

***Application of Business Process Model Notation in Ticketing and
Vehicle Management for Maritime Transportation
(Case Study: Roll on-Roll off in Bengkalis Regency)***

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ABSTRACT

This study is motivated by the problem of vehicle congestion and long waiting times in the Ro-Ro sea transportation service in Bengkalis Regency due to manual ticket purchasing processes and the lack of digital integration, indicating a gap in systematically documented business process management. This research proposes a solution by designing a business process model using Business Process Model and Notation (BPMN) and conducting simulations to evaluate the effectiveness of the proposed system. The objective of this study is to design a more efficient ticketing and vehicle management process and analyze its impact on vehicle waiting time. The methodology includes BPMN modeling up to Level 2, development of a digital ticketing prototype, and simulation using Bizagi Modeler with 100 vehicle entities and variations of 1 to 4 vessels. The analyzed parameters include average waiting time and queue duration. The results show that the proposed system significantly reduces waiting time, where in the three-vessel scenario the average waiting time decreased from 3 hours and 34 minutes to 8 minutes and 33 seconds, while in the four-vessel scenario it was reduced to 42 seconds. These findings indicate that the implementation of BPMN effectively improves operational efficiency and supports the digitalization of sea transportation services.

Keywords: BPMN, Information System, Online Ticketing, Sea Transportation, Queue Simulation.