The DTM method and accuracy of MiTS 2 Earthwork

Earthwork · https://mes100.com/docs/the-dtm-method-and-accuracy-of-mits-2-earthwork/

In MiTS 2, we provide 3 ways of computing the Earthwork quantities; namely, the **DTM method**, the **end area method** and also the **grid method**. In this article, we will talk further about the DTM method, and *why you can't get more accurate than that*.

In MiTS 2, we have various interpolation method for DTM; some of the interpolation depends on sampling the mesh elements at regular interval, we collectively call them **Triangular Regular Network (TRN)**. On the other hand, **Triangular Irregular Network (TIN)** depends only on the surveyor points. **This article** explains what is the difference between them, and why you should use TIN for the accuracy.

As explained in the previous article, both TRN and TIN are a sort of **surface-to-surface comparison** -- we are essentially comparing the Original Ground Level surface (interpolated from the surveyor points) with the platform surface. Based on these two surfaces, we are creating a 3D polyhedron for both cut and fill, and then compute and sum up the volumes for all of the 3D polyhedron. This is a tedious process and best suited to computers. But we also carry out **one manual example** to benchmark with our software. Users are encouraged to repeat and work out the manual example to get a feel of how the method works.

As such, given the surveyor points and the platform edges and points definition, there is *no way you can get more accurate* than our existing DTM method. For once, in our DTM, we *are already* utilizing all of the surveyor points to construct the Original Ground Level surface, and we are already utilizing all of the platform edge points to construct the platform surface. The surfaces are already exact according to the most minute definition, provided by the surveyors and the engineering design of the platform levels. The procedure to slice out different platform surfaces and construct polyhedrons in order to calculate for cut and fill, is just mathematical algorithm that will forever work and is 100% accurate.

The only way to make the DTM more accurate, is to provide even more surveyor points and even more refined platform edges. But this is beyond the scope of our software, and is up to the users to collect more inputs.

Wait, this is not the end!

In MiTS 2, we have an **Alpha** value, that the user can tune so that the ground levels with sparse surveyor points can be excluded from the cutfill calculation. Some users might feel that taking the convex hull of the surveyor points as the surveyor point boundary introduces too much uncertainties into cutfill calculation when it comes to the region where we don't have "a lot of" surveyor points. Of course, whether the number of surveyor points is sufficient *is solely depending on user's engineering judgement*. And we can actually encapsulate this judgement into one single **Alpha** value. Please see **here** on how it works.

With this, you can exclude regions with sparse surveyor points from ever entering into cutfill calculation, and thus preserves the integrity of your cutfill results. This is an innovation, courtesy of MES Innovation Sdn Bhd.

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