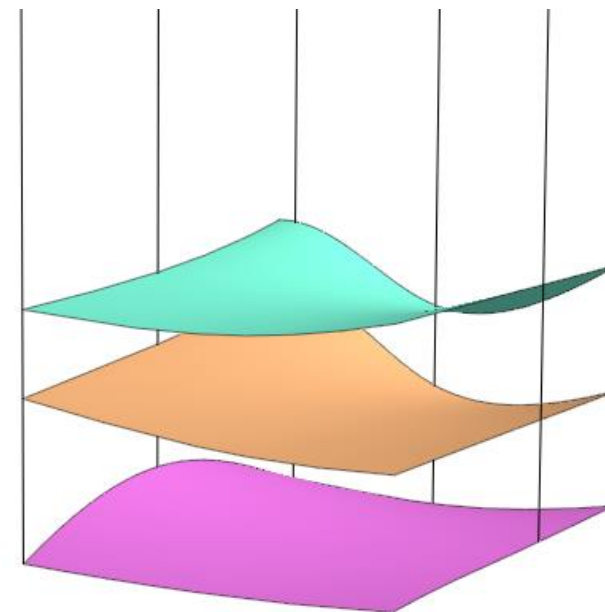




Bedding Plane Generation in GTS NX



Tutorial by Tadavarthi Sree Harsha

Integrated Solver Optimized for the next generation 64-bit platform

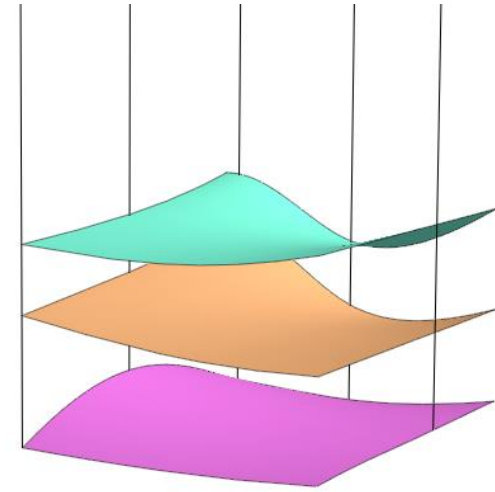
Finite Element Solutions for Geotechnical Engineering



MIDAS *Technical
Material*

Tutorial

Bedding Plane Wizard



Contents

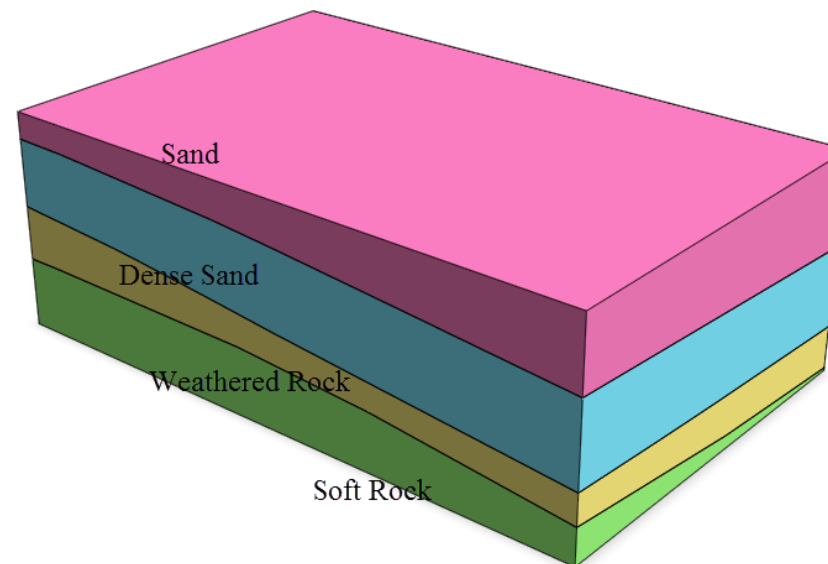
- **Step 1:** Initial Setting
- **Step 2:** Bedding Plane Wizard
- **Step 3:** Input Borehole Data
- **Step 4:** Geometric Modeling

Bedding Plane

Overview

This example problem is meant to demonstrate the general work flow to model bedding plane in GTS NX using Bedding Plane Wizard

Modelling



Program Version

GTS NX 2019(v.2.1.)

Contents

- Step 1: Initial Setting
- Step 2: Bedding Plane Wizard
- Step 3: Input Borehole Data
- Step 4: Geometric Modeling

Borehole Data

Set-1	B1	B2	B3	B4	B5
Location of Boreholes	(0,0,0)	(-10,30,0)	(20,40,0)	(60,20,0)	(30,0,0)
Sand (Distance/Depth from Bore Hole Location)	5	8	10	11	7
Dense Sand	15	18	21	22	18
Weathered Rock	21	23	25	27	22
Soft Rock	30	30	30	30	30

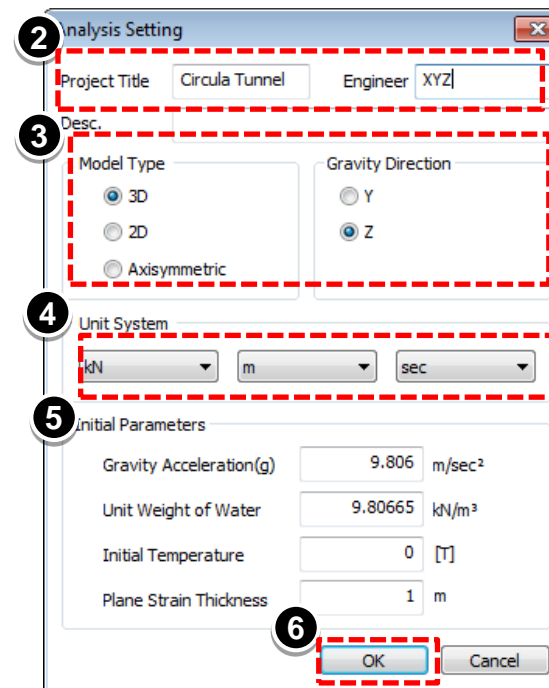
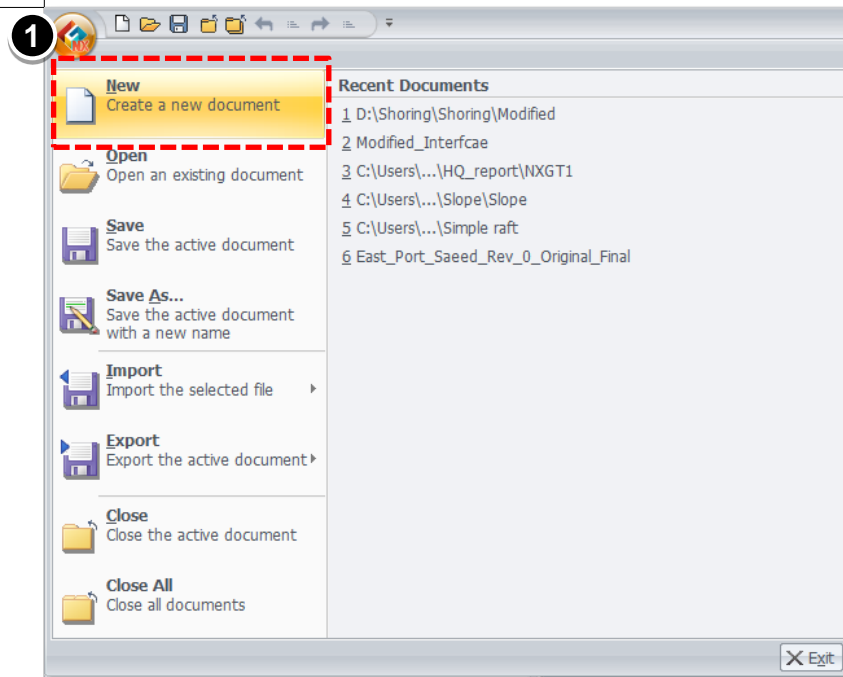
Program Version

GTS NX 2019(v.2.1.)

Procedure

Starting Midas GTS NX

- ① Click on GTS NX icon > **New Project**
- ② Enter the Project name as Bedding Plane & Engineer XYZ
- ③ Select Model Type as 3D
- ④ Select **kN ,m and sec** in The Unit System
- ⑤ Use the Default values for Initial parameters
- ⑥ Click **OK**

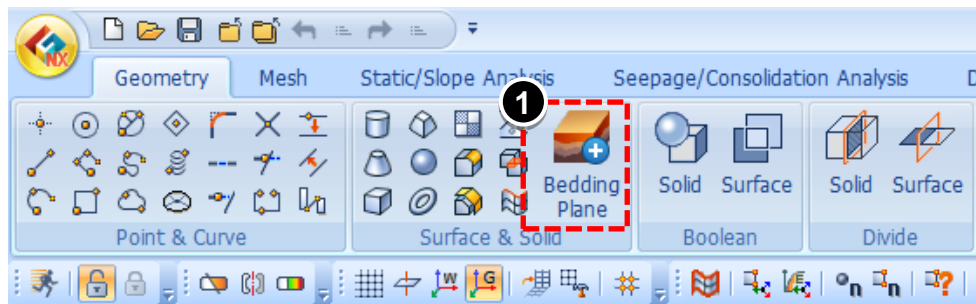


2-1 Bedding Plane Wizard

Procedure

Opening Bedding Plane Wizard

- 1 Go to Geometry>Surface & Solid> Bedding Plane



Bedding Plane Wizard

Bedding Plane

Bedding Plane Name

Boreholes Information

Name

Location

	Plane Name	Depth(m)
+		

Add Modify Delete

Define Bedding Plane... Import

Distance (m)

X-Axis Y-Axis

Geometry Set

OK Cancel Apply

2-2 Defining Bedding Planes

Procedure

- ❶ Select "Define Bedding Plane"
- ❷ Input the Name as 'Sand'
- ❸ Click 'ADD'
- Similarly add 'Dense Sand', 'Weathering Rock' and 'Soft Rock'
- ❹ Delete the unwanted bedding planes
- ❺ Click 'Close'

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name

Boreholes Information

Name

Location 0, 0, 0

Plane Name	Depth(m)
+	

❶ Add Modify Delete Define Bedding Plane... Import

Distance (m)

X-Axis 0 Y-Axis 0

Geometry Set Geometry Set-1

OK Cancel Apply

Define Bedding Plane

❷ Name Sand

❸ Add

Modify

Delete

Name

Bedding Plane-1

Bedding Plane-2

Bedding Plane-3

Bedding Plane-4

< >

Close

Define Bedding Plane

Name Bedding Plane-1

Add

Modify

❹ Delete

Name

Bedding Plane-1

Bedding Plane-2

Bedding Plane-3

Bedding Plane-4

Sand

Dense Sand

Weathered Rock

Soft Rock

< >

❺ Close

3-1 Input Borehole Data

Procedure

Inputting the Borehole Data

- ① Enter 'Set-1' in bedding plane name
- ② Enter 'B1' in the name
- ③ Input 0,0,0 in the location
- ④ Select 'Sand' in the drop down menu in plane name column
- ⑤ Enter '5m' in the depth column
- ⑥ Similarly select 'Dense Sand', 'Weathered Rock' and 'Soft Rock' to input 15m, 21m and 30m in the depth column.
- ⑦ Click 'ADD'

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name: Set-1

Boreholes Information

Name: B1

Location: 0, 0, 0

Plane Name	Depth(m)
Sand	5.00

Buttons: Add, Modify, Delete, Define Bedding Plane..., Import

Distance (m)

X-Axis: 0 Y-Axis: 0

Geometry Set: Geometry Set-1

Buttons: OK, Cancel, Apply

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name: Set-1

Boreholes Information

Name: B1

Location: 0, 0, 0

Plane Name	Depth(m)
1 Sand	5.00
2 Dense Sand	15.00
3 Weathered Rock	21.00
4 Soft Rock	30.00

Buttons: Add, Modify, Delete, Define Bedding Plane..., Import

Distance (m)

X-Axis: 15 Y-Axis: 15

Geometry Set: Geometry Set-1

Buttons: OK, Cancel, Apply

3-2 Input Borehole Data

Procedure

Inputting the Borehole Data

- ① Now, enter 'B2' in the name
- ② Input '-10,30,0' in the location
- ③ Select 'Sand' in the drop down menu in plane name column
- ④ Enter '8m' in the depth column
- ⑤ Similarly select 'Dense Sand', 'Weathered Rock' and 'Soft Rock' to input 18m, 23m and 30m in the depth column.
- ⑥ Click 'ADD'

Similarly Create B2, B3, B4 and B5 according to the data given in Borehole data page.

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name: Set-1

Boreholes Information

B1
B2

Name: B2

Location: -10, 30, 0

	Plane Name	Depth(m)
1	Sand	8.00

③ Sand
Dense Sand
Weathered Rock
Soft Rock

④ 8.00

Add Modify Delete
Define Bedding Plane... Import

Distance (m)
X-Axis: 15 Y-Axis: 15

Geometry Set: Geometry Set-1

OK Cancel Apply

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name: Set-1

Boreholes Information

B1
B2

Name: B2

Location: -10, 30, 0

	Plane Name	Depth(m)
1	Sand	8.00
2	Dense Sand	18.00
3	Weathered Rock	23.00
4	Soft Rock	30.00

⑤

⑥ Add Modify Delete
Define Bedding Plane... Import

Distance (m)
X-Axis: 15 Y-Axis: 15

Geometry Set: Geometry Set-1

OK Cancel Apply

3-3 Bedding Plane Creation

Procedure

Bedding Planes

Once all the boreholes are created,

- 1 Enter 15m in X-axis and Y axis distances
- 2 Enter Geometry set name as 'Set-1'
- 3 Click 'OK'

Bedding Plane Wizard

Bedding Plane

Bedding Plane Name: Set-1

Boreholes Information

B1
B2
B3
B4
B5

Name: B1

Location: 0, 0, 0

	Plane Name	Depth(m)
1	Sand	5.00
2	Dense Sand	15.00
3	Weathered Rock	21.00
4	Soft Rock	30.00
+		

Add Modify Delete

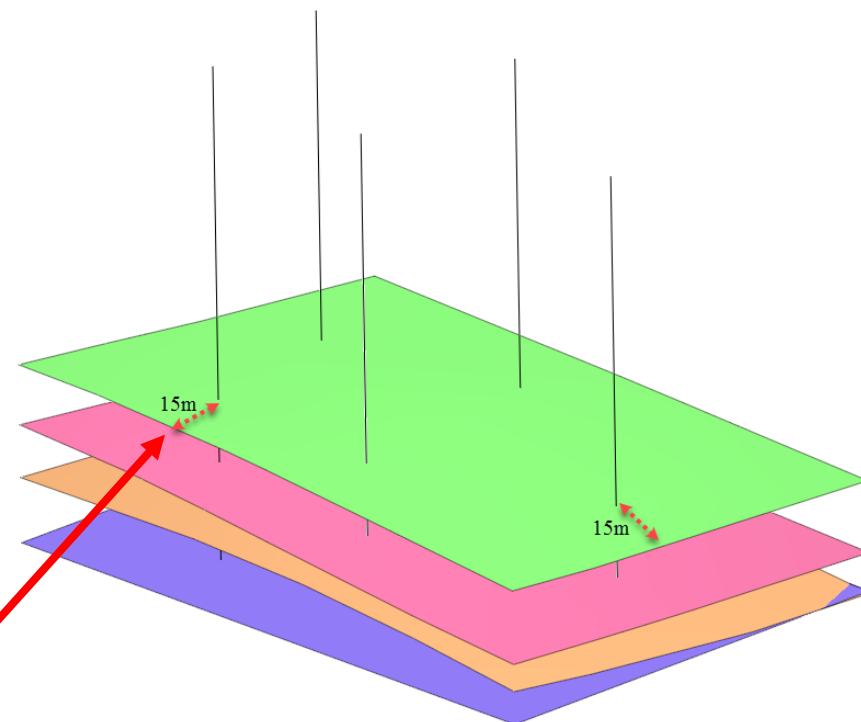
Define Bedding Plane... Import

Distance (m)

X-Axis: 15 Y-Axis: 15

Geometry Set: Set-1

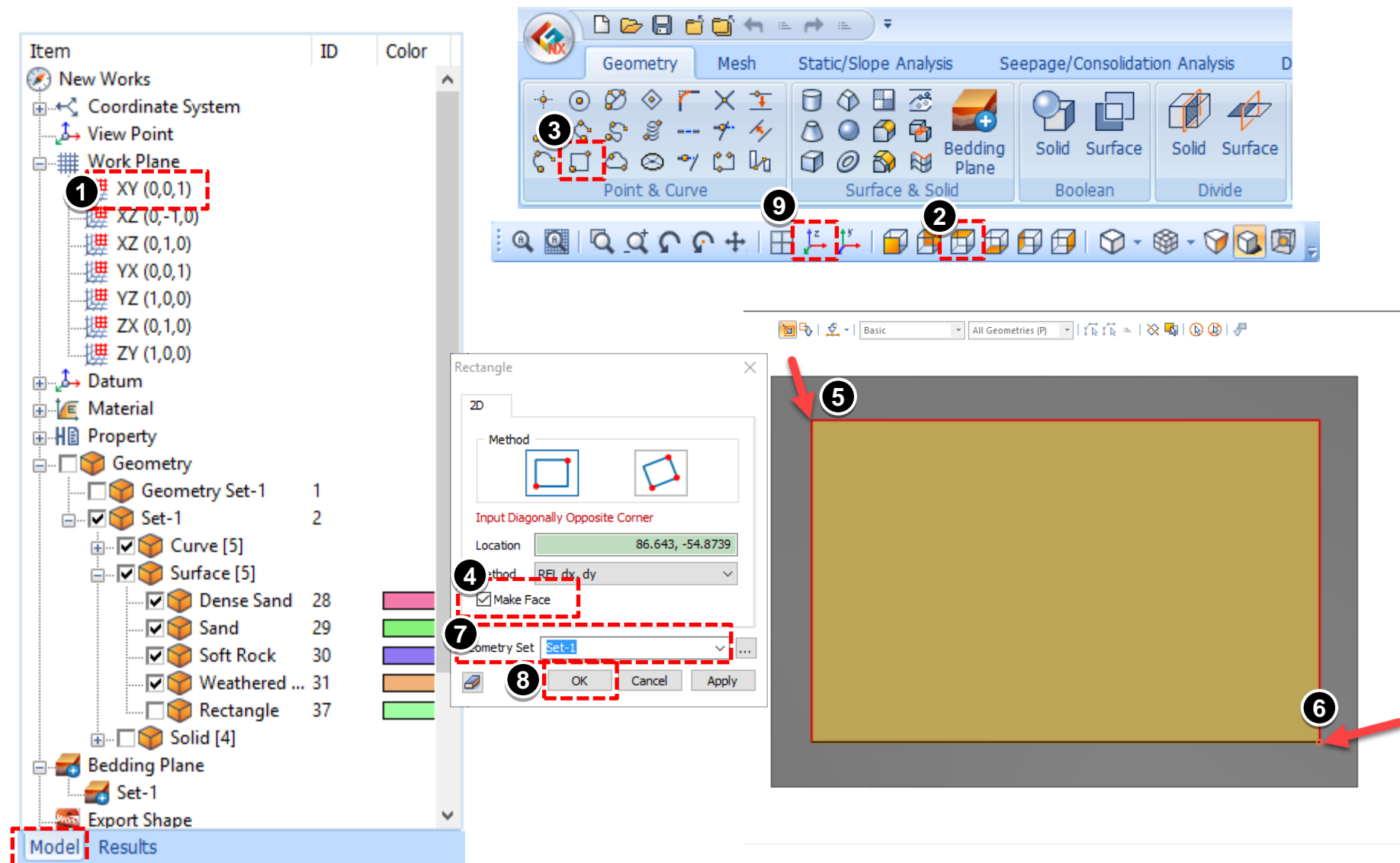
OK Cancel Apply



Procedure

Creating a Face

- ① Select XY work plane in Works tree>Model>Work plane > XY (0,0,1)
- ② Select Top View
- ③ Select 'Rectangle' option
- ④ Enable 'Make Face'
- ⑤⑥ Using the cursor select start location and diagonally opposite corner of the rectangle/face as shown in the figure
- ⑦ Select the geometry set 'Set-1'
- ⑧ Click 'Ok'
- ⑨ Select Isometric view

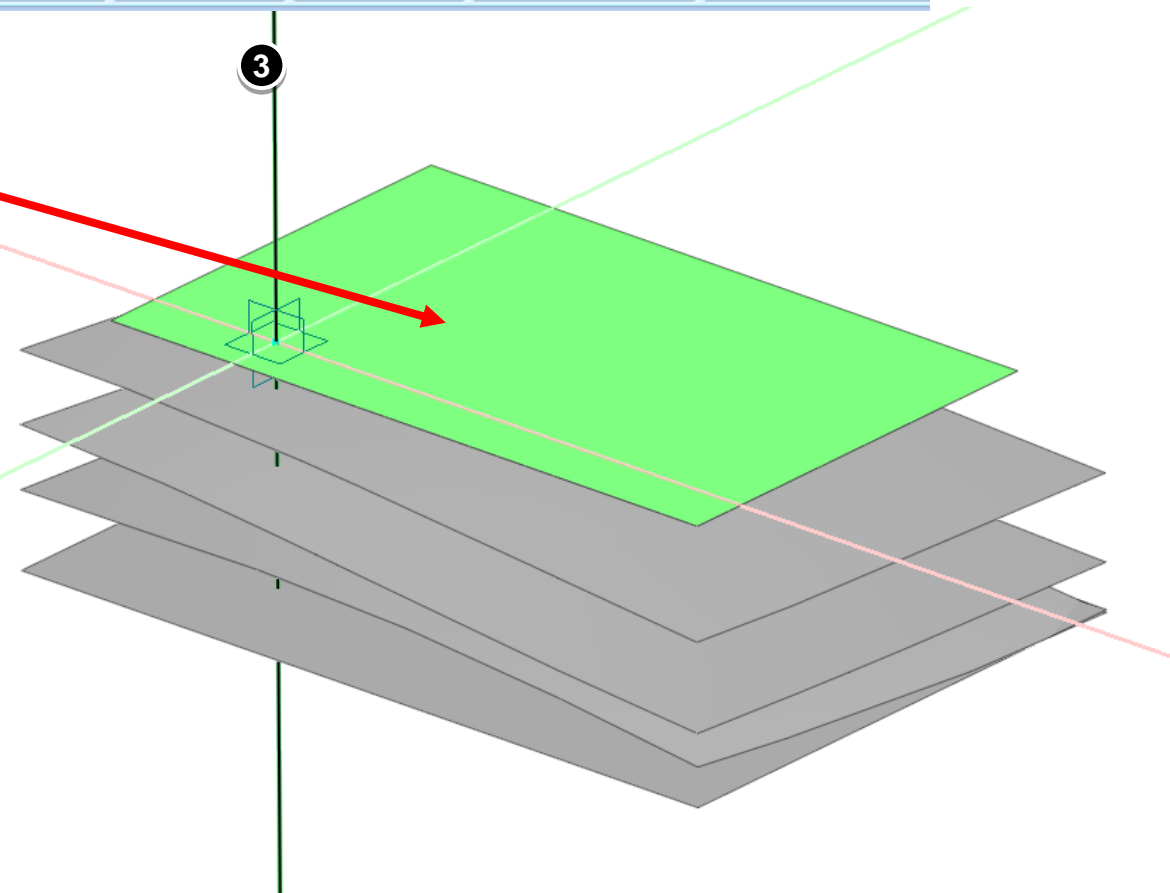
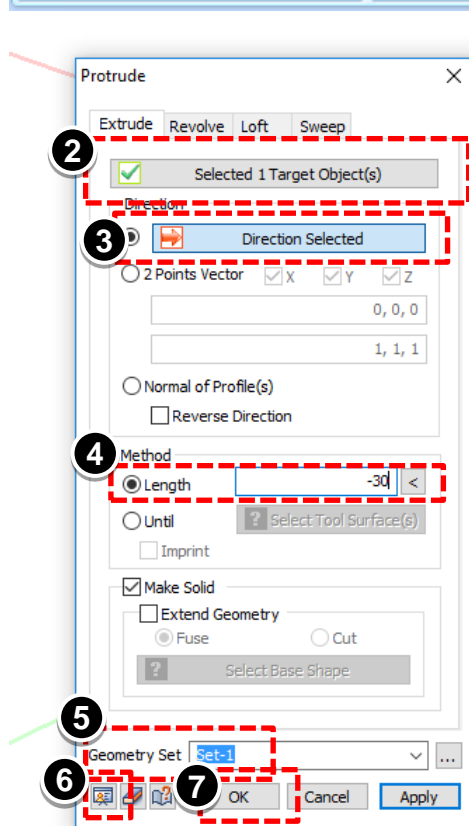
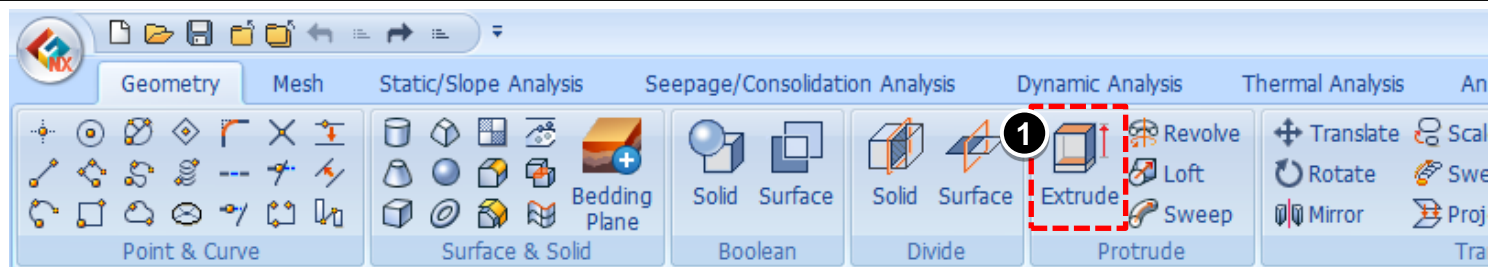


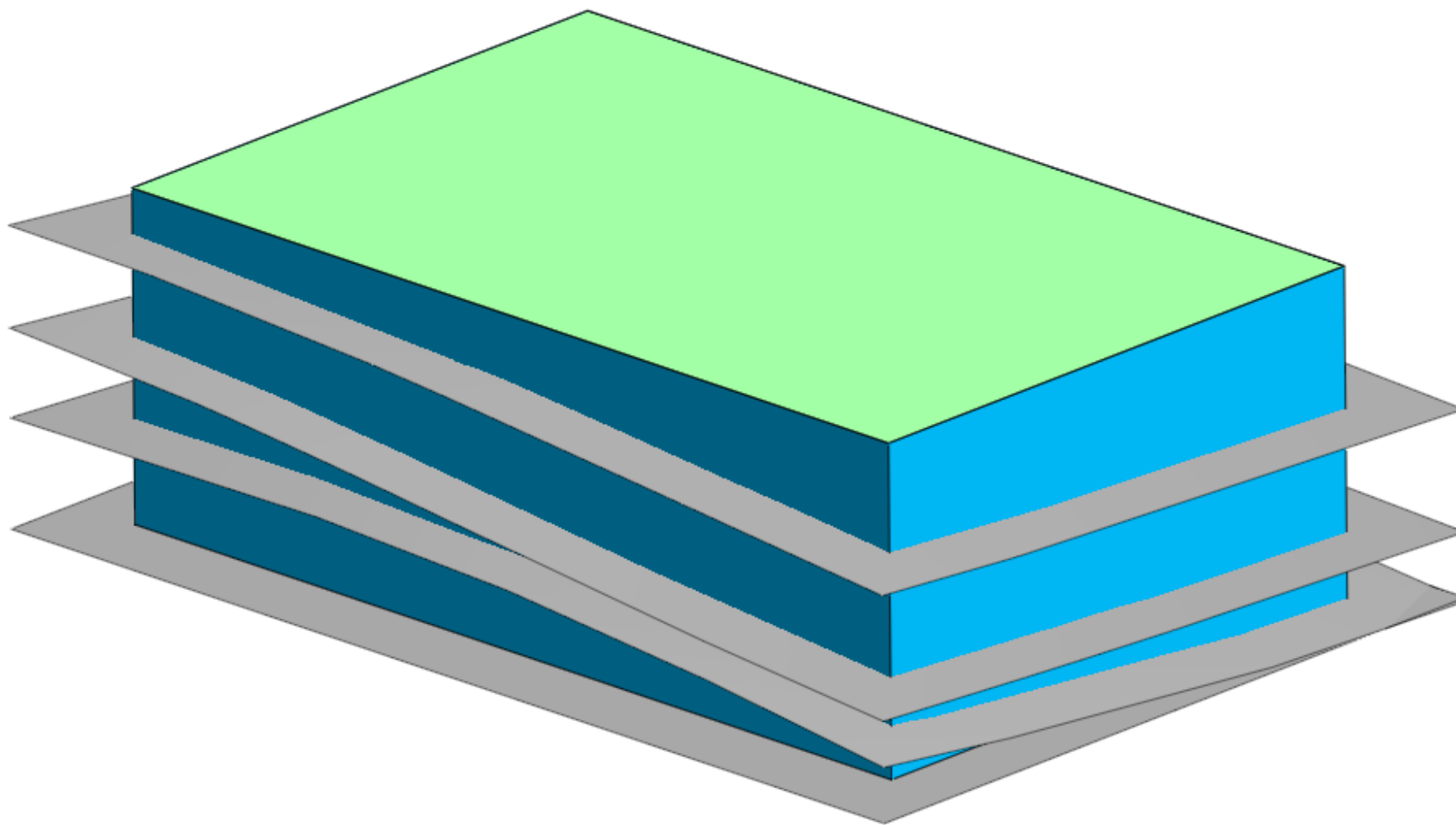
4-2 Extruding the Face to Solid

Procedure

Creating a Solid

- ❶ Go to Geometry>Protrude>Extrude
- ❷ Select the rectangular Face created for extrusion
- ❸ Select the 'Z' Direction
- ❹ Enter the length as '-30m'
- ❺ Select the geometry set 'Set-1'
- ❻ Click 'Preview'
- ❼ Click 'OK'



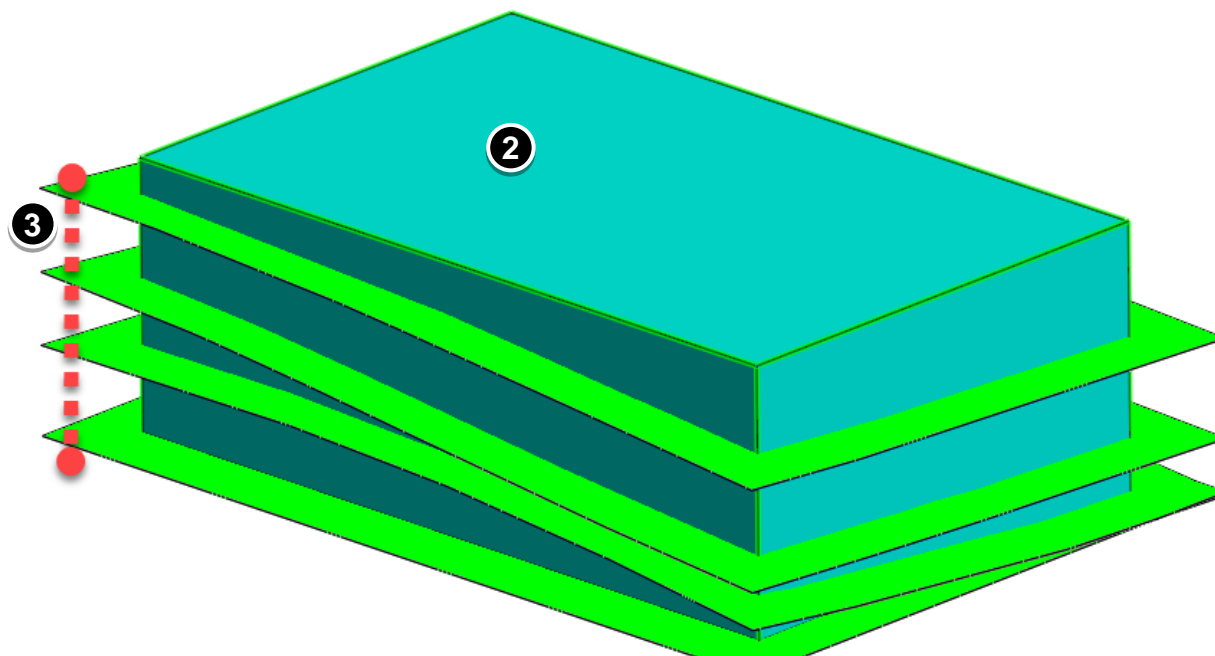
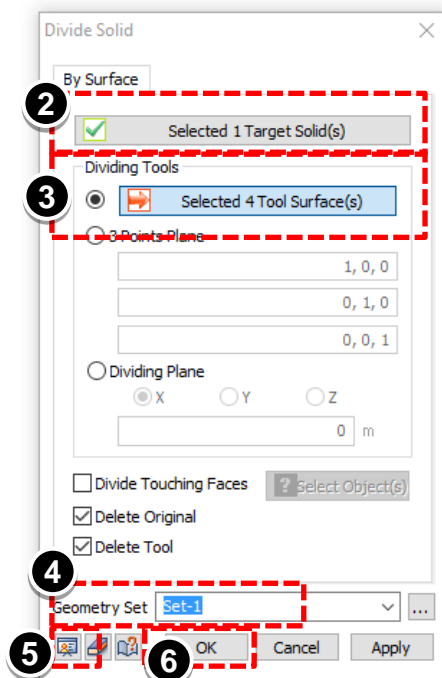
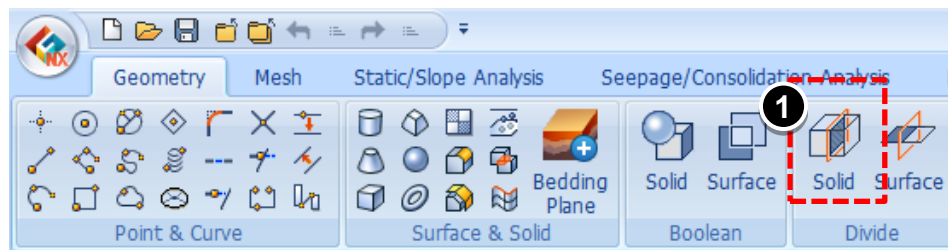
Procedure

4-3 Dividing the Solid

Procedure

Dividing a Solid

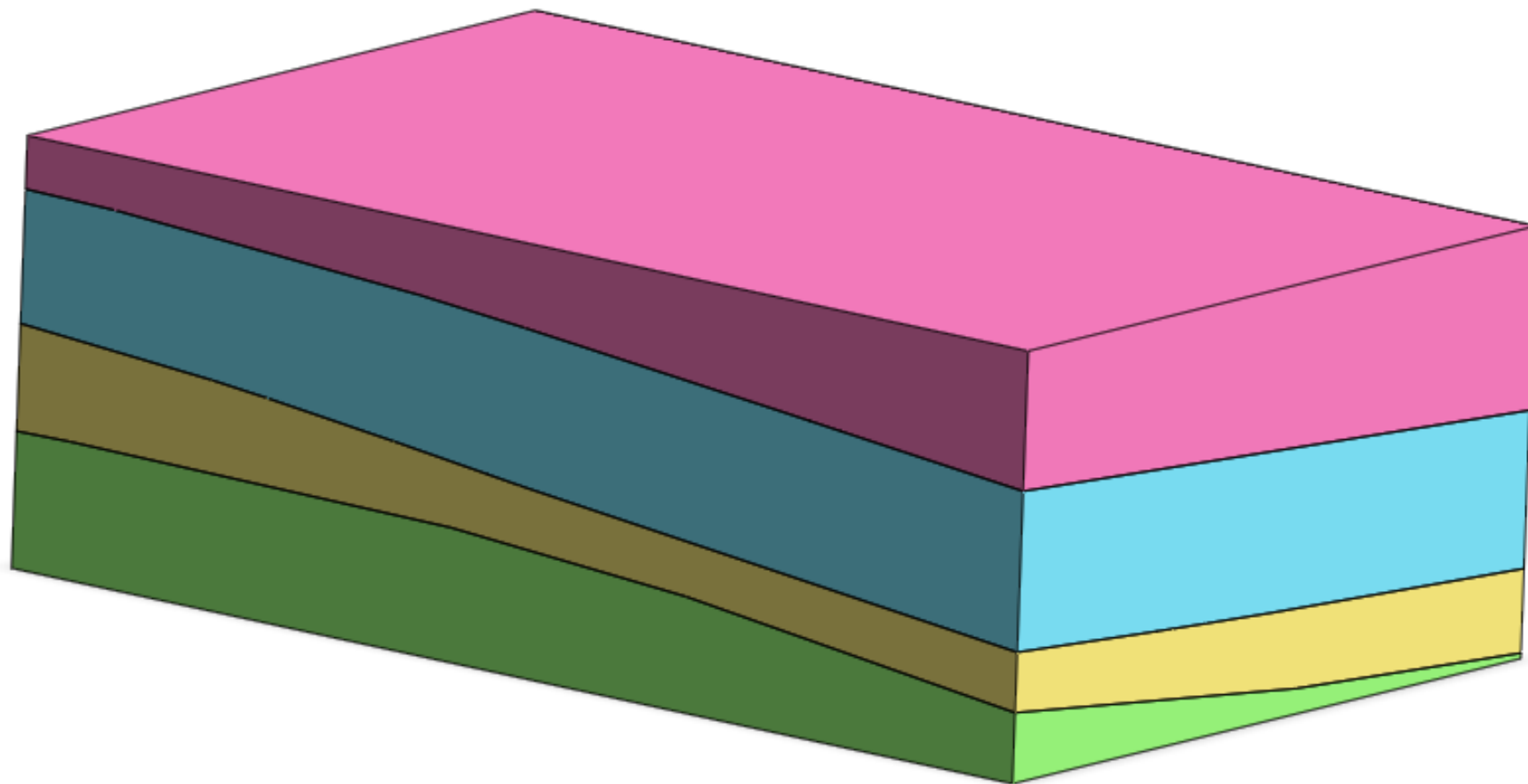
- ❶ Go to Geometry>Divide>Solid
- ❷ Select the extruded solid
- ❸ Select the bedding planes
- ❹ Select the geometry set 'Set-1'
- ❺ Click 'Preview'
- ❻ Click 'OK'



Procedure

Now, bedding strata with four layers are created.

Once the geometry is created, we can define materials/properties and mesh them.



Importing the Borehole Data

Procedure

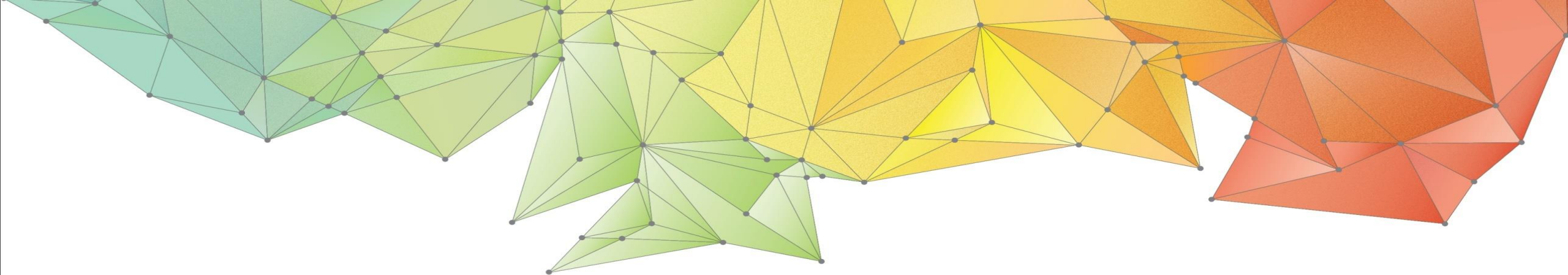
For big projects, it would be difficult for us to manually enter the depths of large number of boreholes.

Instead, we can create an excel sheet in a specific format as shown and then import it into the bedding plane wizard.

Once the excel sheet is ready, we can import it into bedding plane wizard using the 'Import' option as shown in the figure.

	A	B	C	D	E	F	G	H	I
1	[m]								
2		Borehole Name	B1	B2	B3	B4	B5		
3		Location	1,1,10	1,20,10	20,40,7	40,25,10	3,40,10		
4									
5		No. Plane Name	Depth						
6	1	Bedding Plain	20	15	17	17	20		
7	2	Bedding Plain	5	3	5	6	0		
8	3	Bedding Plain	-3	-4	-3	-6	-7		
9									
10									
11									
12									

The screenshot shows the 'Bedding Plane Wizard' dialog box. It has a 'Bedding Plane' tab. Under 'Bedding Plane Name', there is a text field. Under 'Boreholes Information', there is a list box and a table with columns 'Plane Name' and 'Depth(m)'. At the bottom right, there are buttons for 'Add', 'Modify', 'Delete', 'Define Bedding Plane...', and 'Import'. The 'Import' button is highlighted with a red box and a red arrow points to it. At the bottom, there are 'OK', 'Cancel', and 'Apply' buttons.



Thank You



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