INTISARI

PT *United Tractors* Semen Gresik (PT UTSG) merupakan perusahaan di bidang pertambangan yang menggunakan *dump truck* seri Scania P 360 dan Quesster CWE 370 sebagai alat pengangkut material. Pada unit tersebut masih terdapat kekurangan *safety device* pendukung proses *dumping*. Pada PT UTSG ada beberapa titik lokasi berisiko, seperti area depo tanah liat dan jalur menuju tambang yang dilintasi konveyor material, di mana *vessel* dapat tersangkut jika tidak segera diturunkan setelah *dumping*. Tercatat tiga kejadian *vessel* tersangkut akibat kelalaian tersebut. Kondisi ini mendorong penulis untuk merancang sistem *safety dump* sebagai alat peringatan bagi operator selama proses *dumping*. Metode penelitian meliputi observasi dan analisis permasalahan, studi literatur untuk pemilihan komponen, perancangan sistem dan pemrograman, pengujian fungsional sistem, serta penerapan langsung pada unit *dump truck*. Hasil pengujian menunjukkan bahwa sistem bekerja secara konsisten dan akurat, dengan tingkat keberhasilan 100% dalam perhitungan siklus *dumping* dan tampilan persentase kenaikan *vessel*, serta 88,33% untuk respon indikator LED dan *buzzer*. Penyimpangan deteksi sensor sebesar ±1 cm akibat getaran unit dan berhasil diatasi dengan penyesuaian toleransi 1 cm pada sistem. Dengan demikian, sistem *safety dump* ini dapat diandalkan sebagai perangkat keselamatan untuk mendukung operasional *dump truck* yang aman dan efisien.

Kata Kunci: *Dump Truck, Safety Device*, Arduino Uno, Sensor Ultrasonik, Sistem Peringatan, Proses *Dumping*, Keselamatan Kerja.

ABSTRACT

PT United Tractors Semen Gresik (PT UTSG) is a mining company that uses Scania P 360 and Quesster CWE 370 series dump trucks as material transport equipment. These units still lack supporting safety devices for the dumping process. At PT UTSG, there are several high-risk locations, such as the clay depot area and the route to the mine that passes under a material conveyor, where the vessel may get stuck if not lowered immediately after dumping. There have been three recorded incidents of vessels getting stuck due to such negligence. This condition prompted the author to design a safety dump system as a warning device for operators during the dumping process. The research methods include observation and problem analysis, literature study for component selection, system design and programming, functional system testing, and direct implementation on the dump truck unit. Testing results show that the system operates consistently and accurately, with a 100% success rate in calculating the dumping cycle and displaying the percentage of vessel elevation, as well as 88.33% response accuracy for the LED and buzzer indicators. Sensor detection deviation of ±1 cm due to unit vibrations was successfully addressed by applying a 1 cm tolerance adjustment in the system. Therefore, this safety dump system can be relied upon as a safety device to support safe and efficient dump truck operations.

Keywords: *Dump Truck, Safety Device, Arduino Uno, Ultrasonic Sensor, Warning System, Dumping Process, Work Safety.*