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**Risk Mitigation In Supply Chain Disruption During Pandemic  
Covid-19: Evidence From EPC Construction Energy In Indonesia**

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**HALAMAN PENGESAHAN**

**RISK MITIGATION IN SUPPLY CHAIN DISRUPTION  
DURING PANDEMIC COVID-19: EVIDENCE FROM EPC  
CONSTRUCTION ENERGY IN INDONESIA**



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### **“RISK MITIGATION IN SUPPLY CHAIN DISRUPTION DURING PANDEMIC COVID-19: EVIDENCE FROM EPC CONSTRUCTION ENERGY IN INDONESIA”**

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Declared in : Bandung

Date : May 2024

  
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# **RISK MITIGATION IN SUPPLY CHAIN DISRUPTION DURING PANDEMIC COVID-19: EVIDENCE FROM EPC CONSTRUCTION ENERGY IN INDONESIA**

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## **ABSTRACT**

The COVID-19 pandemic, which emerged in early 2019 and persists into 2022, stands as one of the most significant global calamities in recent memory. Beyond the staggering toll of fatalities and hospitalizations, it has unleashed widespread economic repercussions, disrupting businesses on a global scale and inflicting profound hardships. Its reach extends across various sectors, including manufacturing, hospitality, finance, food and beverage, and construction in Indonesia. Numerous projects in the country have encountered delays and budget overruns as a result of the pandemic. Construction sites abruptly ceased operations, and productivity levels stagnated. This study explores the initial experiences of managing the COVID-19 crisis and its impact on the construction industry.

This study examined the impact of the COVID-19 pandemic on EPC construction companies in Indonesia, focusing on the achievement of targets as reported by nine respondents from SCM Departments, including SCM managers and Logistics managers, in nine major international EPC companies operating in oil, gas, power, petrochemical, and related sectors with ongoing projects in Indonesia. The respondents provided insights based on their experiences dealing with the pandemic disruptions, including the overall and adverse effects observed, new opportunities identified, and risk management efforts undertaken. Reported adverse effects included significant project delays, challenges in securing materials promptly, decreased productivity rates, additional logistics expenses, material cost escalations, shifts in transportation methods from sea freight to air freight to meet construction deadlines, among others.

There have been several impacts on Supply Chain disruption, encompassing material movement and delivery flow delays, disruptions in financial flows with payment term disturbances on both seller and buyer ends, and disruptions in information flow across various aspects including human resources, material stock information, quotations, inspections, HSE, and scheduling. Risk management measures have been significantly bolstered, including efforts to enhance safety protocols like enforcing the use of medical face masks among employees, conducting body temperature checks to ensure temperatures below 37 degrees Celsius, implementing social distancing protocols, staggering construction operations, providing COVID-19-related training, administering frequent antigen/PCR tests, and other precautions.

**Keywords :** COVID-19 risk, construction safety, mitigation strategies, supply chain management, disruption

## FOREWORD

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# **CHAPTER I**

## **INTRODUCTION**

### **1.1 Background**

Indonesia has been grappling with the ramifications of the COVID-19 outbreak since its initial detection and government declaration in early March 2020. Subsequently, there has been a surge in confirmed cases across the nation. Various measures, such as the implementation of large-scale social restrictions (PSBB), have been enforced to curb the spread of the virus. These initiatives have significantly impacted nearly every aspect of socio-economic life, with the construction sector being particularly hard-hit. Construction, integral to the national economic agenda, has faced challenges exacerbated by the pandemic. Projects, whether funded through government allocations (APBN, APBD) or private investments, have been subject to temporary delays or reduced productivity. Moreover, lockdowns and PSBB policies, including restricted access to certain areas and limitations on public transportation, have disrupted the flow of labor and construction materials, further complicating the situation.

The COVID-19 pandemic has had a significant impact on the energy sector. Within the commercial sphere, many businesses have scaled back their operating hours, leading to a reduction in energy consumption. Similarly, the transportation sector has seen a sharp decrease in the demand for fuel oil (BBM) due to restrictions on transportation modes (such as reduced flights and limited public transport) and the widespread adoption of work-from-home policies. This global decrease in fuel demand has resulted in a dramatic decline in crude oil prices

worldwide. Consequently, numerous refineries have been compelled to cease operations as they are no longer as profitable compared to imported fuel. Moreover, the viability of new renewable energy (EBT) projects is diminishing due to an oversupply of energy resulting from reduced demand. (Buletin Konstruksi Edisi 4 Tahun 2020).

The COVID-19 pandemic and subsequent strict lockdown measures have caused significant disruptions to the construction industry's supply chain management, including construction, procurement, and logistics. This disruption has affected both developing and developed countries, resulting in material shortages and project delays. The pandemic has led to short-term stress in the non-residential and residential sub-sectors, causing a decrease in GDP and an increase in unemployment. The economic activities of the manufacturing and construction sectors have been severely impaired due to lockdowns and social distancing measures resulting from insufficient numbers of employees. As a result, there is a growing concern that the supply bottleneck will lead to a scarcity of construction materials. This study aims to identify the impact of COVID-19 on the Construction Supply Chain (CSC) and analyze the factors influencing Supply Chain (SC) performance during uncertainty in the construction industry.

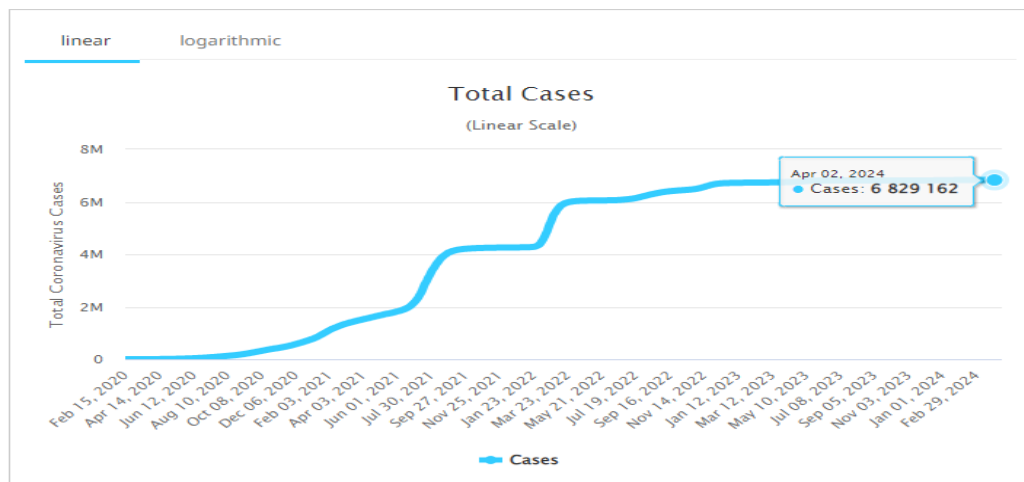
The construction services sector, like many other economic entities, has also been significantly impacted by the Covid-19 outbreak. In practical terms, numerous construction activities have been halted due to the pandemic. It's important to note that construction activities are interconnected with various other sectors, meaning disruptions are not solely caused by clients but can also stem from the service providers themselves. For instance, the cessation of construction



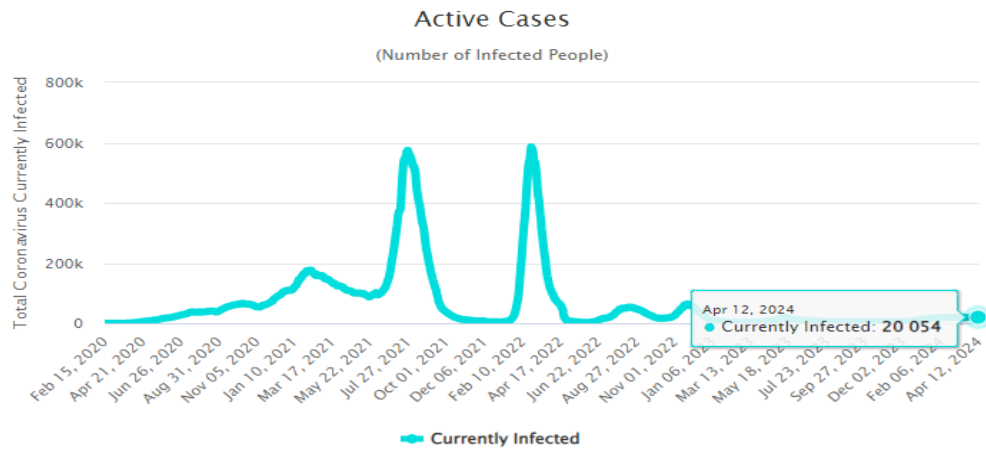
work can result from delays in the delivery of imported raw materials, which may be stuck in countries undergoing lockdowns. Additionally, the presence of Covid-19 positive workers necessitates quarantine measures for their colleagues, further impeding progress. Furthermore, construction projects have experienced slowdowns due to government policies such as Large-Scale Social Restrictions (PSBB), which have limited the distribution of materials, thereby affecting the pace of work. (R. Yudha Triarianto Wasono, 2020)

Measures responding to COVID-19 including inspection and monitoring, isolation and lockdown, social distancing measures during COVID-19, measures for construction workers during COVID-19, COVID-19 awareness and training measures and disinfection and cleaning of public areas.

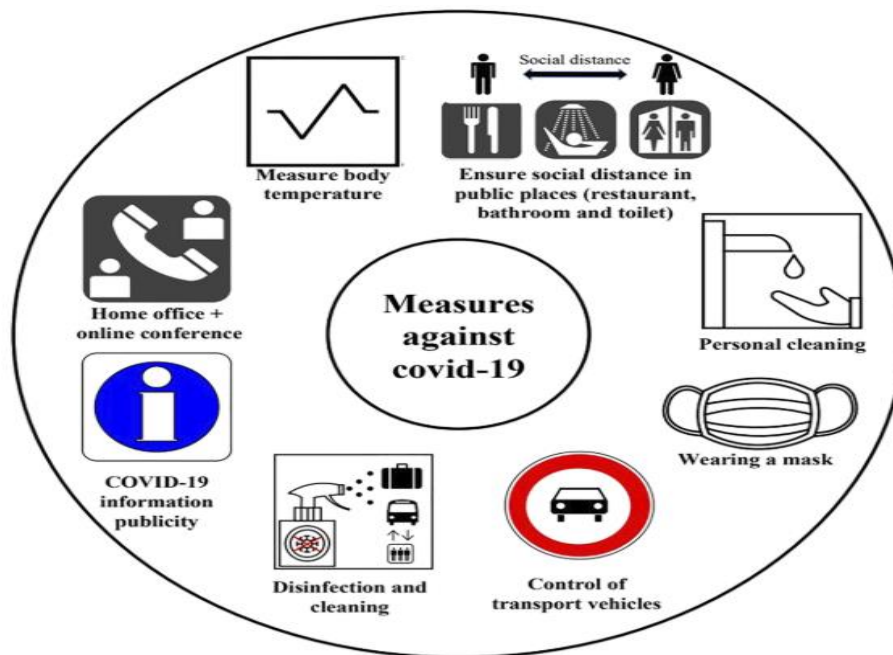
### Total Coronavirus Cases in Indonesia



## Active Cases in Indonesia



Source : <https://www.worldometers.info/coronavirus/country/indonesia/>



The COVID-19 pandemic has brought about several repercussions in the field of construction. Firstly, there has been a decrease in the number of workers available on-site. Secondly, obtaining raw materials from outside the local area has become challenging, hindering industrial operations. Additionally, many projects have failed to meet their intended deadlines or have been entirely abandoned due to safety concerns for workers. Despite governmental directives to

halt certain businesses, the construction industry has largely remained operational, albeit with stringent safety protocols in place. Compliance with these protocols is crucial for safeguarding the well-being of workers; failure to do so may necessitate temporary project suspensions. The disruption of supply chains during the pandemic has further exacerbated logistical challenges. Local government regulations, such as the implementation of Public Activity Restrictions (PSBB), have significantly impacted the distribution of goods. Moreover, adhering to health protocols, including mandatory COVID-19 testing, presents additional hurdles, often requiring dedicated funding for procurement purposes (Susanto, 2020).

Top Challenges Faced by The Indonesian Construction Industry During COVID19 Pandemic as follow :

- Contract delay or cancellation
- Increasing case of employees' termination as an impact of economic slow down
- Lower productivity, leading to deteriorating performance
- Higher USD exchange rate
- Increasing cost of raw materials and transportation
- Logistical issues due to restrictions in seaports and airports
- Shortage of spare parts as a result of import difficulties from China
- Withdrawal of Chinese contractors from projects
- Restriction/lockdown in a numerous project location

The success of a construction project hinges on its ability to adhere to a pre-established timeline, meet quality standards, and yield tangible benefits (Rani, 2021). Nonetheless, during execution, projects frequently encounter diverse hurdles, resulting in setbacks that affect both time and expenses. Numerous construction projects, particularly those spanning multiple years, face the peril of financial losses due to delays (Sajiah, 2020). Ervianto (2005) outlined three key attributes of construction projects:

- a) Construction projects exhibit distinctiveness, as no two are exactly alike, despite potential similarities in activities. Moreover, they are temporary projects involving diverse personnel and stakeholders.
- b) Successful completion of a construction project hinges on proficient allocation and supervision of assorted resources, encompassing finances, equipment, materials, and personnel. This responsibility typically falls on the project manager.
- c) Effectively overseeing a construction project demands meticulous organization due to involvement of multiple individuals with varied skills, interests, personalities, and uncertainties. The project's success relies on the project manager's adeptness in coordinating and managing these diverse elements to meet project objectives.

This research delves into the effects and strategies to address the impact of the Covid-19 outbreak on the execution of EPC construction ventures within Indonesia. Through initial interviews with participants hailing from multinational construction firms operating within the country, data encompassing details regarding their professional roles, work sites, and years of experience will be

collected. The study will focus on an EPC construction entity involved in ventures within the oil and gas, power generation, petrochemical, and related energy domains. Participants will include SCM Managers, Logistics Managers, and Material and Warehouse Managers affiliated with multinational EPC firms overseeing energy projects in Indonesia.

The EPC contractors which survive from the pandemic has supply chain resilience which has capability to deal with disturbance or disruption. According to Hohenstein, Feisel, Hartmann & Giunipero (2015, 90) Supply chain resilience is the ability of a supply chain to prepare for unexpected disruptive events, respond and recover quickly and return to the original or more desirable state. Another opinion from Ponomarov & Holcomb (2009, 131) that Supply chain resilience is the supply chain's adaptive capability to prepare for the unexpected, respond, and recover by sustaining operations and controlling function and structure.

## **1.2 Problem Formulation**

Many factors can influence supply chain disruption. Therefore, the problem of this research can be formulated as follows:

1. How did EPC contractors survive/mitigate during the COVID-19 pandemic in the construction industry?

## **1.3 Research Objective**

The purpose of this research is as follows:

1. To identify risk mitigation strategies implemented by EPC contractors to survive in the construction industry during a pandemic Covid 19.

#### **1.4 Research Benefit**

From this research it is expected to have benefits for the readers as follows:

##### 1. Theoretical Benefits

The result will bring significant knowledge to mitigate the disruption of the COVID-19 pandemic in the Supply Chain of EPC Projects.

##### 2. Practical Benefits

The research activities bring lessons learned practicality for EPC construction companies and individuals in mitigating disruption, which is coming unpredictably.

#### **1.5 Research Limitation**

This study has limitations on the research object only for companies engaged in EPC construction company specializing in oil, gas, energy, mining, and other energy services in Indonesia.