

CHAPTER 5

DISCUSSION

5.1. The Result of Participatory

Participatory intends to involve persons that can get recognized as experts. In this capacity of research, it encompasses the related manager from production and the workers from the sewing area. The goal is to have the target output that is close to what really occurs in the field. The way it gets conducted is by interviewing the managers and workers about the root cause of the defect's problem and asking workers to get to rank the top five problems that they consider to be the most appearance of a defect cause.

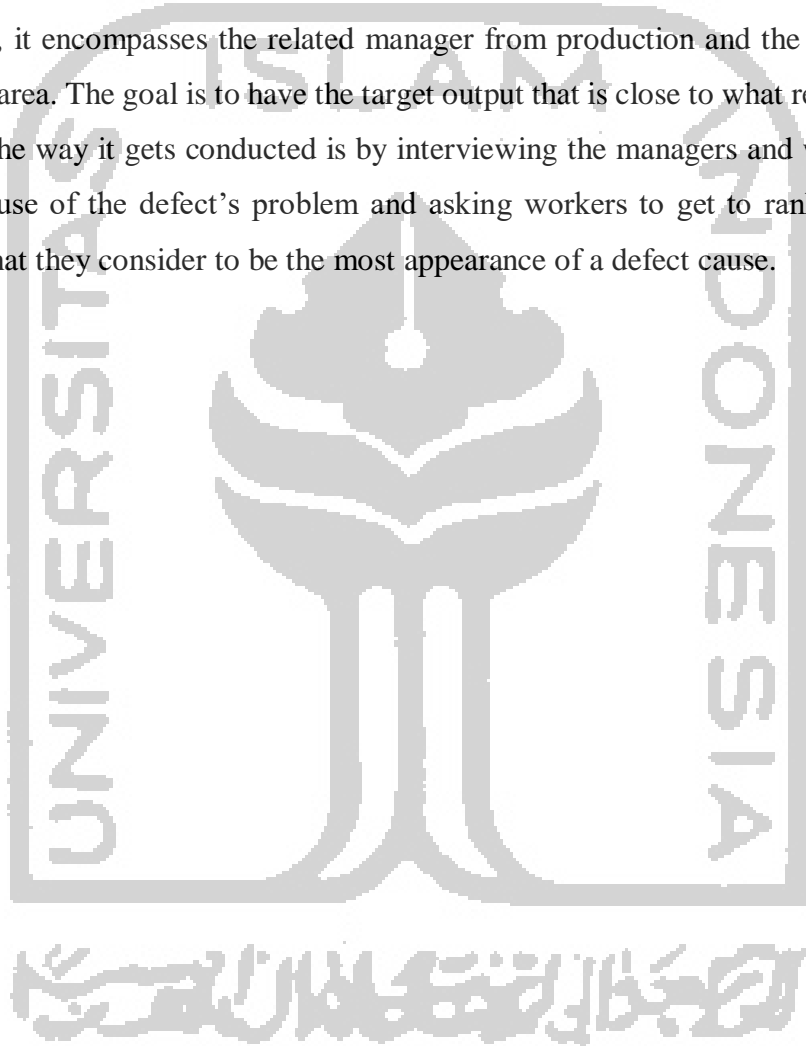


Table 5. 1 List of Interview's Answer

No	Effective Factors
1	New Complex Design (Involve difficult material ; sub process ; many variation)
2	Unsuitable arrangement of working environment
3	Unprepared material
4	Wrongly re check dies
5	Error in the previous coloring process
6	Teamwork
7	Rusty wire side-connector (sliding part machine)
8	Rough pedal (foot pedal on the machine)
9	Dull Needle
10	Type of Material used
11	Pattern of sewing
12	Communication with other division
13	Lack of supervision
14	Pressure target
15	Working with a sharp tool
16	Lack of training

Then, the researcher takes eleven workers to vote these available opinions of root-causes of the problem. They have to checklist five of the available options that they consider as the most intrusive suggestion. The result of this doing is visible in the table below.

Table 5. 2 Five Intrusive Reasons for Defect

No	Effective Factors	Sum
1	New Complex Design (Involve difficult material ; sub process ; many variation etc)	5
2	Unsuitable arrangement of working environment	1
3	Unprepared material	0
4	Wrongly re check dies	0
5	Error in the previous coloring process	0
6	Teamwork	4
7	Rusty wire side-connector (sliding part machine)	4
8	Rough pedal (foot pedal on the machine)	5
9	Dull Needle	3
10	Type of Material used	5
11	Pattern of sewing	0
12	Communication with other division	0
13	Lack of supervision	4
14	Pressure target	15
15	Working with a sharp tool	3
16	Lack of training	6
	Total	55

Eleven workers checklist five of the available opinions given that they consider to be the most intrusive ones. The total amount of voting will be precisely fifty voices. Afterwards, the five highest numbers will get segregated in order to be highlighted and get visualized to the involved manager. To make this information easily read by the manager, this data requires to get converted to a symbol that is shown by the table below.

Table 5. 3 List of Kinds and Symbol

No	Kinds	Voters	Symbol
1	New Complex Design (Involve difficult material ; sub process ; many variation etc)	5	D1
2	Lack of training	6	D2
3	Rough pedal (foot pedal on the machine)	5	D3
4	Type of Material used	5	D4
5	Pressure target	15	D5

The five symbols from the result of participatory will get confirmed by fishbone diagram. The fishbone diagram affects the researcher's thinking structure on arranging the cause and effect in the proper manner. This arrangement will justify the existence opinions that are coming from the experts. On hand means that the emergence of opinions from the experts should get rectified by the researcher based on the systematic way in conducting fishbone diagram.

5.2. Fishbone Diagram

Fishbone diagram aims to locate the cause and effect of the problem in the proper manner. This attitude divides its mainfunction into two parts. Firstly, there is head or effect. Lastly, there is causes or contributive factors which happen to be the reason of the effect occur. These two jobs have its position and duty. Effect is the outline of the causes and vice versa.

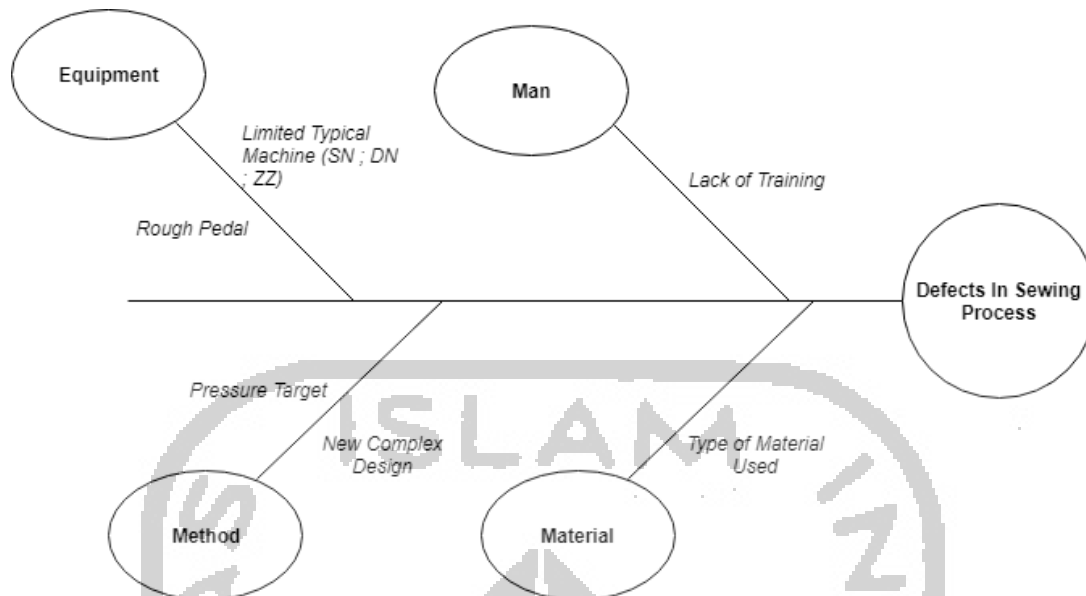


Figure 5. 1 Fishbone Diagram

The fishbone of this research has defects in the sewing process as the outline, more accurately in the product Z's project. The causes' part are divided into 4 sectors. They are man, material, method and equipment. The lack of training gets included in the man, material used in the material, pressure target in the method, and the rough pedal in the equipment. The five intrusive factors above are leading into one effect which is defects in sewing process for product Z. Later, these intrusive factors will be visualized in the risk map and get assessed by risk assessment in order to see if they need an immediate mitigation in an easy way.

5.3. The Result of Risk Analysis

Risk assessment in this research assesses the five of most intrusive factors proposed by the experts. This assessment sets the financial or cost approach in its conduct. The parameter of financial in likelihood gets implied by the number of defect happens. The occurrence of defect varies its reason into five categories. The five categories are those which get included in the formula of likelihood. Meanwhile, severity level is set by financial standard given by the company's manager. The following table are the set up standard.

Table 5. 4 Likelihood Parameter

Parameter of Likelihood		Definition
Improbable	1	So unlikely, it can be assumed occurrence may not be experienced
Remote	2	Unlikely, but possible to occur
Occasional	3	Likely to occur sometime in the life of an item
Probable	4	Will occur several times in the life of an item
Frequent	5	Likely to occur frequently

The likelihood is a gauge for the occurrence of an event. This standard of level follows the company's policy. The focus duty is on the number of the occurrences in the single project. Each of the symbols has its own number of defect. The defect detail is identified by observing the sample of reject product.

Table 5. 5 Likelihood Level

Symbol of Problem	Number of Occurance / Defect	Likelihood Level
D1	22	5
D2	26	5
D3	15	4
D4	38	5
D5	28	5

Severity has parameter in financial way. This financial loss is conducted based on the result of encounter with the related manager. The financial loss eventually will be converted from Dollar USA (\$) to Rupiah Indonesia (IDR). The parameter of severity can be seen in the table below.

Table 5. 6 Severity Parameter

Parameter of Severity	
\$0 - \$ 50 (Rp 0 - Rp 705.700)	1
> = \$51 - \$100 (> Rp 719.814 - Rp 1.411.400)	2
\$101 - \$200 (> Rp 1.425.514 - Rp 2.822.800)	3
> = 201 - \$ 400 (> Rp 2.836.914 - Rp 5.645.600)	4
> = \$ 401 (> = Rp 5,659,714)	5

The result in calculating severity based on its type of defect can be found by identifying the type of out of order in its material and then multiply its number of particular defect with the price of the finished goods. The formula to determine the total loss per category of defect is shown below.

$$\text{Total Loss Per Category} = \text{Number of Defect} \times \text{Dollar} \times \text{Rupiah}$$

The material used in the current project values 4\$ and at the time Indonesia Rupiah is Rp14.114,-. Total loss for each of category will then be matched with the parameter of severity. Eventually, the result for each problem will be obtained. The result of severity level can be seen in the table below.

Table 5. 7 Severity Level

Symbol of Problem	Total Loss Each of Symbol	Severity Level
D1	IDR 1,242,032.00	2
D2	IDR 1,467,856.00	3
D3	IDR 846,840.00	2
D4	IDR 2,935,712.00	4
D5	IDR 1,580,768.00	3

This risk level can easily get reported and read by manager by transforming it to the risk map. Risk map is the visualization of risk location to see how dangerous they are in easy way. Risk level has four stages which are low, medium, high, and extreme. The risk map of this four stages is formulated by the financial standard and risk map establishment which can be seen below.

Table 5. 8 Financial Standard

Financial Standard	
< 25 Million Rupiah	Low
< 50 Million Rupiah	Medium
< 75 Million Rupiah	High
> 75 Million Rupiah	Extreme

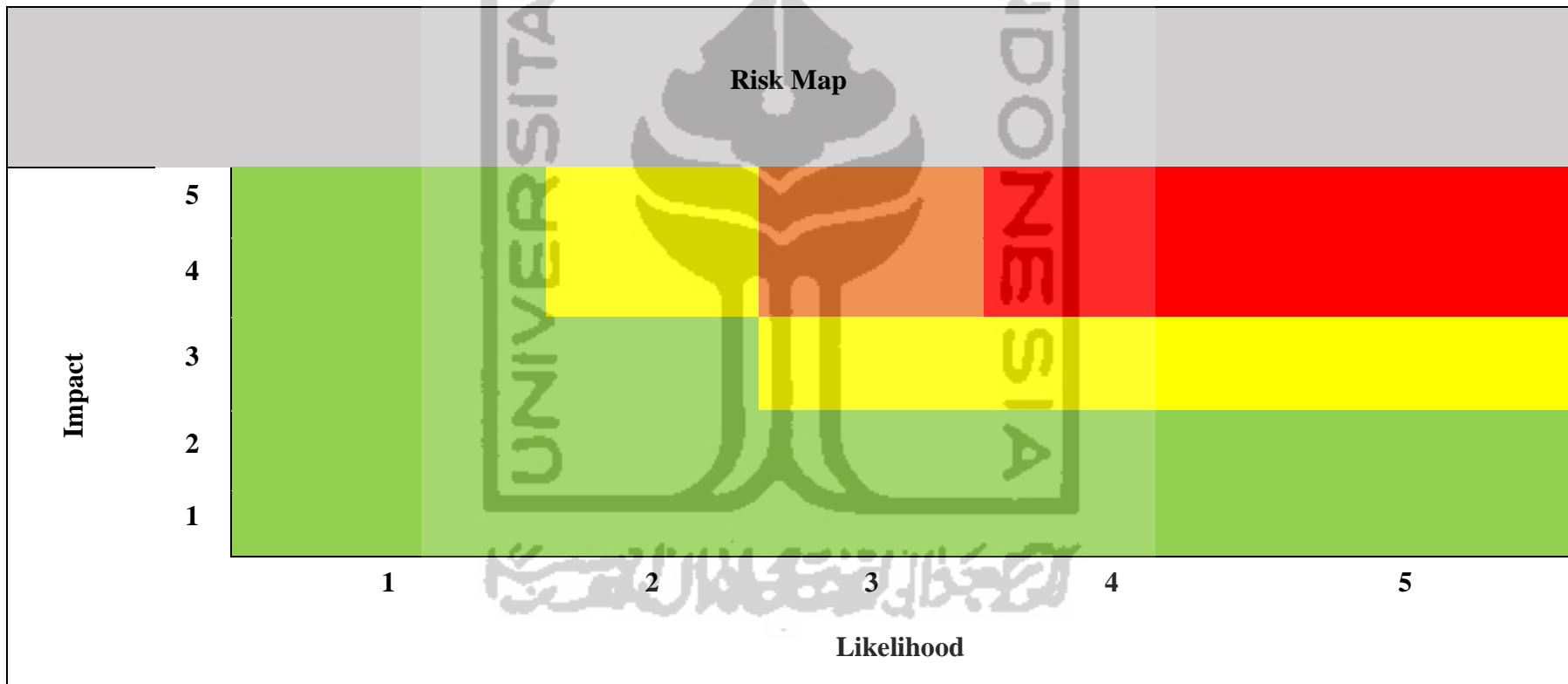


Table 5. 9 Risk Level Parameter

LIKELIHOOD	SEVERITY	RISK LEVEL	RANGE
1	1	LOW	IDR 2,117,100.00
2	1	LOW	IDR 4,234,200.00
3	1	LOW	IDR 8,468,400.00
4	1	LOW	IDR 11,291,200.00
5	1	LOW	IDR 11,996,900.00
1	2	LOW	IDR 4,234,200.00
2	2	LOW	IDR 8,468,400.00
3	2	LOW	IDR 16,936,800.00
4	2	LOW	IDR 22,582,400.00
5	2	LOW	IDR 23,993,800.00
1	3	LOW	IDR 8,468,400.00
2	3	LOW	IDR 16,936,800.00
3	3	MEDIUM	IDR 33,873,600.00
4	3	MEDIUM	IDR 45,164,800.00
5	3	MEDIUM	IDR 47,987,600.00
1	4	LOW	IDR 16,936,800.00
2	4	MEDIUM	IDR 33,873,600.00
3	4	HIGH	IDR 67,747,200.00
4	4	EXTREME	IDR 90,329,600.00
5	4	EXTREME	IDR 95,975,200.00
1	5	LOW	IDR 16,979,142.00
2	5	MEDIUM	IDR 33,958,284.00

3	5	HIGH	IDR	67,916,568.00
4	5	EXTREME	IDR	90,555,424.00
5	5	EXTREME	IDR	96,215,138.00

Table 5. 10 Risk Mapping



The way of this quantitative attitude is applied by having the standard from the production perspective. First, it contains severity and likelihood in a formula. Second, the severity needs to be broken down into the exact amount of money which relies on the privilege of the company, decided by the involved manager. Then, we need to establish the parameter for risk level. This risk level parameter has manager in production to adjust it. Last but not the least, the mix between the likelihood and the severity level that becomes risk level. The risk level can be seen below.

Table 5. 11 Risk Level

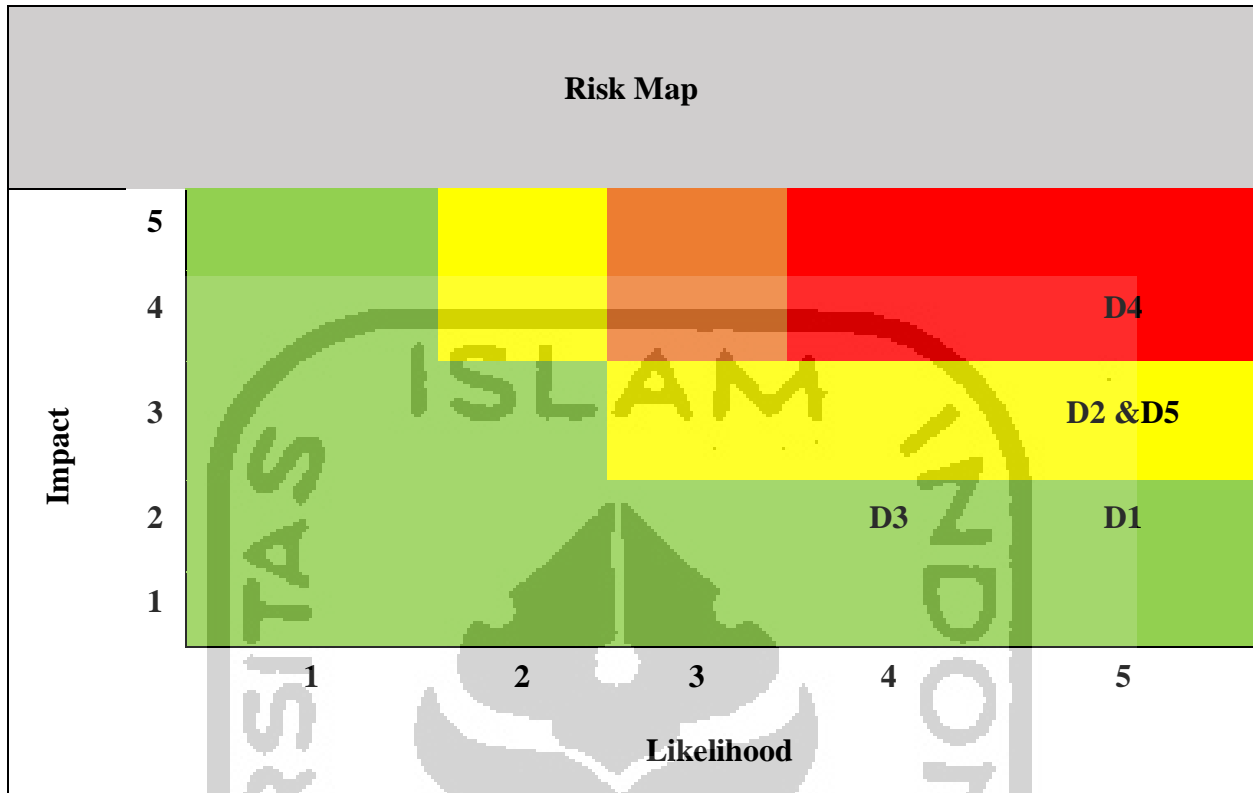
Problem	Likelihood	Severity	Risk Level
D1 = Complex Design	5	2	Low
D2 = Lack of Training	5	3	Medium
D3 = Rough Pedal	4	2	Low
D4 = Type of Material Used	5	4	Extreme
D5 = Pressure Target	5	3	Medium

5.4. The Result of Risk Mapping

Risk mapping is the visualization of detected risks in the colors map. This map helps the manager to read the level or priority risk easily. The colors in the risk map are divided into four colors. They are red, orange, yellow, and green which each of them symbolizes the level of perils.

Each color represents the level of perils. Starting from red, it represents the necessities of a detailed action plan. Second, orange means the requirement of senior management's attention. Third, yellow indicates the needs of management authority. Last but not least, green indicates the needs of routine procedures.

Table 5. 12 Outcome of Risk Mapping



The results show that the most extreme risk that needs to be mitigated and action plan immediately is the defect symbolized by D4. The symbol of D4 is the symbol for the defect of material's type. This type of material used implies the most dangerous reason on why this defect happens in the process-making at the sewing area for product Z. The D2 and D5 occupy the yellow zone, namely medium level. The D2 is the symbol for lacking of training and D5 is pressure target. However, these three risks needs to be mitigated and to be shifted to green zone as the contribution from this research.

The next step is asking for suggestion from the manager. The consultation is settled to see what kind of action performed by the company if the cause of the problem is material used. After having serious consultation with the manager, the manager decides to look out the comparison of cost assessment between this material being used and material in the higher grade for D4 and re-evaluate standard operating procedure for D2 and D5. The manager expects that this mitigation can be a reference for the company development in the future.

5.5. The Result of Cost Analysis

The cost assessment is the calculation of fix and variable costs that are included in the process of the production line in the sewing area only. The goal of this assessment is to show the manager on things that are being compared in the scope of financial. The comparison being proceeded in this research is the goods in the process-making and the proposed solution by the manager. The proposed solution by the manager is to have a higher grade of material. The considered variables in the cost assessment are defect, overtime, and replacement cost. The complete calculation is attached below.

The calculation of cost in comparing these two products involves only the variable of a defect, overtime and replacement cost. These three variables are the essential parts in determining the cost of production in the sewing area. The equations in determining the three variables are attached below.

$$\text{Defect Cost} = \text{Amount of defect} \times \text{Product Selling Price}$$

$$\text{Replacement Cost} = \text{Required Product} \times \text{Cost of Production}$$

$$\text{Overtime Cost} = \text{Labor Cost} \times \text{Hour}$$

Table 5. 13 Comparison Cost of Two Materials

Cost	Product Z	Product Replacement	Differences
Defect Cost	IDR 2.145.328,00	IDR 1.185.576,00	IDR 959.752,00
Overtime Cost	IDR 81.000,00	IDR 10.800,00	IDR 70.200,00
Replacement Cost	IDR 2.145.328,00	IDR 1.185.576,00	IDR 959.752,00
Total Cost	IDR 4.371.656,00	IDR 2.381.952,00	IDR 1.989.704,00

The material of grade B is the material currently being produced and researched in the sewing area. This material is purchased from a local vendor, which is why the company maintains its relationship. Meanwhile the grade A is the material that comes from overseas. It also requires approximately one week to get the order. The grade aims to distinct the quality of a material. The

grade A means that it has the better quality that the company uses to produce glove. It is to say that grade A is one level higher than grade B, in terms of quality in material.

The result of the calculation of cost assessment shows that the product replacement is lower than product Z. The defect cost of product Z is higher as much as IDR 959,752 than product replacement. Overtime cost in product Z is also higher as much as IDR 70,200 than product replacement. Eventually, when it comes to the total cost, product Z causes more cost than product replacement, with IDR 1,989,704 incurred more cost in using product Z. Thus, this assessment will put the extreme into low zone. The shifting value can be seen in table below.

Table 5. 14 Number of Defects of Product Replacement for D4

Number of Occurance / Product Replacement	Symbol
12	D4

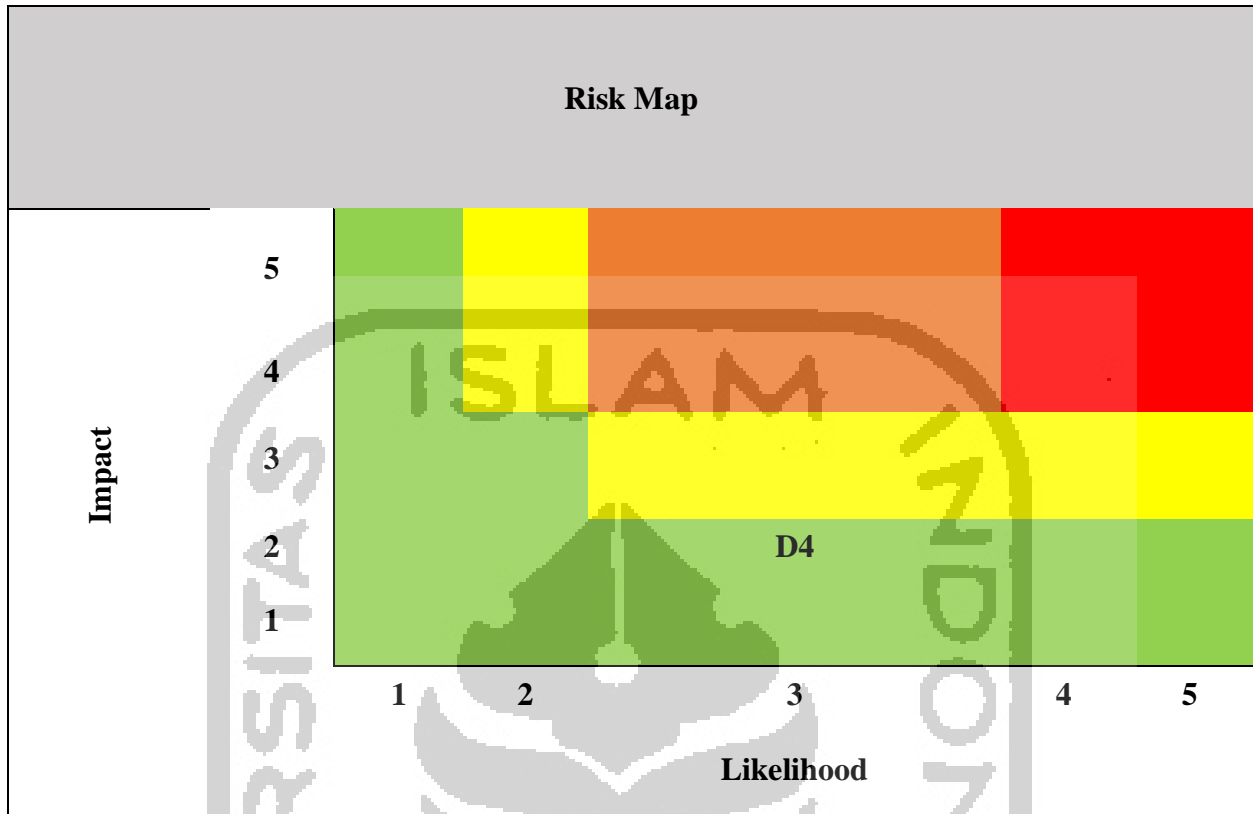
Table 5. 15 Total Loss in Product Replacement for D4

Severity Commentary Replacement Product	Symbol of Problem
IDR 1,185,576.00	D4

Table 5. 16 Risk Level of Product Replacement For D4

Symbol	Likelihood Replacement	Severity Replacement	Risk Level Replacement
D4	3	2	Low

Table 5. 17 Risk Map For D4 as Replacement Product



The mitigation for defect from lack of training and pressure target, company focuses to re-evaluate the standard operating procedure (SOP). The company sees that this shall lower the company's issue in financial. In the sector lack of training, the manager opines that the SOP will be adjusted to create cluster of labors. The group of labors is A, B, and C which indicates good, intermediate, and poor skill respectively. This will also impact to their bonus and career escalation. In addition, this will also impact to the number of occurrences in defect. The worker with good skill will be located in the sensitive project, intermediate worker will manage the medium level of duty, and fresh worker will handle the simple material. The risk of pressure target will be managed by keeping the bonus for worker who overpasses the target production given by the company. This aims to keep the workers motivated during working their job. Thus, appliance this will shift the yellow into the green zone in the risk map.

Table 5. 188 Risk Map For D2 and D5 After

Symbol	Likelihood Replacement	Severity Replacement	Risk Level Replacement
D2	5	2	Low
D5	5	2	Low

Table 5. 199 Risk Map For D2 and D5 After

