

Contour Following Structures

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Megapower plants require large tracts of land. With immense pressure on reducing the overall cost of the plant, most often the land procured turns out to be uneconomical for reasons like weaker soils leading to heavier foundations or rocky strata leading to higher excavation costs. One main factor which makes many projects uneconomical is the levelling costs associated with huge tracks of sloping terrains. Mounting structures play a huge role in avoiding these time consuming tasks of levelling and grading. This is by following the contour of the land to accommodate the slopes and allow the structure to adapt to the natural contour of the land.

The Need To Follow Contour:

The land on which the structures should be installed may not always be flat and picture perfect. Thus, following the contour is a smart approach; it is both economical and a quick way to install structures when compared to grading or levelling activity. Ground levelling and grading are very time consuming, expensive, difficult and need expertise to perform. And in this age of adaptability, this is a very unlikely solution that is to be suggested to the client. Thus, the contour should not be changed to accommodate the structure, but the structure should be designed to follow the contour.

When the levelling and grading of highly undulated land is conducted, there is a possibility of altering the soil properties and compactness of the upper strata, which can have an impact on the foundation pull out strength.

Following The Contour:

Following contour means installing structures that follow uneven terrain with minimal changes to the natural undulations of the ground. In this methodology, the tables are installed on the same plane and are not

at different levels as given in the image below.

Types Of Contour:

Uni-directional: In this type of contour, the undulations will be either in N-S direction or in E-W direction. Customizing for these contours is comparatively easy as the design varies in single direction.

Bi-directional: These types of contours have undulation in both N-S and E-W direction, making it more difficult to design and install.

Method of installation varies with the type of contour that is being dealt with. These methodologies have to be developed through a collaborative approach between the design team and installation team to ensure the structure is optimized for cost and ease of installation. This approach helps the installation team to avoid any onsite difficulties while installing the structures.

Operational Challenges

Installing contour following structures requires a systematic methodology to analyse the contour and develop a solution. An accurate contour analysis should capture the types of slopes and the extent of slopes. Given the dynamic nature of the ground, a single methodology cannot be followed for all contours; based on the inputs from the contour analysis the methodology should be finalized.

Also based on the contour analysis, inputs have to be incorporated in the design stage to provide the requisite adaptability to the structural members.

Usually installation in plain lands doesn't call for skilled labour. But in installation of contour following structures the teams need to be trained to perform installation as per a detailed methodology i.e. whether for uni-directional contours or bi-directional contours. This is because the foundation depths keep varying and the angle of installation needs

to be maintained simultaneously.

Advantages Of Following Contour:

- ✓ This is an economical solution – as opposed to levelling of land that is a time consuming and expensive method.
- ✓ When the natural condition of the ground is not disturbed, we are not impacting the natural drain system therefore one does not have to perform major activity for drain system.

Disadvantages Of Grading And Levelling:

- Grading and levelling disturb the natural soil profile thus leading to extra work to create a uniform profile throughout the area for installing the structures.
- Also, these processes consume quality time and sometimes make the project unviable, which can be avoided by simply opting for the solution which can follow the contour.

Demystifying the truths

There are many myths surrounding the approach of contour following structures. Here are the two specific myths we would like to explore. Many believe that module installation should be on a straight line and should not follow contour which would otherwise lead to generation losses. The fact is that following contour will not have major generation losses. The losses are negligible compared to the cost of levelling and grading.

Also many trust that the pitch in east west direction should be more than normal to avoid shadowing. But this is not absolutely true in all cases. If the contour is followed in a systematic manner the Pitch need not change as all tables will be on the same plane and shadowing will not occur as the height difference between tables is null or marginal.

Project Size: 5.5 MW
Project Location: Susner, MP

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