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Setting Interval Time for Changing Critical Components of JRC JMA 5310 Radar using FMECA Method: A Case Study in KOARMATIM Patrol Ship Unit Marsetio1 , Amarulla Octavian1 , Ahmadi2 , Siswo Hadi Sumantri2 , Rajab Ritonga3 and Yusnaldi1 1 Indonesia Defense University, Bogor, West Java, Indonesia 2 Sekolah Tinggi Angkatan Laut, Surabaya, East Java, Indonesia 3Universitas Prof Dr Moestopo (Beragama), Jakarta, Indonesia *Corresponding author: rajab.ritonga@dsn.moestopo.ac.id Abstract The application of navigation radar onboard a battleship, in particular in KOARMATIM Patrol Ship Unit, as a long range detecting device is notably vital.

It is an absolute necessity for a battleship executing operation, so that the readiness of navigation radar will highly affect the execution of operational duties of those elements. Therefore, it will take a well planned maintenance management in repairing or eliminating failure to keep the system performance from falling. Failure Mode Effect and Criticality Analysis (FMECA) is the method used in identifying and analyzing all potential failure modes of various parts of the system, the effect of failure to the system, and how to avoid failure or reduce the impact of the failure to the system.

This paper presents an application of FMECA model in defining critical component of JRC JMA 5310 Navigation Radar. This FMECA model generates Risk Priority Number (RPN) that will be used in defining critical components. The RPN value of each component is analyzed using Risk Matrix, which produces seven components regarded as critical out of twenty seven identified components, namely Modulator, Power Supply Scanner, Diode Limiter, Magnetron, Receiver, Motor, and Circulator.

Modulator component has the highest RPN value of 24180 while Plotter Control Circuit component has the lowest RPN value of 3289. In setting the interval time for changing

critical components, Reliability and Cost Benefit Ratio (CBR) approach is employed. The results show that Diode Limiter achieved the fastest changing time, namely 152 days, while the components with the longest changing time are Motor and Circulator with 458 days. The CBR value of all critical components are less than 1 (CBR<1) which shows that the recommended changing cost is efficient.

Diode Limiter component has the most efficient CBR value, namely 0.57572. The sensitivity analysis found that Reliability R(t) variable has a big impact in alteration of defining critical component changing interval time, which supports ß (slope), ? (location), and ? (scale) parameter. The ß parameter has more effect to alteration of Reliability R(t) value.

Keywords: FMECA; Risk priority number; Reliability; Changing time interval; Cost benefit ratio

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