Days in the sun

Project Summary

12d Model software was used by Aurecon in Thailand for the civil design of three Solar Farm projects located in the Tak and Sukhothai Provinces in Northern Thailand. These projects consist of Photo Voltaic solar panels spread over an area of approximately 575,000 m2 in Tak and 150,000 m2 in Sukhothai, with a combined

generating capacity of 34 MW.

These Solar Farms will alleviate pressure on existing electrical networks and strengthen Thailand's target for renewable energy. 12d Model was used for the design of the earthworks, roads and surface drainage.

The Challenge

The solar farms are located on gently sloping to steep terrain. Layers of hard rock also existed below the soil. The challenge was to regrade the land to a consistent and gradual slope that would make the foundations easier to construct.

The aspect of the grade of the sites had to be such that each panel faced south, with no shadow effect from adjacent panels. In Thailand, the optimum slope of each panel is 15° south, with a constant surface gradient of less than 2%.

All of the sites were previously used as farms, and there was no established drainage. Runoff from neighbouring properties needed to be cut-off, and effective drainage was required at each site to prevent flooding. As much of the electrical cabling is underground, the control of flooding was extra important.

Aurecon's client for this project was Bouygues Energies and Services. The client was interested in cost savings and wanted cut and fill volumes optimised. They also wanted to limit cut in the underlying rock. Rock

12d® Model

on the site was hard and is both costly and time-consuming to remove.

The Solution

Aurecon's 12d team leader for the project was Keerakiat Khamsee. Using 12d Model for the topographical survey and geotechnical report, the team was able to create TINs of the existing levels and the underlying rock layers. TINs are a form of vector-based digital geographic data and are constructed by triangulating a set of vertices (points). They produce a 3D surface that can be used to determine volumes. Closely spaced range files of 0.5m were used to accurately estimate the soil volumes and rock volumes.

Using experience, good design principles and some trial and error, the final excavation surfaces were created. Slopes and berms were set up to control drainage. The final design levels were then adjusted to balance cut and fill volumes, reduce excavation in hard rock and making sure that the aspect of the final surface maximised the solar gain in the Photo Voltaic Panels.

Several iterations were developed and refined, prior to completing the Final For Construction documents.

The Result

Using 12d Model, Aurecon was able to optimise the design to achieve the project objectives of maximising solar power from the Photo Voltaic panels, controlling stormwater run-off, balancing cut and fill, and limiting excavation in hard rock. Aurecon worked closely with Bouygues Energies and Services to complete the project on time and within budget.

Roads and Highways

12d Model's design option is the smarter solution for the design, modification and maintenance of Road and Highway projects.

Enjoy advanced 3D tools to design local and major roads, intersections, roundabouts, highways, interchanges and much more.

Ports and Dredging

12d Model is the solution for port infrastructure and dredging, easily managing the very large datasets and complex volume calculations often required by these projects.

A complete range of flexible and customisable volume calculation tools allow teams to extract and present the information quickly and easily.

Land Development

12d Model is the most versatile solution for the creation of sustainable land development projects, including residential, commercial and industrial developments, recreational areas, landfills, and agriculture projects.

Easily manage all aspects of your land development project from earthwork quantities, road design utilities and drainage design.

Airport Infrastructure

12d Model provides a solution for the design, construction and analysis of new airports, as well as the upgrade and maintenance of existing runways and airport infrastructure.

Easily manage large airport infrastructure projects and share data across multi-disciplinary teams.

Rail

12d Track has been specifically designed for the survey, design and construction of light, heavy and high speed rail projects.

Extensive railway tools in 12d Track allow the rail designer to quickly and easily design their projects. These options are built on the existing 3D modelling and design tools available in 12d Model.

Mining Infrastructure

12d Model's powerful set of exploration, site investigation, survey and analysis tools are crucial for the initial design, construction and ongoing operation of mining projects.

Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.

Drainage, Sewer and Utilities

12d Model provides comprehensive tools for the design, analysis and optimisation of stormwater and sewer projects using rational, dynamic (hydrograph) and 2d drainage methods.

Powerful clash detection management allows for efficient 3D modelling of service networks such as gas, electricity, telecommunications and water prior to construction.

Surveying

12d Model is a complete surveying package providing the tools to manage all facets of surveyed data including LIDAR, topographical, as-built, conformance, traversing, geodetics, data mapping, labelling and much more.

The 12d Field option runs on a ruggedized tablet and gives the user access to full 12d Model functionality, allowing you to take the entire project into the field with the most comprehensive pick-up and set-out tools.

Oil and Gas

12d Model assists with the design, construction and mapping of oil and gas pipelines, original site exploration and the wide range of infrastructure required for oil and gas projects.
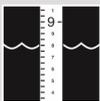
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.

Construction

12d Model is the ultimate software for construction with powerful set-out options, direct interfaces to machine control and detailed conformance reporting and auditing.

Manage 3D data and control volumes, quantities and progress claims with 12d Model. Set-out your project and undertake conformance and as-built surveys live on-site using 12d Field.

Rivers, Dams and Hydrology

12d Model handles very large datasets and interfaces with a wide range of analysis packages, making it perfect for flood studies and the management of rivers and dams.

12d has partnered with industry leading analysis software, allowing users to apply 2D drainage analysis from within 12d Model.

Environmental

12d Model's ability to handle very large datasets combined with flexible and comprehensive 3D analysis and modeling tools make it perfect for a wide variety of environmental projects.

Existing workflows can adopt 12d Model easily as it allows users to directly interface with GIS systems and most software packages and file formats.

Why Choose 12d?

- Powerful data processing & intelligent functionality.
- Modular, easy to update & completely customisable.
- Seamless integration with major industry software and hardware.
- Used in over 55 countries worldwide.
- Friendly support & training from industry experts.

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