

Challenges on Construction Projects at SUKE Highway Alam Damai Interchange

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Abstract

The construction industry is one of the industries that plays a vital function in the development and enhancement of the economy as well as the development of a country. Highway projects are typically classified as high-risk projects because of how crucial they are to the socioeconomic, political, and economic growth of a nation. Therefore, this research is to identify the challenges that exist during the construction of SUKE Highway Alam Damai Interchange, identifying the impact of the challenges towards the process to completing the project, and investigating methods to control the challenges from disturbing the completion of construction process. This research focused on G7 grade contractors' company and there have 4 respondents been interviewed which are planning engineer, safety health officers, traffic management officer, and site engineer. This research was conducted using qualitative methodology by interview session. The results of the study found that the challenges on the construction process of SUKE Highway have given major impact to the progress of the project. While impact of the challenges such as contributed to accident occur, delay, cost overrun, high cost of poor quality and poor quality of the construction have occurred. Next, the strategy to control the challenges such as safety check and safety signs, implementing the latest management tools, absorbing, and training of more skilled workforce and technology use to improve communication have help to mitigate the challenges. In conclusion, this study can help the government and industry leaders get realistic ideas to improve the quality of the construction highway in Malaysia for future.

1. Introduction

Every typical construction issue arises at some point during the life cycle of a project. Given the number of possible challenges that arise on a regular basis, project managers may find it challenging to maintain projects on track, within budget, in compliance with safety regulations, and running smoothly. Due to the slower adoption of digital practices, the construction industry has struggled in terms of both efficiency and quality as compared to

investment development. According to The Malaysian Reserve, (2022) says that labour shortages have been a problem for Malaysia's building industry for years. (The Malaysian Reserve, 2022).

1.1 Research Background

The Malaysian construction sector can be classified into two categories, general construction, and special trade work. General construction consists of building construction and civil engineering construction. Highways are publicly accessible thoroughfares that serve to link urban areas or localities. Highways are important for a nation's growth because they provide rapid movement of individuals and goods. to meet local demands. (Högselius, 2015). Furthermore, compared to other construction projects, highway projects are often inevitably recognized as high-risk projects due to their importance to a nation's economic, societal, and political development (Donaldson, 2018). While governments are pushing for successful highway projects because of its importance, highway projects are negatively affecting Malaysia's economic growth from delays and cost overruns (Bank Negara Malaysia, 2018).

1.2 Research Background

As reported by The Star (2021), a construction crane has collapsed in the Bandar Tasik Selatan region of the Sungai Besi-Ulu Kelang Elevated Highways. As a result of the accidents, three foreign workers lost their lives in the collision, and one road user sustained severe injuries. Moreover, SUKE is a project involving the construction of an elevated highway, which involves the use of various machinery. The construction site is situated in a bustling district. Consequently, the potential danger may arise during the construction of the SUKE highway. Consequently, the potential danger may arise during the construction of the SUKE motorway. Due to the elevated nature of the route, the construction workers are required to work at elevated heights.

According to Journal of Road Engineering 2 (2022), highway constructions on the Qinghai-Tibet Plateau (QTP) face great challenges induced by the unique local environmental, geological, and engineering conditions. Compared with the other areas of China, QTP is unique and challenging in highway construction conditions. First, it is the highest plateau in the world, which is covered by many high mountains or rivers. Second, most area of the plateau is covered by permafrost or seasonal frozen soils and one of the biggest challenges in highway infrastructure construction is how to deal with the frozen soils. Third, it is of challenging climatic conditions including the low temperature, great temperature difference, intense radiation, low oxygen, sunny day and rainy night, and uneven seasonal distribution of rainfall. Even though there are challenges and difficulties in highway engineering on the QTP, Chinese researchers and engineers have not given up on the development of highway infrastructures (Aimin Sha, 2022). From the problem statement, this are related to achieve the objective of the study..

1.3 Research Question

Based on the research problems that have been discussed, there are several research questions that have been formed, namely: -

- (i) What are the challenges during the construction of the SUKE Alam Damai Interchange Highway Project?
- (ii) What are the impacts of the challenges towards the project's completion process?
- (iii) What are the strategies to control the challenges from disturbing the completion of construction process?

1.4 Research Objective

Several research objectives have been established to guarantee that the research is carried out in accordance with the following research questions: -

- (i) To identify the challenges that exist during the construction of SUKE Highway Alam Damai Interchange.
- (ii) To identify the impact of the challenges towards the process to completing the project.
- (iii) To investigate strategies to control the challenges from disturbing the completion of construction process.

1.5 Scope of the study

The research focused on G7 grade contractors which were involved in the project as well as respondents for this research. The respondents are planning engineer, safety health officer, traffic management officer and site engineer. The research area is focused on the SUKE Highway construction site around Alam Damai, Cheras, Kuala Lumpur. The methodology to be used in doing this research is qualitative method and data been collected data interviewing the respondents upon challenges exists in the project. Research sample for this study is targeted sampling as planning engineer, safety health officer, traffic management officer and site engineer included in

interview for this research to collect data upon challenges on construction project. The contractors selected registered with G7 CIDB. The area of construction site to get data from is in Kuala Lumpur. Constructions in Kuala Lumpur are selected because a lot of development is ongoing in Kuala Lumpur which ease in finding site for research purpose. The projects selected are Sungai Besi-Ulu Kelang Elevated Expressway (SUKE) because to identify the challenges occur on this project.

2. Literature Review

2.1 Project Construction Phase

The construction process includes the specific and intricate procedures necessary to successfully execute the construction project. The process can be divided into three distinct phases: pre-construction, construction, and post-construction. Each step of the project has unique problems, which vary based on the project's size and scope.

2.2 Challenges on construction project

The construction industry has been living through an exciting phase of its life, growing nonstop and facing many challenges at the same time. Some of these challenges are relatively new; others are as old as the industry itself. According to Radzi (2020), a superior or unexpected occurrence that prohibits a party from carrying out the provisions of the contract is referred to as force majeure (Radzi, 2020). According to Baloyi & Bekker (2011), manpower shortages had a substantial effect on the construction of football stadiums during the 2010 FIFA World Cup in South Africa. According to Tshela (2014), shortage of skills labour has a significant effect on the socioeconomic growth and development of a country. The poor performance of the Malaysian construction sector has its root in poor communication (Olanrewaju, 2017). To keep the project within the allocated budget, project cost management is therefore required (Kamaruzzaman, 2010). These days, ineffective management and subpar management systems are the root of many constructions projects' issue (Zain, 2021). Rahman (2020) stated that highway projects may have trouble obtaining those materials on time for several reasons (Rahman, 2020). Rahman (2020) asserts that the location of a site can have a significant impact on highway projects.

2.3 Impact on construction completion process

Accidents happen on construction sites usually because of the workers' or the construction companies' negligence (Wahab, 2017). However, construction accidents also affect projects in terms of money and time. These may result in project delays and cost overruns (Asanka and Ranasinghe, 2015). Idris (2017) claims that compared to other industries, the construction industry in Malaysia has a higher accident risk. A study conducted by Niazi (2017) found that project cost overruns are a significant issue facing the Afghan construction sector. Inadequate site management procedures can lead to low quality project performance, particularly in terms of project completion delays, exceeding budgeted costs, and compromised construction quality (Hamid., 2021).

2.4 Strategies to control the challenges during construction phase

According to Talab (2013), safety checks and records ensure the quality of safety. Safety signs not only provide direction but also give true protection in construction sites (Talab, 2013). The right tools can drive efficiency and ensure completion within budget and timelines (Zepth, 2023). To overcome the issue of labour shortage and unskilled workmanship, one of the initiatives is introducing technical and vocational skills training and education (Zaki, 2012). Understanding the issues that using software to manage and monitor cash flow and billing can keep a construction business in operation for a long time (Beaver, 2021). According to BigRentz (2019), there are a few examples of how construction technology is specifically improving communication in construction such as drones can accomplish tasks. (BigRentz, 2019).

3. Research Methodology

Research methodology refers to the process of identifying, gathering, and analysing data based on observations. The research on construction issues at the SUKE Highway Alam Damai Interchange will be examined in this chapter. This chapter will go over the research design, research technique, research population and sample, data collection methods, and data analysis methods used to achieve the study's objectives.

3.1 Research Design

Figure 1 is a form of flowchart that shows the overall research process. This process must be followed to do efficient research. In addition, this research stream overview can assist professionals in initiating the process by

providing them with the appropriate guidance.

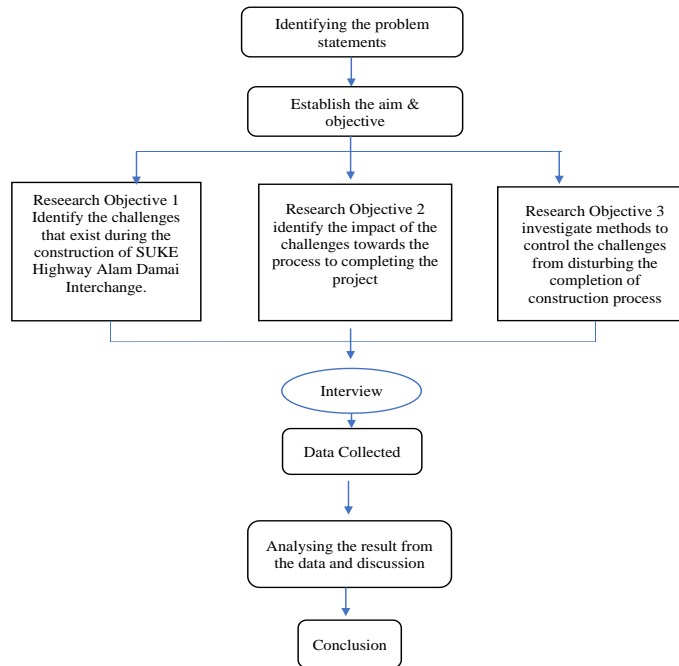


Fig. 1 Research process flowchart

(i) Stage 1: Early Research

Early research is divided by introduction to the research, which includes the background of the study, the problem statement, the research questions and objectives, the importance of the research, the research scope, and a brief explanation of research methodology.

(ii) Stage 2: Literature review

The literature review contains information gathered from reading materials related to the research. This chapter covers construction difficulties on construction site, construction site accidents in Malaysia, and challenges on construction project. Aside from that, this chapter also discusses the research objectives, which are the challenges that exist during the construction of SUKE Highway Alam Damai Interchange and the methods to overcome the challenges from disturbing the construction completion process.

(iii) Stage 3: Data collection

The data for this study was collected using a semi structured interview. This study targets sampling of respondents included in interview for this research to collect data upon challenges on construction project. The contractors selected are registered with G7 CIDB. The area of construction site to get data from is in Kuala Lumpur since there are many developments area that make it easier to acquire construction projects for this study.

a) The collection of data will be done by doing an interview in the form of semi-structured with the relevant parties and expertise which are contractors and project managers. The data from the qualitative method obtained from the semi-structured interview with the contractors, project managers and site supervisor during construction phase.

b) Secondary data are the information obtained from published articles or reading material written by authorized authors. These kinds of data are collected through references and literature surveys through various sources articles in magazine and newspaper, journals, books, internet educational video and theses or dissertations.

(iv) Stage 4: Content Analysis

The data analysis section will discuss and analyse the information gathered during the interview. The information is gathered by referring to the responses of the respondents. An effective qualitative method for examining the content of various types of communication is content analysis. It provides researchers with a systematic methodology to look for connections, themes, and patterns in the data, which produces insightful conclusions and interpretations. This investigation's findings will be reported, and discussion will be based on them. All semi-structured interview questions will be addressed.

(v) Stage 5: Conclusion and Recommendation

This stage will present a conclusion and recommendations. This chapter describes the conclusion, which is based on the research findings, as well as the recommendations for further research. The limitations of research will also be highlighted. Table 1 shows the research design method use in this research to achieve the research objectives.

Table 1 *Research Design Method use in this research*

No.	Research Objective	Method
1.	To identify the challenges that exist during the construction of SUKE Highway Alam Damai Interchange	Interview
2.	To identify the impact of the challenges towards the process to completing the project.	
3.	To investigate methods to overcome the challenges from disturbing the construction completion process	

3.2 Research Scope

This research is based on case study and planning engineer, safety health officer, traffic management officer, and site engineer will be respondents to achieve the research objective. The respondents chosen are experienced in the construction industry for more than 10 years. Besides, the respondents are the main part of the construction team for SUKE Highway Alam Damai Interchange.

3.3 Data Analysis

The purpose of data analysis is to provide the questions asked in research questions with answers. The answer will help in determining whether the research objective was achieved or not. The qualitative method to be executed is interview the respondents. During the interview, researchers recorded the interview by using a voice recorder. After the interview session, researchers listen back the audio of interview and transcribe the main point of the answer given based on the research objectives. The data is then analysed to obtain research objectives.

4. Result and Discussion

In this research, contractor company had been approached for the interview which involve of site engineer, safety health officer, traffic management officer and planning engineer. The data is collected by interviewing all the respondents. There are 6 sections in the interview form which contained section A that explain the respondent background while section B contained of general question regarding project SUKE Alam Damai Interchange, while section C, D, E and F contained of different scope of questions that been asked in the interview to collect the data.

Table 2 *The content analysis*

Item	Method Analysis
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Demography	Content Analysis
<ul style="list-style-type: none"> Name Position Department 	
-Experience in Construction Industry	
-Experience in SUKE Highway Project	
<ul style="list-style-type: none"> Work Experience in Industry Phone No Email 	
General question regarding challenges during construction phases	
Challenges during the construction phases of SUKE Alam Damai Interchange Highway Project	
The impact towards the construction process of SUKE Alam Damai Interchange	
Strategies to mitigate the challenges from giving major impact towards the construction process	
Comment and suggestion	

4.1 Respondent Background

Table 3 layout the respondents' demographics and knowledge. Based on the respondents' job titles, and work experiences, it is reasonable to assume that most respondents are knowledgeable with this SUKE Highway Project. In this research, 3 of the 4 respondents (70%) had 10 to 15 years of experience, and the other 2 (30%) had 1 to 10 years of experience. They all have been involved in this project since the start of the project. As a result, it's reasonable to conclude that they have a thorough understanding of large-scale projects and reliable evidence.

Table 3 Profile of Respondents

Bil.	Name	Position	Department	Experience (Years)
1	Respondent 1	Planning Engineer	Planning	15
2	Respondent 2	Safety Health Officer	Health and Safety	12
3	Respondent 3	Traffic Management Officer	Traffic Management	7
4	Respondent 4	Site Engineer	Planning	10

4.2 Section B: General Questions Regarding Project SUKE Alam Damai Interchanges

In this section, a discussion on the findings and analysis of the general question about the SUKE Highway Alam Damai Interchanges Project. This section to know the progress of the project, the total duration of the project, the most challenging part on the project, the biggest challenges and the effect to the project. The project is presently 99.20% complete. According to the contract, the project duration is 3 years, beginning in 2016 and ending in 2019. However, the actual duration. of the project is currently 8 years till November 2023. The most difficult challenges in this project were the Covid-19 Pandemic, which caused other issues such as a lack of manpower, an increase in material prices, and the lack of a subcontractor.

4.3 Section C : Challenges During Construction Phases of SUKE Alam Damai Interchange Highway Project.

In this section, a discussion on the findings and analysis of challenges during construction phases of SUKE Alam Damai Interchange. The discussion is to achieve objective 1 which is to investigate the challenges during construction phases of SUKE Alam Damai Interchange.

Table 4 Challenges during the construction phase of SUKE Alam Damai Interchange

Challenges	Respondents			
	1	2	3	4
<i>Force Majeure</i>	✓	✓	✓	✓
Shortage of general labour	✓			✓
Shortage of Skilled Labour	✓			✓
Poor Communication		✓	✓	✓
Issues with Cashflow	✓		✓	
Poor Site Management	✓	✓	✓	
Availability of material and equipment	✓	✓		✓
Site Location	✓		✓	

Force Majeure

According to Respondent 1 and Respondent 2, the Covid-19 has been clarified as a *force majeure* event and it have give major impact towards the project. They describe the Covid-19 event is unpredictable event that no one expected it will give major impact not only for their project but all over around the world get effected by the event. The statements given by the respondent are in line with the statement by Royal Institute of Surveyor Malaysia (2020), that The principle of Force Majeure, as outlined in JKR 203A (2007/2010), can be invoked to justify COVID-19 as an incident beyond human control.

“Yes, the Covid-19 Pandemic is a force majeure occurrence for this project. Since the pandemic began, every project in Malaysia has been halted for about two months. However, once the project resumes, there is a problem that must be addressed: subcontractors are not permitted to come to Malaysia since Malaysia has barred foreigners from China from entering the country. As a result of the Covid-19 Pandemic, the staff and workers are unable to return to Malaysia” (Respondent 1).

Shortage of General Labour

There have been issues regarding shortage of general labour during the construction process. This is cause by the effect of Covid-19 pandemic that occur during the timeline of the project. According to respondent 1, there have been issues regarding shortage of general labour during the construction process.

“Yes there is general labour issues. Before Covid-19 Pandemic, the general worker can exceed to 400 to 600 workers. After the pandemic, it only can exceed only 200 to 300 workers. (Respondent 1).

Shortage of skilled worker

According to Faizul (2016), labours are one of essential key factor important factors in successive of construction project management. According to Baloyi & Bekker (2011), manpower shortages had a substantial effect on the construction of football stadiums during the 2010 FIFA World Cup in South Africa. According to respondent 4, the shortage of skilled labour have give a major impact to the project due to the shortage of the skilled worker have contribute to project delay, increase workload to the general labour and quality of work.

“General worker are still available because of general labour from Bangladeshi not so affected there but skilled workers are mostly from China They were forced to abandon this project in 2022 due to financial problem. That was the beginning of the lack of workers. (Respondent 4)

Poor Communication

According to Respondent 2 and 3, the poor communication occurred during the construction process. These are very serious issues that has led to the accident occur during the construction process. This can be related to the statement by Olanrewaju (2017), stated the most construction problems arise from either a breach of contract or insufficient communication among team members. According to respondent 4, there was a major accident event which is the fell of launching girder near Puncak Bayan area caused by miscommunication among the workers that have lead to fatal death.

“So, for the most serious incidents, the gantry toppled due to a miscommunication. The location is a sloped area where everything must be stable. When there is a communication problem, it does not seat properly on the crosshead, so it is unstable, causing it to slip, causing the components near the girder to slip once, including the beam.” (Respondent 4)

Issues with Cashflow

According to Respondent 1, the outbreak Covid-19 has had a significant influence on the project's cashflow. Material prices are rising, and there is a manpower shortage, making the project's cash flow more problematic than expected. The actual costs of the project, which were previously estimated, are unexpectedly increasing.

“ As a result of the epidemic, the price of materials has risen, and a workforce shortage has arisen, During tendering process, any project that will last 5 years will increase the proportion to 1.5% of the actual cost. However, the pandemic has had a significant influence the cashflow as the costs have increased to three times the actual cost”(Respondent 1).

This is related by a study carried out by Kamaruzzaman (2010), which highlights the need of maintaining control over project cost performance in the construction industry in order to maintain the project within the designated budget.

Poor Site Management

According to Respondent 1, they have faced poor site management for their project. The subcontractors do not practically follow the instruction have been given. This demonstrates that, as stated by Zain (2021), a multitude of construction projects encountered difficulties due to inadequate management systems and ineffective management.

“Certain team of the CCC follow the instructions, site management that have been given to them and other of them is quite stubborn. (Respondent 1)

Availability of material and equipment

According to respondent 1, has affected the availability of material and equipment not only for their project but mostly construction project in Malaysia. The respondent's statement aligns with Rahman's (2020) study, which suggests that highway projects encounter challenges in obtaining materials promptly for various reasons.

“After the Covid-19, at one time, we have steel price issue and cement supplier cannot supply aggregate. This mostly is because of the supply chain which means no one can bring a truck to supply goods at that time. The whole of Malaysia experienced the same problem at that time.” (Respondent 1)

Site Location

The site location is very challenging for them because of the topographic and demographic of the location. This related study by Rahman (2020), the location of a site can greatly impact the progress of highway improvements and Karunakaran (2018), stated challenges that are commonly encountered in highway projects in rural areas.

“The site location is on the area that have compact residential area. Then the demographic of the residence is live by non ordinary people. Basically, if there is any accident occurred during the construction, the residence must be deal first. The area along the road area mostly complicated especially the area around the residential area.”. (Respondent 1)

4.4 Section D : The impact towards the construction process

The discussion is to achieve objective 2 which is to investigate the impact towards the construction process. Table 5 below shows list of the impact of the challenges during the construction phase of SUKE Alam Damai Interchange.

Table 5 *The impact towards the construction process*

Impact	Respondents
Accident Occur	There is a record for a near miss accident, a minor accident, and a major accident
Delays	This project has already received nine EOT
Cost Overrun	Causes material inflation of all prices
High Cost Of Poor Quality (COPQ)	This has also resulted in the work being done twice and this has resulted in increased project costs
Poor Quality of Construction	A small number of accidents are caused by poor quality

Accident Occur

All respondents stated that there have been many accidents occurred during the construction process. According to respondent 1, the accident occurred because of the poor work of subcontractor to follow the regulation.

"They did not follow the safety recommendations, according to SMPP. There is a record for a near miss accident, a minor accident, and a major accident. When the number of near misses, minor and major accidents is recorded, it will add even more to the beginning of the first aid issue". (Respondent 1)

The statements given by the respondent are in line with the study by Wahab (2017), prove that accidents at construction sites are primarily caused by either the negligence of construction corporations or the actions of the workers themselves.

Delays

The results of the analysis found that all the respondents have agreed that this project has been delayed for 4 years because of those challenges. As represented by the following statement respondent 1;

"Yes, there is a delay. If the EOT is to be believed, the project was delayed by four years. A three-year project ended up taking eight years. This project has already received nine EOT." (Respondent 1)

According to respondent 4, the underground utilities have given them a major delay problem because it have to deal with many organisation. According to respondent 3, the other EOT is because of issue with manpower which is the shortage of labour during construction because of Covid-19.

"Underground utilities M&E cable with sewerage and waterpipe is the main cause of the first 3 EOT. The main issue is underground utilities" (Respondent 4)

"The next EOT issue of manpower with no subcontractors because of the Covid-19 pandemic that have occur on early of 2020. This is because the shortage of the skilled worker have contribute to project delay, increase workload to the general labour and quality of work." (Respondent 3)

The statements given by the respondent are in line with the study by Diana (2012), proving that the primary factors that led to delays include inadequate equipment, change orders, ineffective site management and supervision, scarcity of construction materials, an incompetent project team, inadequate project planning and scheduling, and financial difficulties faced by the contractor.

Cost overrun

All respondents have agreed that this project has cost overrun issues because of the challenges and that lead to the project to stop a while because of the issue. According to respondent 1, the allocation of the price during early project have been made but the causes of material inflation making the project have cost overrun.

"Yes, there is because we allocate project duration causes material inflation of all prices. Yes, it affected the project because there was a time when we were unable to carry out the project and were assisted by other contractors." (Respondent 1)

The statements given by the respondent are in line with the study by Niaz (2017), proving that cost overruns pose a significant challenge for the construction industry, particularly in Afghanistan. The primary causes of these overruns include corruption, delays in progress payments from clients, financing challenges faced by contractors,

defense-related issues, and change orders made by clients throughout the construction process.

High Cost of Poor Quality

The results of the analysis found that there is a high cost of poor quality. The statements given by the respondent are in line with the study by Ruman (2011), proving that the the Cost of Poor Quality (COPQ) refers to the expenses incurred because of producing items and services of substandard quality.

“This has resulted in the work being done twice and this has resulted in increased project costs. This kind of cost could not be expected by us at the beginning because this matter was beyond our expectations.” (Respondent 3)

Poor quality of construction

The results of the analysis found that there is poor quality of construction. As represented by the following statement Respondent 2.

“There have been a few accidents due to poor quality, first foundation work. There were just 3 accidents because of the low quality.” (Respondent 2)

The statements given by respondent 2 are in line with the study by Hamid (2021), proving that poor project management have risk final product will be of inferior quality. On previous study, the respondents are agreed ineffective site management procedures can result in poor project quality, which in turn affects building quality and has implications for safety and the environment.

4.5 Section E : Strategies to mitigate the challenges from giving major impact towards the construction process

In this section, a discussion on the findings and analysis of strategies to mitigate the challenges from giving major impact towards the construction process during construction phases of SUKE Alam Damai Interchange. The discussion is to achieve objective 3 which is to investigate the strategies to mitigate the challenges from giving major impact towards the construction process during construction phases of SUKE Alam Damai Interchange. Table 4.4 below shows list of the strategies to mitigate the challenges by the respondents during the construction phase of SUKE Alam Damai Interchanges.

Table 6 Strategies to mitigate the challenges from giving major impact towards the construction process.

Strategies	Respondents			
	1	2	3	4
Safety Checks and Safety Signs	✓	✓	✓	✓
Implementing the latest management tools	✓	✓	✓	
Absorbing and training of more skilled workforce			✓	
Manage and Improve Cash Flow with Construction Accounting Software	×	×	×	×
Use Technology to Improve Communication		✓		✓

Safety Checks and Safety Signs

The results of the analysis found that all respondents agree that safety checks and safety signs are important during the construction process. According to respondent 2, this is important to prevent any disaster event from occurring during construction and need to be strictly follow by the workers.

The safety check and safety signs are important during the construction process. It needs to be conducted every time before, during or after construction work.

“We have all of this in place on the job site. from the safety inspection, from our records, and from the weekly walkabouts with the client, principal contractor, and subcontractor.” (Respondent 2)

According to respondent 1, there are sitewalk two times in a week to ensure the safety of the workers while working. This will be held with the client, main contractor, subcontractor.

"We have taken the necessary steps to let our client, main contractor, and subcontractor know whether or not we have control over the level of safety surrounding the construction site." (respondent 1)

Regarding the question about toolbox meeting, the respondent 3 have stated the toolbox have been conduct everyday and must to be inform to all the workers before start the work.

"Toolbox done daily in the morning. Once a week, we will have awareness training. We are going to demonstrate for them how to use it securely and correctly. We will ask the workers to demonstrate how to lift things using a crane the following week." (Respondent 3)

According to respondent 4, the purpose of the training is to create awareness among the workers to work more safe and not to simply do the work by their own.

"Although they are capable of doing the work, the purpose of this training centre is to raise their level of awareness since, although they may have been working for a while, they may have developed a shortcut to expedite their work without adhering to the established safety procedures". (Respondent 4)

The statements given by the respondent are in line with the study by Talab (2023), proving that it is necessary to implement accurate safety inspections and documentation to guarantee the integrity of safety measures. Safety signs not only offer guidance but also provide genuine protection in construction sites.

Implementing Latest Management Tools

The results of the analysis found that the latest management tools that they are using in this project are drones. The drone has helped them in monitoring the progress of the work since they cannot cover all the area of the project, supervise the work's quality, and minimise deficiencies. usage of time. The statements given by respondent 2 are in line with the study by Zepth (2023), proving that an optimal approach is to employ the latest project management platform to diminish the workload through task automation. As represented by the following statement Respondent 2.

"Drones are the most recent tool employed in this research. So it is exactly like we have a high highway project and a three-story elevated project. As a result, when we want to go on an elevated highway, it sometimes takes a while to get there and we cannot cover all places. Therefore, we monitor areas that cannot be covered by people using drones, and we will report accordingly."(Respondent 2)

Absorbing and training of more skilled workforce

The results of the analysis found that there is absorbing and training of more skilled workforce. The statements given by respondent 3 are in line with the study by Olsen (2012), proving that vocational education presents itself as a viable way to address the shortages of skilled workforce. The vocational education and training system plays a vital role in facilitating the alignment of industry's skill requirements with the talents possessed by workers. According to respondent 3, the training for the workers at the early of the project are very active but since the Covid-19, it has reduced productivity in training, partly due to a shortage of funding.

"Due to our early financial stability, we were active on the site and actively participated in many campaigns, such as those about fire safety from the fire department, emergency preparedness from the hospital, CPR instruction, and other topics".(Respondent 3)

Manage and Improve Cash Flow with Construction Accounting Software

The results of the analysis found that there is no use of accounting software that been use in this project. They only used Microsoft Excel to monitor cash flow and track expenses. The statements given by the respondent 4 are in line with the study by Thottoli (2020), proving the deployment of an accounting software system is closely correlated with inadequate accounting abilities. As represented by the following statement Respondent 1.

"Mostly we only use Microsoft Excel. There is no accounting software that we use to help improve our cashflow. This is because we did not been exposed by the new software or any tools to improve cash flow and we did not

have expertise using the latest accounting software.”(Respondent 1)

Use Technology to Improve Communication

The results of the analysis found that they use technology to improve communication. As represented by the following statement Respondent 4.

“To begin with, most worker occasionally bring their iPad to their phone in order to translate. Simply use any tool, such as Google Translate, to translate what they are trying to communicate.” (Respondent 4).

The statements given by the respondent 4 are in line with the study by BigRentz (2019), proving that advancements in construction technology are focused on enhancing communication within the construction industry. For instance, drones are capable of efficiently doing activities like site mapping and project inspections in significantly less time compared to humans.

4.6 Discussion

Based on data collection and analysis, the researcher found that each research objective is in line with the literature review. The researcher could assert that every research objective listed in the literature review, including the the challenges that exist during the construction of SUKE Highway Alam Damai Interchange, identifying the impact of the challenges towards the process to completing the project, and investigating strategies to control the challenges from disturbing the completion of construction process, was appropriate based on the data collection and analysis process.

All respondents agree that force majeure are the biggest challenges towards the project. The respondent's claims align with study by Yee Yang (2023), stated that the outbreak of the novel coronavirus pneumonia (COVID-19) in 2019 and the 2022 war in Ukraine have had profound global impacts on disrupted the material supply chain, significantly influenced the cost and progress of construction projects, and further impacted the operational effectiveness of firms (Yee Yang, 2023). All respondents agree there have been concerns regarding a manpower during the construction phase. This is related to study by Faizul (2016), a significant number of building projects have experienced failure and lack of success as a result of issues related to manpower (Faizul, 2016). The escalating costs of materials and the scarcity of skilled labour are exacerbating the project's cash flow issues beyond initial expectations. This related to study conducted by Kamaruzzaman (2010) emphasises the importance of exercising control over project cost performance in the construction business.

All respondents stated that there have many accidents occurred during the construction process because of subcontractor do not follow the regulation. The statements given by the respondent are in line with the study by Wahab (2017), prove that accidents at construction sites are primarily caused by either the negligence of construction corporations or the actions of the workers themselves. All the respondents have agreed that this project has been delayed for 4 years. According to respondent 3, the other EOT is because of issue with manpower which is the shortage of labour during construction because of Covid-19. The statements given by the respondent are in line with the study by Diana (2012), proving that the primary factors that led to delays include inadequate equipment, change orders, ineffective site management and supervision, scarcity of construction materials, an incompetent project team, inadequate project planning and scheduling, and financial difficulties faced by the contractor.

The results of the analysis found that all respondents agree that safety checks and safety signs are important during the construction process. According to respondent 2, this is important to prevent any disaster event from occurring during construction. According to respondent 4, the purpose of the training is to create awareness among the workers to work more safe and not to simply do the work by their own and this in line with the study by Talab (2023), proving that it is necessary to implement accurate safety inspections and documentation to guarantee the integrity of safety measures. The latest management tools that they are using is drone has helped them in monitoring the progress of the work, supervise the work's quality and minimise deficiencies. This is in line with the study by Zepth (2023), proving that an optimal approach is to employ the latest project management platform to diminish the workload through task automation. All respondent agree absorbing and training of more skilled workforce can help to mitigate the challenges occurred and this in line with the study by Olsen (2012), proving that vocational education presents itself as a viable way to address the shortages of skilled workforce.

5. Conclusion and recommendation

The analysis of the research that has been done is based on the interview session. Therefore, the first, second and third objectives have been successfully achieved and will be explained further.

5.1 Conclusion of each research objectives

5.1.1 Research Objective 1: Challenges Faces in Construction Project

The first objective of this research is to find out the challenges that occurred during the construction process on SUKE Alam Damai. To achieve the objective, the researcher must study the construction project cycle. Therefore, every phase has its own challenges throughout to the completion of a construction project. Despite of that, there are challenges that have occurred during construction process such as *Force Majeure*, shortage of general labour, shortage of skilled labour, poor communication, issues with cashflow, poor site management, availability of material and equipment and site location. Therefore, the researcher has achieved the purpose of the study and the objective.

5.1.2 Research Objective 2: Impact Towards the Construction Process

The second objective has successfully identified the impact of the challenges towards the construction process. Based on the findings, it is possible to conclude that the challenges have impacted towards the completion of SUKE Alam Damai. All respondents stated that there have been many accidents that occurred during the construction process because of the stubbornness of the subcontractor who are not followed the instructions and regulations that have been given to them. All the respondents have agreed that this project has been delayed for 4 years. There are unexpected issues that have been occurred during the construction such as underground utilities issues and manpower issues. All respondents have agreed that this project has cost overrun issues because of the challenges and that lead to the project to stop a while because of the issue. The results of the analysis found that there is high cost of poor quality and this also because of the poor construction that have occurred. Therefore, the researcher has achieved the purpose of the study and the objective.

5.1.3 Research Objective 3: Strategy to control the challenges during construction process of SUKE Alam Damai

The third objective of this research is to identify the strategy to control the challenges. The safety check and safety signs are important during the construction process. It needs to be conducted every time before, during or after construction work to prevent any disaster event from occurring during construction. The latest management tools that they are using in this project are drones. The drone has helped them in monitoring the progress of the work, monitoring the quality of work and the less usage of time. Absorbing and training a more skilled workforce is crucial in the construction industry for several reasons. Training programs can help workers acquire the necessary skills and knowledge to perform their tasks with precision and accuracy, leading to better construction outcomes. The tools that have been used to improve communication are using smartphones to make communication easier and make the work more efficient. As conclusion, the researcher was exposed how the contractors use the strategies to mitigate the challenges that occurred during the construction phase by doing the study. Therefore, the researcher has achieved the purpose of the study and the objective.

5.2 Recommendations

There are several suggestions that the respondent has put to further improve the quality of the construction highway so that this study is more detailed and comprehensive for the industry and further studies.

5.2.1 Industrial Recommendation

For the industry, respondent have their personal view to improve the quality of the construction highway in Malaysia by improving the tendering design and method statement. Improving a tendering design and method statement involves enhancing clarity, completeness, and persuasiveness. Improving the design of highways in Malaysia involves considering various factors, including safety, efficiency, sustainability, and the specific needs of the local environment.

5.2.2 Governmental Recommendations

Traditional toll booths with barriers were commonly used at toll plazas in Malaysia. These toll booths involved vehicles stopping or slowing down to make manual toll payments, either in cash or via electronic toll payment

systems. However, Malaysia has been gradually transitioning to more advanced toll collection methods to enhance efficiency and reduce traffic congestion. While Malaysia has been moving toward electronic toll collection methods to improve efficiency and reduce congestion, the specific toll collection system may vary depending on the highway and toll operator.

5.3 Summary

The construction industry frequently faces difficulties that have an impact on the project's completion period. Being prepared is essential to minimizing these difficulties. The first objective of this research is to investigate the challenges faces in the construction process that have been achieved. Therefore, for this research every stage of the SUKE Alam Damai Project has been significantly impacted by a force majeure occurrence. Other issues that have emerged because of this include the lack of labour, the accessibility of supplies and machinery, and the quality of the project. Another objective is the impact on the construction process also have been achieved. The challenges have given impact such as accident occur, delay, cost overrun, high cost of poor quality and poor quality of the construction. Also, the last objective, which is strategies to control the challenges have been achieved. The researcher has found out the strategies that organizations use to improve and mitigate the challenges that have been faced during the construction phase of the SUKE Alam Damai Interchange project.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Muhamad Haziq Mohd Fadhillah, Roshartini Omar; **data collection:** Muhamad Haziq Mohd Fadhillah; **analysis and interpretation of results:** Muhamad Haziq Mohd Fadhillah; **draft manuscript preparation:** Muhamad Haziq Mohd Fadhillah, Roshartini Omar Md Asrul Nasid Masrom, Seow Ta Wee. All authors reviewed the results and approved the final version of the manuscript.*

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