

ABSTRAK

ANALISIS RISIKO KEBOCORAN PADA *CRUDE OIL STORAGE TANK* MENGGUNAKAN METODE *RISK BASED INSPECTION (RBI)* SEMI-KUANTITATIF

Oleh
Dewa Gde Yoga Setiadhi
NIM: 116210046
(Program Studi Sarjana Teknik Metalurgi)

Kebocoran pada *crude oil storage tank* dapat menimbulkan dampak serius terhadap keselamatan operasional, lingkungan, serta kerugian ekonomi. Oleh karena itu, diperlukan suatu metode penilaian risiko yang sistematis untuk menentukan prioritas inspeksi dan tindakan mitigasi. Penelitian ini bertujuan untuk menganalisis tingkat risiko kebocoran pada tangki penyimpanan minyak mentah dengan menggunakan pendekatan *Risk Based Inspection (RBI)* semi-kuantitatif berdasarkan standar API 581. Metode ini mengintegrasikan nilai *Probability of Failure (PoF)* dan *Consequence of Failure (CoF)* untuk menghasilkan *risk matrix* yang dapat digunakan sebagai dasar pengambilan keputusan inspeksi. Data yang digunakan meliputi spesifikasi teknis tangki, riwayat inspeksi, kondisi korosi, serta parameter operasional lainnya. Perhitungan dilakukan dengan mengidentifikasi mekanisme degradasi utama berupa *thinning*. Berdasarkan hasil penelitian ke-8 *shell course* yang diukur pada tangki 38T-104, maka nilai *Probability of Failure (PoF)* diperoleh kategori 2 sedangkan nilai *Consequence of Failure (CoF)* kategori C yang menempatkan risiko keseluruhan pada kategori *medium risk* dalam *risk matrix*. Rekomendasi inspeksi lanjutan meliputi pemeriksaan *visual examination* dan *ultrasonic thickness measurement* yang dijadwalkan ulang pada 3 tahun berikutnya. Hasil penelitian ini diharapkan menjadi dasar prioritas inspeksi yang lebih tepat dan efisien berbasis risiko aktual.

Kata kunci: *storage tank*, *crude oil*, *risk based inspection*, dan semi-kuantitatif

ABSTRACT

LEAKAGE RISK ANALYSIS IN CRUDE OIL STORAGE TANKS USING SEMI-QUANTITATIVE RISK BASED INSPECTION (RBI) METHODS

By
Dewa Gde Yoga Setiadhi
NIM: 116210046
(Metallurgical Engineering Undergraduated Program)

Leakage in crude oil storage tanks can pose serious impacts on operational safety, the environment, and economic losses. Therefore, a systematic risk assessment method is required to determine inspection priorities and mitigation measures. This study aims to analyze the risk level of leakage in crude oil storage tanks using a semi-quantitative Risk-Based Inspection (RBI) approach based on API 581 standards. The method integrates the Probability of Failure (PoF) and Consequence of Failure (CoF) values to generate a risk matrix that serves as a basis for inspection decision-making. The data used include tank technical specifications, inspection history, corrosion conditions, and other operational parameters. The calculation is carried out by identifying the main degradation mechanism in the form of thinning. Based on the measurement results of the 8th shell course on tank 38T-104, the Probability of Failure (PoF) is categorized as level 2, while the Consequence of Failure (CoF) is categorized as level C, placing the overall risk in the medium-risk category of the risk matrix. Recommended follow-up inspections include visual examination and ultrasonic thickness measurement, rescheduled for the next three years. The findings of this study are expected to serve as a basis for more accurate and efficient risk-based inspection prioritization.

Keywords: storage tank, crude oil, risk based inspection, and semi-quantitative