

ANALISIS PENYEBAB KEGAGALAN PADA FLIGHT CONTROL SYSTEM HELIKOPTER SIKORSKY S76 C++ MENGGUNAKAN METODE FAULT TREE ANALYSIS DI PT. PELITA AIR SERVICE

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ABSTRAK

Flight control pada helikopter Sikorsky S76 C++ mengendalikan main rotor blade dan tail rotor blade diudara secara horizontal, vertical, dan directional serta mengendalikan taxing pada operasi didarat. Gerakan flight control berasal dari cockpit melalui pergerakan cyclic control stick, collective control stick, dan control pedals. Kelancaran proses transportasi helikopter dipengaruhi oleh sistem perawatan yang diterapkan. Setiap komponen yang terlibat dalam aktivitas helikopter akan mengalami penurunan kemampuan sehingga pada akhirnya akan mengalami kerusakan seiring frekuensi pengoperasian helikopter dan keandalan dari komponen tersebut.

Fault Tree Analysis merupakan sebuah analytical tool yang menerjemahkan secara grafik kombinasi-kombinasi dari kesalahan yang menyebabkan kegagalan dari sistem. Fault Tree Analysis mengidentifikasi hubungan antara faktor penyebab kegagalan dan ditampilkan dalam bentuk pohon kesalahan yang melibatkan gerbang logika sederhana. Tujuan dilakukannya analisis menggunakan metode Fault Tree Analysis pada Flight Control System tersebut adalah mencari apa saja jenis-jenis kegagalan yang terjadi pada Flight Control System Helikopter Sikorsky S76 C++, kemudian mencari solusi dari penyebab kegagalan tersebut.

Berdasarkan hasil analisis mengenai kegagalan yang terjadi pada Flight Control System Helikopter Sikorsky S76 C++ di PT. Pelita Air Service dalam kurun waktu Januari 2015 hingga Mei 2018 dengan rata-rata penggunaan jam terbang helikopter 2092.05 hours terjadi 108 kali kegagalan yang menyebabkan unschedule maintenance. Berdasarkan penentuan minimum cut set diperoleh 29 basic event yang menyebabkan dilakukannya unschedule maintenance pada Flight Control System Helikopter Sikorsky S76 C++, sehingga diperlukan adanya penggantian ataupun perbaikan pada komponen yang mempengaruhi kegagalan sistem tersebut.

Kata kunci : Flight Control System, Fault Tree Analysis, Minimum Cut Set.

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ABSTRACT

Flight Control is a system that functions as a helicopter control center. Failure that occurs in flight control would certainly result inconvenience of the pilot in operating the helicopter, even the movement of the helicopter can out of control causing incident or accident. The continuity of the helicopter transportation process is affected by the maintenance system that is applied. Each component involved in the helicopter's activity would decrease in capability so that it would eventually damage along with the frequency of the helicopter's operation and the reliability of the component.

Flight controls provide a means of controlling main rotor blades for horizontal, vertical, and directional flight, and for taxiing during ground operations. The flight controls consist of two systems the main rotor flight controls and the tail rotor (directional) flight controls. Flight control movements originate in the cockpit by movement of the cyclic control stick, collective control stick, and directional pedals. All movement of the controls is transmitted mechanically through control rods and bellcranks to the mixer (upper deck controls). Fault Tree Analysis can be simply described as an analytical technique, whereby an undesired state of the system is specified (usually a state that is critical from a safety or reliability standpoint), and the system is then analyzed in the context of its environment and operation to find all realistic ways in which the undesired event (top event) can occur. The fault tree itself is a graphic model of the various parallel and sequential combinations of faults that will result in the occurrence of the predefined undesired event.

Based on the analysis results of failures that occurred in the Sikorsky S76 C ++ helicopter flight control system at Pelita Air Service Company in the period of January 2015 to May 2018 with an average use of helicopter's 2092.05 flight hours, there were 108 failures which caused unschedule maintenance. Based on the minimum cut set determination, there were 29 basic events which caused unschedule maintenance on Sikorsky S76 C ++ helicopter flight control system, so that a replacement or repair was needed for the components that affected to the system failure.

Keywords : Flight Control System, Fault Tree Analysis, Minimum Cut Set.