

GIS-based Data Evaluation at Sentvid Exploration Gallery

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ABSTRACT

The Sentvid Tunnel Project is part of the motorway bypass of Ljubljana, Section Sentvid – Koseze. Two ramp tunnels shall connect the Celovska Road to the main twin tube tunnel in two underground caverns with a maximum cross-section area of ~320m².

An exploration gallery was excavated along selected alignment sections of the main tunnel tubes to investigate the potential cavern locations in necessary detail.

The large amount of geological and geotechnical data expected from investigation works required an organized structure for data management, -evaluation, -analysis and -visualization to support decision making processes. Therefore, data collected from these investigation works were compiled in a Geographic Information System (GIS) providing a geo-referenced database.

3D visualisation of relevant geological structures and corresponding geological-geotechnical features enhanced the understanding of the tectonic pattern and the spatial distribution of geotechnical materials. Detailed data evaluation allowed to distinguish several domains (alignment sections) that are characterised by typical geological scenarios. Each of these geological scenarios relates to particular properties and deformation behaviour of the rock mass.

Those domains, where the deformation behaviour was expected to be most favourable, were eventually selected for cavern locations. For each of the two cavern locations a geological and geotechnical model was developed on the base of the GIS database. The 3D visualization of dominant faults at the cavern locations facilitate the prognosis for typical rock mass behaviour at the two cavern locations. 3D geotechnical models were used for numerical calculations to verify the technical feasibility with regard to overall stability.

The presented poster discusses the basic principles of GIS application in general and particular GIS methodology and visualisation options employed in the Sentvid Exploration Gallery Project.