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# An information system engineering geology (ISEG) for urban spatial planning

**A. Günther**, D. Balzer, D. Kuhn

Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, Germany (a.guenther@bgr.de)

In many urbanized areas in the world, vast engineering geological subsurface information is available from building ground surveying and construction works. However, in most cases this data is only accessible in analogue form and information systems that offer quick access to digital data and the possibility to generate spatially distributed expert information for urban planning purposes with engineering geological subsurface data are commonly not available.

The Information System Engineering Geology (ISEG) is a database-coupled geoinformation system consisting of four interconnected parts: (1) an exploration database where all lithological master data (well data) and site information of engineering geological field tests is stored, (2) a geotechnical database, containing laboratory sample- and field testing-derived geo-mechanical parameters, and (3) a GIS-based subsurface model constructed from engineering geological cross-sections and maps, consisting of geological surface grids and pixel thickness information of geotechnical units. The databases and the subsurface model can be evaluated through (4) a GIS-embedded mapping and data evaluation tool, from which expert-specified, spatially distributed model information concerning building ground conditions (e.g., bearing capacities, susceptibility to liquefaction, settlement, subcrop mapping, etc.) can be derived. The whole system operates with defined client-server relationships, ensuring dynamic updating capabilities, data safety and automated backup facilities through IT network configurations.

The ISEG prototype was designed for the reconstruction and rehabilitation of the extended urban area of Banda Aceh (West Sumatra, Indonesia) that was severely destroyed by the catastrophic 2004 earthquake/tsunami event. The system is used in this high geo-risk prone area by the local geological survey to produce map information

usable for planners and decision makers in the framework of sustainable post-tsunami urban reconstruction of Banda Aceh. ISEG is designed to operate under widely used low-cost commercial software (ESRI ArcView GIS, MS Access) and has an open and extendable structure, offering the possibilities for easy plug-in of other software components for subsurface modelling or borehole data management, if desired.

In our presentation, we demonstrate the state of development of the ISEG prototype and its efficiency in generating spatially distributed subsurface information for urban spatial planning.