

ABSTRAK

Pelaporan aktivitas Keselamatan, Kesehatan Kerja, dan Lingkungan (K3L) di PT PLN Icon Plus SBU Sumbagsel saat ini masih menggunakan WhatsApp, sehingga rentan terhadap *human error*, manipulasi lokasi, dan keterlambatan informasi. Penelitian ini bertujuan merancang aplikasi web mobile bernama SiAP Icon (Sistem Absensi & Proteksi Icon) untuk mendigitalisasi proses tersebut. Sistem dikembangkan menggunakan metode Waterfall dan mengimplementasikan *geofencing* sebagai pengunci spasial (*spatial lock*) berbasis Algoritma Haversine guna memvalidasi koordinat GPS pegawai secara *real-time*. Uji coba sistem dibatasi pada parameter wilayah Kecamatan Ilir Barat I, Palembang. Aplikasi mewajibkan petugas mengisi *checklist* Alat Pelindung Diri (APD) dan mengunggah foto bukti sebelum formulir dapat dikirim. Hasil pengujian *Black Box* menunjukkan aplikasi berhasil beroperasi, sistem secara otomatis memblokir pelaporan di luar zona dan menyajikan rekapitulasi data akurat bagi supervisor.

Kata Kunci : Geofencing, K3L, Algoritma Haversine, Metode Waterfall, Presensi Digital.

ABSTRACT

Reporting on Occupational Health, Safety, and Environment (K3L) activities at PT PLN Icon Plus SBU Sumbagsel currently still utilizes WhatsApp, making it susceptible to human error, location manipulation, and information delays. This research aims to design a mobile web application named SiAP Icon (Sistem Absensi & Proteksi Icon) to digitalize the process. The system was developed using the Waterfall method and implements geofencing as a spatial lock based on the Haversine Algorithm to validate employees GPS coordinates in real-time. The system trial was limited to the regional parameters of Ilir Barat I District, Palembang. The application requires officers to complete a Personal Protective Equipment (PPE) checklist and upload photo proof before the form can be submitted. The Black Box testing results indicate that the application operates successfully, the system automatically blocks reporting outside the designated zone and provides accurate data recapitulation for supervisors.

Keywords : Geofencing, K3L, Haversine Algorithm, Waterfall Method, Digital Presence.