

Emerson Modeling Technology Reduces Risk and Cost in Industrial Reclamation Project



Industrial site rehabilitation: waste oil handling site (left) is transformed into a seaside residential and commercial complex (right)

RESULTS

- Unknowns in the near surface can lead to unexpected overruns from 10-100% in project cost (and never to savings). Geomodeling enabled the user to significantly reduce near surface uncertainty for the project, so that major surprises should now be avoidable.
- Integrating all available data in a 3D model eliminated the need to acquire costly extra geotechnical ground penetration data, leading to savings of some 25-50% of the subsurface analysis cost. There will also be no need for additional data acquisition in future stages of the project, reducing subsurface costs by 20-30% for the remaining stages.

APPLICATIONS

Emerson RMS™ Modeling

CUSTOMER

Digital Geologi

CHALLENGE

The client is rehabilitating a waste oil handling site to turn it into a seaside residential and commercial gem. Existing oil tanks and other infrastructure need to be demolished, contaminated soil removed, and residential and commercial buildings constructed.

Assessing the near surface is of utmost importance in this type of project. Several challenges were identified: depth to bedrock, settling of buildings, area stability, slope stability, and the presence of quick clay. It was therefore decided to perform a systematic geological analysis of the area in order to establish a representative predictive 3D/4D geological model.

SOLUTION

Emerson's RMS geologic modeling software was chosen to conduct the integrated geological modeling process. All available data had been integrated in a 3D model.

"It was very impressive to see how RMS performed beyond its native oil and gas applications. We were able to handle all types of input data and extract relevant decision-supporting information for the new applications we required from the model. Emerson offers a very flexible and versatile modeling tool that works just as well for construction projects as it does exploration and production."

Lars Edward Rygg Kjellesvik
Senior Advisor Geomodeling

An overall geological understanding of the area was established by a dedicated analysis of regional geological descriptions, giving a structural and sedimentological setting. This was supplemented with an in-depth structural analysis of LIDAR data and a sedimentological analysis of existing ground penetrations and samples.

It was further decided to supplement the dataset with ground penetrating radar on land as well as Bathymetric and shallow seismic data offshore, to fully develop the geological understanding. All of this information was integrated and analyzed in Emerson’s modeling program.

RESULTS

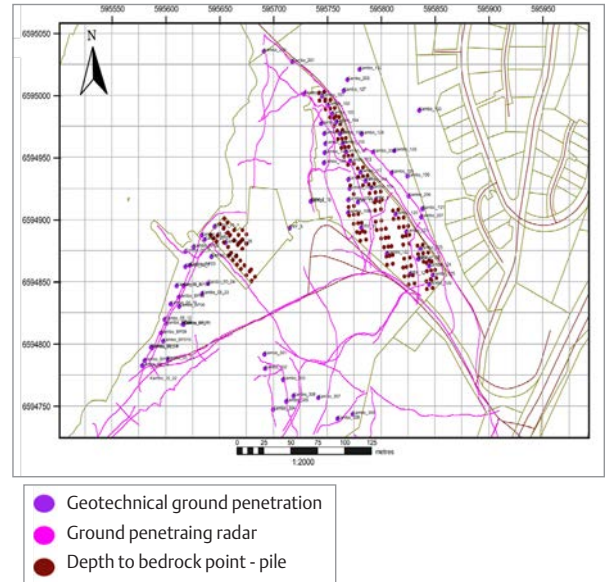
The 3D model created was used to support the decision-making process regarding development of the project. The model demonstrated that the amplitude of post-construction settlement risk was around 2-4 centimeters, rather than 20-30 centimeters as originally estimated, which would have made it impossible for the developer to deliver the houses to the families that had bought them.

BENEFITS

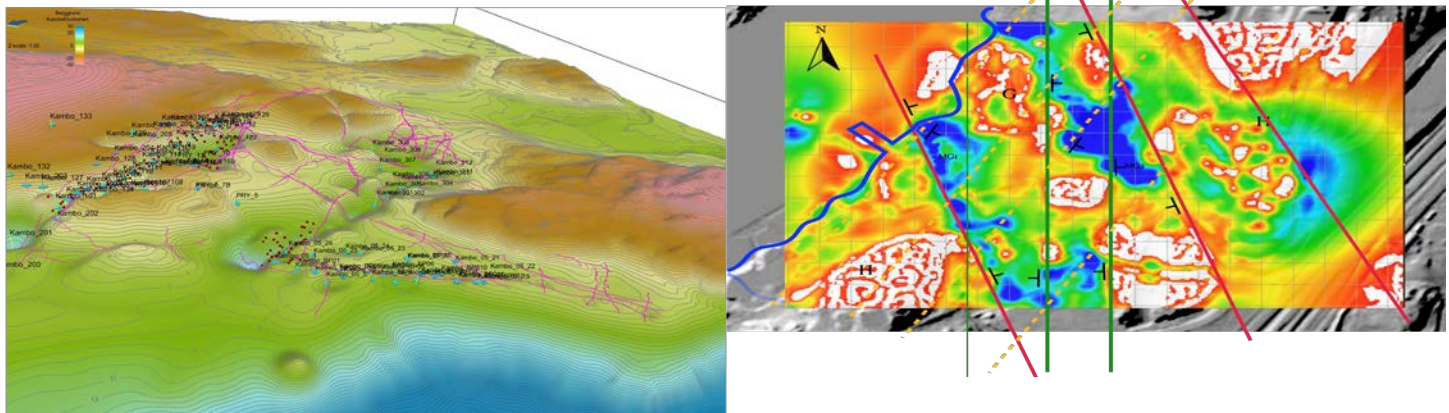
By integrating all the available data in a 3D model, the client gained a better understanding of the near surface, and reduced the uncertainties. The near surface is the main risk factor in any construction project, and may lead to unexpected overruns of between 10-100% of the entire project cost (and never to savings). The model created using RMS significantly lowered the risk, and major surprises should now be avoidable.

The need to acquire costly extra geotechnical ground penetration data was avoided, allowing the client to save some 25-50% of the subsurface analysis cost. With the model already in place, there will also be no need for additional data acquisition in future stages of the project. Normally the subsurface cost is the same for all stages. Now it will drop to 20-30%, or even lower, for the remaining stages.

The model will save further time and cost by enabling the company to optimize foundations, plan mass replacement and landscaping, and perform many other tasks, such as geothermal borehole location.



Data coverage providing information about the depth to bedrock over the site area.



Depth to bedrock map resulting from seismic, geotechnical ground penetration and ground penetration radar data integration. The 2D map on the right highlights a NNW-SSE horst and graben structure.

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