**11. Risk Response**

Risk response is the action taken against the risk that may occur. Important known risks need to be followed up with the responses made by the contractor in handling those risks. Methods used in dealing with risks (Flanagan & Norman, 1993):

a. Withholding risk (Risk Retention)

Is a form of risk management which will be detained or taken alone by a party. Usually this is done if the risk faced does not incur a loss that is too large or the likelihood of loss is small, or the cost incurred to overcome the risk is not too large compared with the benefits to be gained.

b. Reduce risk (Risk reduction)

That is action to reduce the risk that will likely occur by:

- Education and training for workers in risk
- Protection against possible loss
- Protection of people and property
- Risk transfer (Risk transfer)

c. This transfer is done to transfer the risk to the other party. The form of risk transfer in question is insurance by paying a premium.

d. Avoid risk (Risk avoidance)

Avoiding the risk is the same as refusing to accept a meaningful risk of refusing to accept the project.

**12. Relevant research results.**

Here are the various literature reviews that are relevant to this research:

a. Manlian Ronald A.Simanjuntak, Ismeth S Abidin, M. Rifqi HM, Risk Analysis of Construction Implementation to Improve Cost Performance on Toll Road Projects. Journal of Faculty of Science and Technology, Universitas Pelita Harapan. The purpose of this research is to identify the risk of the dominant construction implementation on the decrease of cost performance in the development of Toll Road in Java. This journal is useful in the author's research methodology.

b. Ayunita Indria Dewi, Cahyono Bintang Nurcahyo, Risk Analysis on Underpass Development Project at Simpang Dewa Ruci Kuta Bali. Journal of the Technical Faculty, Sepuluh Nopember Institute of Technology. The purpose of this research is to know the risk of underpass development project at Simpang Dewa Ruci Kuta Bali. This journal is useful in the author's research theory.

c. Ferry Wantouw, Robert J. M. Mandagi, Risk Management of High Voltage Air Traffic Construction Project (SUTT) 150 Kv Lopana-Teling. Journal of Engineering Faculty, Sam Ratulang University. The purpose of this research is to identify, analyze and determine the risk response caused by the construction of SUTT 150 Kv Lopana-Teling. This journal is useful in collecting research data of journal authors.

d. Ari Sandhyavitri, Mmuhammad Zulfiqar, Risk Analysis of Toll Road Construction of Tahapa Konstruksi (Pekanbaru-Dumai Toll Road Case Study). Journal of Faculty of Engineering, University of Riau. The purpose of this study was to identify and analyze project risks (during the construction phase project). This journal is useful in the author's literature review.

e. I Gede Putu Joni, Project Management Risks. Journal of Faculty of Engineering, University of Udayana. The purpose of this research is to know the risks of project management. This journal is useful on the author's background.

## C. RESEARCH METHODOLOGY

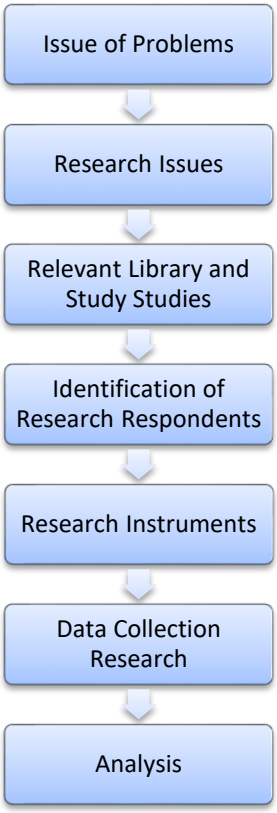
### 1. Research Process

### 1.1 Research Design

The approach to achieve research objectives is done through risk analysis method which is a decision-making system supported by various methods of analysis, simulation and optimization are done measured. These assessments are intended to identify all types of risks that arise during the non-toll road overpass project stage that may affect the performance of the construction project. This research method will use qualitative methods to find out the risks that most influence the project

objectives on the contract and the discussion of risk handling. The following stages of research on this writing:

**Diagram 1. Research Stages**




### 1.2 Data Collection

Data to be collected and used in this research is secondary data derived from various references and relevant research journals.

### 1.3 Operational Research Model

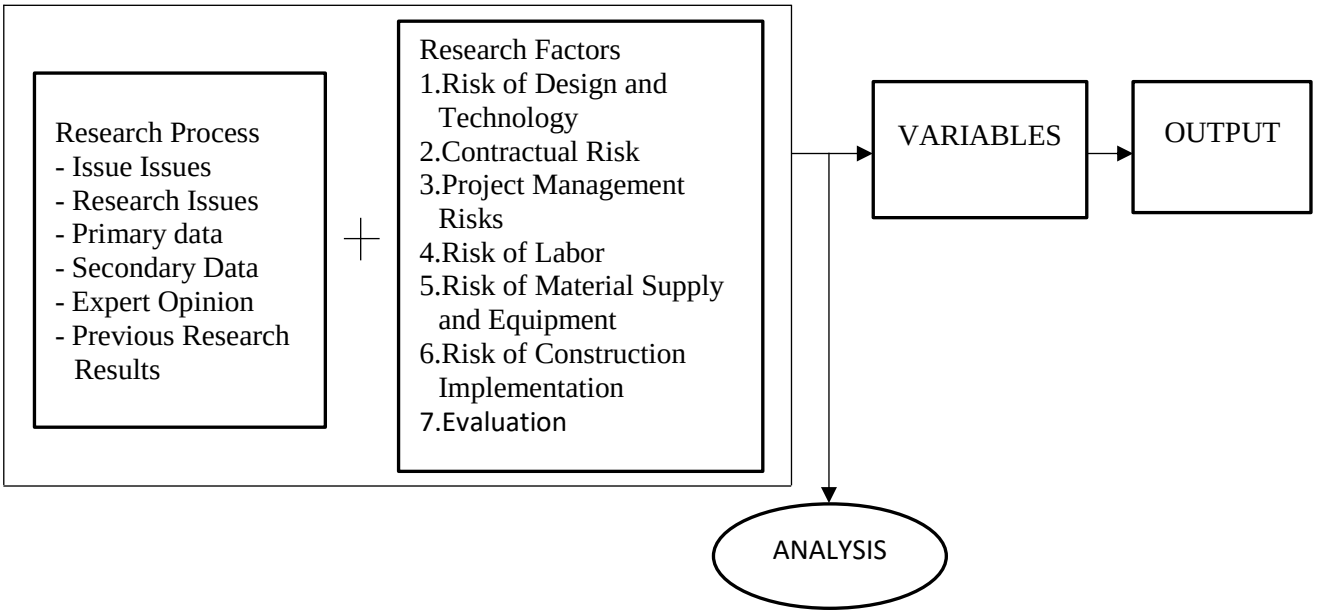



**Diagram 2. Operational Research Model**

## D. DISCUSSION OF RESEARCH RESULTS

This research started from the data collection process through literature study with the output of 6 research factors with each research variables as follows:

a. Research Factors

The factors in this study are:

1. Design and Technology Risks
2. Contractual Risk
3. Project Management Risks
4. Risk of Labor
5. Risks of Material and Equipment Supply
6. Risk of Construction Implementation
7. Evaluation

b. Research variable

- Design and Technology Risks

1. Design error
2. Design changes
3. The use of untested designs
4. The use of new technologies that have not been applied
5. The wrong method of execution
6. Incomplete design data
7. Inadequate and non-conformity specification on design details
8. Error in structural calculation and analysis
9. Mistakes of technical assumptions at the planning stage
10. What is the difference between the owner's and the contractor's specific perceptions
11. Incomplete job documents
12. Late payment by owner
13. Termination of unilateral work by the owner
14. What is the dispute between owner and contractor
15. Late payment to specialist contractor through main contractor

- Project Management Risks

1. Cost estimation error
2. Time estimation error
3. Lack of team control and coordination
4. The presence of less experienced staff in the contracting team
5. Inability of project management planners
6. Performance of a poor specialist contractor
7. Lack of responsibility of the main contractor on the quality of the work of the specialist contractor
8. Non-complete daily reports
9. Low level of management discipline
10. There is an internal conflict within the project management ranks
11. Claim
12. Changes in the scope of work
13. Changes in construction methods that have been made
14. No receipt of work by the owner
15. Inaccuracy of construction works (schedule and quality)

- Labor Risk

1. Disputes between workers
2. Removal of potential workers
3. Unskilled labor
4. Unavailability of the number of field workers
5. Low labor productivity
6. Requests for overtime hiring by workers
7. Demand for salary increases

- Risks of Material and Tool Supply
  1. Limited material availability
  2. Damage or loss (material theft) at construction site location
  3. Lack of material storage at construction site location
  4. Lack of landfills on site construction sites
  5. Delay of material delivery from supplier to construction project location
  6. Increase in material prices that are not fair
  7. Insufficient volume of material shipped can
  8. Damage to machine tools and project equipment can
  9. Equipment that is not in accordance with the working conditions of the project
  10. If the lack of proper procurement of materials and equipment (volume, schedule, price and quality)
- Construction Construction Risk
  1. Site accessibility conditions are difficult
  2. Embezzlement of project assets
  3. Error in survey
  4. Destruction and sabotage
  5. Security disturbance at project site
  6. Quality of material that is not in accordance with the specifications
  7. Uneven compaction at the time of casting
  8. Quality of concrete not in accordance with the specifications
  9. Damage that occurs during maintenance period
  10. Changes in unplanned scheduling of work
- Evaluation
  1. No coordination with the local government
  2. Lack of coordination with experts and skilled personnel
  3. The absence of K-3 education and training (occupational safety health)
  4. Absence of equipment maintenance and completeness of K-3 (occupational safety health)
  5. Not involving residents around the project
  6. No social approach to the local government, community leaders and religious leaders who are in the project environment

## E. CONCLUSION

1. Risks can be identified through the source of the risks and impacts of losses incurred. Based on these impacts can be assessed what risks are potentially large in causing losses. Risks are analyzed by combining likelihood values (probability or frequency) and consequences (impact or effect). Likelihood and consequnces of each risk will determine the level of risk.
2. The risk associated with this uncertainty occurs because of insufficient or unavailable information about what will happen. In handling risk, it can be done through risk avoidance, risk reduction / mitigation, risk retention and risk transfer.

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