other production business management. In broad outline, management of this operational business includes several sectors, which are: (Asmarawitjitra, 1991)

1) Production sector.

As we know that ready mix concrete business has specialty compared with other business which is seen from its production result characteristic, such as:

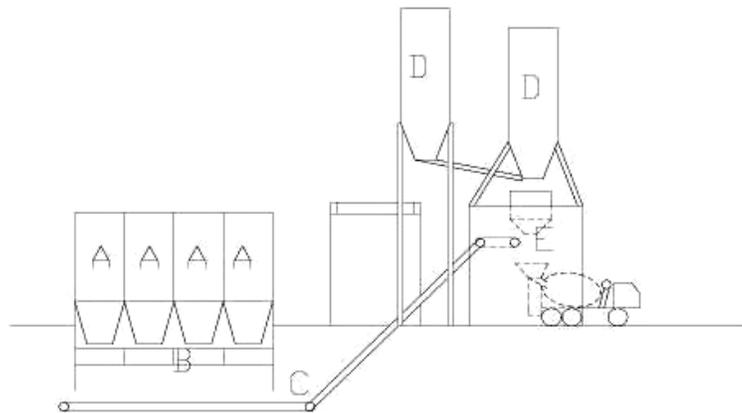
- a. There is setting time limitation.
- b. It cannot be stocked.
- c. It is very sensitive to contamination with chemical liquids and other types of liquids.

Things that are included in production sector are:

1. Equipment.

Equipments that are used in producing ready mix concrete are:

- A. Mixer truck.
- B. Wheel loader.
- C. Batching plant unit.



Legend:

A = Hopper (material storage basin)

B = Weighing tool

C = Conveyor belt

D = Water proof silo
 E = Cone to put mixing concrete into mixer

Figure 2.1 Batching plant figure on ready mix company

2. Materials.

Materials that are used consist of:

- A. Cement (bulk and sack).
- B. Clean water.
- C. Aggregates (sand and coarse aggregate)
- D. Concrete admixture.

3. Production Process System.

Production process system in ready mix concrete business has two types, which are:

A. Dry Process

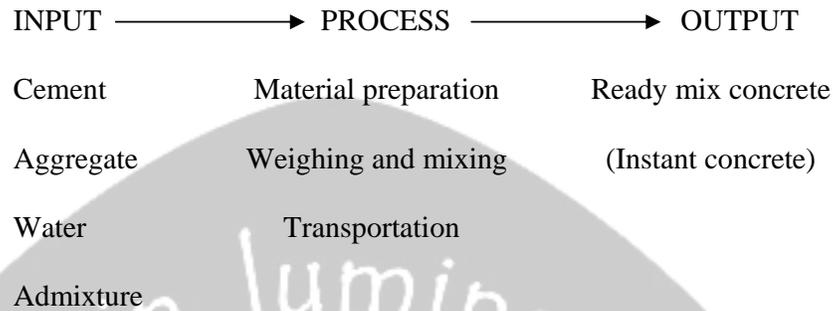
In this process, batching plant has function as loading and material weighing, while the material mixing is done in mixer truck.

B. Wet process

In this process, batching plant has function as loading and material weighing and also has function as mixing, while mixer truck only has function as transporting and to keep concrete homogeneity.

4. Production process implementation.

In outline, ready mix concrete production can be described as follows:



2) Logistic Sector.

The important thing in logistic sector is storage of raw materials, which are:

a. Cement.

Portland cement procurement can be done in bulk using cement bulk carrier or in a 40 kg sack form. Bulk Portland cement is being storage in an air-proof silo, while cement in sack is being storage in a mill safe from humidity.

b. Water.

Water for concrete mixing is being storage in a supply basin that is safe from material pollution that can harm concrete. Soon before it is used, water is prepared by pumping it into a scaling tank. Quality analysis will be enough done once, at the first time it comes from the source and also if there is a problem with the concrete quality.

c. Aggregate.

Aggregate can be conducive from the source or crushing plant through suppliers. Lay out and aggregate storage system need to be arranged particularly depends on things as follows:

1. Loader can move freely and efficiently.
 2. Each material is not mixed one another.
 3. Material congeries is not too high so that it won't be segregated.
 4. Before aggregate used, it is being wet to reduce segregation and pollution.
- d. Concrete Admixture.

In order to serve far distance concrete pouring, it is needed concrete admixtures, retarder type, to avoid concrete being ossify in travelling and to keep slump loss in a small amount. To select suitable admixture, it is needed to do some researches before in a laboratory.

3) Financial Sector

As well known that ready mix concrete business needs a lot of funds, some of them are used for work capital for buying raw materials and admixtures. In other side, costumer usually does payment weeks after shipping.

Financing management is none important to other sectors, especially in situation of tight money policy like this latest, all sectors are being demand to do money management as careful as possible. In ready mix concrete, fund requirement is usually needed for:

- a. Investment of production equipment supporting equipment addition (development).

- b. Work capital to buy raw materials, addition materials, employee salary, and other operational costs.
 - c. To pay tax obligation and dividend for stock owner.
- 4) Marketing Sector.

A number of things that needs to be considered in marketing sector of ready mix concrete company are:

- a. Marketing plan in relation with production capacity.
- b. Shipping plan that is adjusted with consumer schedule.
- c. Price policy.
- d. Promotion / service.
- e. Product diversification.

Only for product diversification, this should be handled with more planning and also integrated. This is badly needed since the demand of ready mix concrete from costumer will be variable and being fluctuation.

2.2 Risk Management Process

Risk management process consists of three steps, which are identification and evaluation of each risk, methods choosing and implementation of those methods, and controlling. Those three steps will be explained as follows:

(Dorfman, 2000, p.47)

2.2.1 Identification and Evaluation (to measure frequency and consequence) of Each Risk

From a literature, it is got a connection between risk categories that is taken with other categories in operational sector.

1) Production Sector

Risk category in production sector include risk that is related to execution risk, physical risk (ASCE), or internal risk (PMI), which related to processing in a company, unforeseen risk (Stephenson and Kangari), from natural disaster risk (Al-Bahar and Crandall).

In this case, risks that are indentified are:

- a. Facilities and supporting facilities:
 1. Mixer Truck.
 2. Loader.
 3. Batching Plant.
- b. Work planning and scheduling:
 1. Schedule arrangement.
 2. Project delay.
- c. Material using accuracy:
 1. Material using.
 2. Testing.
- d. Production process system.
- e. Weather problem:
 1. Rainy season.

2. Dry season.

f. Unforeseen disaster:

1. Flood.

2. Fire.

2) Logistic Sector

Material is an added risk category, where it is needed to consider it as standalone risk. But actually, this risk category can be put into internal risk according to PMI, risk category related to execution risk according to ASCE, and unforeseen risk category according to Stephenson and Kangari.

In this manner, risks that are identified, inter-alia:

a. Material using cycle.

b. Raw material storage, consists of:

1. Water proofed silo.

2. Water tank.

3. Fuel tank.

4. Admixture storage.

a. Material loss, in this case consists of:

1. Cement.

2. Sand.

3. Gravel.

4. Admixture.

b. Material procurement planning, consists of:

1. Material procurement method.
2. Relation with supplier.
3. Material survey.

3) Financing Sector

This risk category is the same as economy risk category according to ASCE and can be counted as external / internal risk according to PMI.

In this manner, risks that are indentified, such as:

- a. Contract:
 1. Contract error.
 2. Payment failure.
- b. Capital.
- c. Monetary.
- d. Price policy.

4) Marketing Sector

This risk category consists of risk that is related to unforeseen event according to Stephenson and Kangari, politic and environmental risk based on Al-Bahar and Crandall and ASCE, and external and internal risk based on PMI.

In this manner, risks that are indentified, such as:

- a. Plant environment location:
 1. Plant location.
 2. Surrounding neighbor influence.

- b. Marketing system:
1. Marketing method.
 2. Market segment.
- c. Mobility licensing.
- d. Project environment location.

Table 2.1 Risk Element

Risk Category	Risk Element	Source
Production	Facilities and supporting facilities	4,5
	Work planning and scheduling	4,5
	Material using accuracy	4,5
	Production process system	4,5
	Weather problems	2,3
	Unforeseen disaster	1
Logistic	Material storage cycle	4,5
	Raw material storage place	2,3
	Material loss	2,3
	Material procurement planning	4,5
Financing	Contract type	4,5
	Capital	4,5
	Monetary	4,5
	Price policy	4,5
Marketing	Plant environment location	1,5
	Marketing system	2,3,5

Mobility licensing	1,5
Project environment location	1,5

Source legend:

1. Al-Bahar and Crandall, 1990, p.538
2. Kangari, 1995, p.423
3. Stephenson, 1996 (Thayono, 1999, p.15)
4. ASCE (Fisk, 1997, p.226)
5. PMI (Krezner, 1995, p.887)

There are two aspects that have to be considered in evaluating risk level that has been identified above, which are as follows:

1) Risk Frequency

In a case that is related to risk, probability is easier to get. For instance in life insurance, statistic report called mortality table is easier to get from life insurance company. Mortality table here shows death probability of all different ages, based on human experience. Insurance company keep storing death report that is used as standard in making estimation about the number of death every year of different ages.

But in another case, probability is harder to get. For instance, “how many probabilities accident would happen in commercial flight?”. Experience shows a small amount or rare in commercial flight accident. Even a life insurance company can estimate the accident probability; but how often?; per year?; or once in 5 or 10 years? We may never really know about that thing.

Probability estimation is a method that can be used to measure loss probability. This method is not too complex, where we only have to know the object that will be estimated and the frequency of its loss (Williams, 1984, p.9).

2) Potential Impact

The other risk aspect and need to pay attention to is the consequence of risk. If loss happens, then how serious that would happen? Some risks make so much loss, for example: natural disaster which can make huge loss.

But oftentimes we may also see risk with less loss. Many people who read book is using pen or pencil to underline important words. Losing pen or pencil is one of risk faced by students. Basically, that loss is often happen but has no large amount of loss. Losing a few thousand rupiahs is not a financial disaster. The effect caused by this risk is very small.

A risk sometimes has a low event and consequence frequency. Usually, it is not a serious problem yet still has to do analyzing. To do analyze risk frequency and consequence, a simple matrix as shown below is made. Each risk is placed in a proper place in the matrix. From the figure, there are 4 placements which explain connection between frequency and consequence of risk.

		FREQUENCY	
		LOW	HIGH
IMPACT	HIGH	Insurance Also : risk transfer, loss reduction, loss prevention.	Risk Avoidance Also : loss prevention and loss reduction, if possible
	LOW	Risk Assumption Also: loss prevention and loss reduction if the cost justifies the benefits.	Loss Prevention Also : loss reduction if cost can be justified. Assume risk if cost of prevention or reduction cannot be justified.

Figure 2.2. Risk Management Evaluation and Method
(Modified from Dorfman, 2000, p.61)

2.2.2 Method selection and implementation

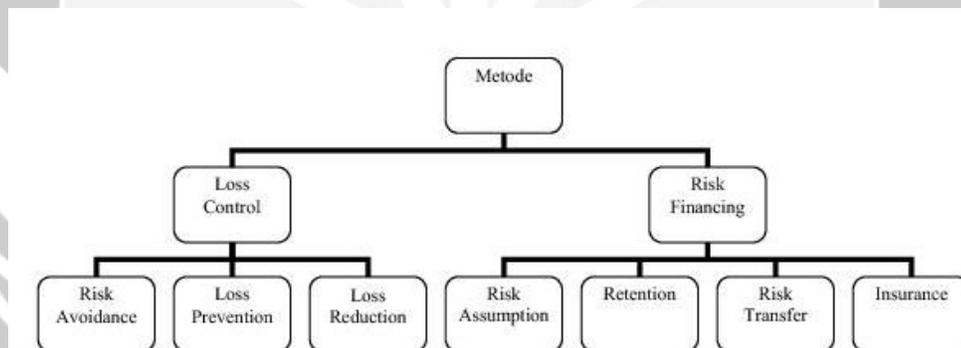
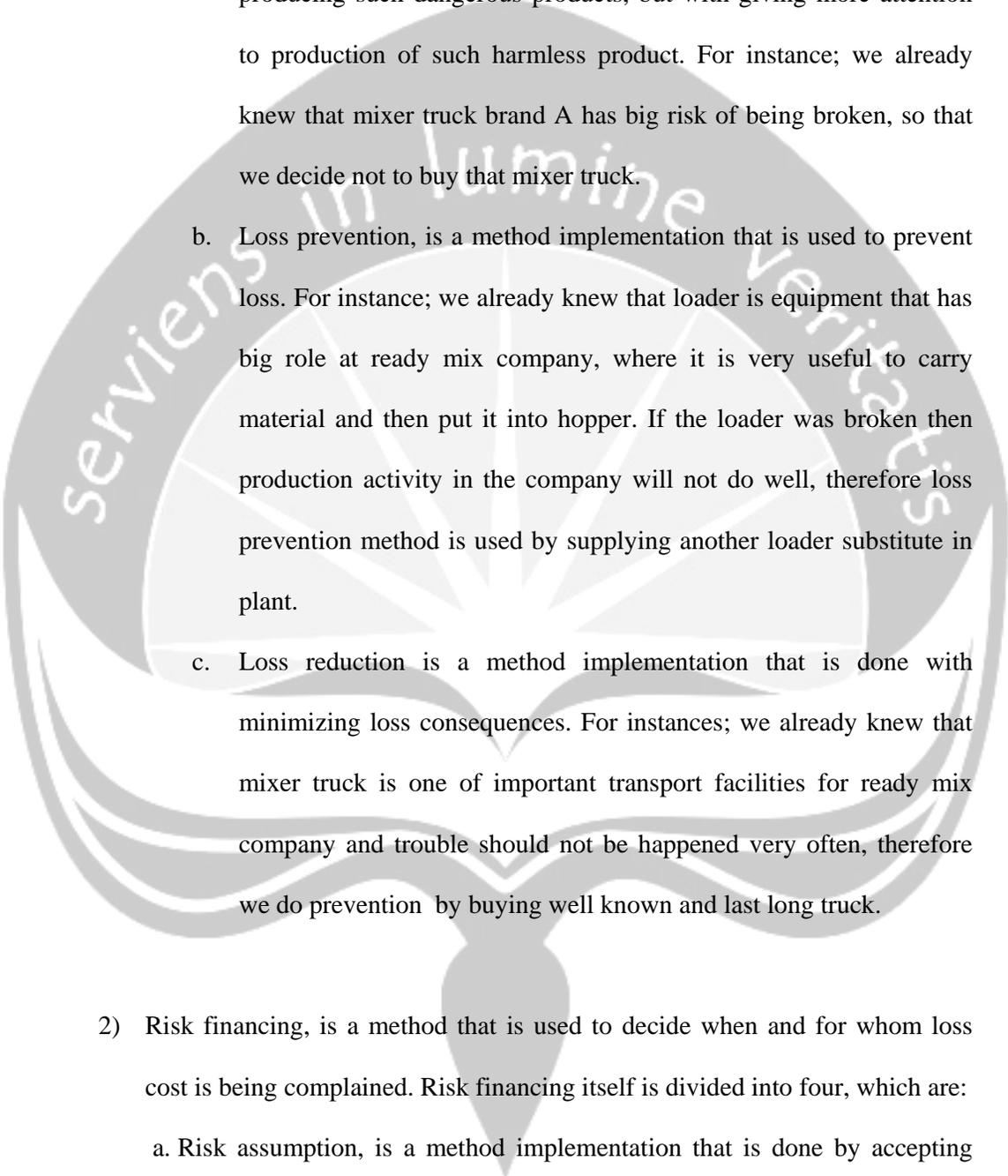


Figure 2.3. Risk Management Method Framework (Dorfman, 2000, p.53-61)

Based on literature, method to handle risks according to Mark S. Dorfman (2000, p.53-61) is divided into two methods, which are:

- 1) Loss control, is an activity to reduce expected cost loss and to reduce frequency level and loss consequence occur. Loss control itself is divided into three, which are:

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- a. Risk avoidance, is a method implementation that is done with not producing such dangerous products, but with giving more attention to production of such harmless product. For instance; we already knew that mixer truck brand A has big risk of being broken, so that we decide not to buy that mixer truck.
 - b. Loss prevention, is a method implementation that is used to prevent loss. For instance; we already knew that loader is equipment that has big role at ready mix company, where it is very useful to carry material and then put it into hopper. If the loader was broken then production activity in the company will not do well, therefore loss prevention method is used by supplying another loader substitute in plant.
 - c. Loss reduction is a method implementation that is done with minimizing loss consequences. For instances; we already knew that mixer truck is one of important transport facilities for ready mix company and trouble should not be happened very often, therefore we do prevention by buying well known and last long truck.
- 2) Risk financing, is a method that is used to decide when and for whom loss cost is being complained. Risk financing itself is divided into four, which are:
- a. Risk assumption, is a method implementation that is done by accepting consequences of all lost or risk that happen. For instance: if leak occurred

on hopper, therefore risk assumption method is taken, which is by accepting that risk and do some efforts to patch the leak.

b. Self insurance and finance risk retention, is a method that is done by holding obligation to cover some parts or all loss. For instance: if contractor failed to do payment because of its bankruptcy, retention method is done by ready mix company by confiscating valuable goods of contractor's own.

c. Risk transfer other than insurance, is an implementation method that is done by allowing company to transfer risk to other company, besides insurance company. For instance: if there were a large amount of order and ready mix company couldn't fulfill by itself, and it's been accepted by the company, risk transfer method should be used with transferring that order to other ready mix company.

d. Insurance, is a method implementation that is done by insurance all things that have big potency to have a risk, into an insurance company. For instance: accident risk of mixer truck can be handled using insurance method by insurance that mixer truck and the driver.

In other hand, in performing a method, it always causes both direct and indirect costs. That cost is used to control loss. For instance, in order to prevent fire in a ready mix company office, thus sprinkler is used. In other hand, sprinkler system has costs in process or maintenance, and it can be seen that the expenditure is actually bigger than without using sprinkler system.

The main problem in performing risk management is always identifying cost on and on. But what it costs is smaller compared with cost if risk happened (Trieschmann & Gustavon, 1995).

2.2.3 Risk management controlling from comparison between plan and actual

Controlling is done soon after doing method performing. Controlling here means to compare between plan and actual situation. From the comparison, it can be known whether the plan is done appropriately or not.



Table 2.2 Literature list of chapter 2

Chapter	Theme	Reference Books
2.1.	LITERATURE REVIEW	(Williams, 1984)
2.1.1	Risk	(Silalahi, 1997) (Williams & Heins, 1985) (Williams, 1984) (Thayono, 1999) (Hamilton, 1997) (Fisk, 1997) (Al-Bahar & Crandall, 1990) (PMI, 2000) (Darmawi, 1997) (Kangari, 1995) (Kerzner, 2004) (Trieschmann & Gustavon, 1995) (Wang, Dulaimi, Aguirra, 2004)
2.1.2	Risk Management	(Ritz, 1994) (Williams, 1984) (Silalahi, 1997) (Turner, 1993) (Claessens, 1993) (Dorfman, 2000) (Chapman & Ward, 1997) (Kezborn & Edward, 2001) (Uher, 1996)
2.1.3	Ready Mix Company	(Neville & Brooks, 1989) (Suaeb, 1991)
2.2	RISK MANAGEMENT	(Dorfman, 2000)
2.2.1	Identification & Evaluation of Risk	(Asmarawitjitra, 1991) (Williams, 1989) (Al-Bahar & Crandall, 1990) (Dorfman, 2000) (Kangari, 1995) (Thayono, 1999) (Fisk, 1997) (PMI, 2000)
2.2.2	Method Choosing & Implementation	(Dorfman, 2000) (Trieschmann & Gustavon, 1995)
2.2.3	Perform Controlling and Risk Management Compatibility	(Dorfman, 2000)