Analysis of the Influence of the Level of Implementation of the Occupational Safety and Health Management System (SMK3) on the Accident Rate in Housing Projects

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ABSTRACT

The so-called Occupational Safety and Health Management System (SMK3) is part of the overall management system which includes organizational structure, planning, responsibilities, implementation, procedures, processes, and resources needed for the development, implementation, achievement, review, and maintenance of K3 policy in the context of controlling work-related risks to create a safe, efficient and timely workplace. An accident is an unexpected event that results in serious injury or illness to an employee and can result in property damage. The aim of this research, based on the background and problem formulation above, is to determine the factors that influence the Occupational Safety and Health Management System (SMK3) in Housing Development projects and to analyze the factors that significantly influence the Occupational Safety and Health Management System (SMK3) on Housing Development projects. The methods used are surveys, interviews, and data analysis in the field. The identified SMK3 risk factors include non-compliance with work safety procedures, lack of SMK3 training or certification for workers, unsafe work environment conditions, use of unsafe equipment or machines, inaccuracy or negligence of workers, and lack of personal protection or adequate safety equipment. To overcome this risk, strict and appropriate SMK3 standards are needed. Safety regulations not implemented in the project environment make the level of health and safety fall into the low category. Jobs that are at risk of causing work accidents.

Keywords: SMK3; accident; structure; organization; safety.

INTRODUCTION

The Occupational Safety and Health Management System (SMK3) is a protection system for workers and construction services to minimize and avoid the risk of moral and material losses, loss of working hours, human safety and the surrounding environment which can later support effective and efficient performance improvement. Guidelines for implementing SMK3 in Indonesia are regulated in Minister of Manpower Regulation Number: PER.05/MEN/1996. The so-called Occupational Safety and Health Management System (SMK3) is part of the overall management system which includes organizational structure, planning, responsibilities, implementation, procedures, processes, and resources needed for the development, implementation, achievement, review, and maintenance of K3 policy in the context of controlling work-related risks to create a safe, efficient and timely workplace.

An accident is an unexpected event that results in serious injury or illness to an employee and can result in property damage. The number of work accidents in Indonesia is still high. Quoting data from the Employment Health Insurance Administering Agency (BPJS), as of the end of 2019 there had been 105,182 work accidents. Meanwhile, cases of serious accidents resulting in death were recorded at 2,375 cases out of the total number of work accidents. Director General of Labor Inspection and Occupational Safety and Health (PPK and K3). The number of work accidents from year to year experiences an increasing trend. The total number of work accidents every year has increased by up to 5%. However, for serious work accidents, the increasing trend is quite large, around 5% - 10% every year.

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Construction work is a job that has a high risk, especially at the construction implementation stage. This causes the construction industry to have a poor record in terms of Occupational Safety and Health (SMK3), so it requires excellent stamina from the workers who carry it out. This housing construction project is one of the construction projects that has a high level of risk and work accidents, this is due to the large number of workers involved, the use of sophisticated tools or machines which require special methods and skills, and require supervision in their use.

Faisal (2018) Currently, the Cileungsi housing area is one of the areas with the fastest development growth in Bogor Regency, West Java. Therefore, even though it is not as expensive as its neighbor, the Cibubur area, East Jakarta, property prices in Cileungsi have increased sharply over time. That factor is what drives property developers in Cileungsi, Bogor. This residential area, which stands on 4.6 hectares of land, adopts a modern minimalist design concept that emphasizes a beautiful and comfortable environment. The housing location for the Housing Financing Liquidity Facility (FLPP) is quite strategic, located in Cileungsi Bogor, which incidentally is one of the areas that is developing rapidly. Apart from a row of large-scale factories, such as Holcim Cement, this area is also surrounded by various new business centers. By carrying out the development concept of "Family Friendly" and supporting the slogan "Good and Harmonious Life".

In general, a construction project is defined as the process of implementing physical development, which is carried out by a contractor. A construction project has started since the project owner had an idea/idea to build, and then the subsequent process will involve and be influenced by various elements such as consultants, contractors, supervising consultants and the owner himself. The process of building construction projects in general is an activity that contains many elements of danger, so it cannot be denied that this construction work is a contributor to a fairly high number of accidents. The large number of cases of work accidents and work-related illnesses is very detrimental to many parties.

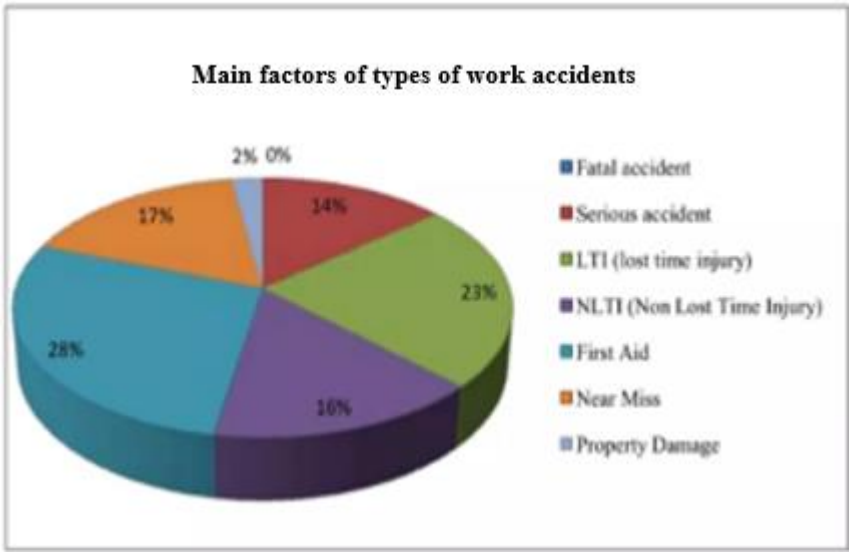

Figure 1. Frequency and types of work accidents

(SMK3) is a more responsible system that strives to create a safe, healthy, and prosperous work environment free from accidents and work-related diseases. This management system is also a unit of interrelated elements that are used to determine policies, and targets and achieve targets. These objectives include organizational structure, activity plans (including risk analysis and objective setting), responsibilities, practices, procedures, processes, and resources. (SMK3) consists of five basic principles as reference elements, namely policy, planning, implementation and operation of activities, evaluation or inspection, and management review or corrective action efforts.

The basic principles (SMK3) have been in law since 1970. In the Republic of Indonesia Law Number 1 of 1970 concerning Work Safety, it is explained that every worker has the right to receive safety protection in carrying out work for welfare and increasing production and national productivity. One of the obstacles that hinders the implementation of the Occupational Safety and Health Management System (SMK3) in construction projects is the perception that implementing SMK3 in the construction sector is expensive and employers who care about the work safety of their employees if they include the costs (SMK3) in their bidding documents are likely to be winners. tender because the offer is not the lowest. The success of implementing (SMK3) in a project can be seen from achieving the target of zero accident conditions. For this reason, the 5 basic criteria (SMK3) in a project are evaluated for their correctness which indicates the measuring value of the success of implementing (SMK3) a project. Success can be seen from the level of achievement of measuring values according to written value standards. Construction work is an activity that uses quite a lot of equipment, both sophisticated and manual. This equipment is carried out on large areas of land in various types of activities, causing a high risk of accidents. Apart from equipment, reduced knowledge of workers regarding Occupational Safety and Health (SMK3) as well as awareness regarding supervision (SMK3) is also one of the causes of accidents. The aim of this research, based on the background and problem formulation above, is to determine the factors that influence the Occupational Safety and Health Management System (SMK3) in Housing Development projects and to analyze the factors that significantly influence the Occupational Safety and Health Management System (SMK3) on Housing Development projects.

Definition of Project

According to the definition in the PMBOK Guidebook (A Guide to the Project Management Body of Knowledge), the definition of a project is a temporary effort carried out to produce a unique product or service. Temporary means each project has a specific start and finish date. Unique means that the product or service produced is different from other similar products or services, no two projects are 100% the same. In other words, every project must have a clear beginning and end. A project can be defined as a series of activities that only occur once, where implementation from start to finish is limited by a certain period.

According to Soeharto (1999): Project activity can be defined as a temporary activity that lasts for a limited period, with the allocation of certain resources, and is intended to produce products or deliverables whose quality criteria have been clearly outlined.

Munawaroh (2003) states that a project is part of an organization's work program which is temporary to support the achievement of organizational goals, by utilizing human and non-human resources.

According to Subagya (2000): A project is a work that has the following special signs, namely:

Start and finish times are planned.

a. It is a unit of work that can be separated from others.
b. Usually the volume of work is large and the relationships between activities are complex.

Heizer and Render (2005) explain that a project can be defined as a series of tasks directed toward a main result. In a construction project, three important things must be considered, namely time, cost, and quality (Kerzner, 2006). In general, construction quality is a basic element that must be maintained to always comply with planning. However, in reality, there are often cost overruns as well as delays in implementation time (Praboyo, 1999; Tjaturono, 2004). Thus, the expected work efficiency and effectiveness is often not achieved. This results in developers losing competitive value and market opportunities (Mora and Li, 2001).

Science in construction can be divided into two general things, namely:

a. Construction technology
   As the name suggests, construction technology relates to the methods or techniques used to place physical materials and construction elements in their place in the field.
b. Construction management
   Refers to how resources are available to managers so that they can be applied well on a

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construction project. Usually, when we talk about resources for construction, what comes to mind are the five M's, namely:

1. Manpower (labor);
2. Machiners (tools and equipment);
3. Materials (building materials);
4. Money (money);
5. Method (method).

Management involves timing and application of the five resources above to build a construction project. There are many things to consider when organizing a project and successfully applying the five M's.

The involvement of good planning in terms of time, cost and project scope is important in the successful development of a project. The task of a manager on a construction project is to utilize resources as effectively and efficiently as possible within the framework of time, cost and quality planning for achievement.

Project Characteristics

a. The characteristics and characteristics of a construction project can provide information that a construction project is different from several other types of projects, making construction projects have their unique characteristics and require special management in controlling all the complexities in their implementation in the field.
b. According to Ervianto (2005): The characteristics of construction projects can be viewed in three characteristics or dimensions, namely unique, requiring resources, and requiring organization.
c. It is unique: there are never exactly the same series of activities (there are no identical projects, there are similar projects), projects are temporary, and always involve different groups of workers.
d. Requires resources (resources): the resources involved in the project, namely workers (men), money (money), machines (manchines), methods (methods) and materials (materialists).
e. Requires an organization: every organization has a variety of goals in which a number of individuals with varying skills, different interests, varying personalities and uncertainty are involved.

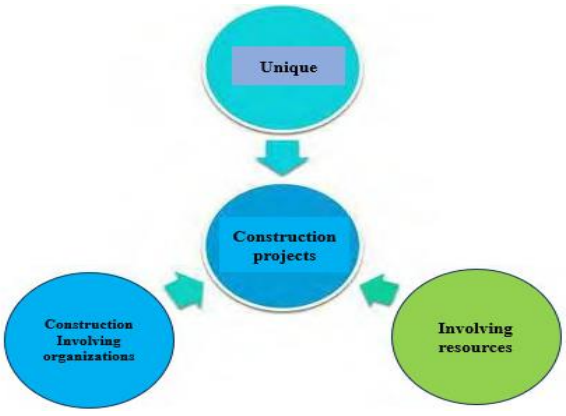

Figure 2. Threedimensional objective Source: Ervianto (2005)

Meanwhile, the general nature or characteristics of construction projects (Soehendrajati, 1987) are as follows:

a. Projects are complex endeavors, usually not recurring activities in the broadest sense.
b. Produce specific products.

Having a life cycle, there is a starting and ending point, the project phases include: conception and definition, design and development, implementation, completion and operations.

a. The characteristics of a project change as it goes through the phases of its life cycle.
b. Uncertainty of costs and time as the project phase matures.

From the description above, the main characteristics of the project are as follows:

a. The goal is clear
b. Targets are directed at change or renewal
c. Goals occur only once
d. There are limits to the start and end of project implementation
e. Projects are interdisciplinary
f. Determination of limited responsibilities for realizing the project
g. There are limits to the available workforce
h. There is a budget and limits on costs
i. Limited liability for project realization

Apart from projects, there are also programs that have the same characteristics as projects. The difference lies in the implementation time period and the amount of resources required. Programs are larger in scale than projects. Generally, programs can be split into more than one project.

In other words, a program is a collection of various projects.

a. Project Goals and Three Constraints (Triple Constraints)
   Apart from the building form above, it has been mentioned that each project has a specific purpose, for example building a residence, bridge or factory installation. It can also be a product resulting from research and development work. In the process of achieving this goal, there are limits that must be met, namely the amount of costs (budget) allocated, schedule, and quality that must be met. These three things are important parameters for project organizers. The three constraints above are called triple constraints. Look at Figure 3.
   1. Budget The project must be completed at a cost that does not exceed the budget. For projects that involve large amounts of funds and a work schedule of many years, the budget is not only determined in total for the project, but is broken down into its components or per certain period (for example, per quarter) whose amount is adjusted to the needs. Thus, completion of project parts must also meet the budget targets per period.
   2. The project schedule must be carried out according to the specified time period and end date. If the final result is a new product, then delivery must not exceed the specified time limit.
   3. Product quality or results of project activities must meet the required specifications and criteria. For example, if the result of the project activity is a factory installation, then the criteria that must be met is that the factory must be able to operate satisfactorily within the specified time period. So, meeting quality requirements means being able to fulfill the intended task or often referred to as fit for the intended use.

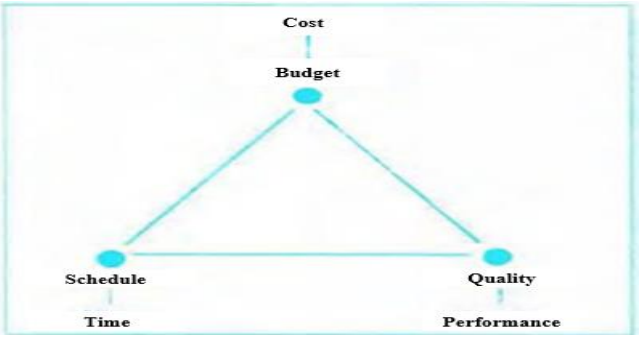

Figure 3. Project targets which are also Triple Constraints Source: Soeharto (1999)

These three boundaries are attractive. This means that if you want to improve product performance as agreed in the contract, then generally this must be followed by improving quality. This then

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results in costs increasing so that they exceed the budget. On the other hand, if you want to reduce costs, you usually have to compromise on quality or schedule.

b. Project Activities versus Operational Activities
There are many differences between project activities and operational activities. The fundamental difference is that operational activities are based on the concept of utilizing existing systems, whether in the form of factories, buildings or other facilities, continuously and repeatedly, while project activities aim to realize or build systems that do not yet exist. Thus, the sequence is that the system (facility or product) is built or realized first by the project, then operated.

Project Types

Broadly speaking, construction projects can be divided or classified into 3 (three) parts (Halpin, 1998), namely: building construction, engineering construction and industrial construction.

a. Building Construction
Building construction is a building that is used as a public facility, for example institutional buildings, education, light industry (such as warehouses), commercial, social buildings and recreational areas. The types of buildings in this construction include office buildings, shopping centers, apartments/flats, and schools. Building construction is usually planned by architects and civil engineers, while the material required is more emphasized on architectural aspects.

b. Engineering Construction
Construction in this category involves structures that are specifically planned and designed by experts and created to meet community needs related to infrastructure. This type of construction is further divided into two parts, namely road construction and heavy construction.

c. Road Construction
This project includes excavation, backfilling, road paving, and construction of bridges and drainage structures. Road construction is usually planned by local public works departments and differs from building construction in terms of activities between owners, planners, and contractors.

d. Heavy Construction
Included in this construction are a country's utility projects, dams, pipelines,transportation other than roads, water transportation and air transportation. This construction is financed by the government or a public-private partnership.

e. Industrial Construction
This construction usually involves high-level engineering projects in manufacturing and production processes. In some cases, contractors and architects are faced with the same problem of designing and implementing factory construction for the owner/client.

According to Soeharto (1999), projects can be grouped into several project types, namely:

1. Engineering-construction projects
Consists of feasibility assessment, engineering design, procurement and construction.
2. Engineering - manufacturing projects
Intended to create new products, including product development, manufacturing, assembly, functional testing and operation of the resulting products.
3. Research and development projects
Aims to carry out research and development in order to produce certain products.
4. Project management services
Management service projects do not provide results in physical form, but a final report, for example designing a management information system.
5. Capital projects
Capital projects are projects related to the use of capital funds for investment.
6. Radio-telecommunication projects
Aims to build a telecommunications network that can cover a wide area at minimal cost.
7. Bio-diversity conservation projects

Projects related to environmental conservation efforts.

Project Stage Cycle

According to Soeharto (1999), one of the phasing systematics compiled by PMI (Project Management Institute) regarding the project phase cycle consists of:

a. Conceptual stage
   In the conceptual stage, ideas are prepared and formulated, preliminary analysis and feasibility assessment are carried out. The final deliverable at this stage is the feasibility study results document.
b. PP or definition stage
   The main activities in the PP or Definition stage are continuing to evaluate the results of conceptual stage activities, preparing tools (in the form of data, technical, engineering and commercial specifications), preparing plans and making strategic decisions, and selecting project participants. The final deliverables at this stage are documents resulting from further analysis of project feasibility, project strategic and operational plan documents, cost budget documents, master schedule, and an outline of project quality criteria.
c. Implementation stage
   In general, the implementation stage consists of detailed engineering design activities for the facilities to be built, procurement of materials and equipment, manufacturing or fabrication, and installation or construction.
d. Termination stage
   Activities at the termination stage include preparing the installation or product for operation (trial), completing administration and other finances.
e. Operation or utility stage
   In this stage, project activities cease and the operating organization begins to be responsible for the operation and maintenance of the installation or project products.
f. In the project cycle, activities take place starting from the starting point, then increase in type and intensity to a peak, decrease, and end. These activities require resources in the form of man-hours, funds, materials or equipment. If you make a graph with resources on the vertical axis and time on the horizontal axis, you will see the project cycle as a curved line with start, peak and end points, as seen in Figure 4 below.

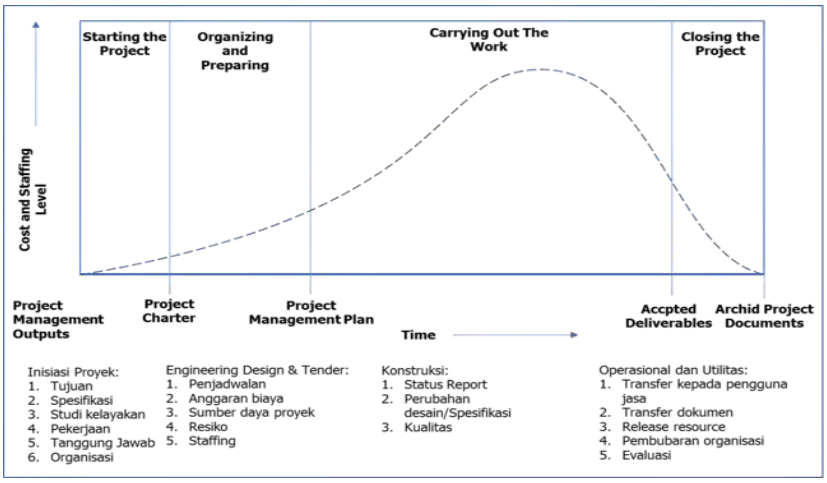

Figure 4. Project Stage Cycle Source: Soeharto (1999)

Apart from the ups and downs in the intensity of activities, there have also been changes in other aspects, such as the qualifications of personnel required. For example, at the start of a project planning and engineering experts are needed, while towards the end of the project more inspectors are needed in the field. Different from routine operational activities which are relatively stable, project activities are dynamic, constantly changing. To achieve efficient use of resources, efforts need to be made to avoid sharp fluctuations. Thus, all activities in the project cycle are a

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continuous series towards the target.

Stakeholders

Project stakeholders are parties either individually, in groups or organizations who may influence or be influenced by the decisions, activities and results of a project. According to PMBOK 6th Edition, stakeholders must be identified before the project begins.

There are four processes in stakeholder management, namely
1. Identify stakeholders (Initiating)
2. Stakeholder Management Planning (Planning)
3. Management of Stakeholder Involvement (Executing)
4. Controlling Stakeholder Involvement (Monitoring – Controlling)

In construction project activities, there is a process that processes project resources into an activity result in the form of a building. The process that occurs in this series of activities involves related parties, both directly and indirectly. Schematically, the parties involved in a construction project can be depicted in Figure 5 below:

Figure 5. Parties Involved in Construction Projects Source: Ervianto (2005)

Project management has the obligation to coordinate all parties involved in a construction project so that project objectives can be achieved well and all parties optimally obtain the goals or objectives of their involvement in the project and also pay attention to the moments of involvement of each party. Functionally, there are three parties who play a very important role in a construction project, namely: project owner, consultant and contractor.

1. Owner (project owner)

Namely the party who owns the project or who owns the building to be built.

Its functions and duties include:

• Provide an overview of the building to be built

• Give decisions on the buildings to be built

• Paying the parties involved in the project.

2. Consultant

Is an expert appointed by the owner and is responsible for making the owner's needs a reality. Its function is to provide assistance or advice to the owner in his expertise in the construction activity process.

3. Executor (contractor)

The contractor is the party appointed by the owner as the project implementer, this party will carry out the project using a planning process that has been prepared by the consultant to produce it into a concrete form, in other words the contractor carries out the project work according to the drawings that have been previously prepared.

The duties of this contractor include:

• Understand design drawings and specifications as a reference in the project.

• Rearranging construction implementation methods and work implementation schedules together with engineering.

• Lead and control the implementation of work in accordance with predetermined time, quality and cost requirements.

• Create daily work programs and provide daily activity direction to work implementers.

• Make evaluations and make reports on the results of work implementation in the field.

Project Performance

Project performance is how the project works by comparing the actual work results with the estimated work methods in the work contract agreed upon by the owner and implementing contractor. Soeharto (2001) stated an example where it could happen that in the report an activity in a project progresses faster than the schedule as expected. However, it turned out that the costs incurred exceeded the budget. If control measures are not taken immediately, it could result in the project not being completed in its entirety due to lack of funds.

To facilitate project control, project managers should have a reference for control goals and objectives. Therefore, indicators of the final goal of achieving the project must be displayed and used as a guide during project implementation. Indicators that are usually targets for achieving final project goals are cost performance indicators, time performance indicators, quality performance indicators and K3 performance indicators.

Time Performance

According to Halpin, a project manager controls various activities at the project site, one of the important aspects supervised is time performance. Time performance is the process of comparing work in the field with the planned schedule.

The time period (duration) can be defined as the time required to complete or complete a predetermined activity or task. Project implementation time is the time determined by the owner to use, utilize or rent out the project building.

From the explanation above, the project implementation time criteria are divided into 3 conditions, namely:

1. Slow Duration

Slow duration is a duration that, for one reason or another, has a duration that is slower than the normal duration.

2. Normal Duration

Normal duration is the project implementation time that utilizes the greatest effective and efficient capabilities of workers who work normally, namely 7 hours a day and 1 hour rest (in accordance with the Indonesian Labor Law).

3. Fast Duration

Fast duration is the project implementation time that utilizes the maximum capabilities of the workforce plus overtime or shift work.

In carrying out a project, there are factors that influence the construction implementation time. These factors include:

• Project Size

The project size can be seen functionally or in terms of area, namely in ft or m. The larger the building, the more complex the construction and the longer the completion time.

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• Building Function

The function of a building implies the business targets to be achieved, for example offices, retail and other buildings.

• Complexity

Complexity describes the complexity of the job. Building complexity impacts construction methods such as the type of foundation used.

• Quality.

Quality can be classified by variables or attributes, namely appearance, strength, stability, use of materials. The appearance of the building is one aspect of quality assessment.

• Location

The location of the building has an important impact on the time of project implementation, because the location of the project has an impact on the availability of resources such as materials, tools, time.

Cost Performance

One important thing in planning a project is cost. According to Soehendrojati (1987), working on a project requires various types of resources such as materials, labor, equipment and so on. This will ultimately involve financial issues, namely the issue of project costs and income as well as issues of financial receipts and expenditure.
The costs that arise in a project are:
1. Direct Costs
2. Direct costs are costs that arise and are directly related to ongoing project activities. Direct costs include:
• Material or materials costs
The quantity of materials or materials that will be used must be calculated carefully by taking into account missing materials. Material costs for one place and another may differ, this is influenced by material scarcity, transportation costs and material stock.
• Wage Costs
Labor costs vary and depend on skills and salary standards where the project is located. This worker's wages include the costs of health coverage and work accident insurance. Project locations where the cost of living is high means the standard salary is also high. For areas where it is quite difficult to find workers who have the desired skills, it is very possible to bring in workers from other areas which will add quite a lot to the costs of mobilizing workers and workers' accommodation costs.
• Equipment Costs
For general equipment that is commonly used, it is necessary to consider renting or purchasing the equipment. Because with proper analysis and consideration you can determine the cost of equipment.
3. Indirect Costs
Indirect costs are costs that are required for each project activity, but are not directly related to the activity in question and are calculated from the beginning of the project until the end of the project. If the final implementation of the project is delayed from the planned time, these indirect costs will be large, while the amount of work and the contract value are fixed, so that the contractor's profits will decrease and even in certain conditions there will be a loss.
These indirect costs include:
• Overhead Costs
Overhead costs are operational costs that support the implementation of work during the project, which include:
1) Temporary facilities
2) Operational field officers
3) Costs for K3
• Unexpected costs

Unexpected costs are costs for events that may or may not occur.
• Profit
The contractor's profit recommended in the work contract is generally 10%, apart from that it also depends on the size of the risk of the work, as large as it is.
The greater the risk, the greater the profit set. For contractors, profit is greatly influenced by how much efficiency the contractor in question can achieve without reducing the quality, specifications and time of project implementation.

Quality Performance

Quality is always related to cost and time parameters, quality parameters will increase costs and possibly also schedule. While reducing costs with a fixed scope of work and schedule, it will likely reduce quality. Quality assurance efforts including quality control aim to ensure that the predetermined quality levels or standards can be met. The planning of a project has taken into account the costs and schedule to achieve it, so that all that remains is proper control over the use of parameters in the form of resources which will help prevent cost overruns or delays in producing goods that meet these standards.

Quality in the ISO 9000 framework is defined as the overall characteristics and characteristics of a product or service that influence the product's ability to satisfy certain needs. This means that we must be able to identify product characteristics and characteristics that are related to quality and then create a basis for benchmarks and

According to Montgomery (1985) quoted by Supranto (1997), quality is the extent to which products meet the requirements to people who use them. A product is said to be of quality for someone if the product can meet their needs. According to Asiyanto (2005), one definition of quality is the overall nature and characteristics of a product or service that is related to its ability to fulfill a need. Construction quality includes two types, namely:

1. Objective quality standards, namely quality that has clear benchmarks and can be measured by anyone with the same standards, with clear benchmarks.
2. Subjective quality standards, namely quality with unclear benchmarks, sometimes one person is not the same as another. Objective quality benchmarks are very clear, such as: hardness, density, strength, dimensional accuracy, straightness and others which can be measured using tools. Meanwhile, subjective benchmarks cannot be shown with numbers, such as: neatness, beauty, smoothness and so on.

Quality is a product or service that meets customer desires. Quality standards can be made at several quality levels (high, medium and low), the important thing is to ensure product quality is as expected. According to Asiyanto (2005), the factors that influence the quality of construction work are:

1. Software in nature, quality of planning and system of processes used.
2. Hardware, quality of labor, construction tools and materials used in the production process.
Products or results of project activities must meet the required specifications and criteria. For example, if the result of the project activity is a factory installation, then the criteria that is met is that the factory must be able to operate satisfactorily within the specified time period.
Project performance indicators from the quality aspect are (Syah, 2004):
• As per technical specification contract documents, agreements.
• The project owner agrees and accepts the project without comments/specific conditions.
• There are no penalties, complaints or claims regarding the quality of project work results.
• Occupational Safety and Health (K-3) is implemented well.
• All parties involved in project implementation are satisfied.
• Obtain a certificate of completion.
• Good company image.
• There are invitations and/or appointments to new projects.
These three targets are closely related and interrelated. This means that if you want to improve the performance of the product that has been agreed upon in the contract, then generally this must be followed by increasing the quality, which in turn results in an increase in costs beyond the budget.

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On the other hand, if you want to reduce costs, you will reduce quality and implementation time. From a technical perspective, the measure of project success is related to the extent to which these three targets can be met.

Understanding Accidents

Definition (definition) Accident level is the potential loss that can be caused if it comes into contact with a hazard or if a function fails. Risk assessment is the product of the frequency value and the severity value of a risk. To determine the category of a risk, whether it is low, medium, high or extreme Hafnidar (2017)

Definition of occupational safety and health system according to the decision of the Minister of Manpower of the Republic of Indonesia. No. Kep 463/MEN/1993 is work safety and health protection aimed at ensuring that workers and other people in the workplace/company are always in a healthy and safe condition, and that every production source can be used safely and efficiently. The occupational safety and health symbol has its own meaning in the Republic of Indonesia Minister of Work Decree 1135/MEN/1987 concerning the occupational safety and health flag

Figure 6. Meaning and significance of the SMK3 Symbol/Emblem/Logo: Faisal (2018)

Cross: Free from accidents and work-related illnesses. Gear: Work with physical and spiritual freshness.

White : Clean and holy.

Green : Happy, healthy, and prosperous.

Eleven cogs of the wheel : Law No. 1 of 1970 concerning Work safety.

Construction Risk (SMK3) is a measure of possible losses to public safety, property, human life, and the environment that can arise from certain sources of danger that occur during construction work. (Permen PU no 05 of 2014) Risk is a consequence that may occur unexpectedly, risks in a project can interfere with achieving project targets, namely cost, time and quality of a project. In the project implementation process, several risks usually arise that are not considered in the process scheduling. To minimize the risks that arise, it is necessary to identify and analyze risks qualitatively and quantitatively. Quantitative risk analysis can be carried out by focusing on project scheduling planning calculations. Risk mitigation measures are also needed to overcome the possibility of risks occurring in project work, especially risks in the dominant category so that they can be used as a basis for decision making by related parties. So it is necessary to identify and analyze construction risks during project implementation. So that the project can survive failure and achieve the desired time target

Risk identification is a process of assessing risks and uncertainties that are carried out systematically and continuously. So that risk can be managed effectively, the first step is to identify the type of risk, namely which is business risk and which is pure risk. Project risks are classified as pure risks, then identified based on potential sources of risk, or can also be based on impacts. Qualitative methods use risk matrices that describe the level of probability and severity of an event expressed in the form of a range from lowest risk to high risk. This method is rough because of the difference between low, medium, or high-risk levels. According to the AS/NZS 430

standard, the possibility or likelihood is given a range between a risk that rarely occurs to a risk that can occur at any time. For severity, it is categorized between events that do not cause injury or only small losses and the most severe if they can cause fatal events (death) or major damage to company assets.

Risks that are known to be large and have potential consequences must be managed appropriately, effectively, and by the company's capabilities and conditions. This technique can help differentiate the level of danger clearly, making it easier to determine priorities for control measures. The implementation method is structured and consistent so that the risk management process can run in a balanced manner.

Work accident

According to Sonata (2017), construction projects with elevated structures are construction where the planning and implementation of work are carried out above ground level.

Work accidents are accidents that occur in connection with work relations, including illnesses that arise due to work relations, as well as accidents that occur on the way from home to work and returning home via normal or natural roads. Work accidents are unexpected events (no element of intention) and are not expected because it result in loss, both material and suffering for those who experience them. An accident was previously considered an accident or event that was unintentional, unplanned and happened by chance. An accident is something that is undesirable and feels like something detrimental. Especially for profit-oriented industrial activities, accidents will cause significant losses. Apart from losses involving individuals or groups of people, work accidents in an industry also cause activity inefficiencies, production disruptions, or hinder the achievement of progress and work environment standards. Salami (2016)

This change has had a wide impact, especially on human relations in the workplace. Humans have become mere means of production as machines and other work tools are easily replaced with new ones. Because of this, safety is given less attention, resulting in many accidents. Work accidents are caused by three factors, namely human factors, work, and environmental factors in the workplace. Types of work accidents depend on the type of work activity. Some work environments have a much higher risk of accidents than others. According to the Association of Construction Occupational Safety and Health Experts (A2K4), currently, work accidents in construction service activities constitute the largest part of the number of work accidents in Indonesia compared to activities in the manufacturing industry. Because an accident is something undesirable and unplanned, an accident is often seen as an event without a cause and as if the event could not be prevented. However, in an industrial activity. This accident has the possibility of occurring and having a greater impact than accidents in other public places due to the use of large quantities of materials, special equipment, or the movement of materials and people in high quantities and frequency. Salami (2016).

A research variable is an attribute trait or value of a person, object, or activity that has certain variations determined by the researcher to be studied and then concluded. While factors are circumstances or events that influence the occurrence of a variable. In selecting research variables and factors, researchers took references from previous literature studies which were conditioned according to field observations. Nature (2020). In the research factors above, the following variables were obtained:

Table 1. Factors and variables

Factors	No	Variable
Analysis of the Influence of the Level of Implementation of the Occupational Safety and Health Management System (SMK3) on the Accident Rate in Housing Projects		
Policy Determination (SMK3). (X1.1)	X1.1.1	Short circuit
	X1.1.2	Worker's head hit by material from
	X1.1.3	Height
Planning (SMK3).	X1.2.1	Worker falls from height while

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Factors	No	Variable
(X2.2)	X1.2.2	installing formwork
	X1.2.3	Noise resulting in
	X1.2.4	Workers are required to wear PPE while working
	X1.2.5	Workers receive information about work accidents
	X1.2.6	Sources of danger are not informed to workers
	X1.2.7	Caught in iron when moving materials
Performance Review and Improvement (SMK3) (X3.3)	X1.3.1	K3 regulations and procedures are periodically revised
	X1.3.2	Worker's eyes are hit by fragments of drilled material
	X1.3.3	Injured by concrete vibrator
	X1.3.4	Finger severed by Bar cutter
	X1.3.5	Provide specific K3 training materials related to a job
Performance Monitoring and Evaluation (X4.4)	X1.4.1	The company carries out prevention of Environmental incidents (accidents in the work environment)
	X1.4.2	Workers are electrocuted while working
	X1.4.3	Worker's hands are hit by materials
Implementation of the Plan (SMK3) (X5.5)	X1.5.1	Poor communication between workers
	X1.5.2	Workers get scratched by bar cutter
Risk Influence (Y1.1)	Y1.1.1	Standard Operating Procedure (SOP)

State of the Art

In this research, a literature study was carried out which was used to support the analyzes prepared to make this research more complete and useful. The source of the research gap is obtained by reviewing and analyzing literature studies by identifying the results, strengths, weaknesses and novelty of the research. Next, the results of the literature study are grouped based on the clusters of each discussion topic. The next stage is looking for empty gaps to fill the gaps between clusters which are used as research topics. An overview of the research position taken based on the literature study (research gap) is presented in the form of an image which can be seen in figure 7 below.

Analysis of the Influence of the Level of Implementation of the Occupational Safety and Health Management System (SMK3) on the level of Accidents in Housing Projects.

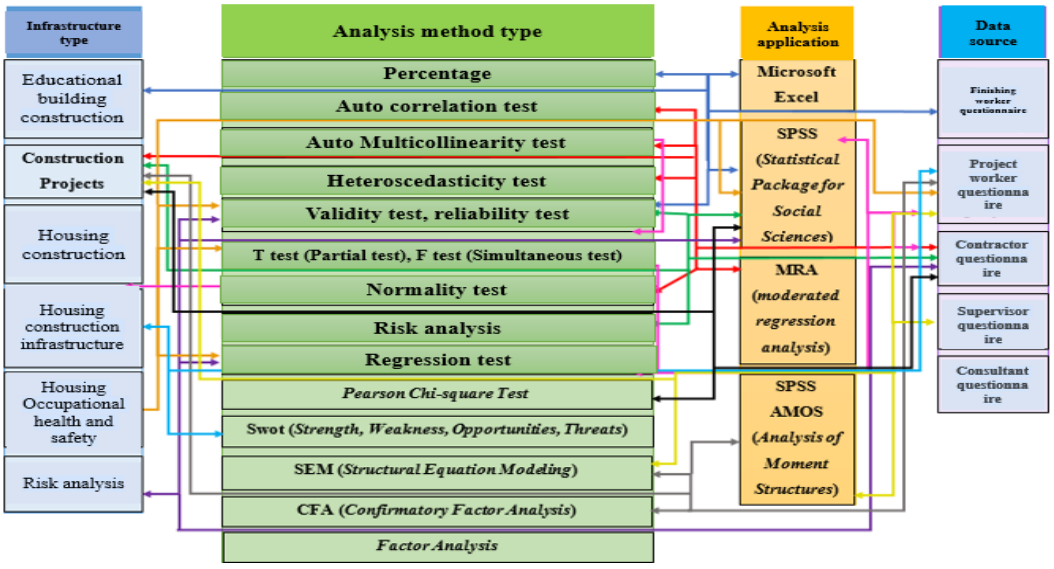

Figure 7. State of the art research Source: Researcher Processing (2023)

RESEARCH METHODS

Questionnaire

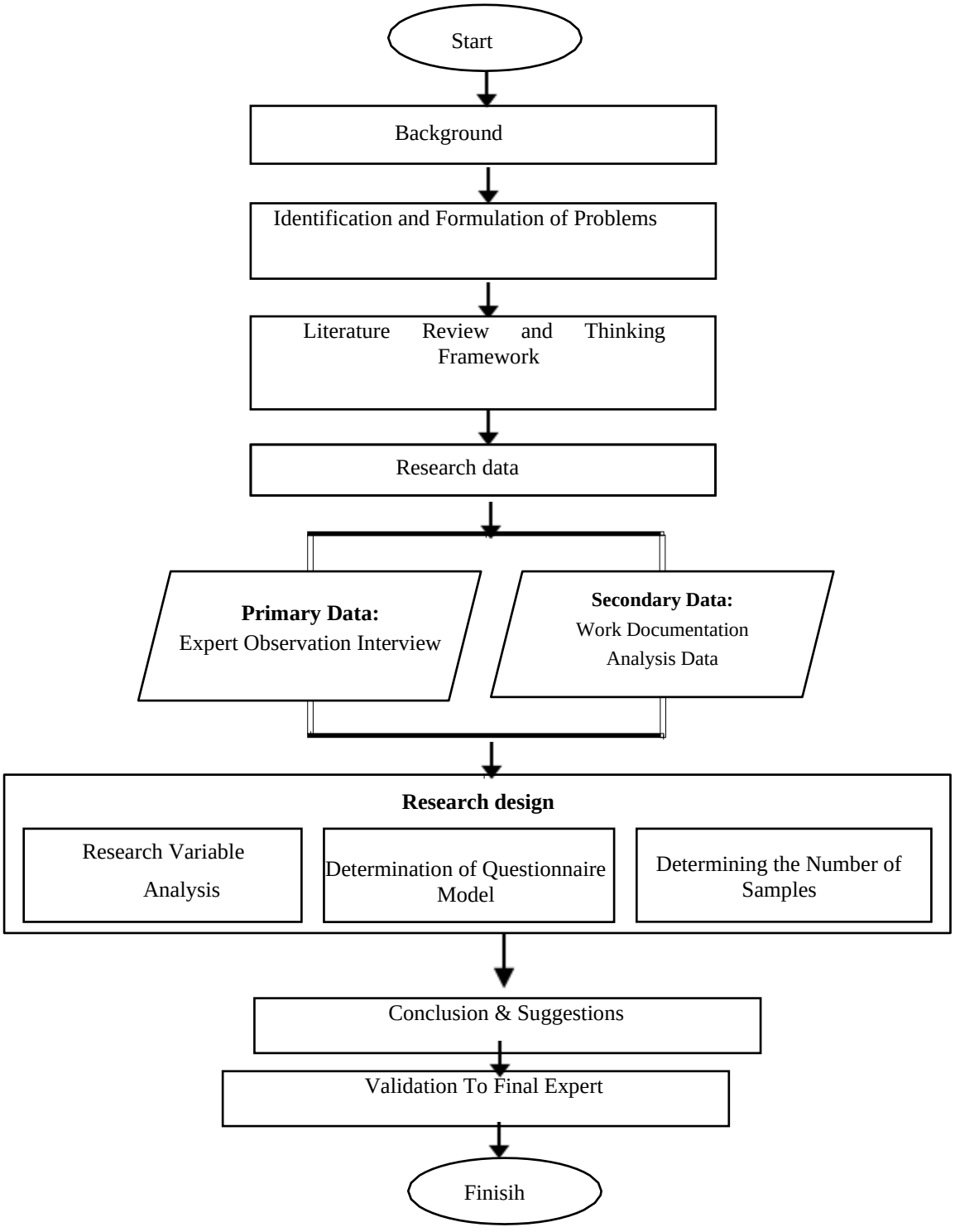

Figure 8. Research Diagram

Questionnaires are used to obtain data directly from sources, namely research respondents. Nature (2020). The questionnaire is used to provide each risk variable that occurs during the

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implementation of construction work. When filling out the questionnaire, a measuring scale is used for further analysis. The scale used in preparing the questionnaire in this research is a probability scale (opportunity) and the impact is given a risk range of 1-5.

Table 2. Opportunity Scale source: Kristen, et al 2017)

No	Level	Scale	Description
1	Very Rare	1	Rarely occurs, only under certain conditions
2	Rarely	2	Sometimes occurs under certain conditions
3	Quite	3	Occurs under certain conditions
4	Often	4	Often occurs under certain conditions
5	Very Often	5	Always occurs under every condition

Table 3. Impact Scale (source: Kristian et al. 2017)

No	Level	Scale	Description
1	Very Small	1	No Effect
2	Small	2	Slight Effect
3	Medium	3	Quite Effect
4	Large	4	Influence
5	Very Large	5	Very Effect

Determining the Number of Samples

To determine sampling (if the population is already known) the Slovin Formula is used with the following equation:

$n = \frac{N}{1+N\ d^2}$

Where:
n: Number of samples
N: Number of population
d2: Precision set (5%, 10%, 15%)
Research Factors and Variables
There are several Factors and Variables in piling work, as explained in the following table 4.

Table 4. Factors and Variables (Source: Author's Processing, 2023)

Factor	No	Variable
Analysis of the Influence of the Level of Implementation of the Occupational Safety and Health Management System (SMK3) on the Accident Rate in Housing Projects		
Policy Determination (SMK3). (X1.1)	X1.1.1	Short circuit (short circuit)
	X1.1.2	Worker's head hit by material from
	X1.1.3	Height
Planning (SMK3). (X2.2)	X1.2.1	Worker falls from a height when
	X1.2.2	installing formwork
	X1.2.3	Noise that causes
	X1.2.4	decreased hearing function
	X1.2.5	Worker's skin exposed to welding sparks
	X1.2.6	Worker hit by building chunks
	X1.2.7	Workers must wear PPE while working
Performance Review and Improvement (SMK3) (X3.3)	X1.3.1	Workers receive information about work accidents
	X1.3.2	Sources of danger are not informed to workers
	X1.3.3	Caught in iron when moving material
	X1.3.4	K3 regulations and procedures are improved periodically
	X1.3.5	Worker's eyes hit by fragments of drilled material

Factor	No	Variable
Performance Monitoring and Evaluation (X4.4)	X1.4.1	Injured by concrete vibrator
	X1.4.2	Finger severed by Bar cutter
	X1.4.3	Provide specific K3 training materials related to a job
Implementation of the Plan (SMK3) (X5.5)	X1.5.1	The company carries out prevention of Environmental incidents
	X1.5.2	(accidents in the work environment)
Risk Influence (Y1.1)	Y1.1.1	Worker electrocuted while working

RESULTS AND DISCUSSION

Phase I Data Collection

Stage I data collection aims to validate, add or remove variables found from the literature study. Experts are asked to fill out the questionnaire given by the researcher by providing a checklist in the column provided with the answer Yes/No. Apart from that, experts can also provide comments and add variables if the variables provided from the literature study are less relevant to improve the variables that have been created previously. The expert profiles from stage I data collection who were asked for opinions were people who had at least 10 years of experience in the construction sector and had an Intermediate or Junior K3 Expertise Certificate (SKA Ahli).

Table 5. Expert Profile (Source: Author's Process, 2023)

Expert	Position	Experience	Educational	Certificate of expertise
Expert 1	HSE manager	10 – 15 Years	S1	Middle
Expert 2	Project Manager	> 15 Years	S1	Middle
Expert 3	Project Manager	> 15 Years	S2	Middle

Phase I Data Analysis

In this stage, the experts provide responses, improvements and input on the 20 variables proposed by the author. After that, variable improvements are carried out, including reducing variables that are not approved by the expert or adding variables that are recommended by the expert.

Phase II Data Collection

Stage II data collection (pilot survey) was carried out after obtaining the variables

has been validated and received approval from experts. These variables were given to several selected potential respondents to provide input on whether these variables could be understood or still needed simplification. This aims to obtain improvements before the questionnaire is delivered to stage II respondents.

Phase II Data Analysis

Based on the results of stage II data analysis (pilot survey), it can be concluded that the description of each variable item that must be filled in by respondents and how to fill it in, can basically be clearly understood by respondents. So there is no need for changes or improvements to the variables in the questionnaire.

Phase II Data Collection (Respondents)

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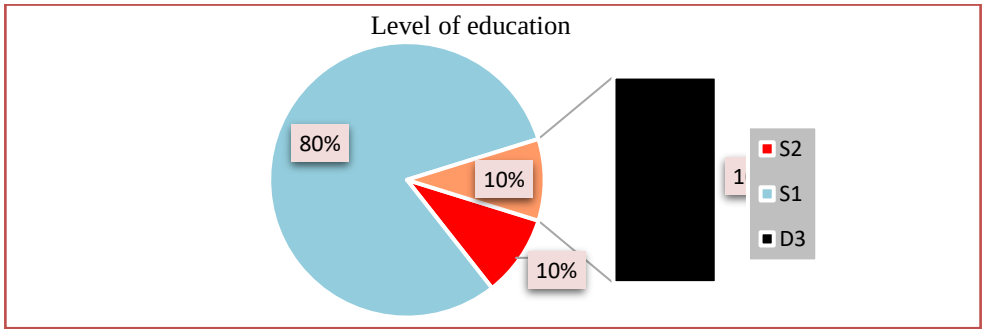

Figure 9. Pie Chart of Respondents' Education Level (Source: Author's Process, 2023)

Based on table 5 and figure 9 above, it can be seen that the education level of respondents who graduated from Strata 2 (S2) amounted to 2 people or 10%, Strata 1 (S1) amounted to 17 people or 80%, and Diploma 3 (D3) which amounted to 2 people or 10 %.

1. Respondent Profile Based on Work Experience

To find out the distribution of respondents based on work experience, it can be seen in table 6 as follows:

Table 6. Distribution of Respondents' Work Experience (source: Author's Process 2023)

No	Work Experience	Total	Percentage
1	1 – 5 year	8	38,1%
2	5 – 10 years	6	28,6%
3	> 10 years	7	33,3%
	Total	**21**	**100%**

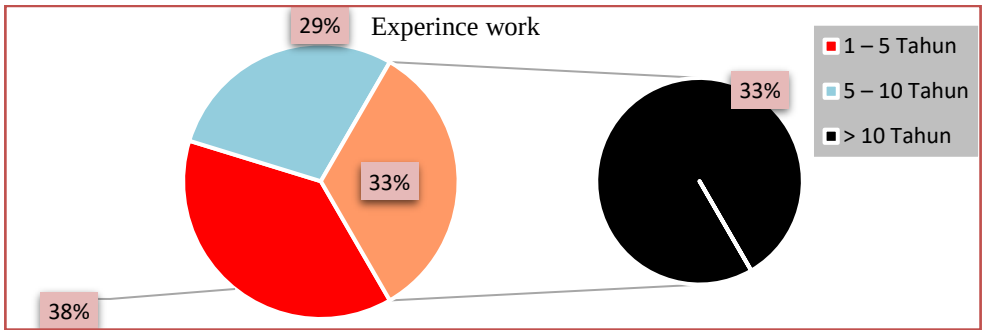

Figure 10. Pie Chart of Respondents' Work Experience

Based on table 6 and figure 10, it can be seen that there are 8 respondents who have work experience of 1 - 5 years (38%), 6 respondents who have work experience of 5 - 10 years (29%), and respondents who have work experience > 10 years old amounted to 7 people (33%).

Respondent Profile Based on Position

To find out the distribution of respondents based on position, it can be seen in table 6 as follows:

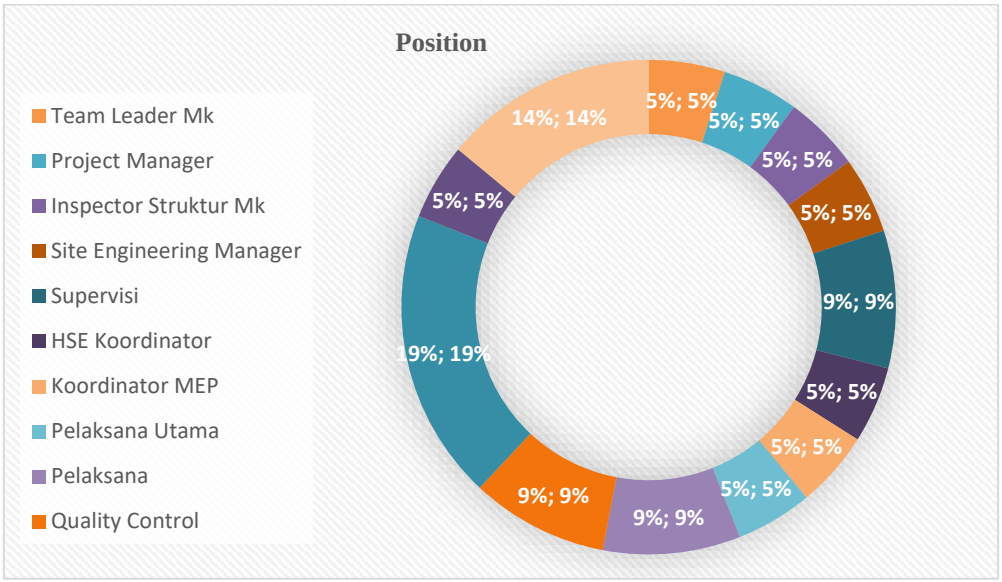

Figure 11. Pie Chart of Respondents' Positions (Source: Author's Process, 2023)

Based on Figure 11, it can be seen that the number of respondents who have the position of MK team leader is 1 person (5%), the respondent who has the position of project manager is 1 person (5%), the respondent who has the position of MK structure inspector is 1 person (5%), respondents who have the position of site engineering manager are 1 person (5%), respondents who have the position of supervisor are 2 people (9%), respondents who have the position of HSE coordinator are 1 person (5%), respondents who have the position of MEP coordinator are 1 person people (5%), respondents who have the position of Main Executive are 1 person (5%), respondents who have the position of Executive are 2 people (9%), respondents who have the position of Quality Control are 2 people (9%), respondents who have There were 4 technical staff positions (19%), 1 respondent with an operational staff position (5%), and 3 respondents with a Drafter position (14%).

Phase III Data Analysis
Validity test

Validity test using SPSS (Statistical Package for Social Science) software. This is defined as a test to determine the extent of accuracy and accuracy of a measuring instrument in carrying out its measuring function. Milen. (2016). So it is necessary to carry out a significant test or real level of 0.05 (5%) or 0.01 (1%), then we compare the calculated r value with the table r value. The r table is found to be significant at 5% with a 2-tailed test and N=21, degree of freedom (df) = N – 2 = 21 -2 = 19, so the r table is 0.456.

At a significance of 5% and N of 21 respondents, the degree of freedom (df) = N – 2 = 21 -2 = 19 is calculated, so the r table is 0.456. From the results of the validity test data output above, it can be concluded that for the 20 item variables, r Pearson Correlation was found to be more than r table, so it can be declared valid.

Reliability Test

Reliability test using SPSS (Statistical Package for Social Science) software. The purpose of the reliability test is to determine the consistency and stability of the questionnaire. Thus, this measuring instrument will give the same results even if it is used many times by the same researcher or by different researchers. Milen. (2016). A reliability test was used using the Cronbach's alpha method as follows:

a. Cronbach Alpha value ≥ 0.6 indicates that the research questionnaire is reliable.

b. A Cronbach Alpha value ≤ 0.6 indicates that the research questionnaire is not reliable.

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For 20 items (N), a Cronbach's Alpha of 0.878 ≥ 0.6 was obtained, indicating that the research questionnaire was reliable.

Normality test

The Normality Test using SPSS (Statistical Package for Social Science) software is used to test whether the regression model meets the assumptions of normality. The Shapiro Wilk normality test is usually used when the sample is small, so in this study the Shapiro Wilk normality test is used because the number of respondents is 21 respondents. In the Shapiro Wilk normality test it can be said to be normal if it is significant > 0.050. The output results of the normality test data with the SPSS version 22 statistical program can be seen in Table 7 as follows:

Table 7. Shapiro Wilk's Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**Df**	**Sig.**	**Statistic**	**Df**	**Sig.**
Total_X	,241	21	,003	,920	21	,085
Total_Y	,167	21	,129	,930	21	,136

From table 7 of the Shapiro Wilk normality test data output results, a significant value for X is 0.085 and for Y it is 0.136 > 0.05. So it can be concluded that the research data is normally distributed. The Probability Plot can be seen as a graph showing the distribution of data around the diagonal line and following the direction of the diagonal line, so the regression meets the assumption of normality.

Correlation Test

Correlation Test is a relationship between two variables, if the value of one variable increases, while the value of another variable decreases, then it is said that there is a negative relationship and vice versa. The correlation used in this research is simple correlation analysis using the Pearson method or often called Pearson Product Moment. The greater the correlation coefficient value, the greater the degree of relationship between the two variables. Pearson correlation is usually a linear relationship (both increase or both decrease). Simple correlation analysis (Bivariate Correlation) is used to determine the closeness of the relationship between two variables and to determine the direction of the relationship that occurs. The simple correlation coefficient shows how big the relationship is between two variables. The correlation value (r) ranges from 1 to -1, a value closer to 1 or -1 means the relationship between two variables is getting stronger, conversely a value approaching 0 means the relationship between two variables is getting weaker. Positive values indicate a unidirectional relationship (X increases then Y increases) and negative values indicate an inverse relationship (X increases then Y decreases). Output results of correlation test data with the SPSS version 22 statistical program.

It can be concluded as follows:

1. There are 14 variables that are classified as correlated which can be used for further research, namely variables X1, X2, X6,
2. There is 1 variable that is classified as uncorrelated which can be used for further research, namely variable X5.
3. Significance value 0.000 to 0.003 < 0.050 on variables X1,
   Stage IV Data Analysis (Regression Analysis)
   Regression analysis using SPSS (Statistical Package for Social Science) software is used to test whether there is an influence between one variable and another. The regression analysis used in this research is multiple regression analysis and simple regression analysis. As explained as follows:
4. Multiple Linear Regression Analysis Test
   Functions to find the influence of two or more independent SMK3 Risk variables. In housing construction projects (X) the dependent variable is the occurrence of accidents (Y). The multiple linear regression analysis test can refer to First, if the significant value is <0.05, it means that variable X has an effect on variable Y. Second, if the significant value is >0.05, it

means that variable SMK3 Regarding the Housing Project Development Work (X) where there was an Accident (Y) a simultaneous hypothesis test (F Test) was carried out.

Partial Hypothesis Test (f Test)

Test significance with simultaneous hypotheses as follows:

H0: there is no significant influence between the independent variable (X5) together with the dependent variable (Y).

Ha: there is a significant influence between the independent variables (X1, bound (Y).

1. If significance <0.050, then H0 is rejected and Ha is accepted.
2. If significance is > 0.050, then H0 is accepted and Ha is rejected.
3. If f count > t table, then H0 is rejected and Ha is accepted.
4. If f count < t table, then H0 is accepted and Ha is rejected

Simple Linear Regression Analysis Test

Simple linear regression is used to measure the magnitude of the influence of one independent variable (X) SMK3 Risk on housing construction work, the dependent variable (Y) Accident with conditions referring to two things, namely:

First, if the significant value is < 0.05, it means that variable X has an effect on variable Y. Second, if the significant value is > 0.05, it means that variable Accident (Y) is carried out by a partial hypothesis test (t test) as explained.

Discussion

After carrying out the analysis using simple linear regression analysis and factor analysis, we will then discuss the determining model for the results we obtained previously.

1. From the results of multiple linear regression analysis, the regression equation Y = a + b1 X1 + b2 X2 + b3 X6 + b4 X7 + b5 X10 + b6 + 17 + b12 + 18 + b13 + 19 + b14 + 20 = 1.076 + 3.441 .888 X16 – .983 X17 + 3,746 X18 + 5,572 X19 – 4,519 SMK3 housing works project), with a coefficient of determination percentage of 98% as evidenced by the calculated f-value of $f = \frac{R^2 \times (N - m - 1)}{m(1 - R^2)} = \frac{0{,}98 \times (21-14-1)}{14(1-0{,}98)}$ = 21 > f-table 3,55 or the Sig. value of 0,012 < 0,05.

a. A regression equation was obtained from the simple linear regression analysis results. Y = a + b from X1 got Y = 43.591 + 7.210X1 =50.801 X1, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}729\sqrt{21-2}}{\sqrt{1-0{,}531}}$ = 6.77 > t-table 2,093, or the Sig. value of 0,000 < 0,05.

b. On X2 got Y = 41.986 + 6.217X2 = 48.203X2, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}442\sqrt{21-2}}{\sqrt{1-0{,}195}}$ = 2.15 > t-table 2,093, or the Sig. value of 0,000 < 0,05.

c. On X6 got Y = 33.130 + 9.318X6 = 42.448X6, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}770\sqrt{21-2}}{\sqrt{1-0{,}490}}$ = 4.27 > t-table 2,093, or the Sig. value of 0,001 < 0,05.

d. On X7 got Y = 37.782 + 8.277X7 = 46.059X7, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}712\sqrt{21-2}}{\sqrt{1-0{,}507}}$ = 4.42 > t-table 2,093, or the Sig. value of 0,001 < 0,05.

e. On X10 got Y = 32.232 + 9.727X10 = 41.959X10, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}816\sqrt{21-2}}{\sqrt{1-0{,}665}}$ = 6.15 > t-table 2,093, or the Sig. value of 0,001 < 0,05.

f. On X11 got Y = 28.809 + 10.465X11 = 39.274X11, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}793\sqrt{21-2}}{\sqrt{1-0{,}630}}$ = 5.68 > t-table 2,093, or the Sig. value of 0,001 < 0,05.

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g. On X13 got Y = 37.381 + 8.403X13 = 45.784 X13, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}599\sqrt{21-2}}{\sqrt{1-0{,}359}}$ = 3.26 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
h. On X14 got Y = 45.153 + 7.490X14 = 52.643X14, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}644\sqrt{21-2}}{\sqrt{1-0{,}415}}$ = 3.67 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
i. On X15 got Y = 37.083 + 8.625X15 = 45.708X15, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}600\sqrt{21-2}}{\sqrt{1-0{,}360}}$ = 3.27 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
j. On X16 got Y = 45.548 + 6.214X16 = 51.762X16, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}645\sqrt{21-2}}{\sqrt{1-0{,}416}}$ = 3.68 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
k. On X17 got Y = 41.915 + 6.683X17 = 48598X17, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}771\sqrt{21-2}}{\sqrt{1-0{,}595}}$ = 5.28 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
l. On X18 got Y = 38.625 + 8.260X18 = 46.885X18, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}721\sqrt{21-2}}{\sqrt{1-0{,}520}}$ = 4.54 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
m. On X19 got Y = 33.167 + 8.353X19 = 41520X19, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}773\sqrt{21-2}}{\sqrt{1-0{,}598}}$ = 5.31 > t-table 2,093, or the Sig. value of 0,001 < 0,05.
n. On X20 got Y = 51.572 + 3.354X20 = 54926X20, with a determination coefficient percentage of 53.1%, which is proven by the t-count value of $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0{,}345\sqrt{21-2}}{\sqrt{1-0{,}189}}$ = 2.11 > t-table 2,093, atau nilai Sig. sebesar 0,001 < 0,05.

CONCLUSION

The identified SMK3 risk factors include non-compliance with work safety procedures, lack of SMK3 training or certification for workers, unsafe work environment conditions, use of unsafe equipment or machines, inaccuracy or negligence of workers, and lack of personal protection or adequate safety equipment. To overcome this risk, strict and appropriate SMK3 standards are needed. Safety regulations that are not implemented in the project environment make the level of health and safety fall into the low category. Jobs that are at risk of causing work accidents.

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