Penilaian Risiko Kuantitatif Kebakaran Pipa Penyalur Minyak Darat di Area Pemukiman Warga Daerah Talang Ubi, Sumatera Selatan Berdasarkan Metode BS PD 8010-3:2009+A1:2013 = Fire Quantitative Risk Assessment of Onshore Pipeline in Residential Area, Talang Ubi Region, South Sumatera, Based on BS PD 8010-3:2009+A1:2013

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Abstrak

Pipa penyalur merupakan sarana transportasi hidrokarbon yang umum digunakan sebagai media transportasi hidrokarbon. Namun apabila terjadi kegagalan akan berdampak besar terhadap jalur yang dilalui terutama di daerah padat penduduk. Pipa penyalur yang digelar harus mempunyai hak guna jalan (right of way) untuk keperluan pengoperasian, perawatan, dan kondisi tanggap darurat. Di Indonesia, pipa penyalur harus mempunyai jarak dari bangunan tetap minimal adalah 9 meter. Namun, karena faktor sosial, ekonomi, dan petumbuhan penduduk serta tingkat urbanisasi kondisi tersebut sering tidak tercapai. Oleh karena itu tingkat risiko penduduk di sekitar pipa penyalur harus diketahui. Di beberapa negara penilaian risiko kuantitatif diwajibkan sebagai dasar pertimbangan pengambilan keputusan dan sebagai sistem kontrol bahaya yang terjadi. Penilaian risiko kuantitatif terdiri dari penilaian frekuensi dan konsekuensi. Penilaian frekuensi diperoleh dari nilai laju kegagalan pipa penyalur akibat cacat material dan cacat konstruksi, korosi internal, korosi eksternal, gangguan pihak ketiga, pergerakan tanah. Penilaian konsekuensi memperhitungkan tingkat keparahan apabila kebakaran crater fire, jet fire, dan flash fire berdasarkan pohon kejadian (event tree). Pemodelan konsekuensi berdasarkan data meteorologi, data populasi, data teknis pipa penyalur, data komposisi fluidan, data perawatan dan rekam jejak kegagalan. Berdasarkan hasil perhitungan dan pemodelan nilai risiko dalam bentuk kontur pada setiap skenario (crater fire, jet fire, dan flash fire) diperoleh nilai risiko paling besar adalah 1x10-5 terjadi pada skenario crater fire dan jet fire. Luas wilayah yang mempunyai nilai risiko 1x10-5 pada skenario crater fire lebih besar dibandingkan skenario jet fire. Berdasarkan klasifikasi ALARP (As Low As Reasonably Practicable) nilai tersebut masih dapat diterima apabila diberikan alat pengaman tambahan.

......Pipeline is commonly used for hydrocarbon transportation. However, if a failure occurs, it will have a major impact on the route traveled, especially in densely populated areas. The pipeline must have a right of way for operation, maintenance, and emergency response. In Indonesia, pipelines must have a minimum distance from fixed buildings of 9 meters. However, due to social, economic and population growth factors as well as the level of urbanization this condition is often not achieved. Therefore, the risk level of the population around the pipeline must be known. In some countries, quantitative risk analysis is required as a basis for decision-making and as a control system for hazards. Quantitative risk analysis consists of frequency and consequence analysis. The frequency analysis is obtained from the failure rate of the pipeline due to material and construction defects, internal corrosion, external corrosion, third party interference, and ground movement. The consequence analysis takes into account the severity of crater fire, jet fire and flash fire based on the event tree. Consequence modeling is based on meteorological data, population data, pipeline technical data, fluid composition data, maintenance data and failure track record. Based on the results of the calculation and modeling of risk values in the form of contours in each scenario (crater fire, jet fire, and flash fire), the greatest risk value is 1x10-5 occurring in the crater fire and jet fire scenarios. The area that has a risk value of 1x10-5 in the crater fire scenario is greater than the jet fire scenario. Based on the ALARP (As Low As Reasonably Practicable) classification, this value is still acceptable if additional safety equipment is provided.Keywords: Workover Rig, Oil and Gas Accident, Systematic Cause Analysis Technique, Technical Guidelines.