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Analysis of Construction Safety Implementation in the Post-Covid-19 Pandemic Era: A Case Study on Infectious Disease Prevention in Construction Projects

Benediktus Wisnumurti[1], Iris Mahani[2]

[1,2]Construction Engineering and Management Research Group, Faculty of Civil and environmental Engineering, Institut Teknologi Bandung, Jalan Ganesa No. 10, Bandung 40132, Indonesia

Abstract

This research will discuss the Analysis of Construction Safety Implementation Post-COVID-19 Pandemic: A Case Study of Infectious Disease Prevention in Construction Projects. The study employs descriptive qualitative analysis and taxonomy methods, with data obtained from questionnaires on construction projects related to the implementation of health protocols post-COVID-19 pandemic. The results show that 29.41% of projects still apply health protocols post-pandemic. The preparations made by service providers from several state-owned enterprises comply with the health protocols outlined in the COVID-19 Handling Task Force Circular Letter SE No. 1 of 2023 regarding Health Protocols during the Endemic Transition Period of Corona Virus Disease 2019 (Covid-19). Subsequently, a taxonomy analysis was conducted to produce recommendations for health protocol management in post-pandemic construction projects. The analysis concludes that while several ongoing construction projects are reasonably good at applying health protocols post-pandemic, improvements are needed, and the recommendations provided in this study could be utilized.

Keywords: Post COVID-19 Pandemic, Health Protocols, Infectious Disease Prevention, Construction

1. Introduction

The COVID-19 pandemic, which struck the world in 2019, has transformed various aspects of society and posed new challenges across all industry sectors. Declared a global pandemic by the World Health Organization (WHO) on March 11, 2020, COVID-19 has significantly changed human life. From the onset of the pandemic until its conclusion, the construction sector has been notably impacted. Economic activity restrictions, health protocols, and changes in public behavior during the pandemic have significantly affected construction project implementation. In Indonesia, the social restriction policy (PSBB) was implemented by the government to mitigate the spread of the virus, causing disruptions across various sectors, including construction projects.

By June 2023, the government removed mandatory health protocol regulations, including mask use and COVID-19 vaccination requirements. This marked a transition period to post-pandemic times, although COVID-19 has not completely disappeared and continues to present new challenges regarding post-pandemic health protocols in construction environments. Health protocols in the post-pandemic era are

crucial to ensuring protection for the workforce.

COVID-19 has not entirely vanished and continues to circulate, mutating and producing new variants. Since the government lifted mandatory health protocol regulations in June 2023, there has been an increase in COVID-19 cases. As illustrated in the image below, from November 2023 to January 2024, there was a rise in COVID-19 cases and deaths.

Efforts to manage infectious diseases in the construction sector must focus on promotional and preventive aspects, with the aim of reducing the spread of infectious diseases among construction workers. This will help construction projects minimize disease spread and better prepare for potential future pandemics.

Therefore, this research will discuss the Analysis of Construction Safety Implementation Post-COVID-19 Pandemic: A Case Study of Infectious Disease Prevention in Construction Projects. This study aims to contribute to the enhancement of occupational safety and health and improve construction project performance in the post-pandemic era.

2. Objective

The objectives of this research are as follows:

1. To identify the implementation of health protocols in construction projects following the end of the COVID-19 pandemic.
2. To identify preparations for handling infectious disease prevention in construction projects.
3. To provide recommendations for health protocols that can be suggested for construction projects during the post-COVID-19 pandemic period.

3. Review Literature

1. Infectious Disease Control

   According to Minister of Health Regulation No. 82 of 2014 on Infectious Disease Control, infectious disease control is a health effort that prioritizes promotive and preventive aspects aimed at reducing and eliminating morbidity, disability, and mortality rates, limiting transmission, and preventing the spread of diseases from expanding between regions or countries, and potentially causing extraordinary events/outbreaks.
2. Construction Safety Management Regulation in Indonesia

   According to Minister of Public Works and Housing Regulation No. 10 of 2021 on Construction Safety Management Guidelines, activities to achieve the highest health standards for construction workers and the community around construction sites involve preventing health disturbances and occupational diseases through health checks, including procedures and/or work instructions for occupational health management. This encompasses periodic health checks, special health checks, infectious disease prevention, and occupational disease prevention, signed by relevant experts and the head of the construction project/management representative.
3. Health Protocols

   According to the COVID-19 Handling Task Force Circular Letter SE No. 1 of 2023 on Health Protocols During the Endemic Transition Period of Corona Virus Disease 2019 (Covid-19), large-scale activities are advised to continue implementing protective measures through preventive and promotive efforts. Additionally, oversight, guidance, enforcement, and actions regarding the implementation of health protocols should be maintained.

4. Methodology

This research was conducted using both qualitative and quantitative methods, obtained through data collection via questionnaires, literature such as journals, previous theses, government policies or regulations, and books relevant to the study. The questionnaire data was then analyzed using descriptive analysis. The qualitative descriptive analysis aimed to depict the implementation of health protocols in construction projects following the end of the COVID-19 pandemic. Subsequently, taxonomy analysis was conducted to produce recommendations for managing health protocols in post-pandemic construction projects. Using the taxonomy analysis method, the results involved observations to create a picture or pattern, which would then lead to recommendations for health protocols in construction projects during the post-pandemic period.

5. Analysis and Discussion

5.1 Descriptive Analysis and Identification of Health Protocol Implementation in Construction Projects Following the End of the COVID-19 Pandemic

From the research results of the Analysis of Construction Safety Implementation in the Post-COVID-19 Pandemic Era: A Case Study of Infectious Disease Prevention in Construction Projects, data from a sample of 7 projects (4 State-Owned Enterprises) revealed that the research subjects included 3 road projects, 1 building project, 1 pump station project, and 1 EPC project. The project value overview from the research indicates that the ongoing projects have values ≥ 250,000,000,000.00. This means the research results pertain to large-scale construction projects.

In this study, a questionnaire was conducted with questions based on the identification of potential COVID-19 transmission activities in indoor and outdoor settings by Ratih Dewi Shima in the study titled "Review of COVID-19 Health Protocol Standards for Construction Service Environments" in 2022. Below is a table of the checklist results for health protocol implementation in construction projects following the end of the COVID-19 pandemic..

Table 1. Recap of Questionnaire Results on Health Protocol Implementation During the Post-COVID-19 Pandemic Transition Period

No.	Question	Answer	
		Yes	No
1. Indoor Activities			
1.1 Security Room/Reception Area			
1	Are external guests required to bring a health certificate?	2	5
2	Is body temperature or temperature still checked for external guests?	2	5
3	Is there still a registration process for guests, including their last visited places, to facilitate tracking the virus's arrival routes?	2	5
4	Are handwashing stations and hand sanitizers still provided at the project's office entrance?	7	0
5	Are workers still disciplined in adhering to health protocols in rest areas or dining spaces?	1	6
6	Is there still specific training for workers on the health hazards	6	1

No.	Question	Answer	
		Yes	No
	of infectious diseases and maintaining health protocols?		
7	Is there still periodic cleaning with disinfectants for tables and chairs?	3	4
1.2 Office Room			
1	Are cross marks still used to indicate permitted locations for guests?	1	6
2	Are transparent plastic barriers still provided between workers?	1	6
3	Are face-to-face meetings still minimized, with most meetings conducted via teleconference, and the number of in-person attendees limited?	4	3
4	Are there still restrictions on consuming snacks or food during work hours to prevent contamination from work activities?	1	6
5	Are remote controls for air conditioners and other electronic devices still covered with plastic, which is replaced periodically after each use or after each room use?	0	7
6	Is there still a Work From Home (WFH) and Work From Office (WFO) arrangement to limit the number of workers in one place?	0	7
7	Does the project facilitate communication and remote work needs using Industry 4.0 technology?	6	1
8	Is the project management still minimizing the sharing of office supplies, requiring all supplies to be personally owned without hand transfers?	3	4
9	Is there still periodic cleaning with disinfectants in office room?	2	5
10	Are there still rules that recommend using elbows or body parts other than hands to avoid touching handles and buttons?	1	6
11	Are workers still required to keep a set of personal eating utensils at their desk or workspace?	2	5
12	Are there still rules that waste bins must be placed outside, in open areas, and must have lids?	4	3
13	Is there still a minimum distance of 1 meter between seating areas or partitions during meals?	1	6
1.3 Storage Room, Worship Area, and Restroom			
1	Are used personal protective equipment (PPE) still disinfected or washed after each use?	0	7
2	Is there still a rule requiring workers to wash their hands before storing and after removing PPE?	3	4
3	Does the project's storage area have adequate ventilation, sunlight exposure, and proper room temperature?	5	2

No.	Question	Answer	
		Yes	No
4	Are handwashing stations/hand sanitizers still available near the prayer room?	6	1
5	Are there still restrictions on the number of people allowed to perform ablution at one time?	0	7
1.4 Barracks/Dormitory			
1	Are beds, pillows, mattresses, sheets, blankets, and pillowcases in the mess still washed and dried regularly?	5	2
2	Are there still restrictions on the number of beds per room, with sufficient spacing and dividers between beds?	4	3
2. Activities in Fields			
2.1 Preparation Work			
1	Is there still disinfection of frequently touched areas on heavy machinery?	0	7
2	Are disposable rubber gloves still provided for operators for single use per day?	2	5
3	Is there still zoning and mobility restriction for workers when disembarking from heavy machinery?	2	5
4	Is there still disinfection of measuring tools like theodolites on buttons and frequently touched parts before use?	0	7
5	Are workers still provided with cloth gloves and N95 masks?	3	4
6	Are workers still provided with protective glasses or goggles to prevent virus transmission from theodolites during surveying?	4	3
7	Do workers still use the same tool for the entire workday?	4	3
8	Is disinfection still performed before and after equipment is returned to the storage area?	0	7
2.2 Foundation Work			
1	Is disinfection still performed on steering wheels, levers, and seats before and after operating heavy machinery and for large equipment?	1	6
2	Are operators still provided with gloves when operating heavy machinery?	2	5
3	Is there still cleaning of safety boots with disinfectants after entering wet areas, and are the plastic coverings removed and disposed of safely?	0	7
2.3 Storage Room, Worship Area, and Restroom			
1	Are workers still provided with gloves while working?	5	2
2	Is there still periodic disinfection of fabrication tools before or after hand transfer?	1	6
3	Is the policy still in place to minimize hand transfers, with one worker not allowed to switch tools during a shift?	2	5

No.	Question	Answer	
		Yes	No
4	Are double gloves still used, with disposable latex gloves worn before cloth or welding gloves?	1	6
5	Is there still a work zone arrangement for fabrication areas, open and large areas, and a minimum of 1.5 meters for fabrication work?	0	7
6	Are there still distance regulations in the work mobilization area during the transfer of fabricated rebar?	0	7
2.4 Formwork			
1	Is there still a limit on the number of workers for formwork/falsework?	0	7
2	Are workers still restricted to using only one tool throughout their work?	1	6
2.5 Concrete Casting			
1	During slump tests, are testers still required to use disposable latex gloves and disinfect testing tools regularly?	2	5
2	Is disinfection still performed before using tools and before hand transfers?	0	7
3	Are field workers still provided with disposable latex gloves?	2	5
4	Is there still a limit on the number of workers directing the concrete hose in narrow zones?	1	6
5	Is the use of latex gloves and disinfection before using vibrators still required?	0	7

The measurement of health protocol implementation variables in construction projects post-COVID-19 pandemic uses "yes" or "no" options. Out of 61 questions posed in the questionnaire, 105 responses were "yes" and 252 responses were "no," indicating that 29.41% of projects still implement health protocols post-pandemic. This is based on the questionnaire questions with details on each activity in both enclosed and open spaces, as shown in the following image.

Figure 1. Results of the Questionnaire on Indoor Activities

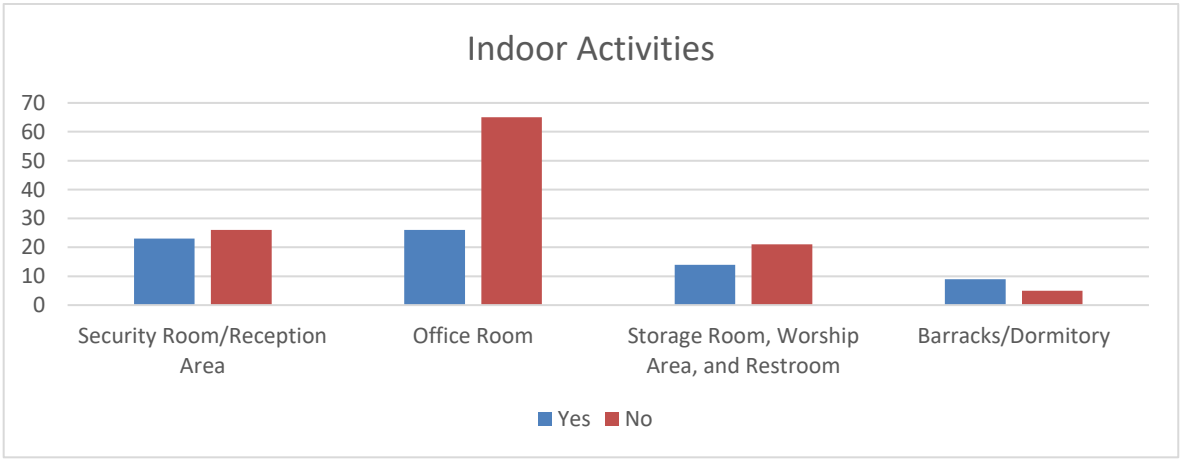
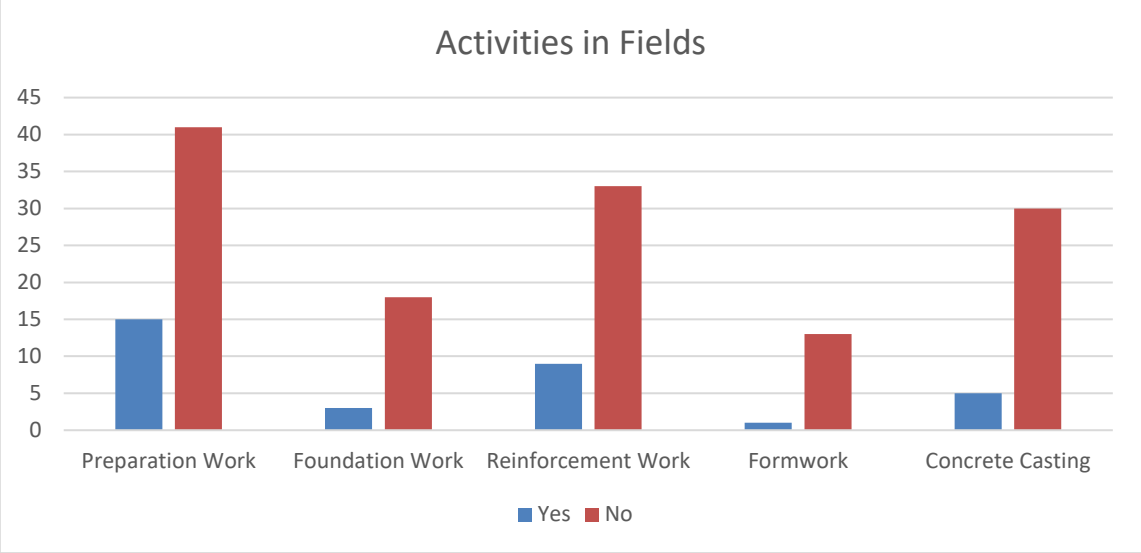


Figure 2. Results of the Questionnaire on Activities in Fields



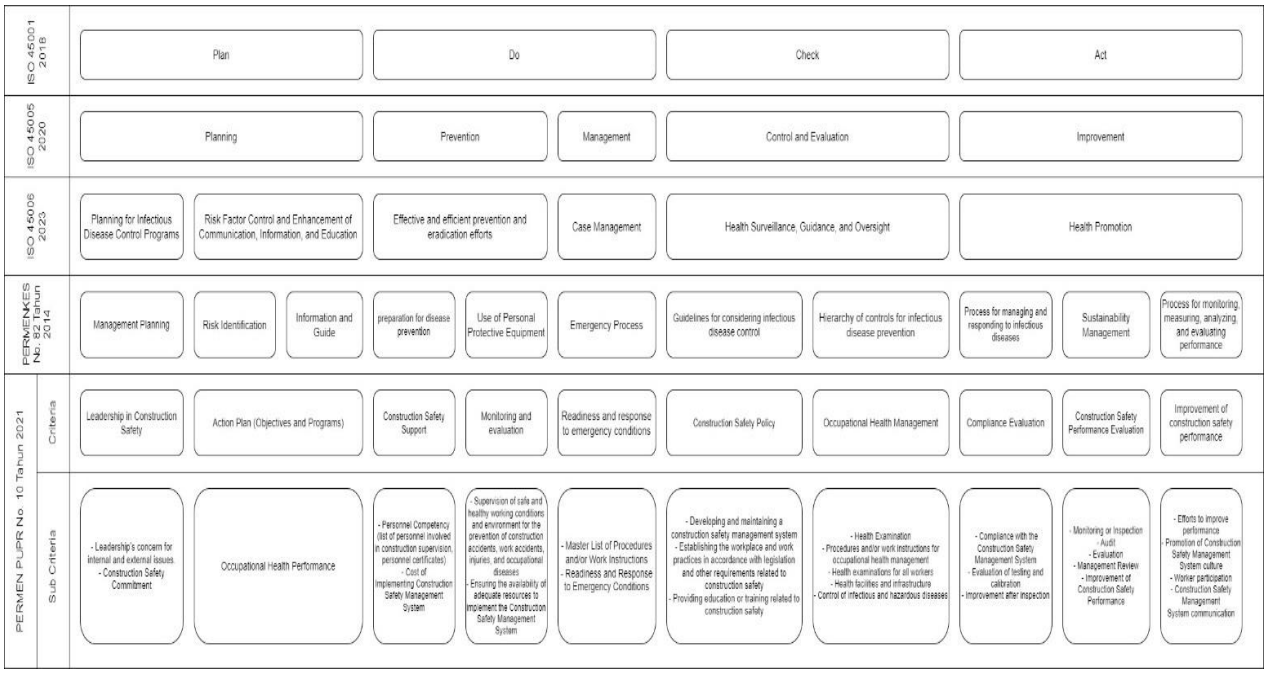
The image above shows that the implementation of health protocols in construction projects post-pandemic COVID-19 has become more relaxed. Although the percentage is very small, some projects still adhere to health protocols, though not as strictly as during the COVID-19 pandemic. The preparations made by service providers from several state-owned enterprises are in line with the post-pandemic health protocols outlined in the COVID-19 Handling Task Force Circular Letter SE No. 1 of 2023 on Health Protocols During the Endemic Transition Period of Corona Virus Disease 2019 (Covid-19). This circular states that large-scale activities are advised to continue with protective measures through preventive and promotive efforts, and to maintain oversight, guidance, enforcement, and actions regarding the implementation of health protocols.

5.2 Identification of Post-COVID-19 Pandemic Health Protocol Recommendations through Taxonomy Analysis

From the data analysis related to the implementation of health protocols in construction projects post-COVID-19 pandemic, an identification process was carried out to generate health protocol recommendations based on the latest ISO standards, namely ISO 45006:2023. The data analysis conducted is taxonomy analysis, which uses ISO 45001:2018 and ISO 45006:2023 and will be aligned with Minister of Public Works and Housing Regulation No. 10 of 2021.

The pattern from the taxonomy analysis in this study is an extension of previous research, specifically the thesis by Ratih Dewi Shima titled "Study of COVID-19 Health Protocol Standards for Construction Service Provider Environments." Based on ISO 45001:2018, Occupational Health and Safety Management Systems (SMK3) are divided into 4 elements: "plan" (planning), "do" (implementation), "check" (checking), and "act" (improvement). These clauses are then developed into clauses related to infectious disease prevention as outlined in ISO 45006:2023. From the resulting taxonomy pattern, recommendations for health protocols in construction projects during the post-COVID-19 pandemic period will be derived.

Figure 3. Taxonomy Analysis Results



Based on the taxonomy analysis, a connection was found between ISO standards and regulations from the Ministry of Public Works and Housing (Kementerian PUPR), indicating that in the construction safety plan, health is crucial for workers and the community around the construction site. Therefore, the recommended health protocols for construction projects during the post-COVID-19 period are based on the latest ISO standard, ISO 45006:2023, which provides guidelines for organizations in the prevention, control, and management of infectious diseases. This standard has been aligned with Minister of Health Regulation No. 82 of 2014 on the Control of Infectious Diseases and Ministry of Public Works and Housing Regulation No. 10 of 2021 on Construction Safety Management System Guidelines. Below is an outline of recommendations for implementing health protocols during the post-COVID-19 period. Attached is the table of Recommended Health Protocols for Construction Projects During the Post-COVID-19 Period.

Table 2. Recommendations for Implementing Health Protocols Post-COVID-19 Pandemic (Infectious Disease Prevention)

No	Recommendations for Implementing Health Protocols Post-COVID-19 Pandemic (Infectious Disease Prevention) ISO 45006:2023	Health Protocols Still in Effect
I	**PLANNING**	
1	Management planning in the prevention of infectious diseases	Specific training for workers on the health hazards of infectious diseases and how to adhere to health protocols
2	Management must have a process to identify the causes of diseases and other hazards related to infectious diseases and assess the risks to health, safety, and well-being	
3	Management efforts provide information and guidance on infectious diseases	
II	**PREVENTION**	

No	Recommendations for Implementing Health Protocols Post-COVID-19 Pandemic (Infectious Disease Prevention) ISO 45006:2023	Health Protocols Still in Effect
1	Preventive measures from management when a disease is identified or has the potential to become a problem	Workers are still provided with protective glasses or goggles to prevent transmission of the virus from theodolites during surveying
2	Management should consider the use of appropriate personal protective equipment (PPE) to protect workers from the risks of infectious diseases, taking into account the characteristics of the infectious disease	
III	**MANAGEMENT**	
1	Management should consider existing emergency procedures and the need for changes and adaptations	Regular cleaning of tables and chairs with disinfectants
IV	**CONTROL AND EVALUATION**	
1	Guidelines for considering the control of all diseases and infectious diseases	The project facilitates communication and remote work needs by leveraging Industry 4.0 technology
2	Guidelines for the hierarchy of controls for the prevention of infectious diseases	
V	**IMPROVEMENT**	
1	Management must have a process to manage and respond to infectious diseases and to limit exposure and transmission in the workplace	Check the illnesses currently being experienced by workers
2	Handling the sustainability of infectious disease management in the workplace	
3	Management must have a process to monitor, measure, analyze, and evaluate performance	

6. Conclusion

The implementation of health protocols carried out by service providers from several state-owned enterprises is in accordance with the post-COVID-19 health protocols outlined in the COVID-19 Handling Task Force Circular Letter SE No. 1 of 2023 on Health Protocols During the Endemic Transition Period of Corona Virus Disease 2019 (Covid-19). This circular states that large-scale activities are advised to continue implementing protective measures through preventive and promotive efforts, and to maintain oversight, guidance, enforcement, and action regarding the implementation of health protocols.

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