

Reliabilitas sistem perpipaan gas bumi transmisi Sumatera - Jawa fase I berdasarkan metode fault tree analysis = Reliability of phase I gas transmission Sumatera - Jawa pipeline system of PGN based on fault tree analysis

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Abstrak

Tesis ini dilatarbelakangi oleh tiadanya prediksi tingkat reliabilitas sistem perpipaan transmisi gas bumi Sumatera ? Jawa Phase 1. Prediksi tingkat reliabilitas perlu untuk diketahui sebagai dasar manajemen operasi dan pemeliharaan dalam mengembangkan sistemnya agar dapat mengantisipasi kegagalan dan menjaga reliabilitas di masa depan. Untuk menghitung tingkat reliabilitas tersebut menggunakan metode Fault Tree Analysis yang mendasarkan perhitungannya pada laju kegagalan komponen penyusun sistem perpipaan. Laju kegagalan komponen mengacu pada data operasi dan pemeliharaan yang tersedia dan OREDA (Offshore Reliability Data Handbook). Kualitas hasil perhitungan reliabilitas dengan metode FTA ditentukan oleh seberapa baik pemodelan sistem, keakuratan pohon kegagalan (fault tree) berikut rangkaian gerbang logikanya (logic gate) serta ketepatan penerapan modus kegagalan komponen berikut laju keagalannya. Dengan metode FTA ini diperoleh besaran reliabilitas total sistem perpipaan sekaligus sub-sistemnya sehingga dapat digunakan untuk melihat subsistem mana yang paling besar pengaruhnya terhadap reliabilitas total sistem. Dari perhitungan reliabilitas didapatkan hasil tingkat reliabilitas total sistem sebesar 99,5%. Data reliabilitas dan analisisnya digunakan untuk mengevaluasi program operasi dan pemeliharaan saat ini dan melihat efektifitasnya untuk menjaga reliabilitas sistem yang tinggi. Rekomendasi diberikan untuk mengembangkan program operasi dan pemeliharaan untuk fokus pada reliabilitas.

<hr><i>The background of this thesis is the absence of prediction on reliability of Phase 1 Gas Transmission Sumatera ? Jawa pipeline system. The predictive reliability is needed by operation and maintenance management to develop their system in order to anticipate potential failure in future and to maintain required level of reliability of their system. Reliability is calculated by using Fault Tree Analysis based on the failure of components in the system. Failure rate of components are determined from historical operation & maintenance data and OREDA (Offshore Reliability Data Handbook). The quality of reliability calculation by using FTA are depending on the validity of system modeling, the accuracy of fault-tree developed with proper logic-gate and the choice of relevant component-failure mode and its failure rate. Reliability calculation using FTA gives the total reliability of system and sub-system, therefore it is able to see the sub-system which has big contribution to the total reliability of system. The calculation gives the total reliability of system of 99,5%. The reliability data and the analysis is used to evaluate the effectiveness of the existing operation & maintenance program in maintaining the reliability. Recommendation is given to improve the operation & maintenance program in order to focus on reliability.;The background of this thesis is the absence of prediction on reliability of Phase 1 Gas Transmission Sumatera ? Jawa pipeline system. The predictive reliability is needed by operation and maintenance management to develop their system in order to anticipate potential failure in future and to maintain required level of reliability of their system. Reliability is calculated by using Fault Tree Analysis based on the failure of components in the system. Failure rate of components are determined from historical operation & maintenance data and OREDA

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