

CHAPTER 1 - INTRODUCTION

1.1 Background

Indonesia is one of the countries with abundant natural resource potential, including in the coal mining sector. Coal has long been one of the main commodities in the energy and industrial sectors in Indonesia. However, the coal business is also faced with various challenges and changes in global dynamics, which require the use of efficient heavy equipment in the mining, transportation and processing processes. Indonesia has large coal reserves spread across various regions, such as Kalimantan, Sumatra, Sulawesi and Papua. This potential makes coal one of the strategic natural resources for the Indonesian economy. The coal business contributes significantly to the Indonesian economy. Coal exports are one of the country's foreign exchange earnings, while creating jobs in various related sectors. Although the shift towards clean energy is being promoted, coal still plays an important role as an energy source in meeting the needs of electricity and industry in Indonesia. Its presence helps maintain the stability of the national energy supply.

International demand for coal has fluctuated due to the shift towards clean energy. This can affect the price and export of Indonesian coal. Coal mining activities have significant environmental impacts, including land degradation, water pollution and greenhouse gas emissions. Responsible mining and the use of more efficient and environmentally friendly machinery are important. Regulatory changes at national and international levels may affect coal business operations and heavy equipment requirements. Government policies related to the environment and energy can lead to changes in business strategies.

Businesses and governments can respond to changing dynamics by investing in energy diversification, including renewable energy, to reduce dependence on coal. Adopting new technologies in mining and processing can improve operational efficiency and reduce environmental impact. More advanced and efficient machinery can help address some of the challenges. Sustainable management in coal mining, including rehabilitation of mined land, strict environmental monitoring, and the use of environmentally friendly heavy equipment, can help reduce negative impacts. The coal business in Indonesia has significant economic potential, but also faces complex challenges related to global demand, environmental issues and regulatory changes. The use of efficient and innovative machines can help address some

of these challenges and support the sustainable and responsible growth of the coal business. With a commitment to good business practices and sustainable natural resource management, the coal business can remain relevant in Indonesia's economy while being mindful of its social and environmental impacts.

The global demand for coal can be influenced by several global economic, industrial, environmental and geopolitical factors. After the economic downturn caused by the COVID-19 pandemic in 2020, there was a global economic recovery that could increase demand for energy, including coal, to support industrial activity and energy consumption. Coal demand is often linked to demand from the industrial sector, especially heavy industries such as manufacturing and steel production. If there is an increase in industrial production and activity, then coal demand may also increase. Disruptions in energy supply, such as shortages in natural gas or oil supply, can lead to increased use of coal as an alternative energy source. Due to constraints in the development and supply of renewable energy (such as wind, solar and hydro), some countries may rely more on coal as a temporary energy source. When natural gas or oil prices are high, coal may become a more economical option for some countries.

The conflict between Russia and Ukraine has resulted in a number of significant impacts on various sectors, including energy supply and commodities such as coal. Russia plays an important role in the supply of natural gas and energy to European countries, so tensions and fighting between these two countries have impacted the supply of energy needs in the region and especially in Europe. Disruptions to energy infrastructure, including natural gas pipelines and electricity, can result in power outages and disruptions in natural gas supply. Concerns about energy supply have prompted European countries to seek alternative energy sources, one of which is reviving coal-fired power plants. Thus, the demand for coal globally is also getting higher. This has resulted in coal commodity prices soaring. Figure 1 shows that commodity prices, especially coal, skyrocketed from January to March 2022, Nerlinger (2022). With the increasing demand for coal, other supply chains also increase, especially the need for heavy equipment. The military conflict between Russia and Ukraine has cut off many important shipping routes, forced transportation companies to suspend services, and soaring air freight rates caused serious disruptions to the global supply chain, Ngoc (2022).

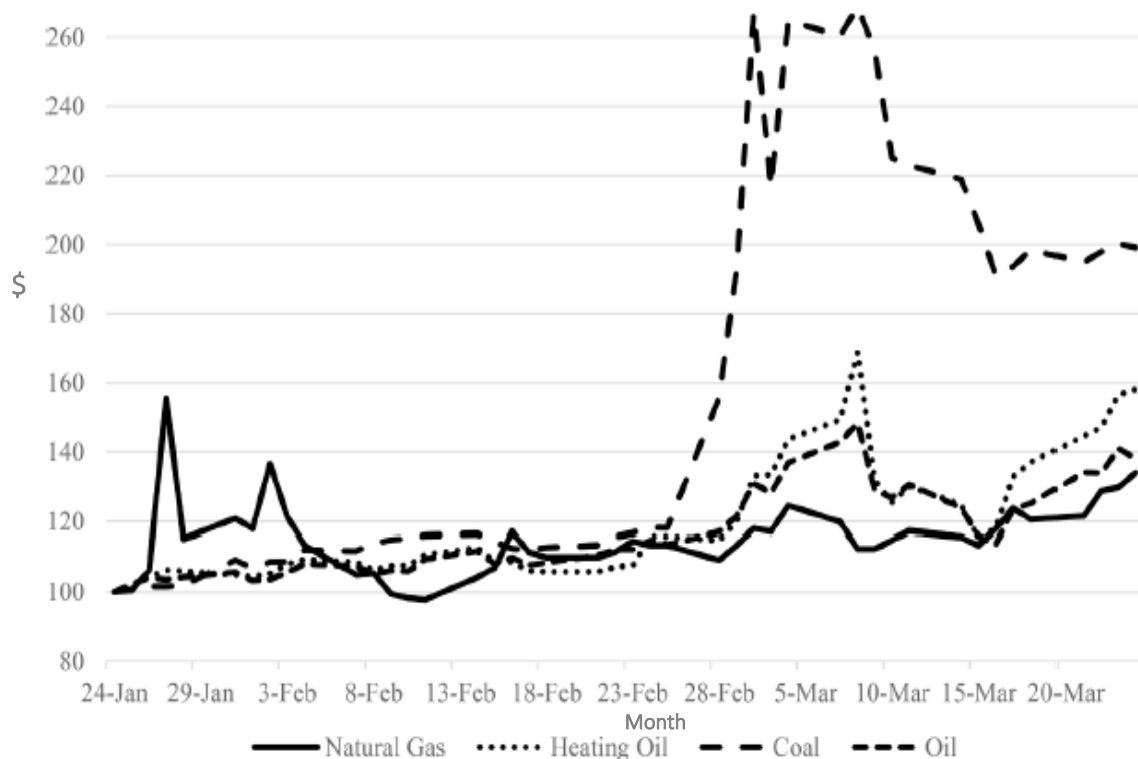


Figure 1. 1 Russian-Ukrainian wartime commodity prices 2022

The scarcity of heavy equipment in Indonesia can be a complex issue due to the demand for increased coal production. PT. XYZ, which is a subsidiary of the biggest mining contractor engaged in the mining contractor business, is greatly affected by the scarcity of heavy equipment, especially from 2021 to 2023, where 95% of the heavy equipment uses Komatsu. The scarcity of heavy equipment is caused by the large increase in world and Indonesian coal production targets, especially at PT. XYZ, which urgently needs additional heavy equipment or optimizes existing heavy equipment even though it has expired. The scarcity of heavy equipment is found at the PT. XYZ South Kalimantan jobsite, especially on the Komatsu Excavator PC1250-8 loader unit.

From Figure 1. 2 Komatsu heavy equipment sales data trends in Indonesia 2000-2023 shows that there are still many gaps between the growth or demand for Komatsu heavy equipment and its sales



Figure 1. 2 Trends in Komatsu heavy equipment sales data in Indonesia 2000-2023

1.2 Research Problem

The shortage of PC1250-8 heavy equipment occurs at PT. XYZ, especially at the Kalsel jobsite as a mining contractor where the loader unit has 71% book value and has entered the scrap period. This resulted in PT. XYZ needing a solution to be able to solve the problem of lack of equipment, especially on the Komatsu PC1250-8 loader where PT United Tractors as a heavy equipment distributor is not ready to provide the heavy equipment.

1.3 Research Objectives

The purpose of this research is to analyze the life cycle of Komatsu PC1250-8 excavator using life cycle cost analysis through a general Overhaul program to optimize or increase the service life of equipment that has entered the scrap period with efficient costs and higher productivity.

1.4 Significant Study

This research can provide new insights regarding how to optimize the service life of heavy equipment through the General Overhaul program. So that it is not only an alternative solution to the scarcity of heavy equipment but also as an option to increase the company's profitability in increasing its service life..

1.5 Research Question

The questions in this research proposal elaborate on the following questions:

Question 1: Can life cycle cost analysis through the implementation of a general overhaul program at the end of the life of the Komatsu PC1250-8 excavator increase cost efficiency and high productivity?

Question 2: How can life cycle cost analysis through the implementation of the general overhaul program at the end of the life of the Komatsu PC1250-8 excavator, increase cost efficiency and high productivity?

Question 3: Why should a general overhaul be carried out to optimize the service life and also increase the cost efficiency of the Komatsu PC1250-8 excavator using life cycle cost analysis?

1.6 Hypothesis

The hypothesis in this research is as follows:

Hypothesis 1: Conducting life cycle cost analysis through the implementation of a general overhaul program at the end of the life of the Komatsu PC1250-8 excavator can increase cost efficiency and high productivity.

Hypothesis 2: Conducting life cycle cost analysis by identifying all cost parameters through the implementation of a general overhaul program at the end of the life of a Komatsu PC1250-8 excavator can increase cost efficiency and high productivity.

Hypothesis 3: Implementing a general overhaul program assisted by life cycle cost analysis of Komatsu PC1250-8 excavators can increase cost efficiency and high productivity.