

## ***ABSTRACT***

Cipularang Toll Way (Cikampek - Purwakarta - Padalarang) is one of segment tollways connecting Jakarta and Bandung. Tollway that stretches along 59 KM was developed and is managed by PT Jasa Marga as its implementation of toll roads in Indonesia. In conducting its operations, PT Jasa Marga has that quality objectives, smooth, secure, safe, and comfortable. Therefore, PT Jasa Marga should give more attention to the quality of the highway infrastructure by optimizing existing resources so that quality objectives are being achieved. To maintain the quality of the highway infrastructure, good maintenance is needed in many aspects. Cipularang have seven variable toll roads at a total cost of maintenance for 3 years amounting to Rp 90,204,475,708. Infrastructure highway agencies have huge maintenance costs about 98.69% of the total cost. So that the road should be in good condition in order to achieve quality objectives.

Currently Branch Toll Cipularang using Performance-Based Maintenance Contract (PBMC) for maintenance of the road toll. 3-year maintenance contract duration, consisting of repairs and maintenance during the warranty period of 1 year and 2 years job performance. PBMC contracts should have a long period of time, 5 years or more. However, the contractor has not believed capable of calculating the cost of the initial contract requirements to ensure the performance of the highway, especially the need performance warranty costs at the time of employment, where the condition of the road is not yet known. Therefore, the Markov Process and Monte Carlo Simulation are used to determine the condition of the road in the coming year

Based on the results of data processing using a Markov Process, obtained estimates of maintenance costs over 5 years, Rp 5,061,332,300. Sensitivity analysis is performed using annual average daily traffic (AADT) as a distress factor affecting the rate of destruction of the road. From the calculation, obtained AADT growth rate of 5%. Based on AADT growth, estimated maintenance costs over 5 years of Rp 5,721,281,900.

Keywords : maintenance cost, Markov Process, Monte Carlo Simulation, AADT