











TABLE X  
QUALITATIVE RISKS ASSESSMENT

Risk Variable	Qualitative Risk Assessment in each Periods		
	1 <sup>st</sup> Period	2 <sup>nd</sup> Period	3 <sup>rd</sup> Period
P1	Medium Risk	Medium Risk	Low Risk
P2	Low Risk	Low Risk	Low Risk
P3	Low Risk	Low Risk	Low Risk
P4	Low Risk	Low Risk	Medium Risk
P5	Medium Risk	Medium Risk	Medium Risk
P6	Medium Risk	Medium Risk	Medium Risk
P7	Low Risk	Low Risk	Low Risk
P8	Low Risk	Low Risk	Low Risk
P9	Low Risk	Low Risk	Low Risk
P10	Low Risk	Low Risk	Low Risk
P11	Extreme Risk	Medium Risk	Medium Risk
P12	Medium Risk	Medium Risk	Low Risk
P13	Low Risk	Low Risk	Low Risk
P14	Low Risk	Low Risk	Low Risk
P15	Low Risk	Low Risk	Low Risk
P16	Low Risk	Low Risk	Low Risk
P17	Low Risk	Low Risk	Low Risk
P18	Low Risk	Low Risk	Low Risk
P19	Low Risk	Low Risk	Low Risk
P20	Low Risk	Low Risk	Low Risk
P21	Low Risk	Low Risk	Low Risk
P22	Low Risk	Low Risk	Low Risk
P23	Low Risk	Low Risk	Low Risk
P24	Low Risk	Low Risk	Low Risk
P25	Low Risk	Low Risk	Low Risk

Based on the risk matrix analysis we will conduct the assessment of-of 25 risk variables, as shown in Table X. Some of these variables indicate a decrease and some remain, while the rest is showing a decrease. The results of the risk matrix will conduct a significant test using statistics.

We will perform the ANOVA test to know whether any the significant difference between the 1st period to the second period, second period to the third period, and first period to the third period. This is done because of variations in the data, although the assessment of the Statistics Mean is different. ANOVA test is done by comparing  $P_{value}$  to significant level  $\alpha_{5\%}$ . The rule as follow:

if  $P_{value} > \alpha_{5\%}$ , then the variable is **Not Difference significantly (Nd)**

if  $P_{value} \leq \alpha_{5\%}$ , then the variable is **Difference significantly (D)**

The results of the ANOVA test are as shown in Table XI. In the table are shown  $P_{value}$  for each variable that are compared across the three periods. Only the P11 variable indicates a significant decrease in risk from 1st period to the next period. We can conclude that P11 (Unofficial levies charges by bullies) is the most dominant project risk variable to other variables and has decreased from one period to the next.

TABLE XI  
THE RESULT OF HYPOTHESIS BASED ON P-VALUE OF ANOVA

Risk Variables	P-value			$\alpha_{5\%}$	Result Hypothesis of each variable		
	1st Period to 2nd Period	2nd Period to 3rd Period	1st Period to 3rd Period		1st Period to 2nd Period	2nd Period to 3rd Period	1st Period to 3rd Period
P1	0.9308	0.8496	0.7847	0.05	Nd	Nd	Nd
P2	0.9755	0.9759	0.9508	0.05	Nd	Nd	Nd
P3	0.8869	0.8516	0.9633	0.05	Nd	Nd	Nd
P4	0.8574	0.7824	0.9224	0.05	Nd	Nd	Nd
P5	0.4602	0.7588	0.3021	0.05	Nd	Nd	Nd
P6	0.6240	0.7183	0.4211	0.05	Nd	Nd	Nd
P7	0.9955	0.8512	0.8485	0.05	Nd	Nd	Nd
P8	0.5872	0.6313	0.9790	0.05	Nd	Nd	Nd
P9	0.8389	0.7901	0.9417	0.05	Nd	Nd	Nd
P10	0.9989	0.9373	0.9310	0.05	Nd	Nd	Nd
P11	0.0443	0.9603	0.0479	0.05	D	Nd	D
P12	0.9751	1.0000	0.9763	0.05	Nd	Nd	Nd
P13	0.8560	0.9057	0.7655	0.05	Nd	Nd	Nd
P14	0.9391	0.8807	0.9408	0.05	Nd	Nd	Nd
P15	1.0000	0.9179	0.9165	0.05	Nd	Nd	Nd
P16	0.9101	0.9778	0.9313	0.05	Nd	Nd	Nd
P17	0.8289	0.8306	1.0000	0.05	Nd	Nd	Nd
P18	0.9782	1.0000	0.9782	0.05	Nd	Nd	Nd
P19	0.8846	0.7645	0.6595	0.05	Nd	Nd	Nd
P20	0.7197	0.7197	0.9979	0.05	Nd	Nd	Nd
P21	0.9751	0.8630	0.8369	0.05	Nd	Nd	Nd
P22	0.9184	0.8939	0.8154	0.05	Nd	Nd	Nd
P23	0.9520	0.8627	0.9090	0.05	Nd	Nd	Nd
P24	0.7543	0.9206	0.8319	0.05	Nd	Nd	Nd
P25	0.9900	0.9287	0.9287	0.05	Nd	Nd	Nd

Note: **Nd** as No Significant Different; **D** as Significant Different

Based on the result of the assessment risk for each variable across in all the third periods, the P4 (Penalties for project delays) increases in the 3rd period and both P1 and P12 are a decrease in the 3rd period, as shown in Table X and on the contrary, the hypothesis analysis, as shown in Table XI. They conclude that P1, P4, and P12 are not different between the three periods. It proves that it will be important to test the hypothesis on the output of RII, as part of the qualitative risk assessment.

Our concern is that the variables P5, P6, and P11 in the context are greater than or equal to Medium risk in the three periods, as shown in Table X. The most dominant variables occur regarding frequency and severity, and Important is the variable Unofficial levies charges by bullies (P11). The variable P11 triggers both P5 and P6.

The contractors generally agree that all three periods have different risk characteristics and they assert that the period of political conflict (1st Period) is the most difficult time frame to carry out the project because it involves security and could even derail the project's goals. P11 (Unofficial levies charges by bullies) in the 1st Period is very high in Aceh [18], and the contractors prefer to reject the project, even though, is offered by the owner (This is a statement of concern about the high risk of conflict in Aceh that could affect the implementation of the project). The contractor will be ready to accept the project work if the P11 variable could be accommodated in the contract, as the responsibility of the owner [19]. The effect on cost is derived both of the internal and external factors. Risks of the external factor are the most avoided by contractors when working on construction projects. It is avoided due to the project manager cannot controlling and assessing the risk of the occurrences, and it is even time [20].

Variable P11 will trigger the emergence of P5 (safety and security in the project areas) which is also a Medium risk. While P6 (Increased labor costs due to increased wages) was triggered by the workers' safety reasons for the conflicting area. The labors do not want to work in a particular place that could also threaten the worker's safety [18]. They are willing to work if the labor's wage that given could compensate the risk they receive or the labors demand very high wages (This is the reason why we declare P5, P6 triggered by P11).

In the 2nd Period in Aceh, it was assumed that about 101,000 housing units need replacement, 95,000 units needed to be rehabilitated and most of the infrastructure had been destroyed [21]. Risk characteristic in the 2nd Period is the large scale of projects in large number that must be conducted in limited time to revitalization and rehabilitation of constructions by the contractors. In this 2nd period, the risk of the P11 variables has decreased from the previous period. This decrease occurs on FI (as shown in Fig. 1), SI (as shown in Fig. 2), and on RII (as shown in Fig. 3), while in P5 and P6 variables are constant. These P5 and P6 variables do not follow the pattern of P11 (as shown in Fig. 3), which according to logic P5 and P6 should decrease in line with P11 (as the trigger variable). This may be possible because the problem of limited resources in the 2nd Period becomes another cause.

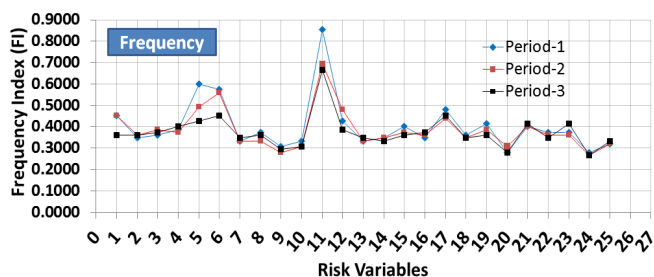


Fig. 1 Frequency Index (FI) in all three Periods

Another risk problem in the 2nd Period is many projects work that experiences the contract delay, or the projects could not be completed within the limit time span. This is due to overloading in carrying out many projects and exceeding contractor capacity. Indirectly, it has resulted in the loss of profit and even loss of contractor working capital, although this is not due to contractor fault. It is more because the system in Aceh has been paralyzed. The working contract is not for profit, but they are moved to be involved in the emergency response process in Aceh. Project risk is an uncertain event or condition that, if it occurs, has a positive/negative effect on project objectives such as scope, schedule, cost, and quality [22]. This is known as risk accepted as a sacrifice and willingness for humanitarian purposes. It is also done by foreign NGOs (Non-Government Organizations) and other local NGOs.

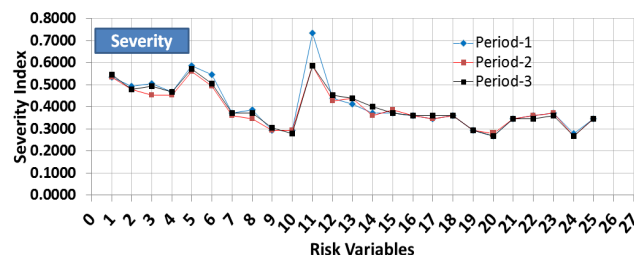


Fig. 2 Severity Index (SI) in all three Periods

We conclude that P5 (Increased costs for safety and security in project areas) and P6 (Increased labor costs due to increased wages) are not decreasing in line with the P11 (unofficial levies charges by bullies) pattern, as shown in Fig. 1 and Fig. 2, are not caused by political factors (like P11 in 1st Period) but is caused by the social, namely the lack and impoverishment of needs. This problem is common in disaster-affected areas.

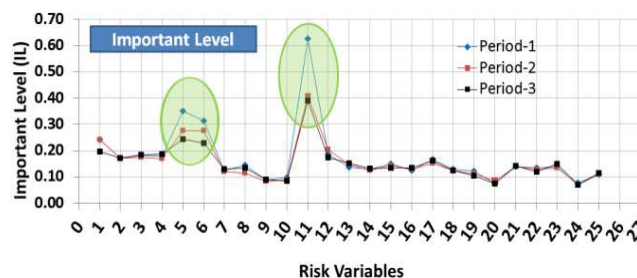


Fig. 3 Risk Important Index (RII) in all three Periods

In this 3rd period, the risk pattern for that period is not triggered by 1st period, but rather follows the precedence pattern (2nd period), as shown in Fig. 3.

#### IV. CONCLUSION

In this research, we have researched the project risks occurring in Aceh on the three periods. This period is a perilous period from various aspects of life, including the construction aspect. The period is the political conflict (1st Period), the post-tsunami disaster (mitigation/2nd Period), and post-mitigation (3rd Period).

One of the most perceived risk variables by contractors is unofficial levies charges by bullies (P11). The high impact of these variables have on the Loss of Contractor's Profit, the contractor prefers to reject the project work offered to them. This P11 variable also has the potential to trigger other variables.

This research was conducted using hypothesis of the risk variables and combines it with risk assessment theory. This finding shows that hypotheses on the variables would have contributed to the change in the results of qualitative risk analysis, rather than using only RRI for risk-level analysis, as examples in P1, P4, and P12. The most important risk variable, unofficial levies charges by bullies (P11), is the most important variable of risk and it has dramatically decreased from the risk extreme to the Medium risk. This could be seen from the high number of contractors originating outside the province of Aceh who has followed the offer and carried out the work. Although should be supported by an understanding of the local geographic conditions [22].

The interpretation of the risk extreme in the 1st period is that the contractor will suffer huge losses and will even break the contract. However, in the next condition, the 2nd period and 3rd period, the contractor can carry out the work in Aceh, although the profit is not too large compared to other provinces in Indonesia. This research can be used as a recommendation for the Indonesian government, especially in Aceh, investors, and contractors in outside of Aceh.

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