Probabilistic risk assessment of the shipyard industry using the bayesian method

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Abstrak

The shipbuilding industry is characterized by high-risk business activities; therefore, caution should be taken in its operational processes. From upstream to downstream, the shipbuilding industry depends on other industries. In this study, a risk assessment was conducted on the construction of new vessels using the Bayesian network approach; accordingly, the risk assessment was carried out using a probabilistic value at risk (VaR). The study was carried out by PT PAL Indonesia in association with the construction of a new tanker ship (building production codes M271 and M272). An analysis was conducted on three main components of new vessel construction—design components, material and production components, and subcomponents of the previous two components. From the study, we could conclude that the probability of delay for new vessel construction caused by design delay is 0.05; the probability of delay caused by material delay is 0.65; and the probability of delay caused by production delay is 0.3. For delays caused by design factors, a yard plan is the sub-component that contributes predominantly to delays (i.e., probability of 0.3). For delays caused by material factors, the sub-component with the greatest impact is hull and machinery outfitting, with a probability of 0.3. For delays caused by production factors, the sub-component with the biggest impact is hull construction, with a probability of 0.39. Thus, we could conclude that a project delay would occur if the material component and the hull construction sub-components were not handled properly.