

## ABSTRACT

In actual conditions, the coal target that was achieved in October 2020 was only 49%, this was due to several factors such as natural and other factors which had an impact on the total productivity of loader. The purpose of this study is to calculate the productivity of mechanical equipment in actual conditions and provide improvement scenarios for production optimization which is then designed to design an integrated supply chain system using a dynamic system, carry out simulations that produce production quantities, and propose adding the number of mechanical equipment. The data used are primary and secondary data. In actual conditions, the average productivity of loading equipment is 127.29 tons/hour with a total production of 262,746.61 tons. Improvements were made by reducing 35% of the avoidable delay time after considering the amount of lost time planned by the company and after conducting a sensitivity analysis, an increase of 67.3% was obtained from the actual production volume with an average loading equipment productivity of 167.37 tons/hour , and several scenarios were also carried out to determine the optimum amount of coal to be sent from temporary stocks so that the total stock of livestock corresponds to the minimum supply because under actual conditions the number of livestock is very high.

A dynamic system model was also developed for the coal mining supply chain, there were four sub-models namely Total Production, livestock, temporary stock, and Total demand. The dynamic system design uses historical data from the company, and an integrated supply chain system design is obtained as well as the amount of production based on rainy hours, the optimum amount of coal sent from temporary stock, and the amount of demand for each mode. The calculation is continued by calculating the Company's margin and obtaining a suggestion to add mechanical equipment, namely one fleet consisting of the addition of one excavator and five dump trucks and by calculating the match factor in the existing conditions, it is possible to add hauler to each fleet so that there is no waiting time for excavators. There are several suggestions in this research for companies such as

adding mechanical devices and for future researchers it is hoped that they will be able to develop this model to calculate other mining locations.

*Keyword: Mechanical Equipment productivity, total production, livestock, system dynamic, amount of mechanical equipment*