

ANALISIS RISIKO DAN PENENTUAN TEKNIK MITIGASI PERISTIWA PELOLOSAN AMONIA (NH₃) DENGAN MENGGUNAKAN *FAULT TREE ANALYSIS* DAN PEMODELAN DISPERSI GAUSS PADA PERANGKAT LUNAK ALOHA DI PT. SARIHUSADA GENERASI MAHARDHIKA 2 KLATEN, JAWA TENGAH

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INTISARI

PT. Sarihusada Generasi Mahardhika 2 memiliki 1 unit penyimpanan NH₃ cair yang digunakan sebagai bahan pendingin dalam proses pembuatan susu. Penyimpanan NH₃ memiliki potensi pelolosan material NH₃ ke atmosfer dan paparannya terhadap pekerja di sekitar pabrik dapat menyebabkan kecelakaan hingga kematian. Adanya potensi dari penyimpanan NH₃ menunjukkan perlunya mitigasi terhadap bahayanya.

Penentuan teknik mitigasi berbasis risiko dilakukan dengan memperoleh distribusi risiko dengan pemodelan di ALOHA, mendapatkan nilai risiko dengan menggunakan *fault tree analysis* di setiap distribusi risiko, dilanjutkan dengan menetapkan teknik-teknik mitigasi pada distribusi risiko sehingga didapatkan nilai penurunan risiko.

Hasil dari penelitian ini adalah distribusi risiko pelolosan NH₃ di Sarihusada, yaitu zona merah sejauh 18 meter, zona oranye sejauh 55 meter dan zona kuning sejauh 129 meter. Hasil analisis probit menunjukkan risiko kematian hanya terdapat di zona merah dengan nilai risiko sebanyak kematian 2 orang, sehingga teknik mitigasi dipilih untuk zona merah. Standar keselamatan perusahaan mengharuskan risiko kematian sebesar nol sehingga risiko kematian direduksi sampai nol dengan tindakan rekayasa keteknikian dan regulasi peraturan terkait keselamatan yang berlaku di perusahaan. Teknik mitigasi berupa rekayasa keteknikian berdasarkan karakteristik respon dosis NH₃ di zona merah berupa *chemical barrier* dan prosedur kerja.

Kata kunci : amonia, analisis risiko, teknik mitigasi, ALOHA, fault tree analysis, reduksi risiko

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RISK ANALYSIS AND MITIGATION OF AMMONIA (NH₃) STORAGE TANK WITH FAULT TREE ANALYSIS AND GAUSSIAN DISPERSION MODEL USING ALOHA IN PT. SARIHUSADA GENERASI MAHARDHIKA 2, KLATEN, CENTRAL JAVA

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ABSTRACT

PT. Sarihusada Generasi Mahardhika 2 is a milk-producing company that has 1 storage unit of liquid NH₃ which is used as the refrigerant in the milk production. Storage of NH₃ has the potential to release NH₃ material into the atmosphere and its exposure to workers around the plant can cause injury and even death. The hazard potential of NH₃ storage indicates the need for mitigation plans.

Determination of risk-based mitigation techniques is done by obtaining risk distribution by modeling in ALOHA, obtaining risk values using a fault tree analysis at each risk distribution, followed by establishing mitigation techniques on risk distribution so that the risk reduction value is obtained.

The results of this study are the risk distribution of NH₃ potential release in Sarihusada defined as threat zones. The red zone is as far as 18 meters, the orange zone is as far as 55 meters and the yellow zone is as far as 129 meters. The red zone has the potential of death for 2 workers, the orange zone has the potential of disabling injury for 2 workers in the CNG station, and the yellow zone has the potential of odor and minor injury for 0 workers. The result of the probit analysis shows that the risk of death is only found in the red zone with the risk value of 2 deaths so that mitigation techniques are chosen for the red zone. Company safety standards require a zero risk of death so that the risk of death is reduced to zero with engineering actions and regulations related to safety applicable in the company. The mitigation technique is engineering design based on the response characteristics of NH₃ doses in the red zone in the form of water spray and working procedures.

Keywords: ammonia, risk analysis, mitigation techniques, ALOHA, fault tree analysis, risk reduction

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