

## **ABSTRACT**

The growth of infrastructure development in 2004-2009 period increased by 9.44% including residential construction market (International Agency for Research WMI, 2010) that will cause cement demand will be high. This is an opportunity and a challenge for cement producers. PT. Holcim Indonesia Tbk is one of the cement producer in Indonesia. Cement production process requires machines that are always prosecuted in good condition, one kind of that machine is cement packing machine. If the packing machine failed, it will disrupt the distribution of cement to customer because cement stuck in silo. Likewise, aging machinery and the increased hazard rate of packing machines will happen, it is necessary to count the number of maintenance crew optimization and optimal age of machine. In addition, there should be also calculated the optimal number of machines that must be used then getting the smallest total LCC. Methods which will be used for optimization is the life cycle cost method and Monte Carlo simulations. Life cycle cost method will combine the three variables: the number of machines, machine age and the number of maintenance crew set for a decision.

Plotting the distribution and determination of the distribution representing will be done based on the data TTF, TTR, DT in 2010. Then, processing data of Acquisition Cost and Sustaining Life Cycle Cost to obtain the smallest cost. Sustaining annual cost consists of operating costs, maintenance costs, and Shortage cost. Acquisition costs consist of purchasing costs and population cost.

Based on life cycle cost calculations, the smallest total LCC is Rp40,901,318,527.28. On the smallest total LCC, optimization produces maintenance number which consists of 1 team, 5-year life of the engine and the engine number is 8 units. If the engine life will be extended to 8 years, total LCC will increase as much as 17.52%. Based on Monte Carlo simulation, total LCC is Rp40,900,879,882.89 with the optimal combination of 8 units on the number of machines, maintenance crew sets 1, 5-year life of the engine. Based on a Monte Carlo simulation with the addition of a new machine then the smallest total LCC is Rp46,578,805,727.63 and the optimal combination of 9 units on the number of machines, maintenance crew sets 1, and 5-year life of the engine.

Keywords: Maintenance Management, Optimization, LCC, Monte Carlo Simulation.