New MineSight® Interactive Planner Period Maps Tool

A new **Period Maps** tool for the MineSight® Interactive Planner (MSIP) is available in MineSight® 3-D version 4.50. This new tool works with mining cuts for both 3D block models (3DBM) and Gridded Seam Models (GSM). It completely replaces the non-standard **`EOP-Maps.pyc`** script and has some additional functionality. It also runs much faster than the EOP-Maps script but still uses vertical walls.

All that is required to use the **IP Period Maps** tool is a set of polygonal cuts that have period names in alphanumeric or numeric order and a starting surface, usually a triangulated mesh (DTM). The **IP Period Maps** tool does not process solid cuts, it just ignores them. The processing of solids cuts will be considered as a future enhancement.

There are essentially three different types of cut/model combinations. This article will review the setup and results for each of these.

Cuts that use the bench toe elevations for a 3DBM. Inclined benches aren't handled directly (see case 2).

Cuts that use an elevation item from a 3DBM for the bench toe elevation.

Cuts that use the model view seam bottom elevation item from the cut's lowest seam mined for a GSM.

The **IP Period Maps** tool is activated from inside the **IP Cut Design** dialog by clicking on the Period Maps button (far right toolbar button, see Figure 1) or by clicking on **Tools | Period Maps**. The dialog is shown in Figure 2.

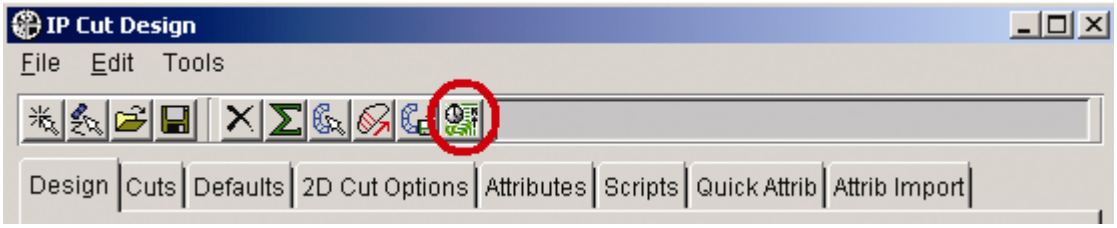


Figure 1. IP **Cut Design** *dialog showing* **IP Period Maps** *toolbar button.*

Example 1 – Bench Toe Elevations for 3D Block Model

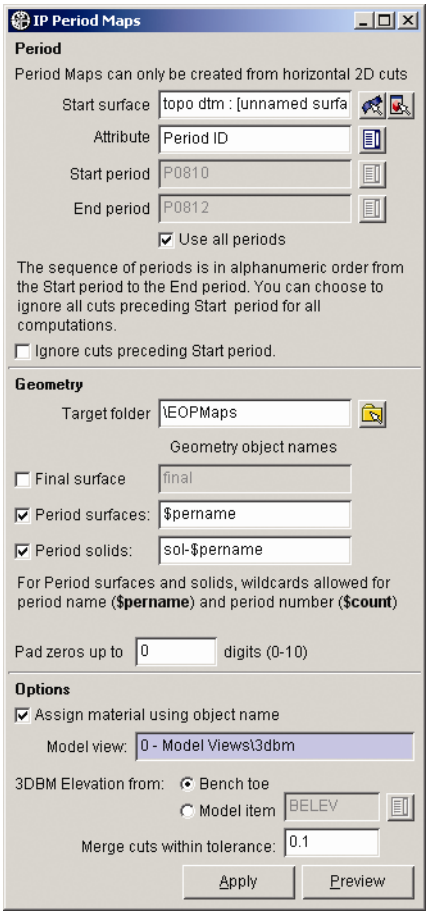


Figure 2. **IP Period Maps** *dialog for Example 1 – 3DBM using bench toe elevations.*

The example shown in Figure 2 is for case 1 with a 3DBM. In the **Cut Design** dialog, on the **Cuts** page, a **Plane Label** is shown for each cut. The label indicates the bench toe elevation of the cut. This might differ from the actual physical elevation of the cut in space; the cut is considered to be at the nearest bench toe elevation as shown in the **Plane Label**. Figure 3 shows the list of cuts that will be used in this example.

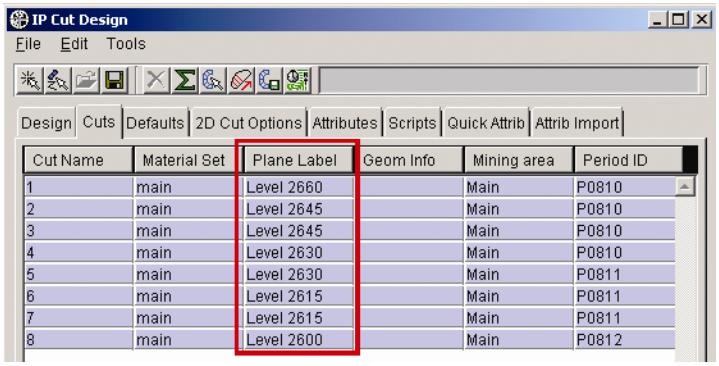


Figure 3. List of cuts for example 1 with **Plane Label** *as elevation of bottom of cut.*

The first prompt in the dialog in Figure 2 is for the **Start Surface**. The next prompt, **Attribute**, is the cut attribute for specifying the **Start Period** and **End Period**. The **Attribute** can be alphanumeric, integer, or double. The periods will be ordered either alphanumerically or numerically between the **Start** and **End** periods. The value of the **Attribute** item is also used for naming period surfaces and solids using the wildcard token **`$pername`** (see example below).

You can process all the periods by toggling **ON Use all periods**. This will process all the periods in either alphanumeric (if **Attribute** is an alphanumeric item) or numeric (if **Attribute** is an integer or double item)

order.

If **Use all periods** is toggled **OFF**, then specify the **Start** and **End** period. In general, all cuts should be used to generate **Period** surfaces and solids between the **Start** and **End** period. However, sometimes you might want the calculations to ignore cuts preceding the **Start Period**. For example, MineSight® Strategic Optimizer numbers periods using an integer attribute and sets the attribute to zero for unscheduled cuts that are not to be considered in the calculations.

This example processes all periods.

The next section of the dialog, **Geometry**, is for selecting the **Target folder** where the resulting surfaces and solids will be stored and for determining how they will be named. A mix of fixed characters and wildcard tokens can be used in naming. This example designates the period name token (**`$pername`**) as part of the name so the surfaces will be named P0810, P0811, and P0812 and the solids will be named sol-P0810, sol-P0811, and sol-P0812. The surfaces and solids can also be named using the period number by using token **`$count`**. The **Pad zeros up to** option works with the **`$count`** token and will force resulting surfaces and solids to be named with leading zeros for better sorting in the data manager. For example, if pad is 3 then surfaces and solids would be named with a 001, 002, etc.

The final surface will be the same as the last period when **Use all periods** is toggled **ON** and the **Period surfaces** option is toggled **ON**. The final surface option is available for generating the final surface without all the intermediate period surfaces.

If a surface or solid geometry object already exists in the **Target folder**, then it will be overwritten. And if any of the overwritten objects are open when the surfaces and solids are generated, then the folder needs to be refreshed to display the resulting geometry in the viewer.

The last section of the dialog, **Options**, allows a material to be created for each surface and solid if such a material does not already exist. The material will have the same name as the surface or solid.

The **Options** section also allows a 3DBM elevation item value to be used instead of the bench toe elevation. This option can be used with multiple model views (for example, cuts can have different Material Sets and each Material Set can have a different Model View, and thus a different 3DBM, for its Area) but the elevation item must be named the same in each 3DBM. Only the 3DBM corresponding to the first cut will be used for elevation item selection. Example 2 shows an example of a model elevation item.

Merge cuts within tolerance allows you to define the tolerance for combining cuts on the same Plane (i.e., bench/GSM level) from the same period to account for any small gaps that might exist between cuts (i.e., cuts that aren't snapped to each other). The default is 0.01. It is highly recommended that all cuts be snapped to each other regardless of period. This will avoid potential merging problems and will accurately report MSIP reserves.

After the dialog responses are complete, the **Preview** button can be used to view the surfaces and solids. Each period is displayed and then replaced by the next period. The **Apply** button can be used to generate the surfaces and solids. The results of the final P0812 period and the individual solids are shown in Figures 4a and 4b.

Figure 4a. Surface for period P0812 from example 1 with elevation from 3DBM bench toe.

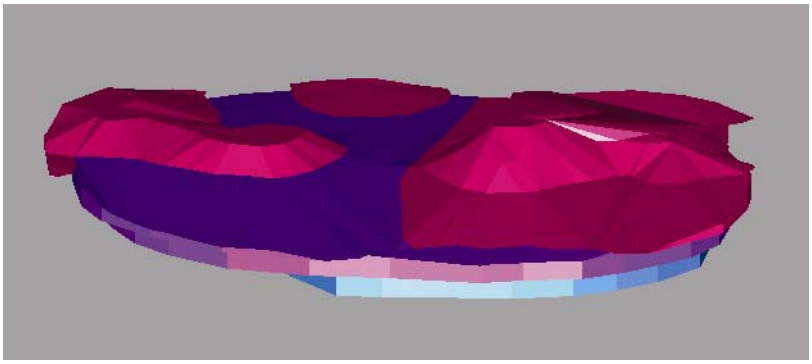


Figure 4b. Solids for example 1 – **Plane Label** *for 3DBM.*

Example 2 – Bench Elevation from 3D Block Model elevation item

This example is from the same project using the same cuts as example 1. The only difference is that the bench toe elevation for each bench has been stored in each block of the 3DBM in item BELEV as shown in Figure 5. You would use a 3DBM elevation item to, for example, model inclined benches.

The **IP Period Maps** dialog is filled out the same way except the **3DBM Elevation from:** option is set to **Model item** and the BELEV item has been selected as shown in Figure 6.

The final P0812 period with the variable bench floors is shown in Figure 7.

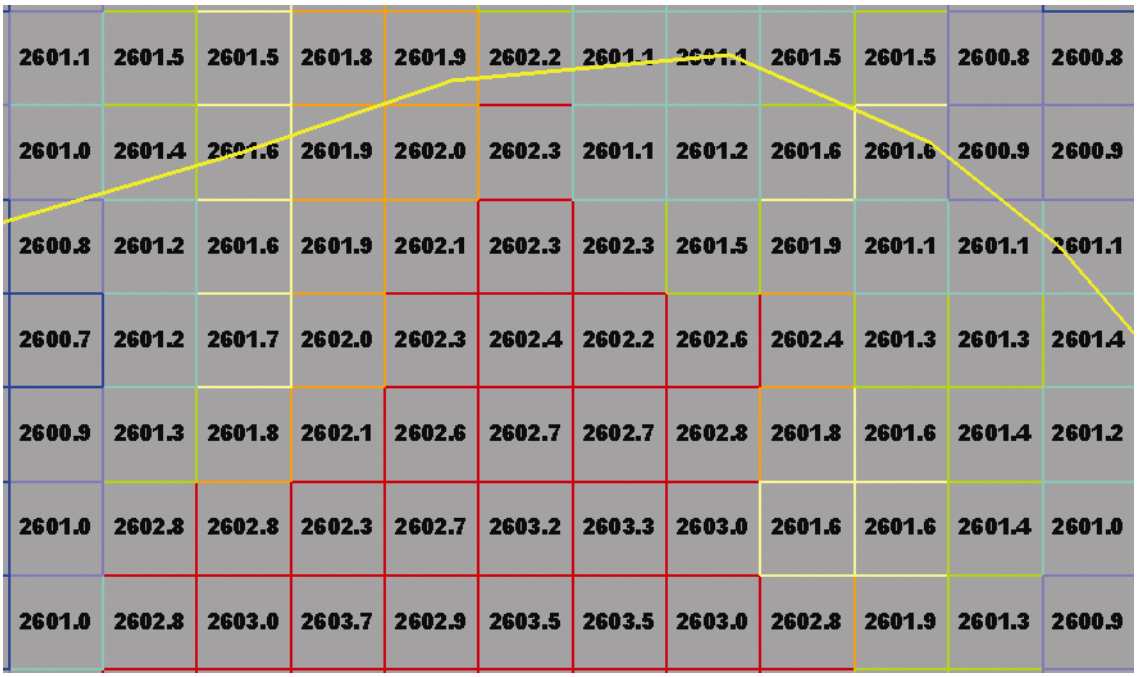


Figure 5. Portion of BELEV values for variable bench floor on 2600 bench with MSIP cut.

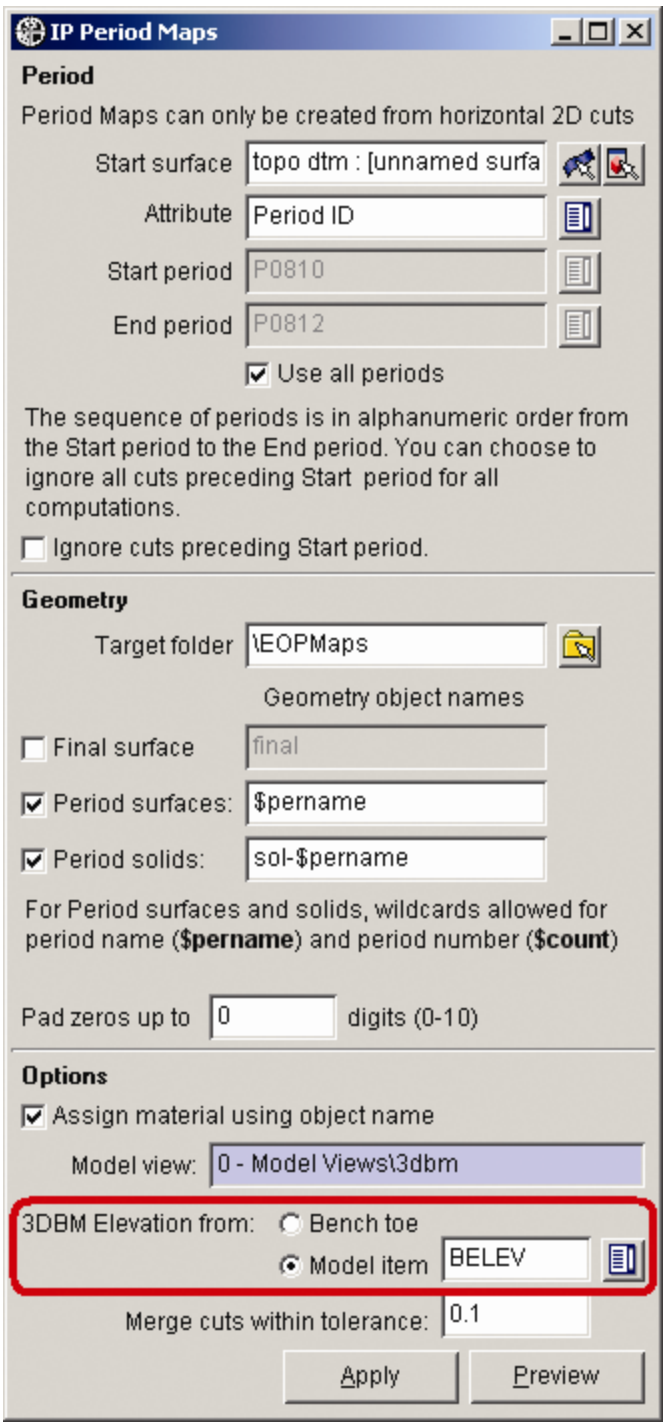


Figure 6. IP Period Maps dialog for example 2 – 3DBM using model elevation item.

Figure7. Surface for period P0812 from example 2 with variable elevation from 3DBM item BELEV.

Example 3 – Seam bottom elevation from Gridded Seam Model

This example is from a GSM using the seam bottom elevation from the lowest seam in each cut. The **Seam Bottom** elevation item is specified on the **GSM/Surfaces** page of the **Model View Properties** dialog as show in Figure 8. In this case, it is item ZBOT.

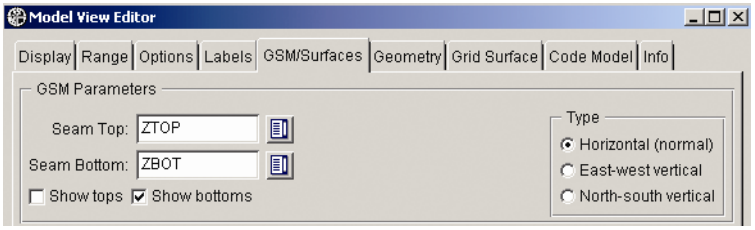
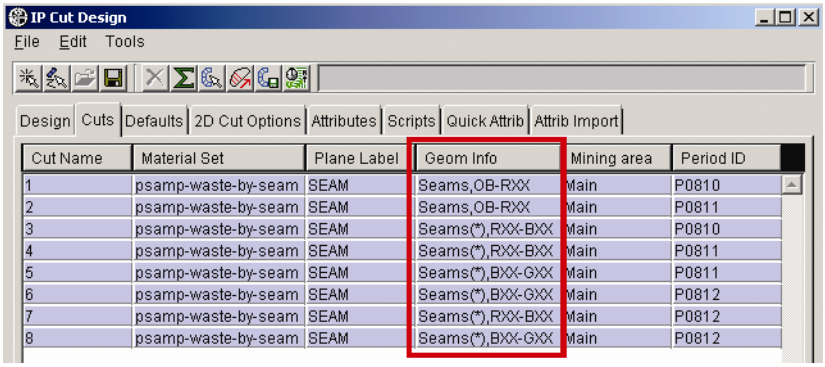


Figure 8. **Model View Properties** *dialog showing* **Seam Bottom** *item.*

The MSIP cuts are designed as usual. The digitized cut elevation is ignored and each cut is treated as a cookie cutter against the appropriate seam bottom of the lowest seam in the cut. The seam to mine to is specified in one of two ways. By default, the seam to mine to is the lowest elevation seam visible in the viewer when the cut is digitized (the visible seams are specified in the **Model View Properties** dialog on the **Range** page for the model view corresponding to the cut's Material Set). However, the visible seam setting can be overridden for a particular cut using the **Edit Range** function in the **IP Cut Design** dialog on the **Design** page. In either case, the value of **Geom Info** shows the lowest seam mined in each cut as shown in Figure 9.



Cut Name	Material Set	Plane Label	Geom Info	Mining area	Period ID
1	psamp-waste-by-seam	SEAM	Seams,OB-RXX	Main	P0810
2	psamp-waste-by-seam	SEAM	Seams,OB-RXX	Main	P0811
3	psamp-waste-by-seam	SEAM	Seams(*),RXX-BXX	Main	P0810
4	psamp-waste-by-seam	SEAM	Seams(*),RXX-BXX	Main	P0811
5	psamp-waste-by-seam	SEAM	Seams(*),BXX-GXX	Main	P0811
6	psamp-waste-by-seam	SEAM	Seams(*),BXX-GXX	Main	P0812
7	psamp-waste-by-seam	SEAM	Seams(*),RXX-BXX	Main	P0812
8	psamp-waste-by-seam	SEAM	Seams(*),BXX-GXX	Main	P0812

Figure 9. List of cuts for GSM example 3 with the **Geom Info** *value indicating lowest seam.*

The **IP Period Maps** dialog in Figure 10 is filled in the same way as the first example. Because you are using

a GSM, the 3DBM options are disabled and the model view seam bottom item is used for the elevation of the bottom of each cut. The final surface for example 3 is shown in Figure 11.

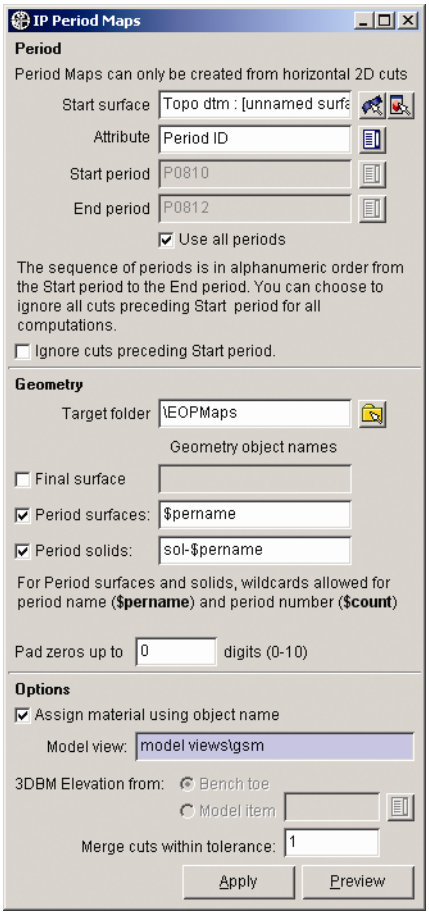


Figure 10. **IP Period Maps** *dialog for example 3 – GSM.*

Figure 11. Surface for period P0812 from example 3 using ZBOT from GSM.

The new **IP Period Maps** tool is very easy to use and runs quickly. The only significant limitations are not processing solids, using vertical walls, and needing to use a 3DBM elevation item for each block for inclined benches. Look for this tool in the release of MineSight® 3-D version 4.50.