

A Web-based Consolidated Geotechnical Site Investigation (CoGSI) of Sarawak Soils

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Abstract

A web-based Consolidated Geotechnical Site Investigation (CoGSI) of the Sarawak Soils is aim to presents a well-organized, systematic and easy to access digital geotechnical database. This database system was developed to allow users to search, view, and digitally download boreholes of the available Sarawak subsurface information with data entry functionality. This CoGSI provides many opportunities to explore the data, and web-based can be accessed anywhere through the computer and smart phones with internet access, where all SI information is stored in a digital format and function as a database management system. This will ensure that the CoGSI database can be used by the engineering community, especially practitioners and academics by making the data freely available in digital form. The user-friendly digitized CoGSI database would be valuable contributor for future planning of infrastructure developments; making preliminary design estimates for earthwork/foundation assessment; and future decision making with early identification of potential areas for construction purposes, which will produce an economic and safe design.

Keywords: Soil-Database; Web-Based; Data Entry; Openstreetmap; Spatial Data

1. Introduction

The lack of geotechnical investigation lead to a high level of financial and technical risk with construction time overruns has been discussed for many years. The risk of a construction failure is dependent on the information obtained from the geotechnical site investigation, which aimed at characterizing the underlying soil conditions in order to produce a safe and satisfactory design (Goldworthy, 2004). A quality geotechnical evaluation of a project site can save a project considerable time and expenses, by providing the design team and contractors with the subsurface information and design parameters during the initial design and planning stages. Many factors have been recognized by the geotechnical engineers for the uncertainties outcomes when dealing with the ground condition which are presented in Table 1.

Thus, to maximizing the benefit of geotechnical information, a document management system is needed to be replace with the digital version. The geotechnical SI reports are electronically upload, store and available to access, which increased the availability by creating a means for field engineers and authorized consultants using the system. A study by Okunade (2010) indicated that the geotechnical databases has been developed for units of different area ranging from individual project sites, to cities or municipal areas, counties, states countries and regions consisting of several countries or whole

continents. Thus, this paper presented the development of a complete prototype Consolidated Sarawak Geotechnical Site Investigation (CoGSI) system for Sarawak soil into a digitized database management system. The system aims to enables data to be retrieved faster and worthwhile tools to promote user-friendliness, effective dissemination, and efficient administration for current and future development geotechnical databases for public officials, geotechnical experts and public users. The CoGSI database uses OpenStreetMaps (OSM) to display pins of the borehole logs for each designated project which defined through recording coordinates using Borneo-RSO (Rectified Skew Orthomorphic) or BRSO system. The BRSO system is a system that use in East Malaysia and also Brunei. Each pin is linked to the data collected from the specific location and the information associated with pin is displayed. The development of CoGSI system is significant to the construction industry and serve differently with the existing developed system known as GEOINFOS by Jabatan Kerja Raya (JKR) (Sahadan and Seman, 2003) as the latter serve as a document management system function. The difference between the current development of the CoGSI database system when compared with GEOINFOS is the Geotechnical information stored in a digital format rather than as images. The CoGSI is kept in digital format, thus the system allows for quick loading, searching as well as displaying of geotechnical data and can be further