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Identifying occurrences of accident at work place in terms of occupational safety on roads and bridges infrastructure in Indonesia

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Abstract. The economic growth of a country will be greatly influenced by road and bridge infrastructure that serves as a connecting flow of goods and human transportation. There are still some road and bridge construction projects in Indonesia that show the occurrence of accidents because lack of awareness by the management of the adverse effects of safety. Therefore, the author tries to find solutions to the improvement measures in minimizing the occurrence of occupational accidents by providing safety knowledge to the Project Managers and related staff, to be more concerned about the safety and the environment around the project. Based on data collected from the Ministry of Public Works and Indonesian People's Housing, there are several work accidents in toll road projects in Indonesia from August 2017 to February 2018. When viewed from several of these accidents, it can be concluded that the main cause is the lack of knowledge of the management staff about the need to enforce safety regulations, especially in the work of lifting object to the upper structure. Therefore, a commitment is needed to implement serious occupational safety regulations from all stakeholders who play a role in developing this infrastructure project.

1. Introduction

The Indonesian government has in recent years put in place a robust institutional framework to support its infrastructure plans. In the last year it has announced 13 economic policy packages (“deregulation packages”) focusing on the deregulation of investment and tax incentives. The government expects these deregulation packages to improve Indonesia’s competitiveness and help to attract investment by cutting bureaucracy and providing greater legal and business certainty. Overall, total government infrastructure spends in Indonesia increased by a substantial 51% from IDR 139 trillion (US\$ 11.7 billion) in 2014 to IDR 209 trillion (US\$ 15.5 billion) in 2015. While this represents significant progress in pursuing the government's ambitious infrastructure expansion plans, it was still below the planned increase of 63% [1].



Improving infrastructure is critical to stimulating inclusive growth in Indonesia. Inadequate infrastructure has hampered growth and poverty reduction, and poses significant obstacles to doing business in Indonesia. Poor road infrastructure contributes to logistics cost in Indonesia of 24% of GDP. Food security is affected by poor irrigation infrastructure: since 2005, irrigated land with good infrastructure has decreased from 78% to less than 50% today. Access to basic urban water and sanitation services lags far behind other middle-income countries. In 2014, just 80.7% of the urban population had access to improved water sources, while 61.06% had access to improved sanitation facilities. Such gaps in basic infrastructure provision are the result of both low government infrastructure investment and under-utilization of the capital budget [2].

Development of road and bridge infrastructure in Indonesia through the Ministry of Public Works and Public Housing (PWPB) in the Strategic Plan of the Ministry of PWPB 2015-2019, the activities will pursue time completion, cost effective and good quality [3]. However, by neglecting the rules of safety and health in the implementation of such work, it seems that previously, there were some events that resulted in work accidents in several major project sites, whereby the safety factor appears ignored in the project management. In the management of work safety, it is clearly seen that the competence factor of workers and employees are poorly managed.

“Safety First” should be a key element of project integration management because it affects all of the project management knowledge areas outlined in *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*. “Safety First” must be integrated into all aspects of the project to ensure success. This integration needs to begin with project scope management. The project manager needs to ensure that the project charter adequately identifies the importance of developing and maintaining a safe working environment for the project team. Each project manager should insist that a project-level Safety Plan is developed implemented and enforced. The project specific plan should be a subset of the corporate safety plan of either the client or the implementing organization. This top-tier project document will provide a framework for the implementation of safety procedures and safe work practices for all project members and sub-contractors. The project manager must believe that an injury-free work environment is possible [4].

Sistem Manajemen Kesehatan, Keselamatan Kerja dan Lingkungan (SMK3L) is an inseparable part of the labour protection system in Indonesia [5] and also for construction services work in order to minimize and avoid everyone from the risks of moral or material loss, lost of working hours, and the safety of people and the surrounding environment. This will be able to support an improvement which has effective and efficient project performance in the development process of the infrastructure projects. Road and bridge infrastructure projects are at high risk in terms of safety, especially flyovers and bridges that involved many workers and machine tools. Therefore, it is necessary to manage SMK3L in those projects by Project Manager which has integrated system together with their assistants who have experienced, expertise and care about work safety.

Recently, the case of work accidents that happened to construction workers on development projects in DKI Jakarta, was widely reported by the media. In the latest news, one of the main girder of Jakarta Becakayu toll road project was collapse, 7 workers are seriously injured. The previous tragedy occurred in the Double Double Track (DDT) project of Jalan Matraman Raya claiming the lives of 4 workers and other workers injured by the collapse of one of the concrete transport cranes. In January 2018, accident at the Light Rapid Transit (LRT) project on the Pulogadung line also seriously inflicted five workers [6].

Based on data from Badan Penyelenggara Jaminan Sosial (BPJS) Ketenagakerjaan the number of work accident cases continues to decline. In 2015 there were 110,285 work accidents, while in 2016 there were 105,182 cases, which decreased by 4.6%. Until August 2017 there were 80,392 cases [7].

Infrastructure development projects in Indonesia is still very weak in implementation of safety rules, even though there are several regulations such as Occupational Safety and Accidents (OSA/K3) in the regulation of Law no. 1 of 1970 on Occupational Safety [8]. Government Regulation no. 50 of 2012 on the Implementation of Health and Safety Management System [9], and Law No.13 of 2003 on Employment which also discuss about Health and Safety [10].

The spirit of the Indonesian government in boosting infrastructure development, hampered by number of work accident from the workers accordingly. In fact, the construction sector becomes a very important part in the development of a State. The Construction Services sector which is one of the main sector that support the Indonesian economy, and employ a significant number of labour. Based on the research note from the team of Economist of the Bank Mandiri, where the number of construction workers in the year 2017 amounted to about 7.2 million people [11]. On the other hand, the construction services sector is considered to be one of the sectors that are at high risk for workplace accidents.

For the type of occupational accidents [12], mentions that there are two types of jobs in the dangerous construction sector, namely work carried out at height and excavation work. For work at height the accident occurred in the form of workers falling from a height and for excavation work, inhaled toxic gas. Occupational accident risk research in the apartment building projects undertaken by [13] shows the greatest risk is the lifted materials falling from height, electrocuted, hit by equipment, and workers fall from height. With all the issues highlighted above, it is therefore timely for the authors to seriously look at this issue.

2. Methodology research

Every construction company should have involved the project managers and his/her team work who are experienced in carrying out good work, which does not only refer to time, cost and quality. However, mastery of occupational health and safety issues is a mandatory requirement to be implemented. In terms of enforcing regulations that are requirements that have been set out in a work contract and several regulations, the role of the project manager most important crucial.

2.1. Collection and analysis of data

In the context of this study, the collection of articles from the mass media related to workplace accidents was carried out on toll road and bridge construction projects that occurred in several regions in Indonesia within 1 year. The article taken is an online newspaper article obtained by Google's search. Key words used are: 'Infrastructure construction accidents', 'Toll road work accidents', 'Overpass work accident', 'Dead workers', and 'Workers fall'.

This study only collected a number of articles related to work accident cases in toll road and bridge infrastructure construction projects that occurred in Indonesia from August 2017 to February 2018. These data were classified and written in the form of Ms. Words and given name based on the date, month and year of the event. At the initial stage, by gathering news online using various google search engines with keywords, there were 15 articles on project work accidents which are toll road and bridge infrastructure construction projects were found.

3. Results and discussion

In general, occupational accidents or structural failures in the construction phase are mostly caused by a lack of discipline on the part of workers. The desire to speed up projects is one of the reasons why certain stages are passed without adequate care. According to Handbook of Occupational Health and Safety, construction safety is measured by the compliance of project implementers toward various stages, starting at planning and continuing through the entire life cycle of project. The design must be

equipped with quality assurance in the method of implementation, proper work equipment and materials that comply with safety standards. The contractor selected in the bidding process is responsible for safety and preventing accidents — thus reviewing a company's history of safety should be part of selecting a contractor. The next stage is the implementation stage with zero accidents. In this case, efforts are necessary to supervise standard operating procedures, work equipment and materials used. In the last stage, inspections are critical to assessing the project's safe completion [14].

Based on data collected from the Ministry of Public Works and Indonesian People's Housing [15] and some news within various media [16, 17, 18, 19, 20, 21, 22], There are several work accidents occurring in toll road projects in Sumatera and Java Island from August 2017 to February 2018 as follows (Table.1)

Table 1. Construction work accident data of infrastructure in Indonesia.

No.	Dated	Project Title	Location	Kind of accident	Cause of accident
1.	Aug 04, 2017	Palembang Light Rail Transit	Palembang	Falling from the height	Negligence of officers
2.	Sept 22, 2017	Bogor-Sukabumi Toll Road	Bogor	Failed of lifting	Negligence of officers
3.	Oct 16, 2017	Jakarta Light Rail Transit	Jakarta	Failed of lifting	Negligence of officers
4.	Oct 26, 2017	Bogor Outer Ring Road	Bogor	Failed of lifting	Negligence of officers
5.	Oct 28, 2017	Toll Road Pasuruan Probolinggo	Pasuruan	Failed of lifting	Negligence of officers
6.	Nov 3, 2017	Jakarta Mass Rapid Transport	Jakarta	Failed of lifting	Negligence of officers
7.	Nov 16, 2017	Jakarta-Cikampek Toll Road	Bekasi	Failed of lifting	Negligence of officers
8.	Dec 09, 2017	Manggarai-Jatinegara DDT	Jakarta	Scaffolding collapse	Negligence of officers
9.	Dec 09, 2017	Ciputra Pinggan Bridge	Banjar	Failed of lifting	Negligence of officers
10.	Dec 30, 2017	Pemalang-batang Toll Road	Pemalang	Failed of lifting	Negligence of officers
11.	Jan 02, 2018	Depok-Antasari Toll Road	Jakarta	Failed of lifting	Negligence of officers
12.	Jan 22, 2018	Jakarta Light Rail Transit	Jakarta	Failed of lifting	Negligence of officers
13.	Feb 04, 2018	Manggarai-Jatinegara DDT	Jakarta	Failed of lifting	Negligence of officers
14.	Feb 05, 2018	Soekarno-Hatta Airport Main Road	Banten	Embankment sliding	Negligence of officers
15.	Feb 20, 2018	Becakayu Toll Road	Jakarta	Pier collapse	Negligence of officers

Referring to all the accident event data shown in Table 1 above, it can be classified against the causes of accidents and the types of accidents that occur as summarised in Table.2:

Table 2. Classification of causes accidents.

No.	Kind of accident	Total	Cause of accident
1	Falling from the height	1 case	Negligence of officers
2	Failed of lifting	11 cases	Negligence of officers
3	Scaffolding collapse	1 case	Negligence of officers
4	Embankment sliding	1 case	Negligence of officers
5	Pier collapse	1 case	Negligence of officers

Looking at some of the above incidents, it is clear that the safety aspects of work are somewhat marginalized in order to pursue the progress of work demanded by the time of completion known to the public. There is a need for commitment from all stakeholders who play a role in the development of these infrastructure projects, so that the same focus is reminded each other about the risk of danger that will occur in the work place. The construction company is one of the main executor in this work should be very careful in the management of work safety that refers to the safety regulations that are referred to in the work.

Table 2 shows that, out of 5 cases, there are 4 types of accidents it is generally caused by the negligence of the safety officers in monitoring and preventing work accidents. However, eleven cases type of accident was caused by the process of lifting objects in construction structures. Besides that, almost all accidents were related to the problem of lifting work using cranes, which many must pay attention to (Crane, Lifting Accessories, Scaffolding, Rigging Plan, etc).

4. Conclusions

Based on the description in the section above, the parties involved in the construction work activities seemed do not understand the meaning of work safety starting from the project manager and the related staff involved in these projects. Where in every activity they must have observed the potential hazards that will arise and be reminded through tools-box meeting, safety briefings and safety induction. And also put up the safety signs, banners, posters and reminder which is easy to see and read.

Also, it is required that every party involved in regulating and overseeing the performance of national construction service companies in Indonesia, to conduct an assessment of the project manager and all of his employees in implementing occupational health and safety programs in his projects. In addition, related institutions that play a role in providing competency test certification for occupational safety officers in construction companies, to be even more stringent in certifying their assessments.

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