

ABSTRAK

PERANCANGAN ALAT MONITORING KADAR LIMBAH GAS PADA BENGKEL CAT MEBEL

Baginda Muda Abbas Siregar: 47 Halaman

Penelitian ini menguji akurasi sensor MEMS ekonomis dalam memantau gas *Formaldehida* (HCHO) dan *Total Volatile Organic Compounds* (TVOC) di bengkel cat mebel. Alat dirancang menggunakan sensor SEN0563 dan SEN0566 yang terhubung ke Arduino Uno, dengan tampilan LCD. Pengujian dilakukan dengan membandingkan pembacaan alat terhadap monitor udara komersial selama aktivitas pengecatan. Hasil menunjukkan sensor merespons perubahan konsentrasi, namun memiliki error tinggi: rata-rata 64,02% untuk HCHO dan 73,12% untuk TVOC. Uji statistik ($p < 0,05$) mengkonfirmasi perbedaan signifikan dengan alat referensi. Disimpulkan bahwa sensor ini cocok untuk deteksi kualitatif dan peringatan dini, tetapi tidak akurat untuk pengukuran kuantitatif tanpa kalibrasi mendalam. Penelitian menyoroti keterbatasan sensor murah dalam aplikasi industri sekaligus potensinya sebagai sistem pemantau awal yang terjangkau.

Kata Kunci: Monitoring Gas, Formalin, TVOC, Arduino, Sensor MEMS.

ABSTRACT
DESIGN OF A GAS WASTE LEVEL MONITORING TOOL FOR
FURNITURE PAINTING WORKSHOPS

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This research examines the accuracy of low-cost MEMS sensors in monitoring *Formaldehyde* (HCHO) and *Total Volatile Organic Compounds* (TVOC) in furniture painting workshops. The device was designed using SEN0563 and SEN0566 sensors connected to an Arduino Uno, with an LCD display. Testing was conducted by comparing the device's readings against a commercial air monitor during painting activities. Results showed that the sensors responded to changes in concentration but exhibited high error: an average of 64.02% for HCHO and 73.12% for TVOC. Statistical testing ($p < 0.05$) confirmed a significant difference compared to the reference device. It is concluded that these sensors are suitable for qualitative detection and early warning purposes, but are not accurate for quantitative measurement without thorough calibration. The research highlights the limitations of low-cost sensors in industrial applications while emphasizing their potential as an affordable initial monitoring system.

Keywords: Gas Monitoring, Formaldehyde, TVOC, Arduino, MEMS Sensor.