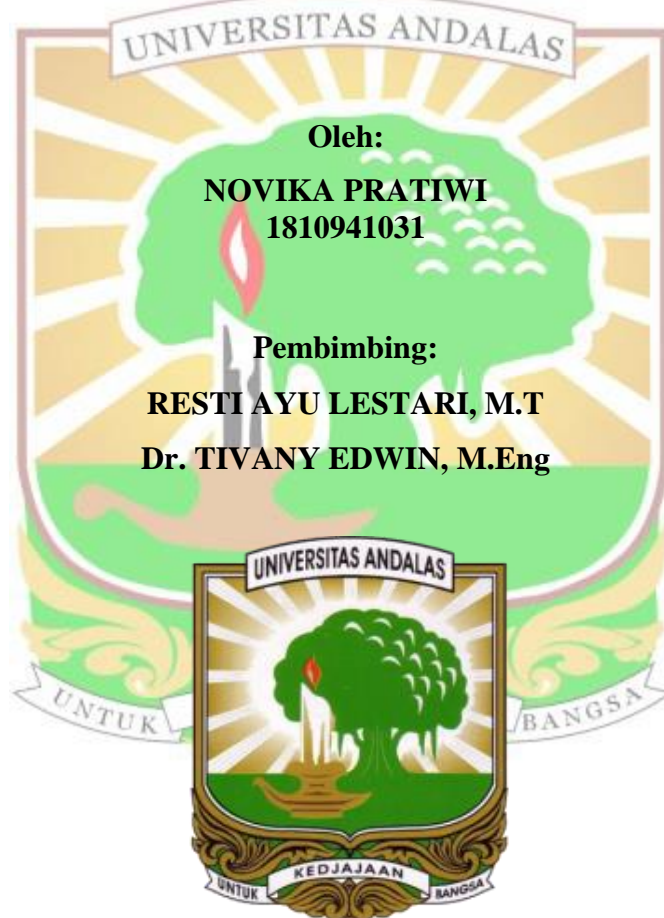


**ANALISIS RISIKO KEBAKARAN DAN LEDAKAN PADA
UNIT BOILER DENGAN METODE *DOW'S FIRE AND
EXPLOSION INDEX* DI PABRIK KELAPA SAWIT PT. X
SUMATRA UTARA**

TUGAS AKHIR

Sebagai salah satu syarat untuk menyelesaikan
Program Strata – 1 pada
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ABSTRAK

Penelitian ini bertujuan untuk mengidentifikasi faktor penyebab bahaya dan menganalisis risiko kebakaran/ledakan pada unit boiler di pabrik kelapa sawit PT.X Sumatra Utara. Metode yang digunakan meliputi observasi dan wawancara, dengan analisis data menggunakan Dow's Fire and Explosion Index (DFEI). Faktor penyebab bahaya meliputi kegagalan sistem, prosedur dan kesalahan manusia. Penelitian ini mengembangkan empat skenario kebakaran/ledakan. Skenario 1 menunjukkan kebakaran/ledakan pada satu boiler dengan nilai DFEI 168, radius dampak 43,01 m, dan kerugian Rp 1.502.677.511. Skenario 2 menunjukkan kebakaran/ledakan pada boiler 2 dengan nilai DFEI 168, radius 43,01 m, dan kerugian Rp 1.502.677.511, serta pada boiler 1 dan 3 dengan nilai DFEI 331,49, radius 84,87 m, dan kerugian Rp 3.005.355.025. Skenario 3 menunjukkan kebakaran/ledakan pada boiler 1 dan 2 dengan nilai DFEI 331,49, radius 84,87 m, dan kerugian Rp 3.005.355.025, serta pada boiler 3 dengan nilai DFEI 168, radius 43,01 m, dan kerugian Rp 1.502.677.511. Skenario 4 menunjukkan kebakaran/ledakan pada ketiga boiler dengan nilai DFEI 333,22, radius 85,31 m, dan kerugian Rp 4.508.032.535. Hasil dari penelitian ini diharapkan akan memberikan kontribusi bagi perusahaan untuk mendapatkan gambaran skenario dan estimasi dampak kebakaran/ledakan yang ditimbulkan dari kegagalan pengoperasian unit boiler serta dalam peningkatan keselamatan dan kesehatan kerja pada perusahaan. Rekomendasi pengendalian yang dapat dilakukan yaitu penyediaan sarana proteksi kebakaran baik aktif maupun pasif yang memadai, memperbarui prosedur tanggap darurat, simulasi dan pelatihan personil.

Kata Kunci: *Dow's Fire and Explosion Index, kebakaran, ledakan, pabrik kelapa sawit*



ABSTRACT

This study aims to identify the factors caused hazards and analyze the risk of fire/explosion in the boiler unit at the X company palm oil mill in North Sumatra. The methods used included observation and interviews, with data analysis based on the Dow's Fire and Explosion Index (DFEI). The identified hazard factors included system failure, procedural issues, and human error. This study developed four fire/explosion scenarios. Scenario 1 showed a fire/explosion in single boiler, with a DFEI value of 168, an impact radius of 43.01 m, and a loss of IDR 1,502,677,511. Scenario 2 showed a fire/explosion in boiler 2, with a DFEI value of 168, an impact radius of 43.01 m, and a loss of IDR 1,502,677,511, as well as in boilers 1 and 3, with a DFEI value of 331.49, an impact radius of 84.87 m, and a loss of IDR 3,005,355,025. Scenario 3 showed a fire/explosion in boilers 1 and 2, with a DFEI value of 331.49, an impact radius of 84.87 m, and a loss of IDR 3,005,355,025, along with a fire/explosion in Boiler 3, with a DFEI value of 168, an impact radius of 43.01 m, and a loss of IDR 1,502,677,511. Scenario 4 showed a fire/explosion in all three boilers, with a DFEI value of 333.22, an impact radius of 85.31 m, and a loss of IDR 4,508,032,535. The results of this study were expected to contribute for the company to get an overview of the scenario and the estimated impact of fire/explosion caused by the failure of the boiler unit operation as well as in improving the work safety and health at the company. The recommended controls include the provision of both active and passive fire protection facilities that are adequate, updating emergency response procedures, simulation and personnel training.

Keywords: *Dow's Fire and Explosion Index, explosion, fire, palm oil mill.*

