GTS NX Official Training Series

SEEPAGE ANALYSIS
Analysis of a Retaining Wall

沈約翰
john@midasuser.com.tw

止水帷幕 | SEEPAGE CUT-OFF CURTAIN

Cut-off walls are a commonly used technical term in **underground engineering**, **hydraulic engineering**, and **excavation support systems**.
When the **bottom of an excavation** is **below the groundwater table**, and **dewatering is difficult**, it is generally necessary to **install a cut-off wall** to **prevent groundwater seepage**.
Cut-off walls constructed from **continuous mixing piles** (e.g., cement-soil mixing piles) or **single-jet and triple-jet grouting piles** are also referred to as **cut-off walls**.

Common Applications	
Excavation Engineering	Installing cut-off walls during **deep excavations** to prevent surrounding groundwater from seeping into the pit.
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Reference
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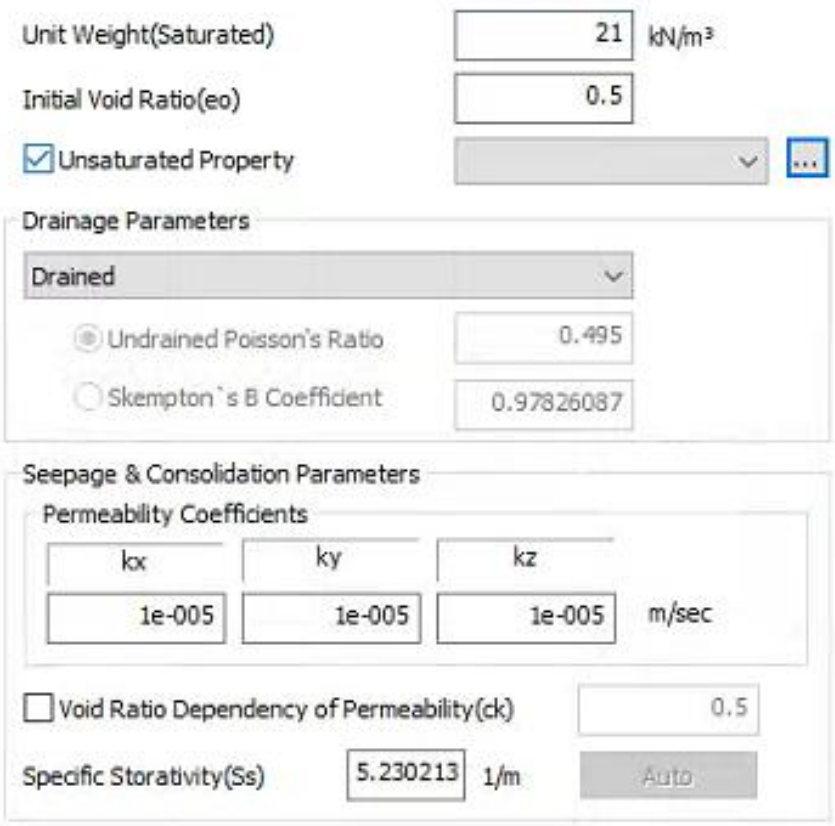
孔隙材料 | Porous Material



Soil Saturated/Unsaturated Parameters
Permeability function: Can be estimated using the **Gardner coefficient**.
Water content function: Can be estimated using the **Van Genuchten model**.

Drained / Undrained Material Parameters: Defined using **effective stiffness**, **undrained stiffness**, and **undrained strength**.

Permeability Coefficient (Kx/Ky/Kz)
Although **Darcy's Law** was originally derived under **saturated conditions**, it is also applicable to **unsaturated conditions**.

Saturated Aquifer Storage Coefficient (Ss)
The **volume of water released from storage per unit volume of aquifer per unit decline in hydraulic head**.
Note: For **undrained materials**, Ss is automatically calculated from the **elastic modulus** and **Poisson's ratio**.

註:滲流計算過程未定義不飽和參數，則視作飽和 土壤。

TOTAL HEAD

Total Head (總水頭)

Total head refers to the **total energy of a fluid at a specific point**, usually expressed as **an equivalent height of a water column** (in units of length, such as meters or feet).

It consists of **three main components**:

$$H = h_p + h_v + h_z$$

- h_p 壓力水頭（Pressure Head）$= \frac{P}{\gamma}$
  - 來自流體的靜壓力（P 為壓力，γ 為流體單位重量
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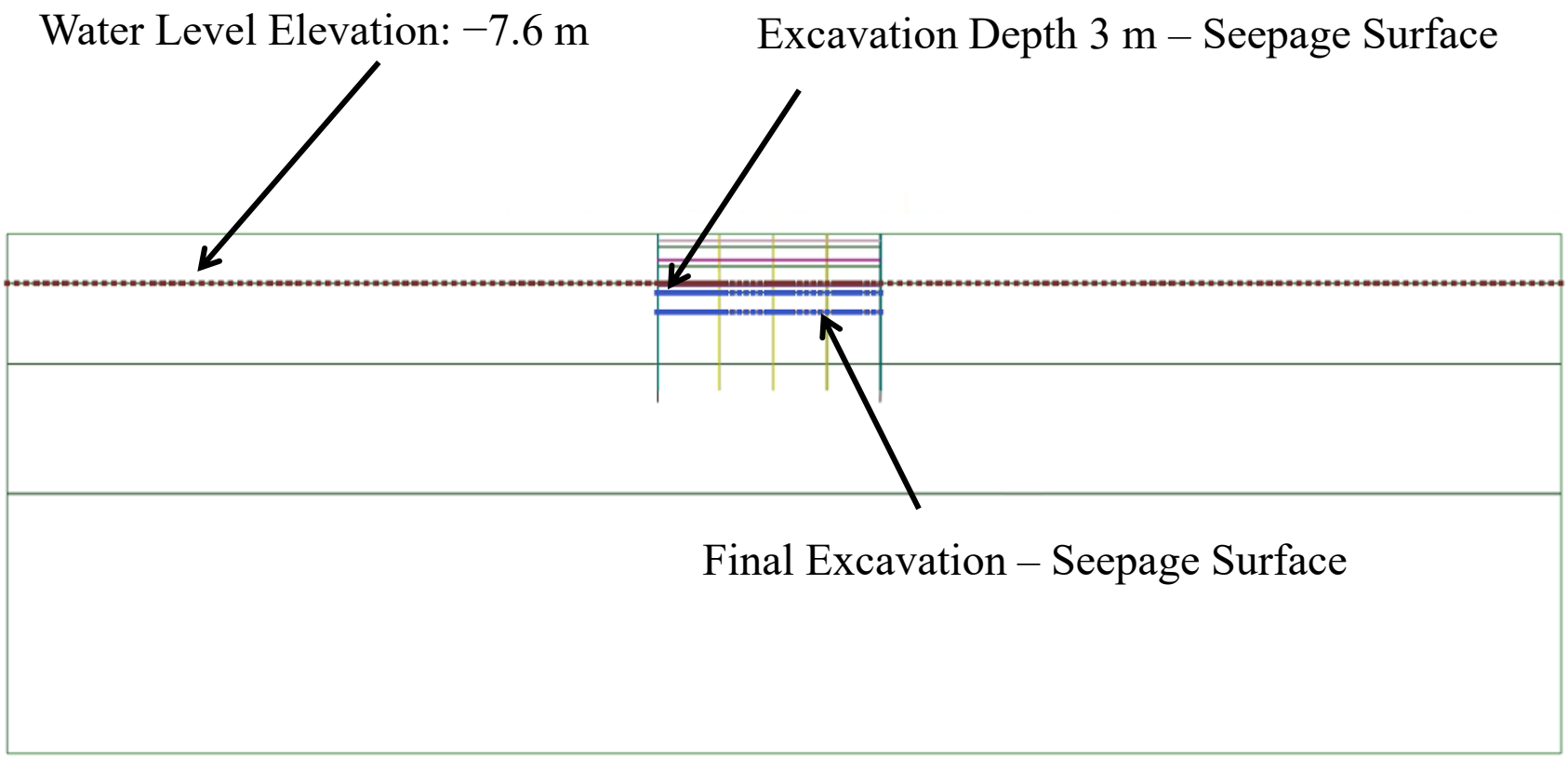
  - 來自流體的位能（z 為流體位置的高度）

https://chatgpt.com/

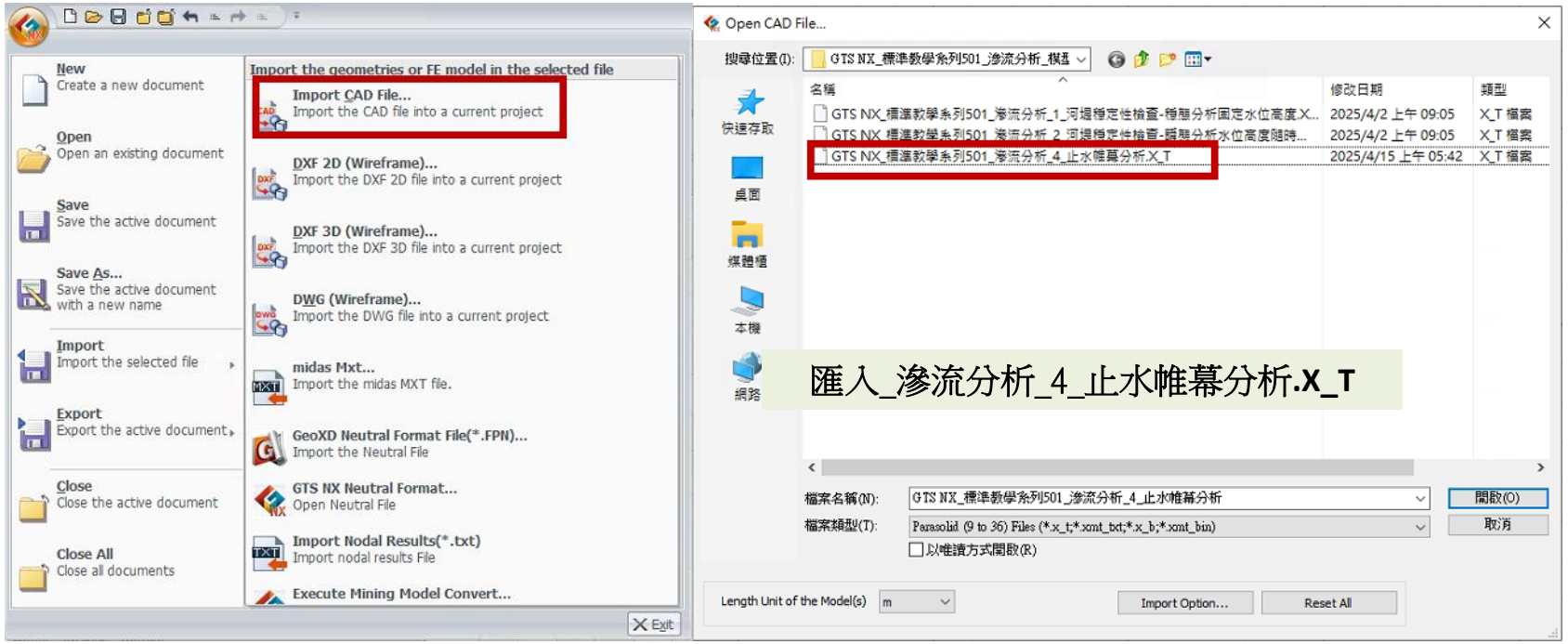
https://zh.wikipedia.org/zh-tw/%E6%89%AC%E7%A8%8B

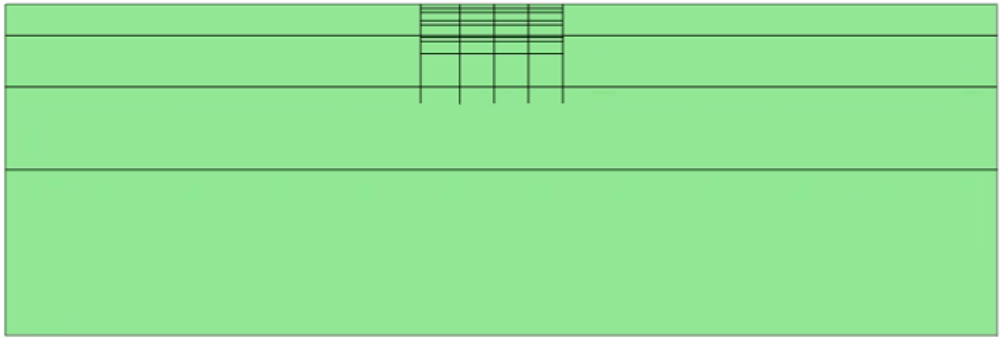
CUT-OFF WALL – ANALYSIS DESCRIPTION



註:範例相關參數使用假設條件。

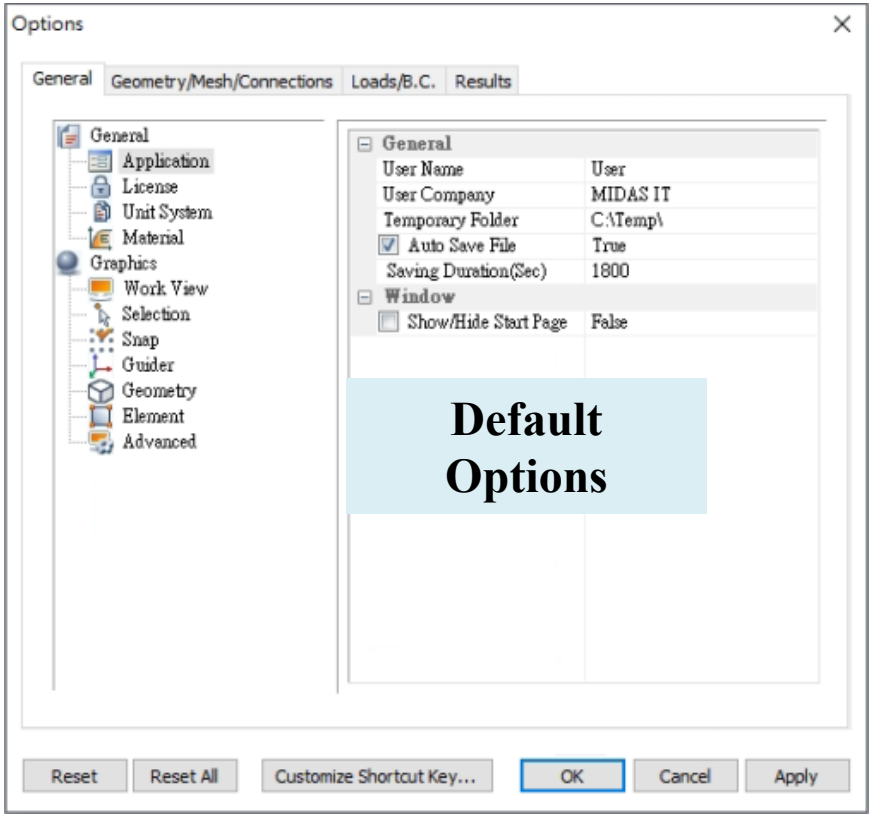
GEOMETRY IMPORT



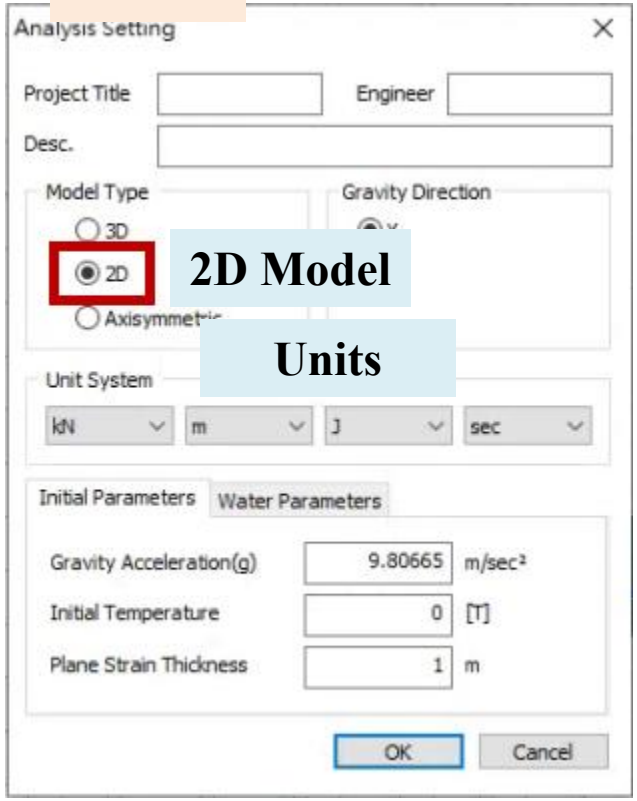


OPTIONS AND SETTINGS

New



Default Options

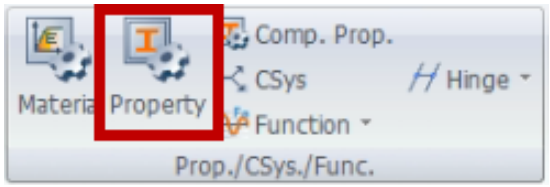


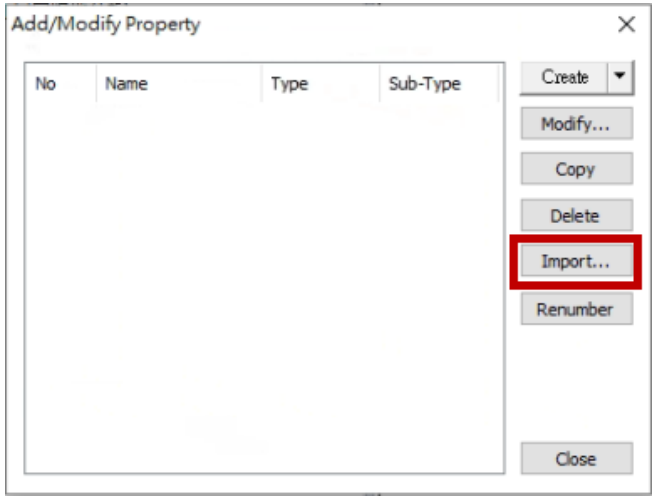
2D Model

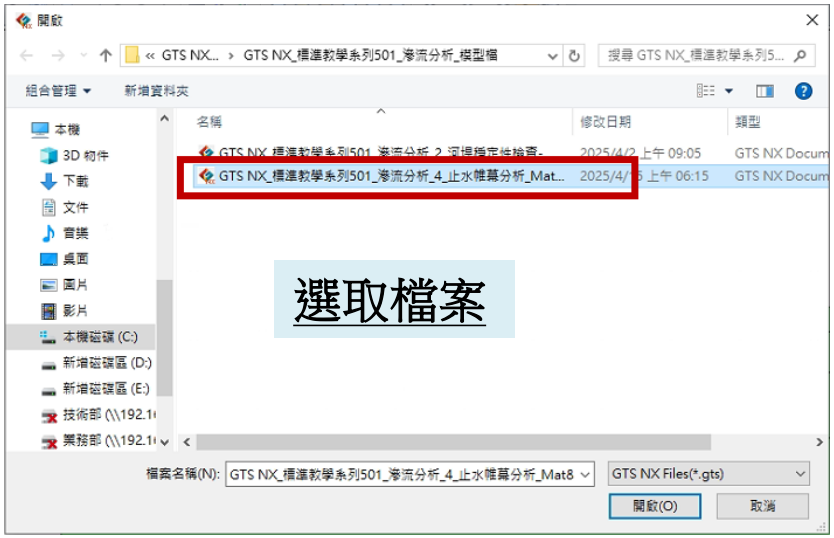
Units

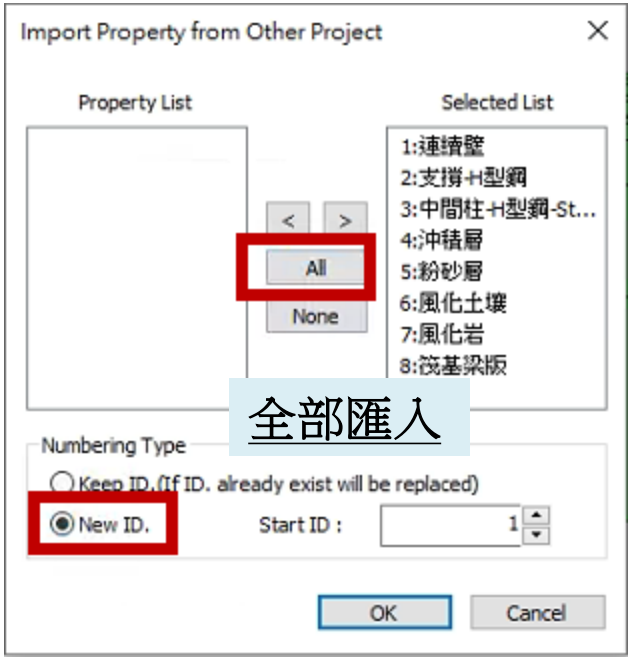
單位使用KN/m/J/sec

PROPERTY IMPORT









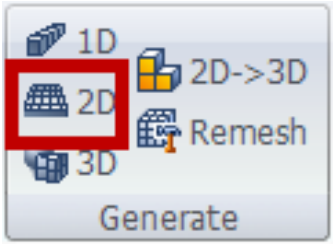
POROSITY PARAMETERS

Geotechnical Material

	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(v)	Unit Weight(γ) ($tonf/m^3$)	Unit Weight (Saturated) (KN/m^3)	Coefficient of permeability(K) (m/day)	Cohesion(C) (KN/m^2)	Friction Angle(ϕ)
沖積層	8000	0.35	17	18	0.1	15	20
粉砂層	19500	0.3	17.65	18.65	1	10	30
風化土壌	36500	0.33	18.5	19.5	1	17.5	31
風化岩石	150000	0.3	21	22	0.001	50	30

Note 1: Seepage analysis requires defining **porous material parameters**.
Note 2: If **unsaturated parameters** are not defined, the soil is treated as **saturated** during the seepage calculation.
Note 3: For **seepage–stress coupled analysis**, both **geotechnical** and **porous material parameters** must be defined.

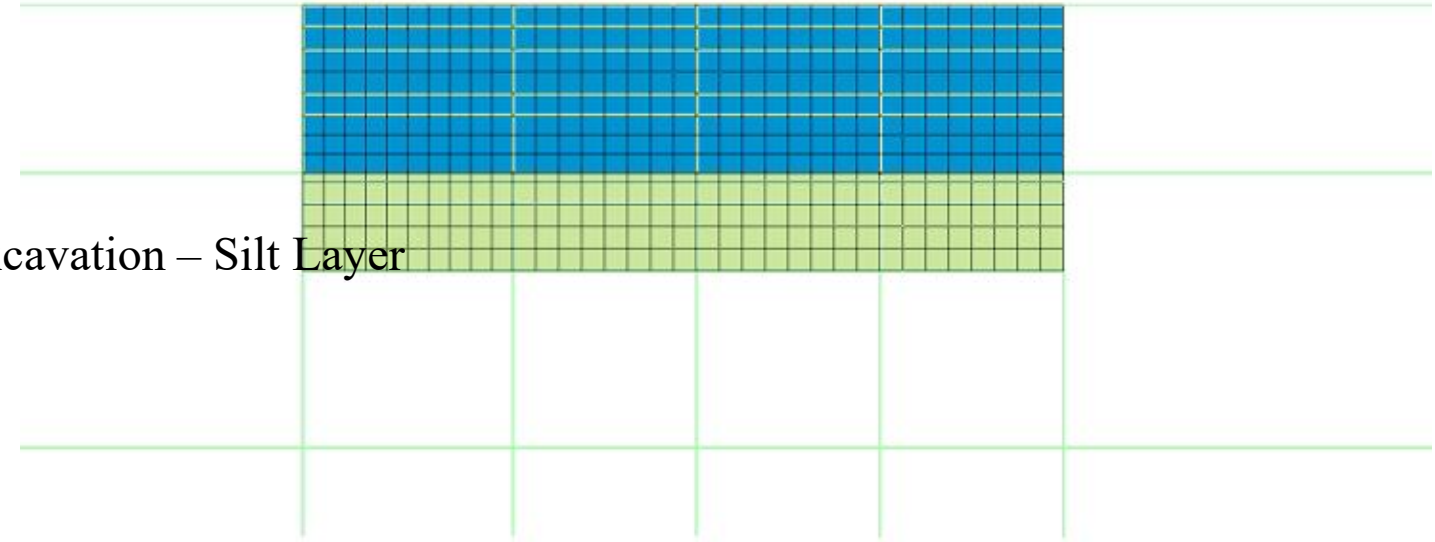
EXCAVATION AREA – 2D MESH GENERATION



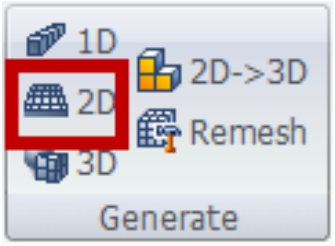
Mesh Size: 1 / Shared Nodes

Excavation – Alluvial Layer

Excavation – Silt Layer



SURROUNDING AREA – 2D MESH GENERATION



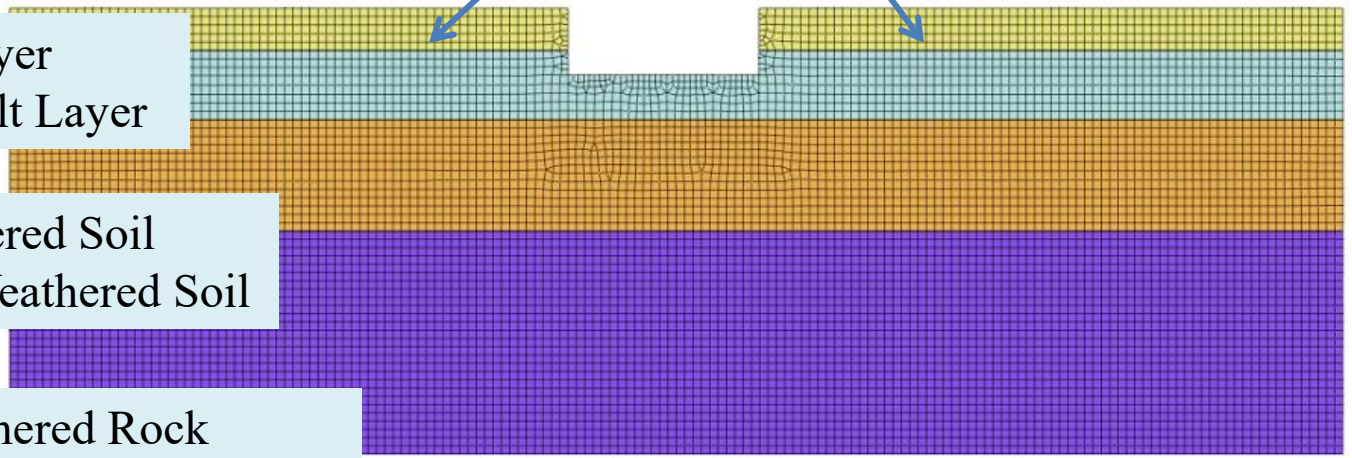
Mesh Size: 1.5 / Shared Nodes

Alluvial Layer
Property: Alluvial Layer

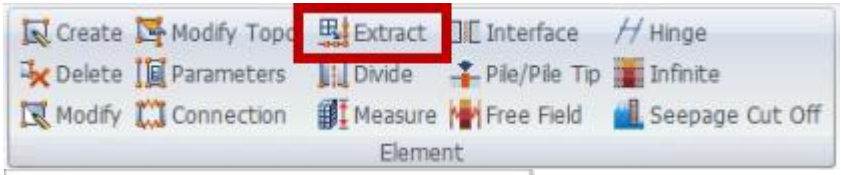
Silt Layer
Property: Silt Layer

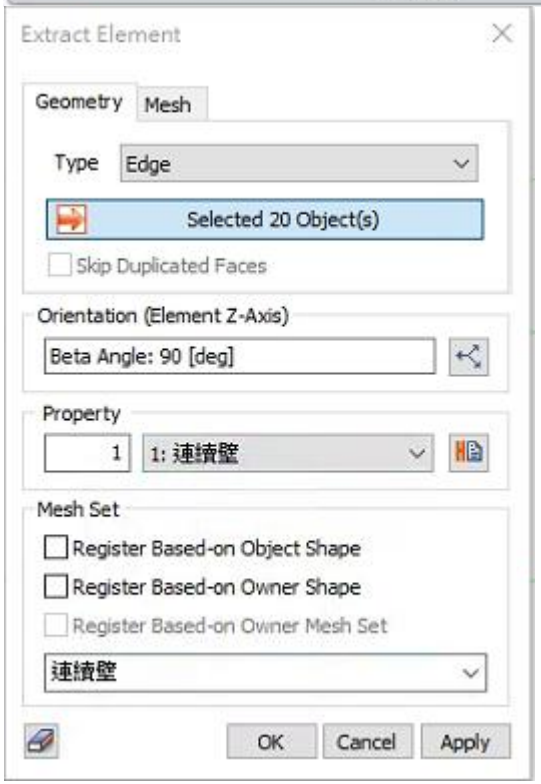
Weathered Soil
Property: Weathered Soil

Weathered Rock
Property: Weathered Rock



DIAPHRAGM WALL EXTRACTION AND GENERATION

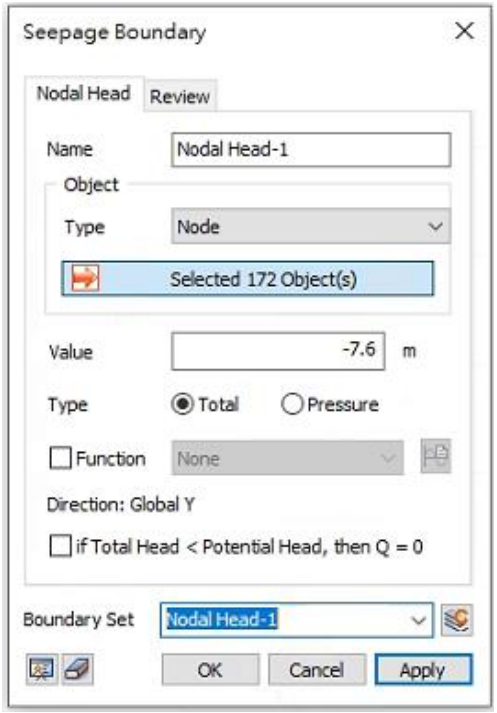




Extract Nodes on Edge Features as Beam Elements

水頭 | WATER HEAD

Association Between Elements and Geometric Features Exists; Nodes Can Be Selected via Geometric Features

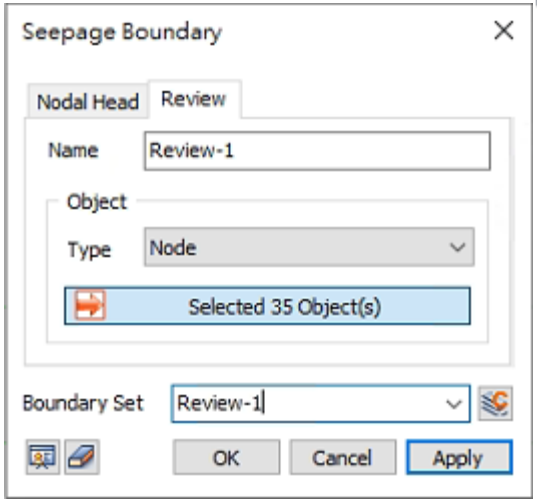


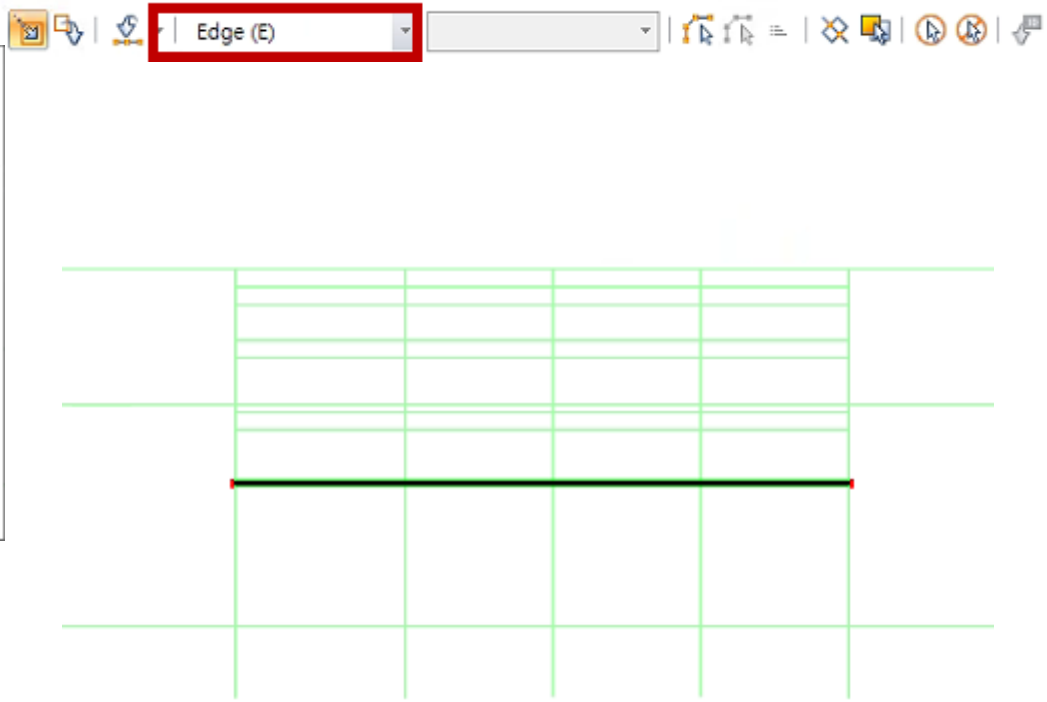
水位高度-7.6(m)

註:初始水頭也可

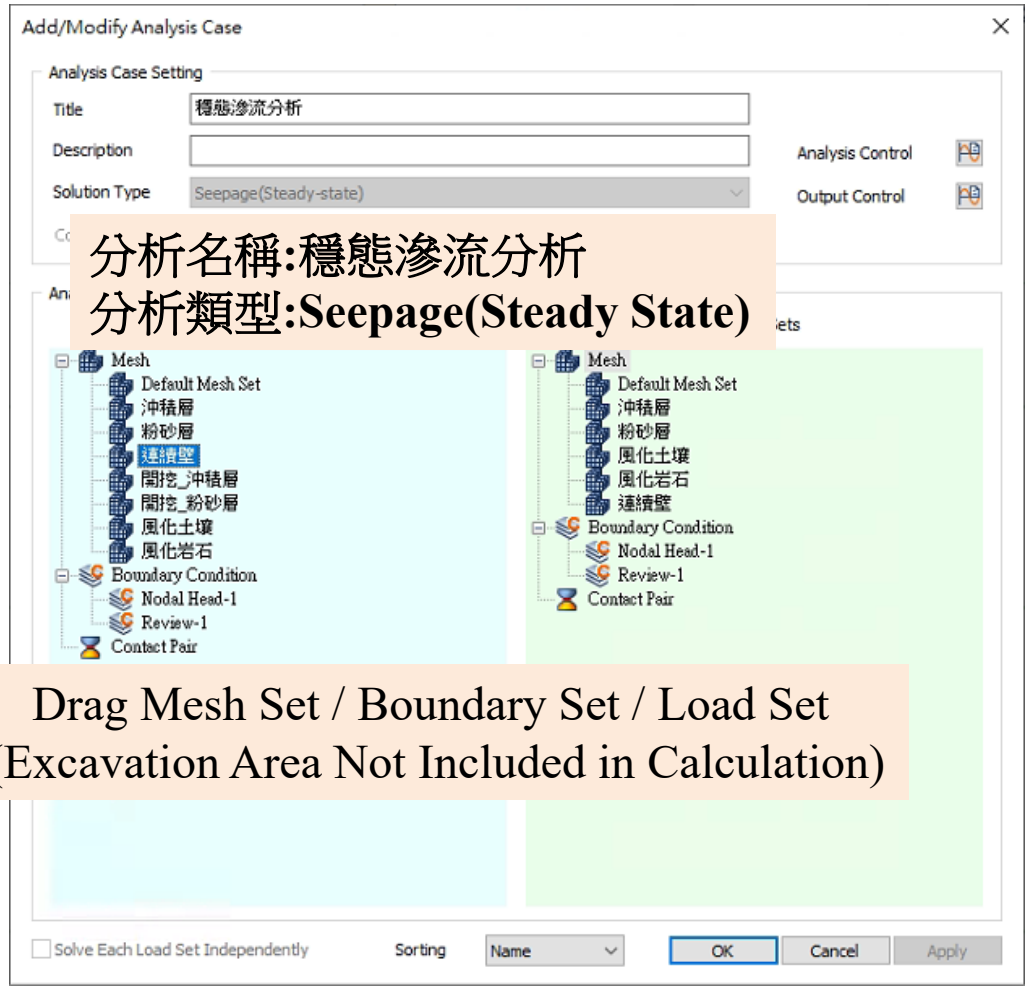
滲流面 | REVIEW/ SEEPAGE

Association Between Elements and Geometric Features Exists; Nodes Can Be Selected via Geometric Features



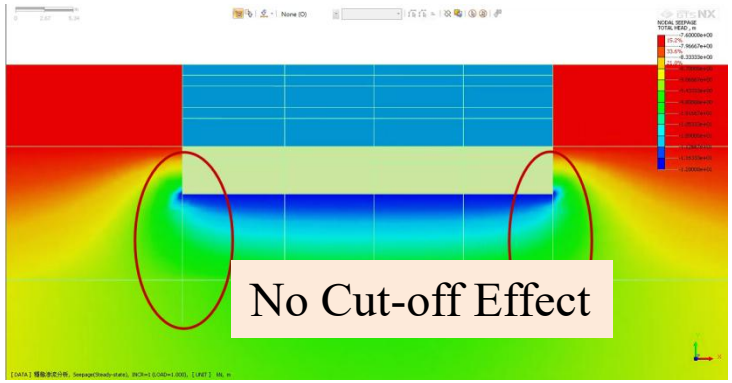


Steady-State Seepage Analysis (Diaphragm Wall Nodes Connected)

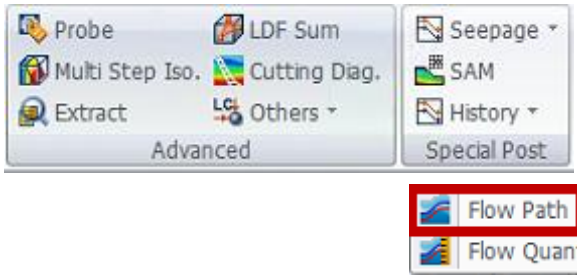


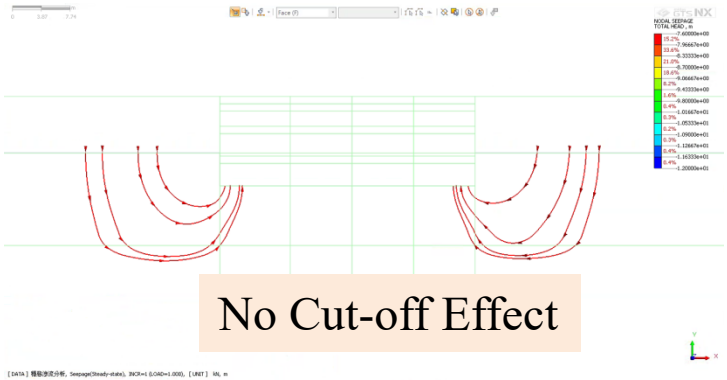
RESULT ANALYSIS

Total Head (m)



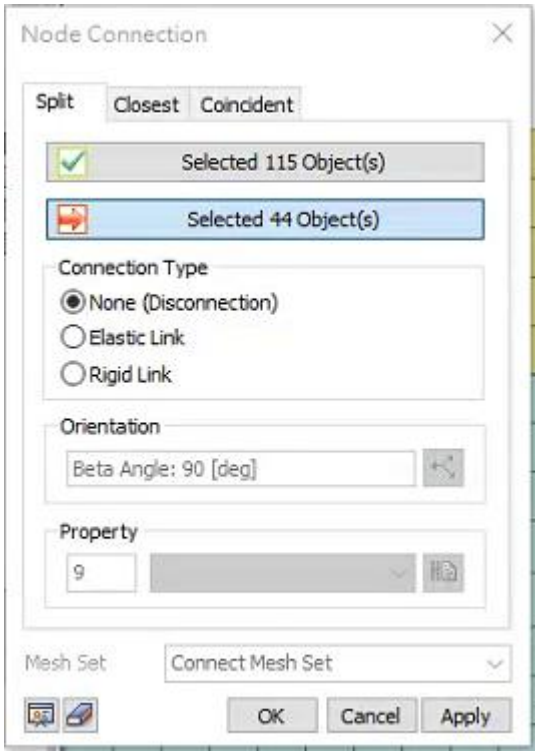
Flow Line Distribution

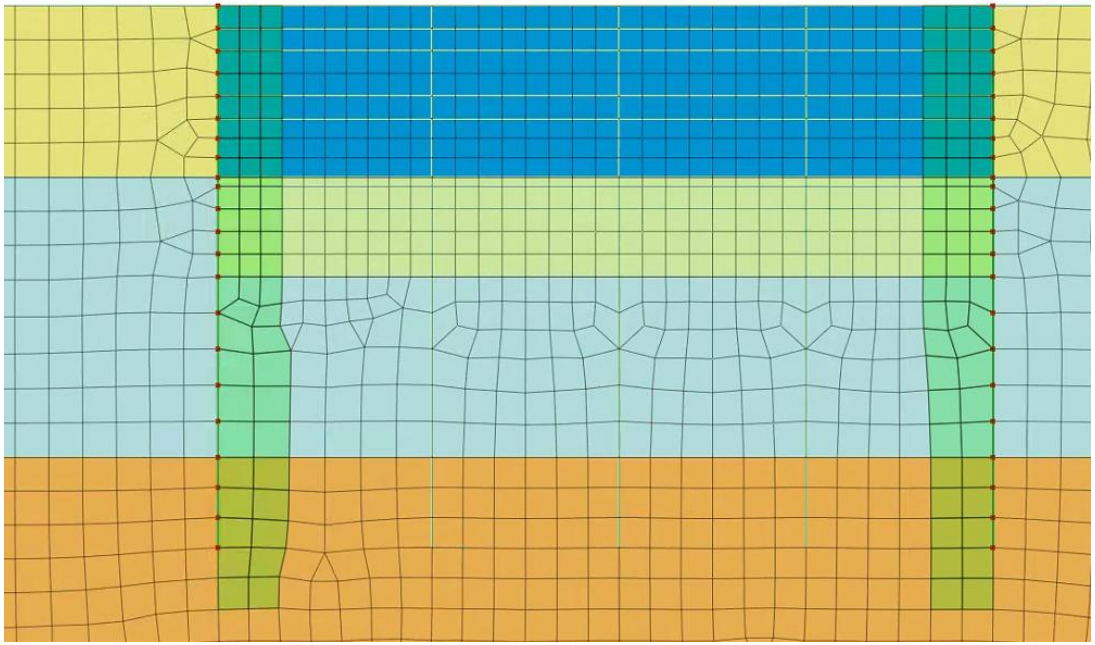




NODE CONNECTION

First Select Elements Around the Diaphragm Wall, Then Select Nodes on the Diaphragm Wall





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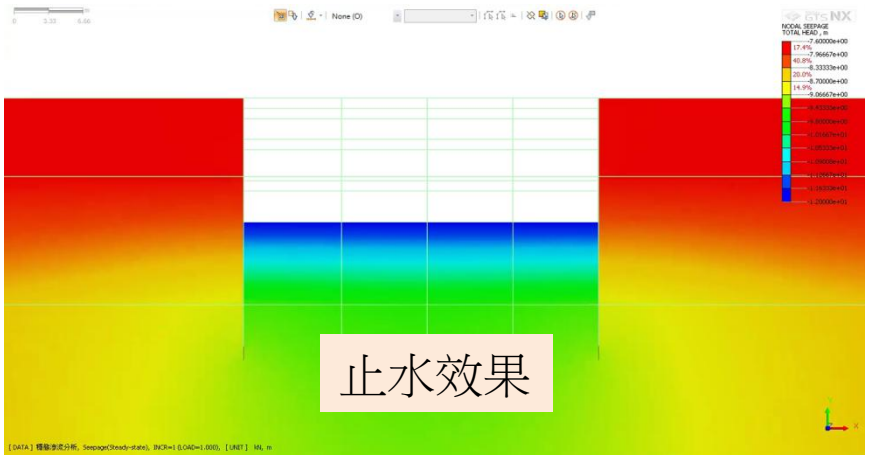
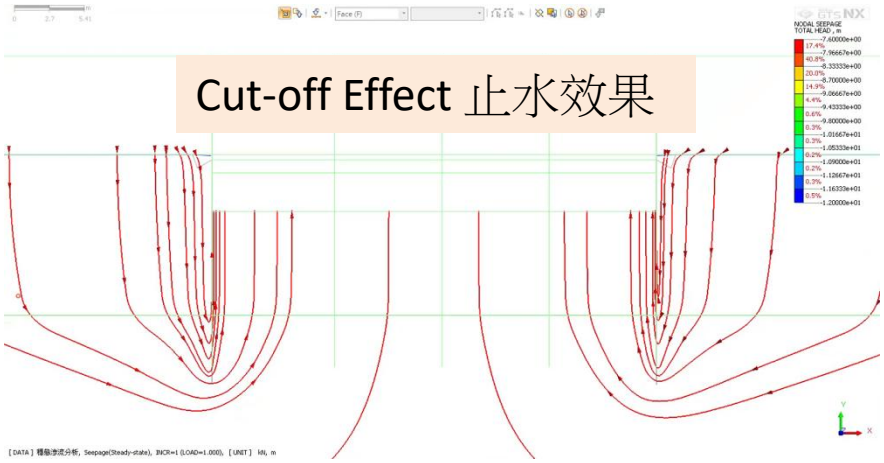
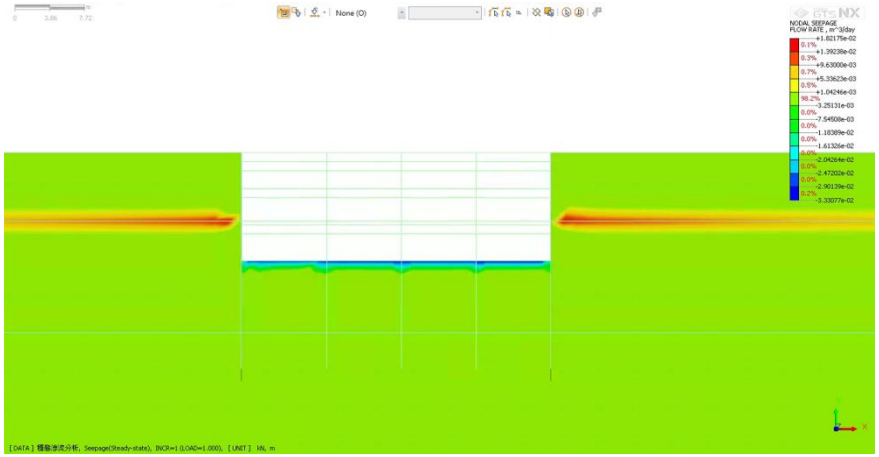


流線分布

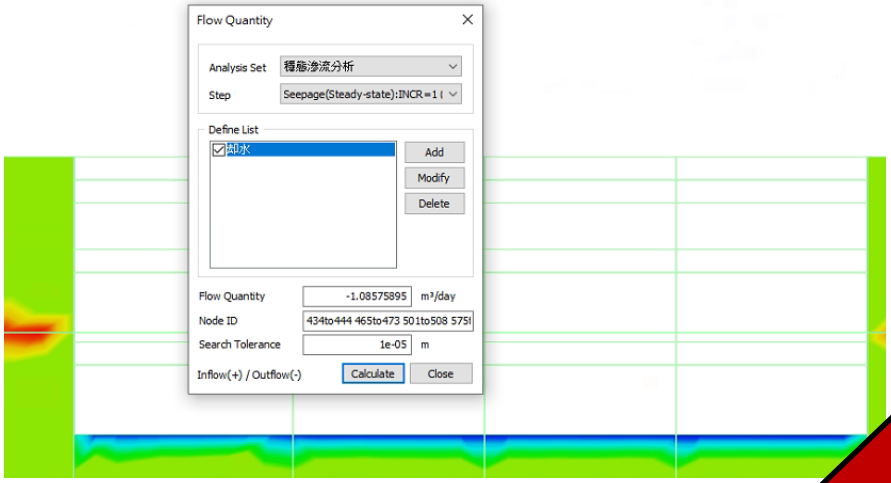


RESULT ANALYSIS

Flow Rate (m^3/day)



Seepage / Pumping Volume Calculation (m^3/day)



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COUPLED STRESS-SEEPAGE Analysis of a Retaining Wall

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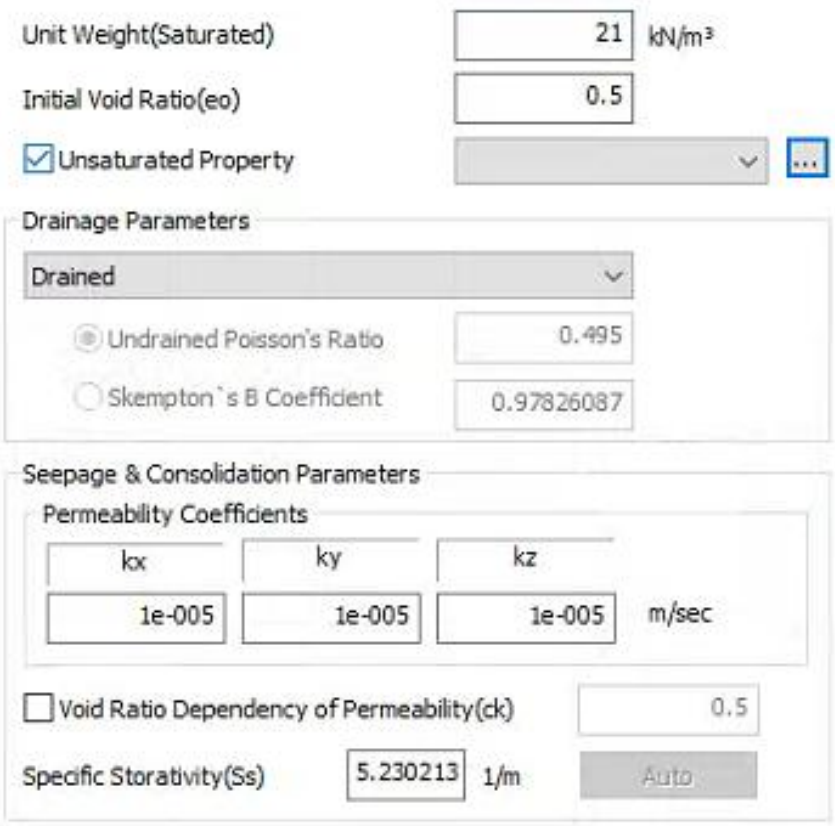

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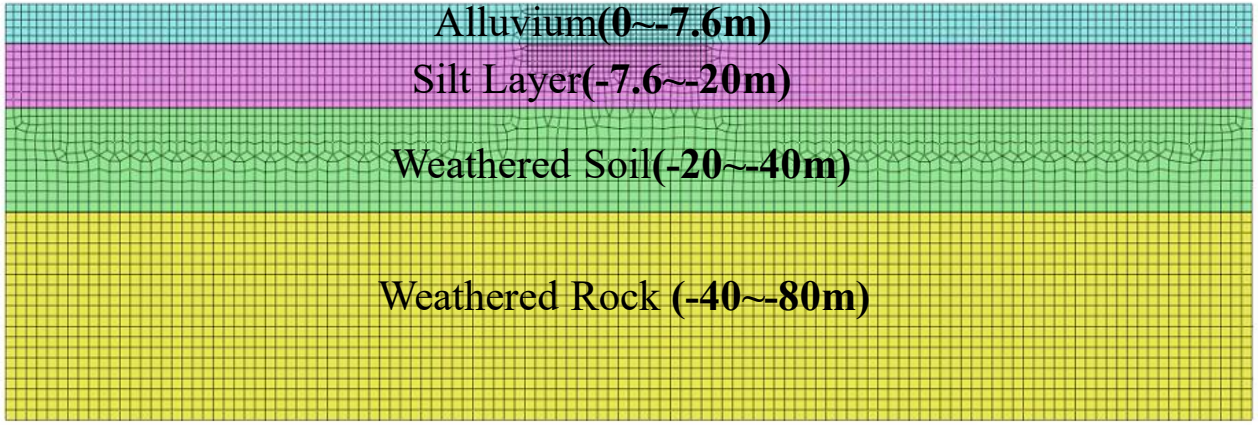
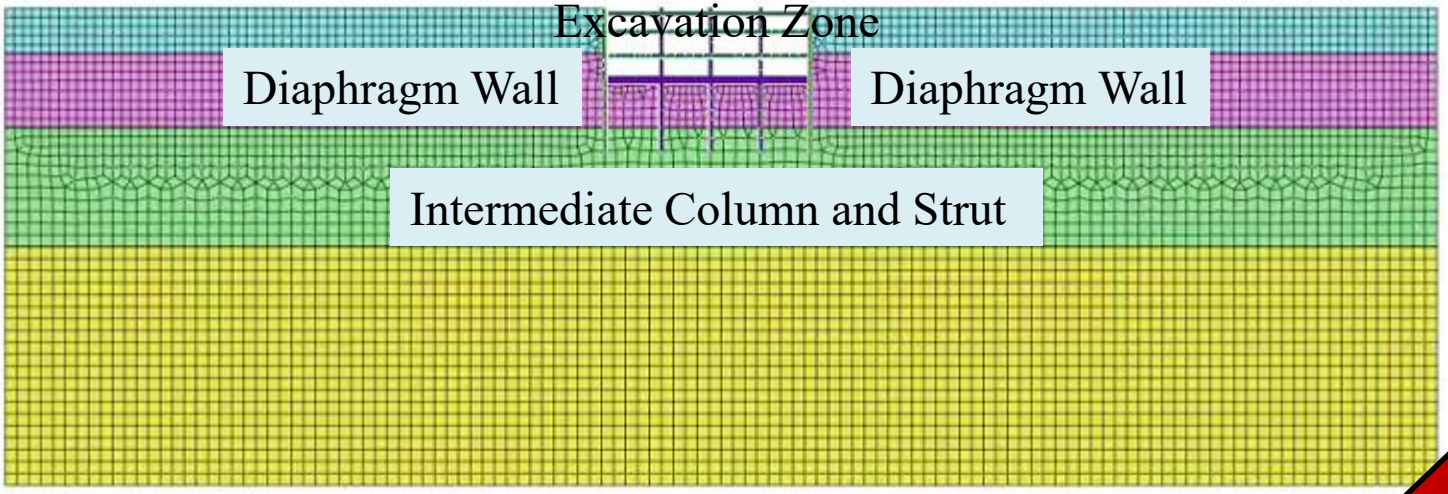
DEEP EXCAVATION | PROBLEM ANALYSIS

PRE-CONSTRUCTION STAGE



POST-CONSTRUCTION STAGE



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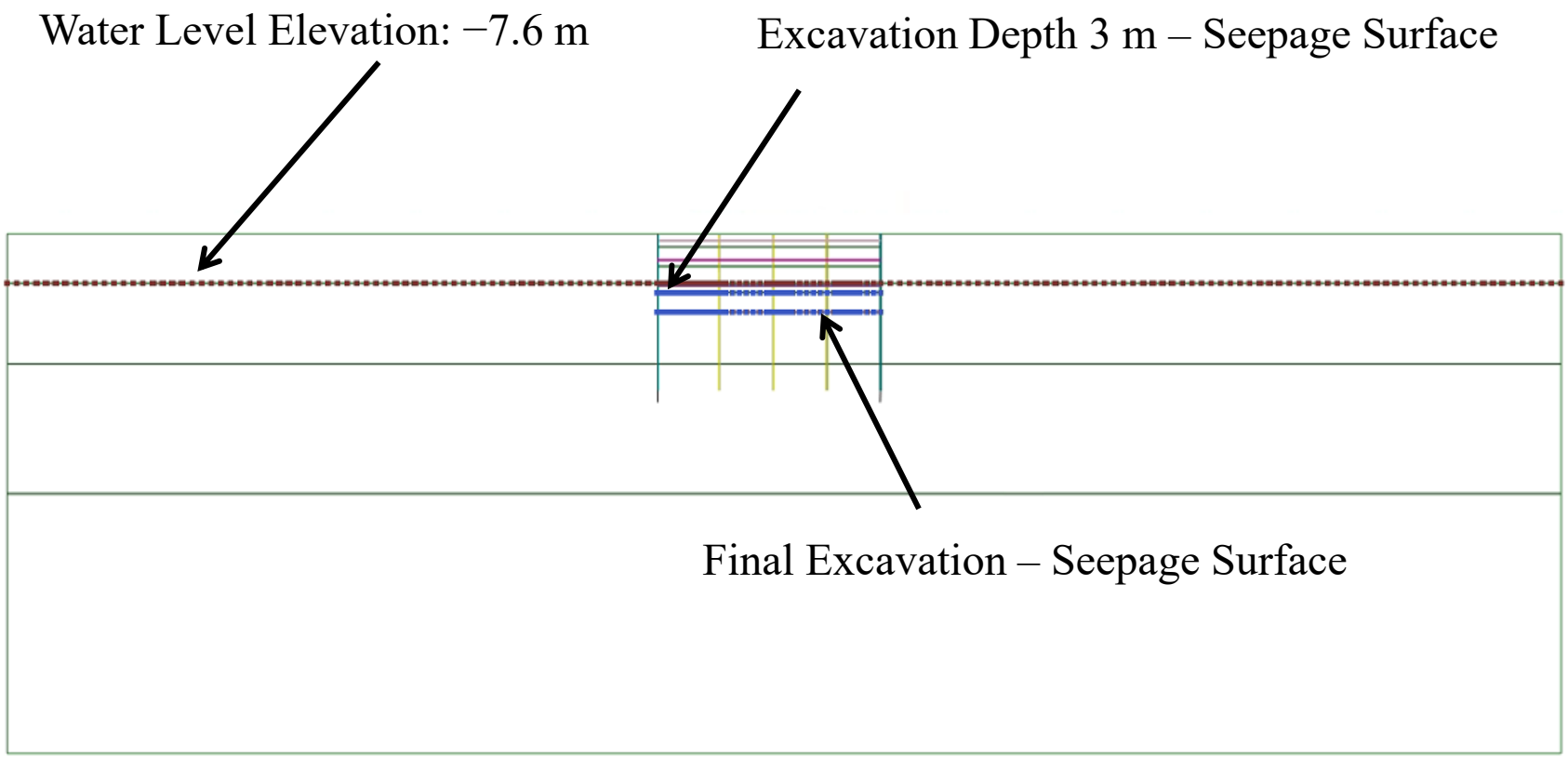

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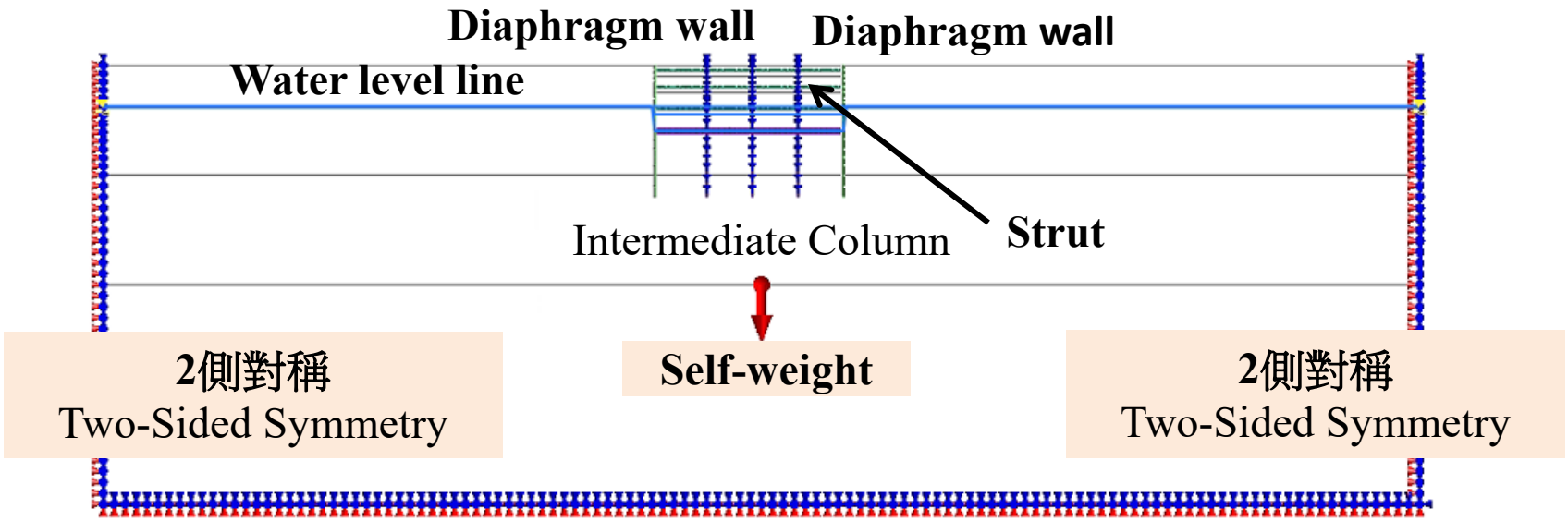
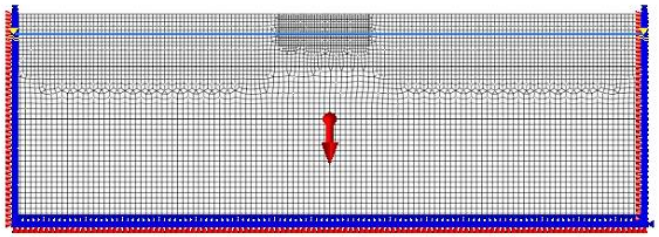
CONSTRUCTION STAGES

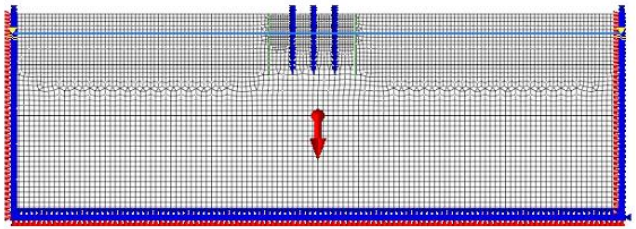


Bottom Boundary Constraint – Tx / Ty

Stage 0: Pre-Construction

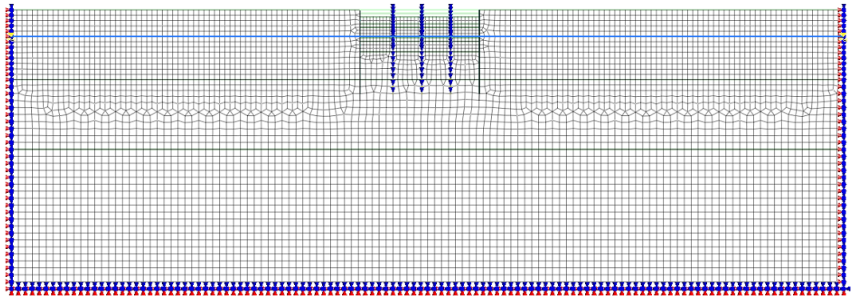


Stage1: Construction of Diaphragm Wall (24 m) and Intermediate Columns

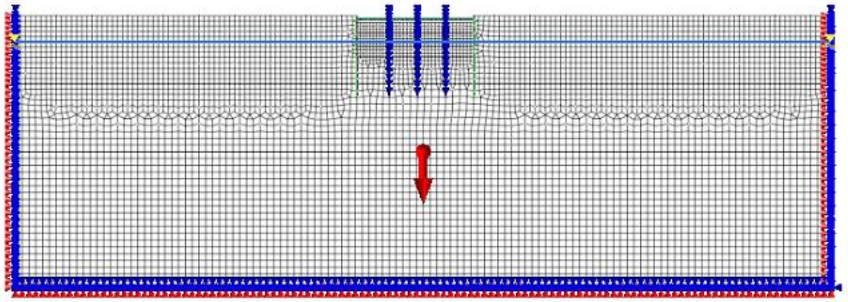


CONSTRUCTION STAGES

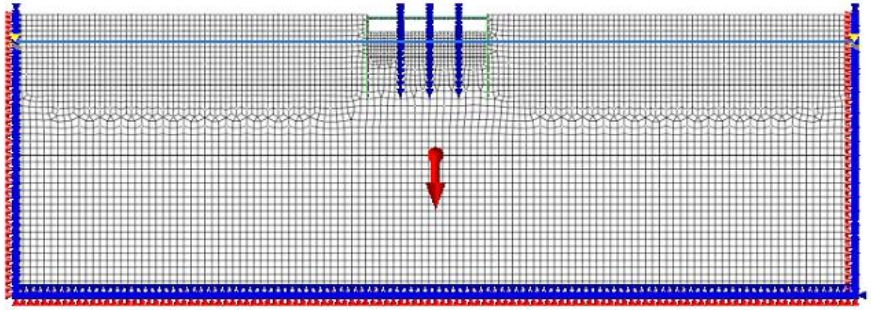
Stage 2: Excavation 1 (excavation depth −2 m)



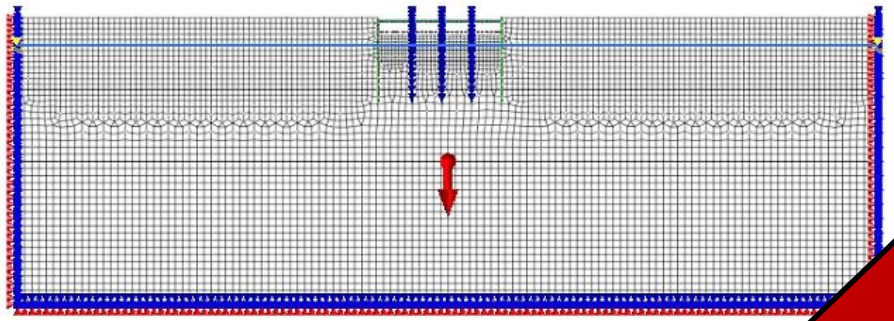
Stage 3: Horizontal Strut 1 (elevation −1 m)



Stage 4: Excavation 2 (excavation depth −5 m)

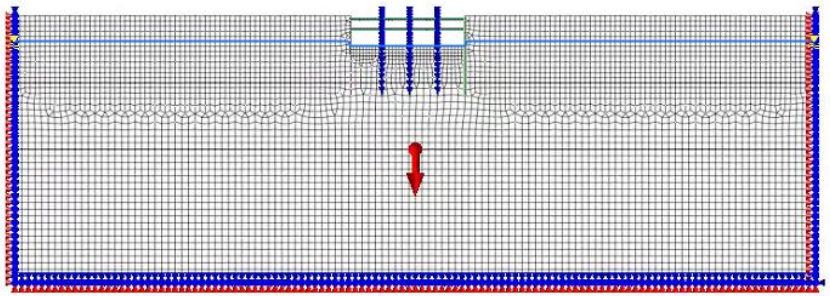


Stage 5: Horizontal Strut 2 (elevation −4 m)

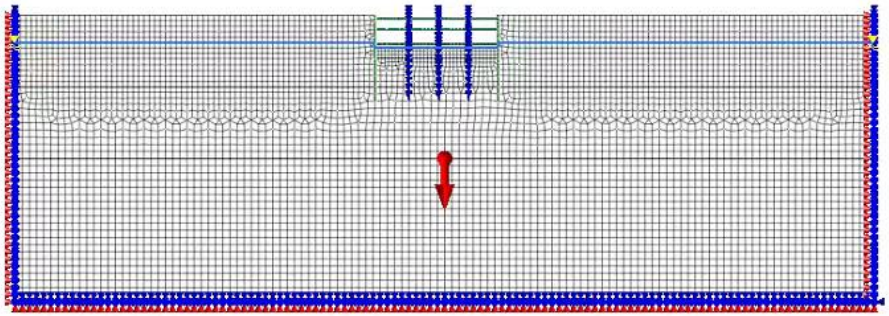


CONSTRUCTION STAGES

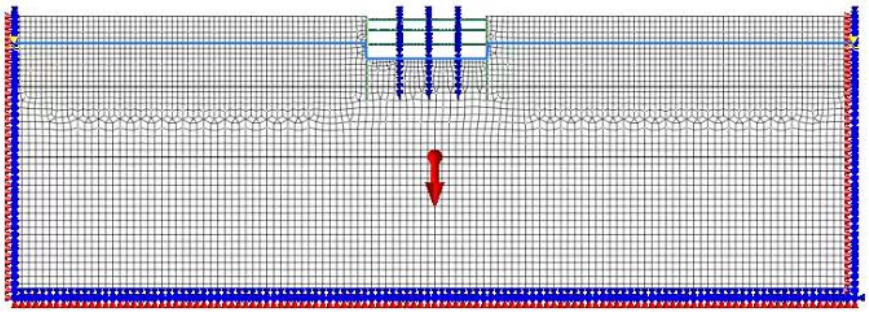
Stage 6: Excavation 3 (excavation depth −9 m)



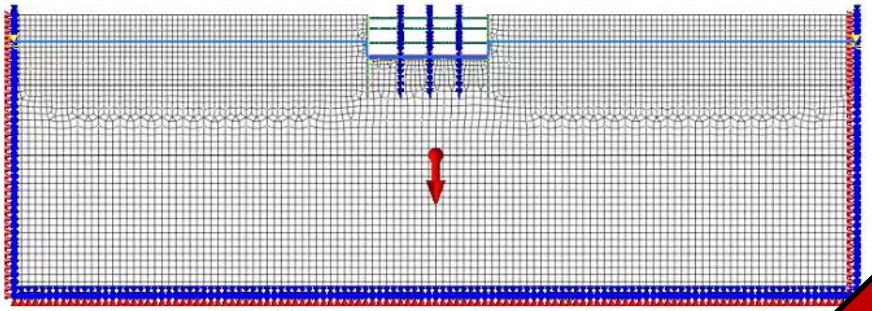
Stage 7: Horizontal Strut 3 (elevation −8 m)



Stage 8: Final Excavation (−12 m)



Stage 9: Raft foundation slab–beam (t = 1 m)

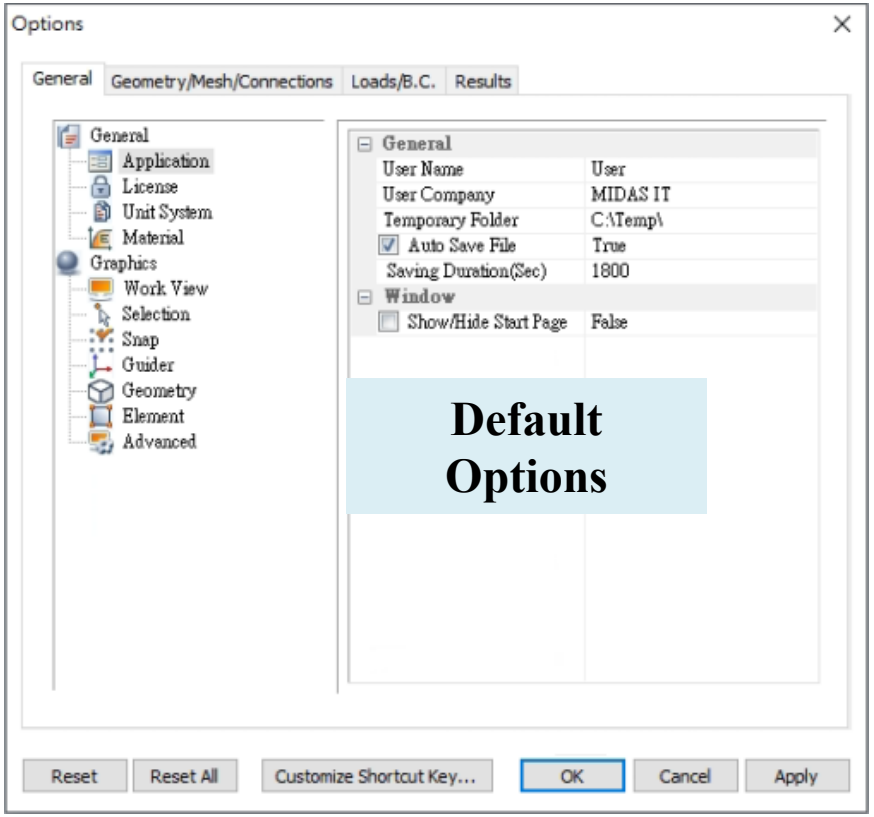


Part 1
2D SOIL STRATIFICATION MODEL

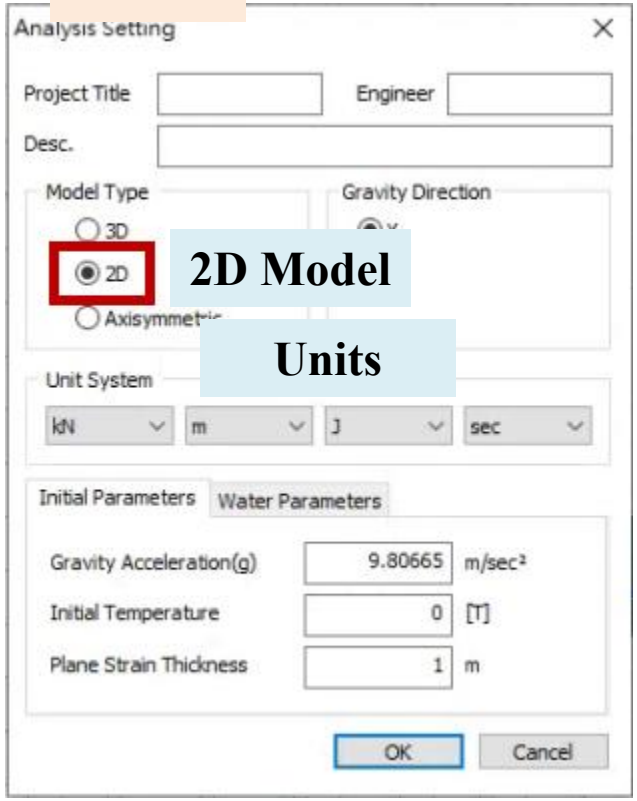
台灣邁達斯

OPTIONS AND SETTINGS

New



Default Options

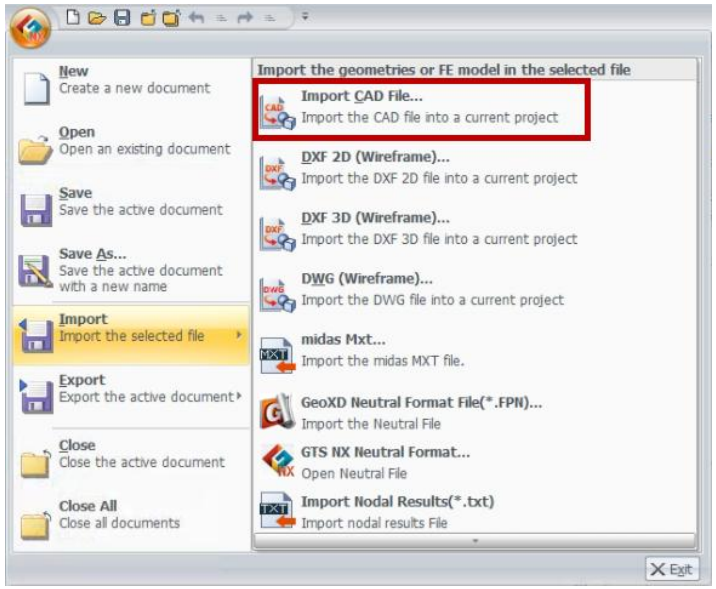


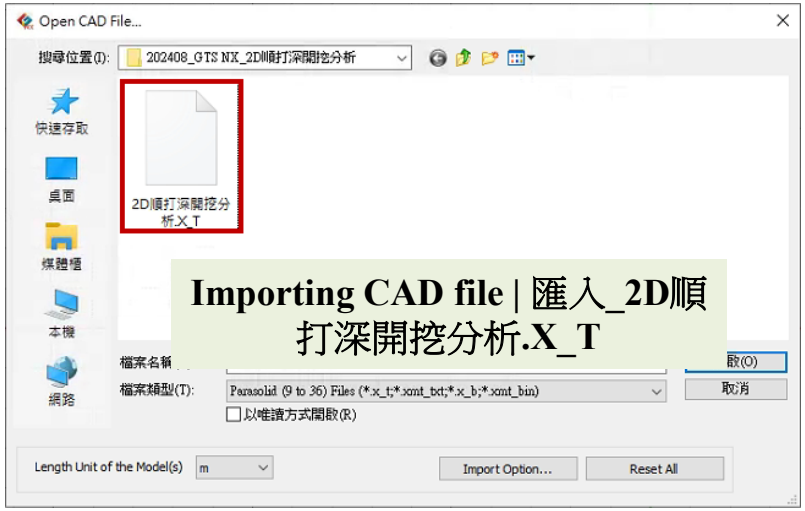
2D Model

Units

單位使用KN/m/J/sec

MODEL IMPORT



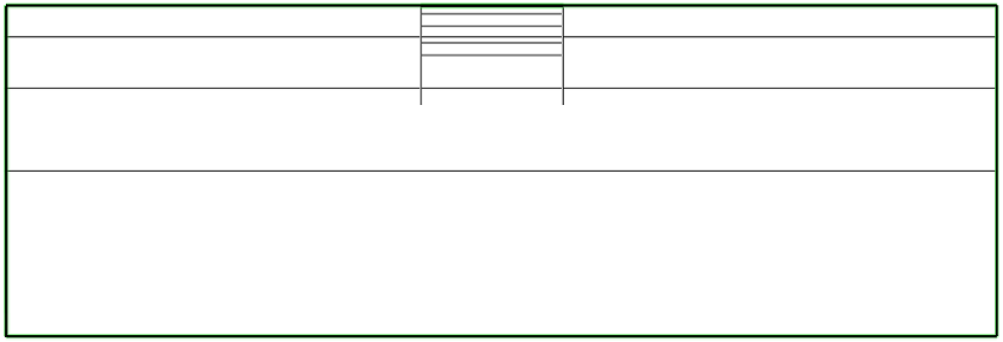


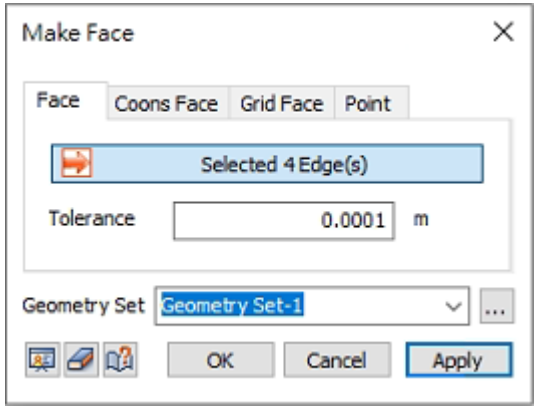
Importing CAD file | 匯入_2D順打深開挖分析.X_T

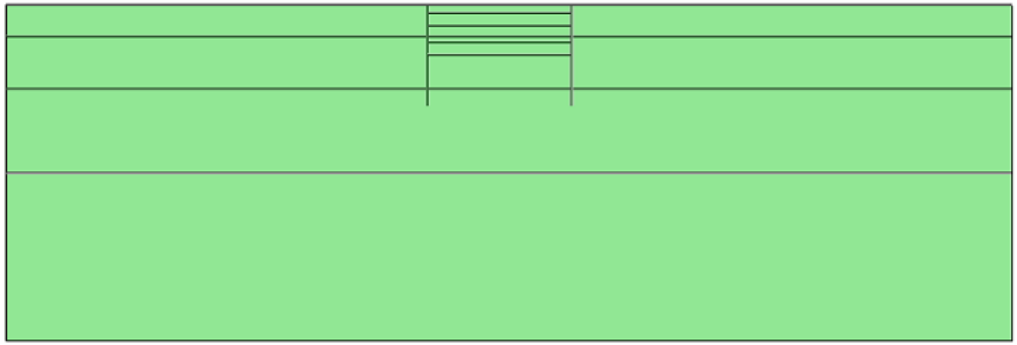
註:支援匯入DWG/DXF線模型

MAKE FACE

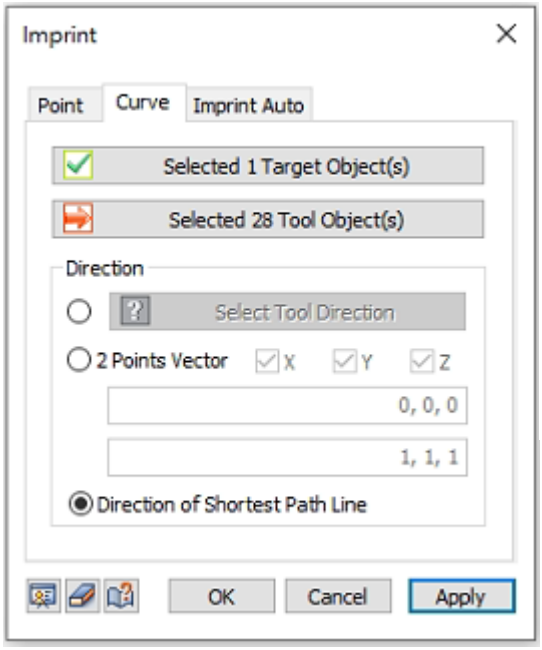
Selecting Closed Line Features





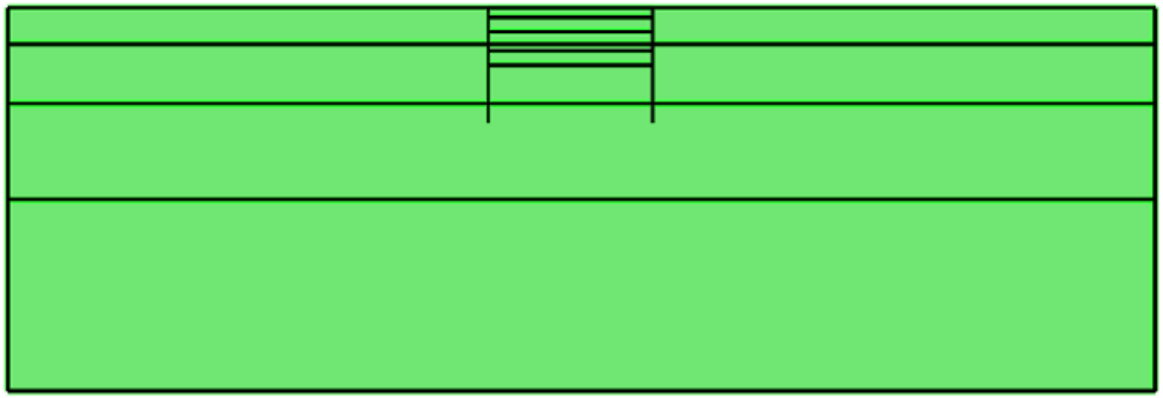


IMPRINT



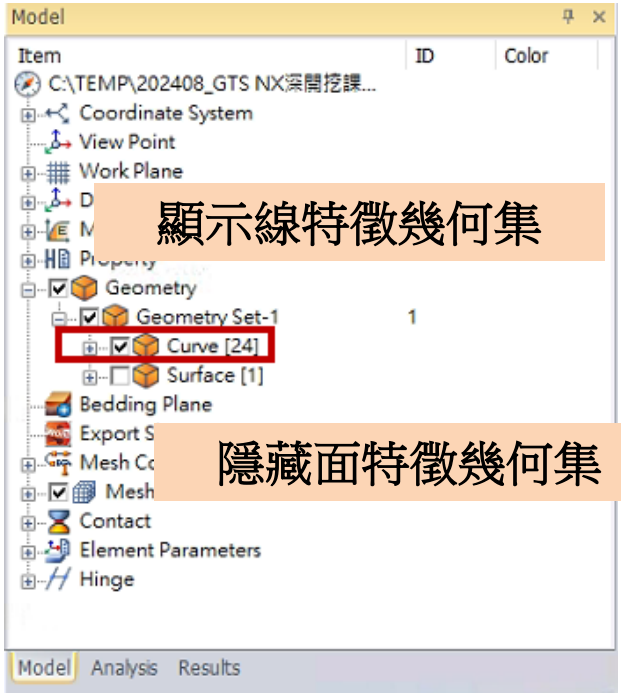
Use Shortest Distance Projection Feature

Target Object:選取特徵面



Tool Object:選取所有線特徵

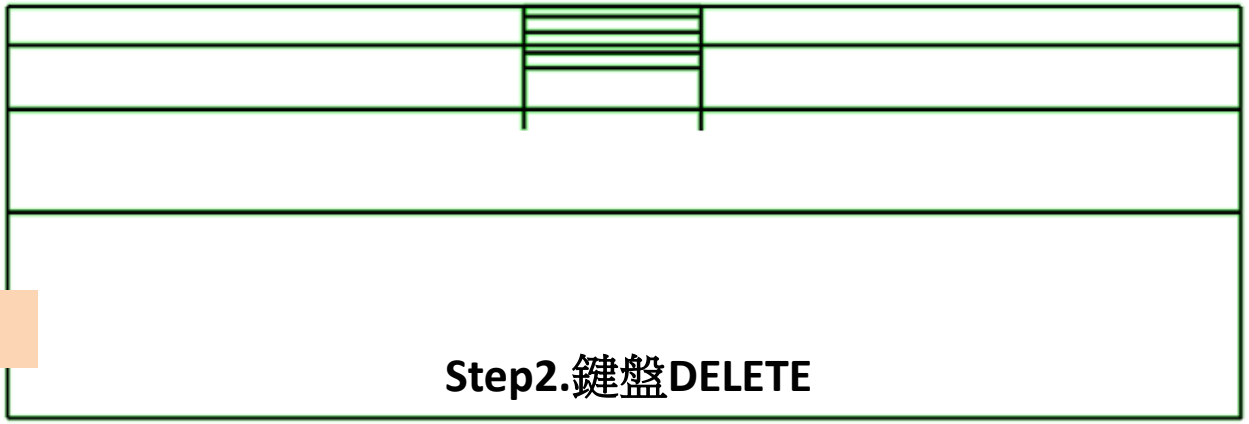
DELETING LINE GEOMETRY FEATURES



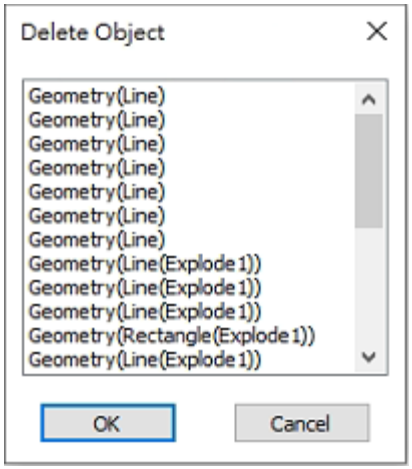
顯示線特徵幾何集

隱藏面特徵幾何集

Step1. Select All Line Features

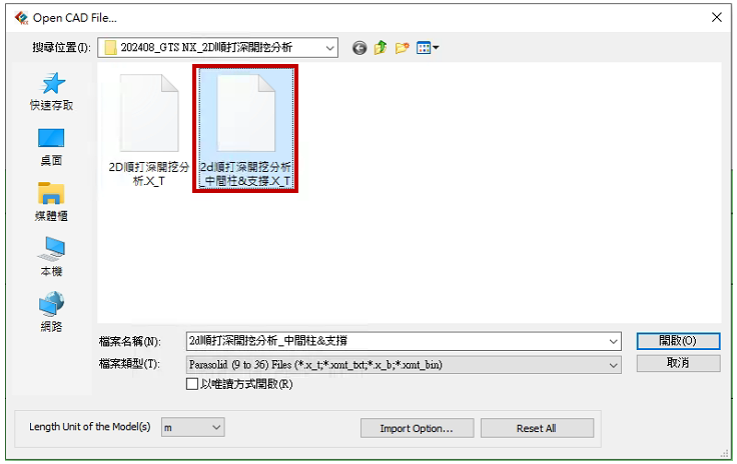


Step2.鍵盤DELETE

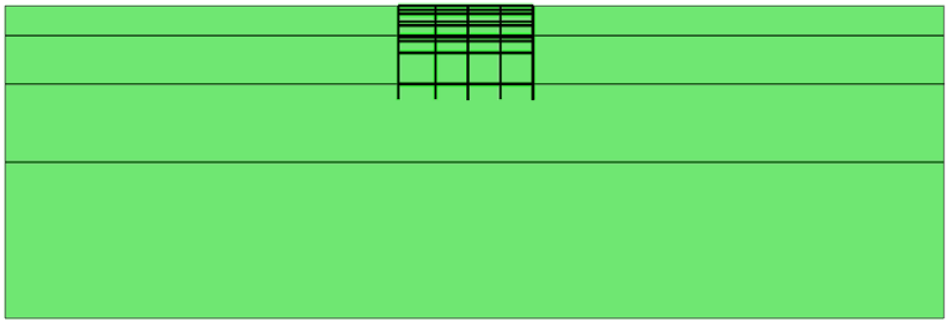


INTERMEDIATE COLUMNS & STRUTS

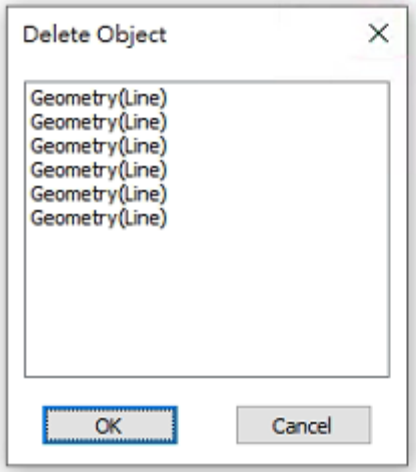
Step 1: Import _Intermediate Columns & Struts.X_T

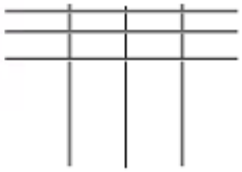


Step 2: Project Line Feature



Step 3: Delete Line Feature

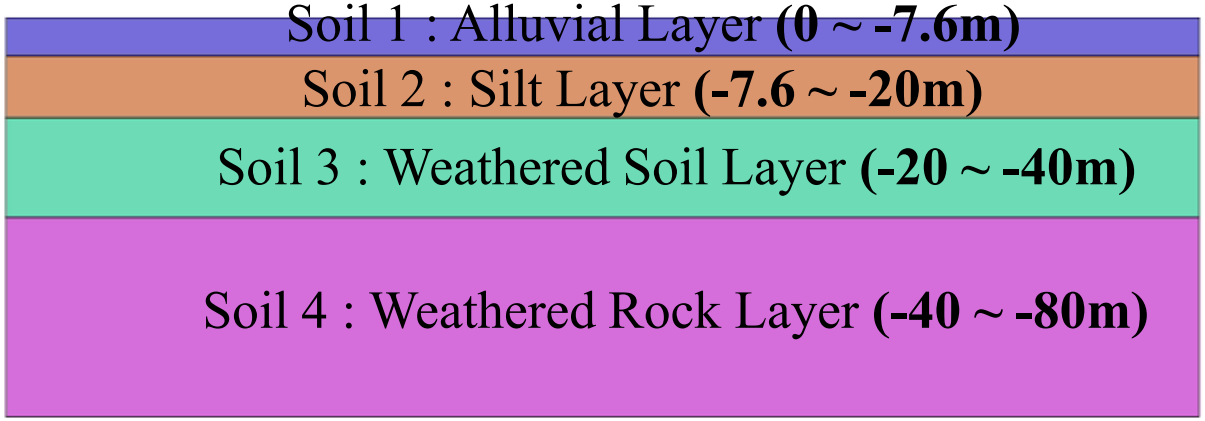




PART 2
SOIL FINITE ELEMENT MODEL

台灣邁達斯

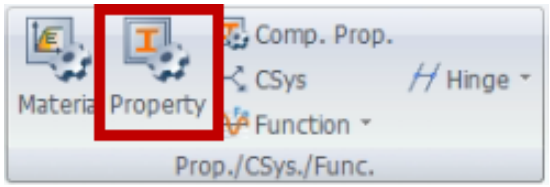
GEOTECHNICAL SOIL MATERIAL

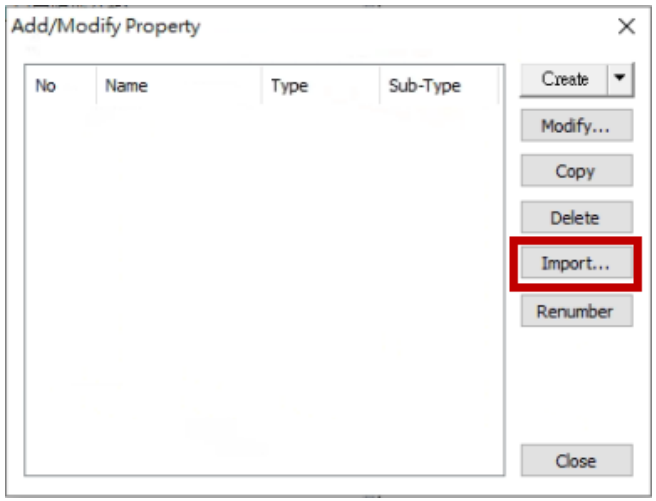


	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(v)	Unit Weight(γ) (KN/m^3)	Unit Weight (Saturated) (KN/m^3)	Cohesion(C) (KN/m^2)	Friction Angle(φ)
沖積層 Soil 1	8,000	0.35	17	18	15	20
粉砂層 Soil 2	19,500	0.3	17.65	18.65	10	30
風化土壌 Soil 3	36,500	0.33	18.5	19.5	17.5	31
風化岩 Soil 4	150,000	0.3	21	22	50	33

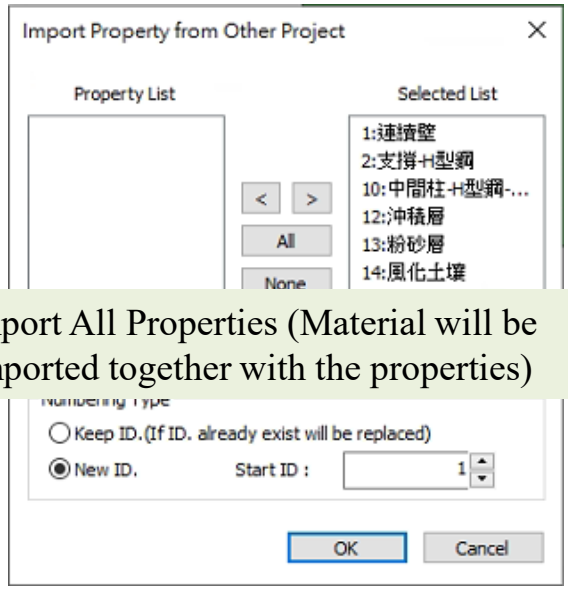
註:範例相關參數使用假設條件。

PROPERTY IMPORT





選擇_GTS深開挖_2D_MAT&Prop.gts



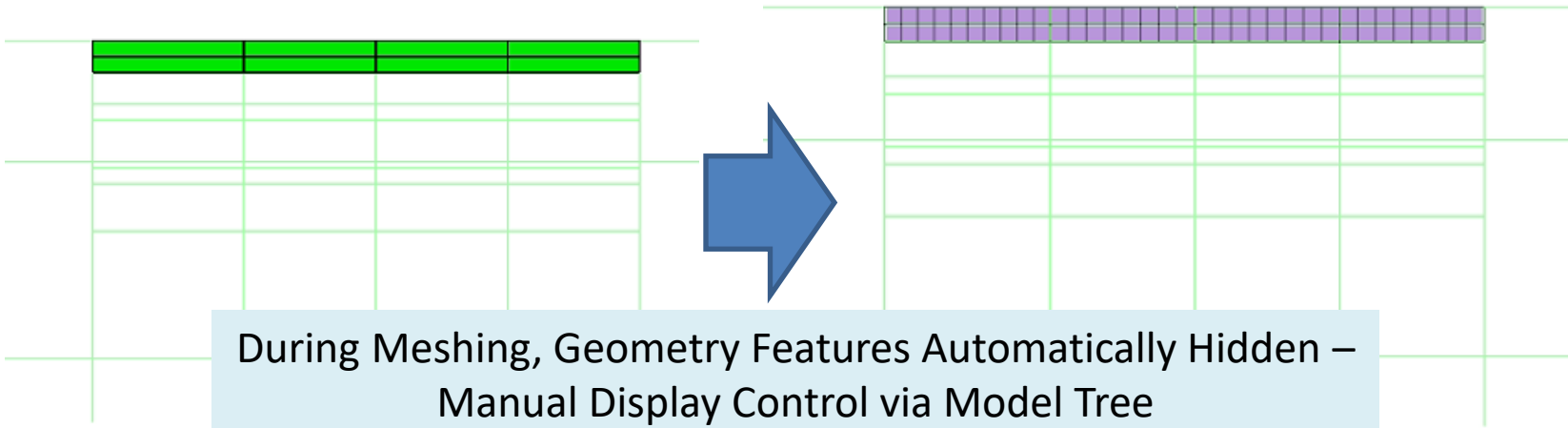
Import All Properties (Material will be imported together with the properties)

EXCAVATION AREA – 2D MESH

Adjacent Surface Features / Merge Nodes / Mesh Size: 1
(Disable Separate Mesh Set Creation)

Select Excavation 1_Soil1 Geometry Feature

Mesh Set Name: Excavation 1_Soil1

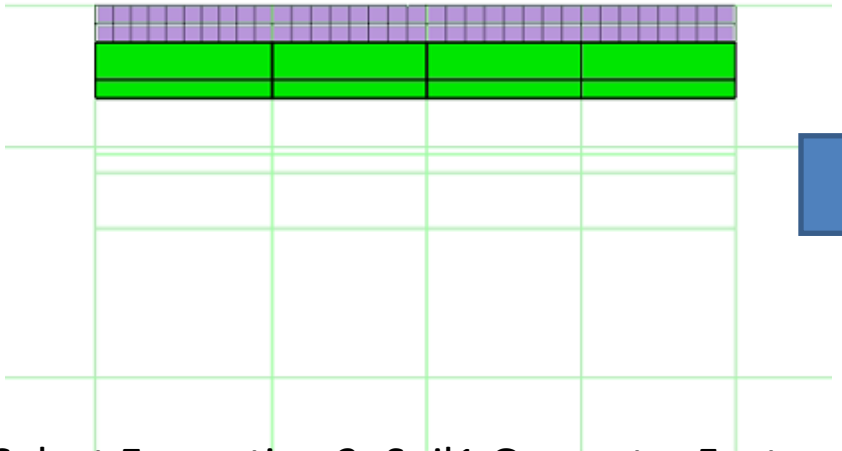


During Meshing, Geometry Features Automatically Hidden –
Manual Display Control via Model Tree

EXCAVATION AREA – 2D MESH

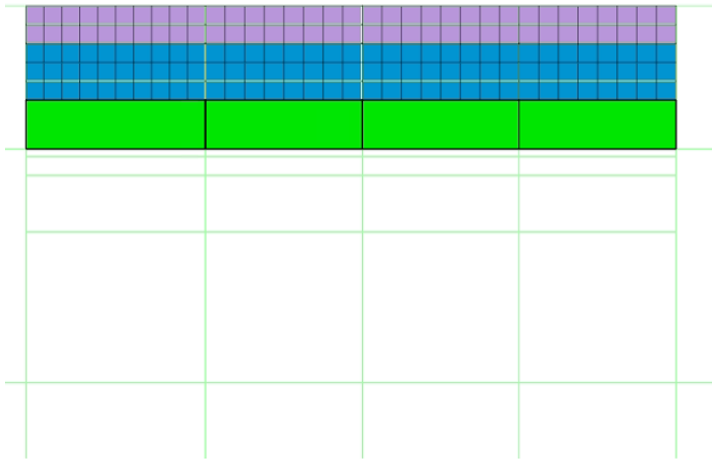
Adjacent Surface Features / Merge Nodes / Mesh Size: 1
(Disable Separate Mesh Set Creation)

Select Excavation 2_Soil1 Geometry Feature

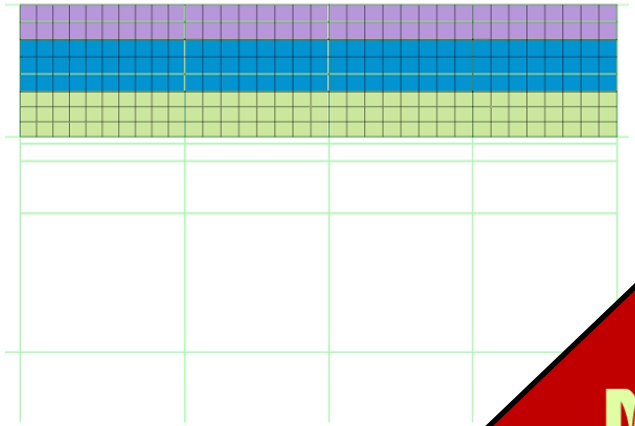


Mesh Set Name: Excavation 2_Soil1

Select Excavation 3_Soil1 Geometry Feature



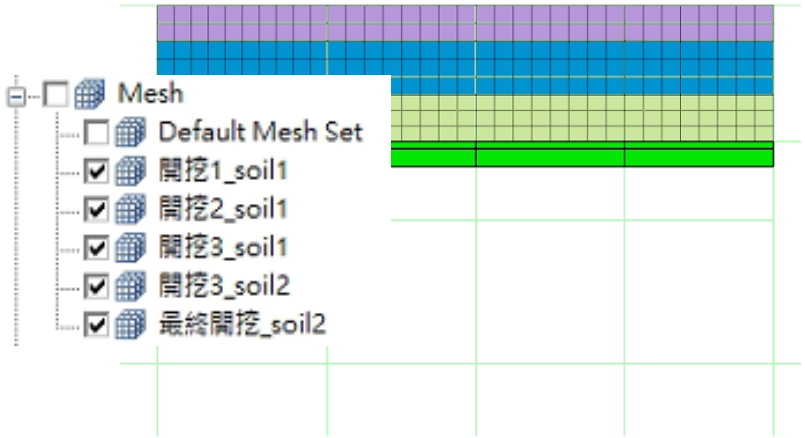
Mesh Set Name: Excavation 3_Soil1



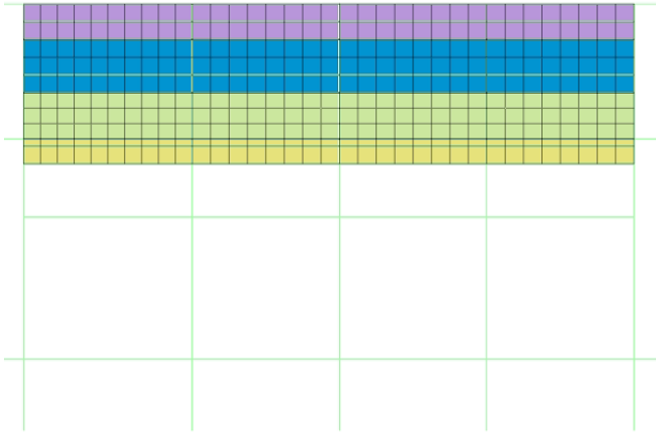
EXCAVATION AREA – 2D MESH

Adjacent Surface Features / Merge Nodes / Mesh Size: 1
(Disable Separate Mesh Set Creation)

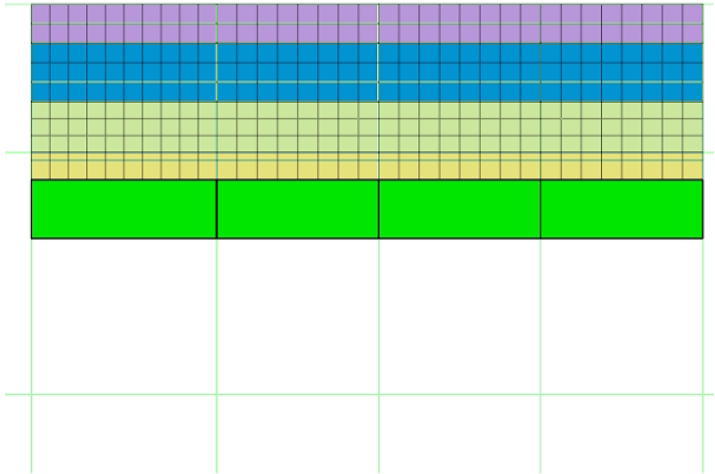
Select Excavation 3_Soil2 Geometry Feature



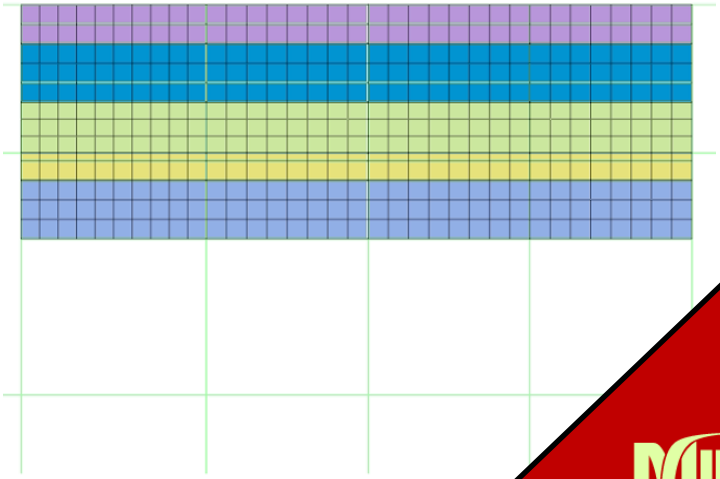
Mesh Set Name: Excavation 3_Soil2



Select Final Excavation_Soil2 Geometry Feature

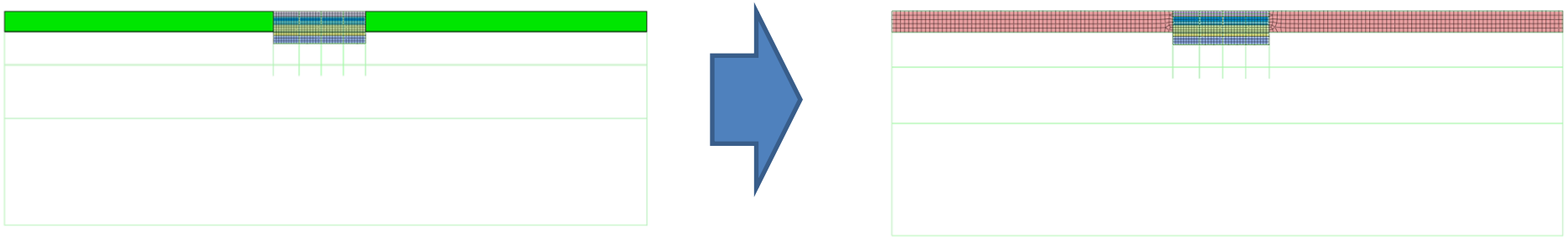


Mesh Set Name: Final Excavation_Soil2

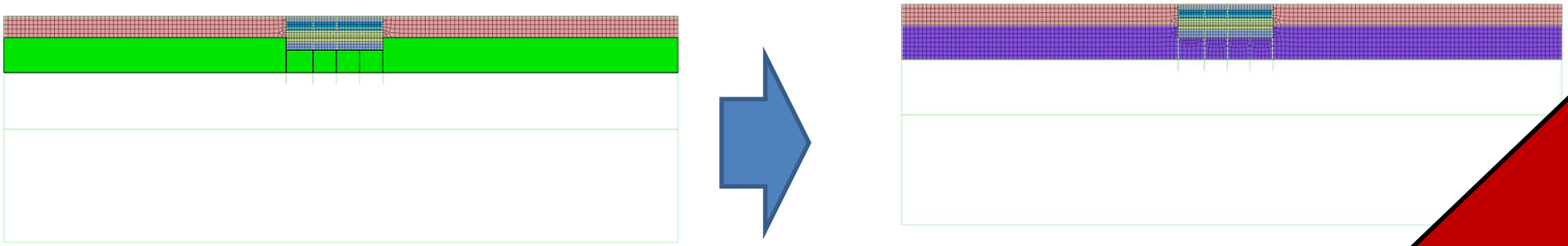


SURROUNDING SOIL – 2D MESH

Name: Soil 1 / Property: Alluvial Layer / Mesh Size: 1.5
Adjacent Surface Features / Merge Nodes / Disable
Separate Mesh Set Creation

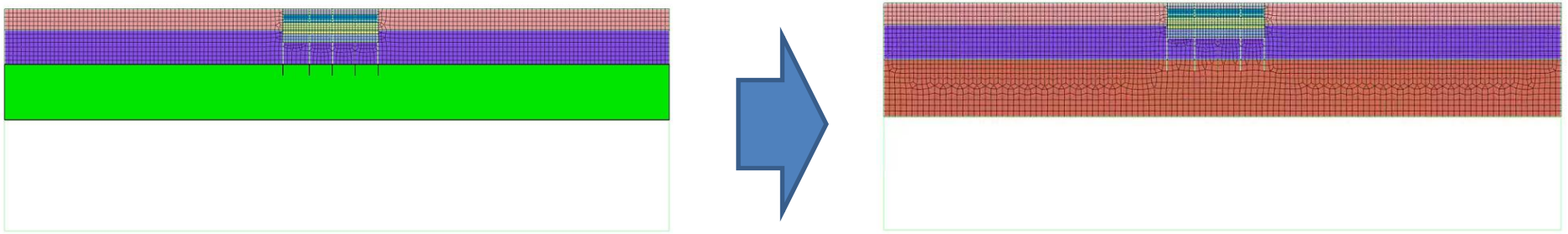


Name: Soil 2 / Property: Silty Layer / Mesh Size: 1.5
Adjacent Surface Features / Merge Nodes / Disable
Separate Mesh Set Creation

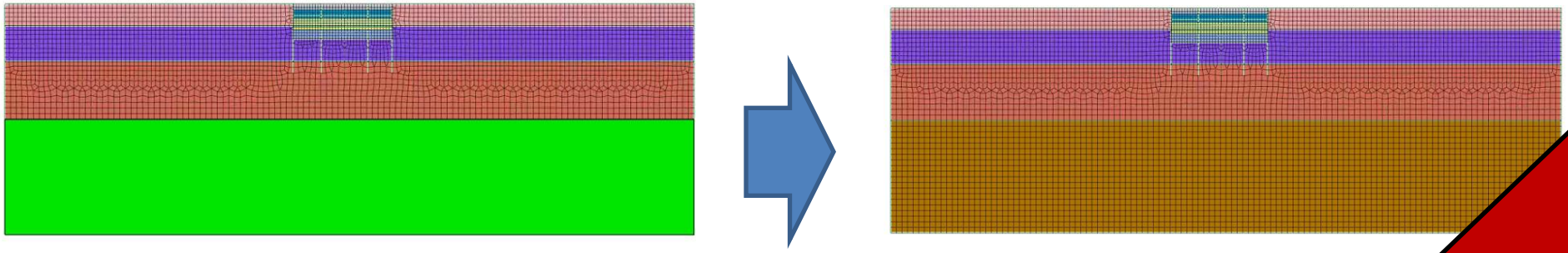


SURROUNDING SOIL – 2D MESH

Name: Soil 3 / Property: Weathered Soil / Mesh Size: 2
Adjacent Surface Features / Merge Nodes / Disable Separate Mesh Set Creation



Name: Soil 4 / Property: Weathered Rock / Mesh Size: 2
Adjacent Surface Features / Merge Nodes / Disable Separate Mesh Set Creation



PART 3
STRUCTURAL FINITE ELEMENT MODEL

台灣邁達斯

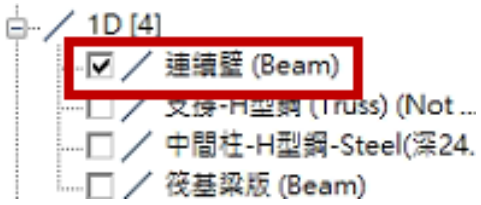
DIAPHRAGM WALL -1D BEAM

Use Edge Features to Extract 1D Elements for Diaphragm Wall

Name: Diaphragm Wall /
Property: Diaphragm Wall

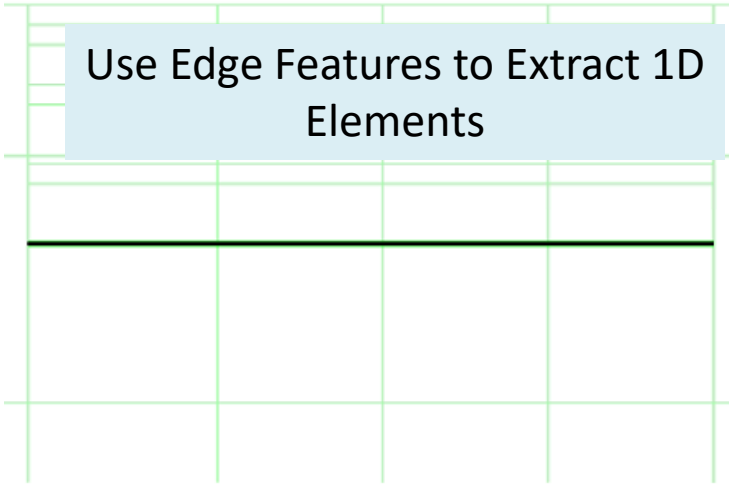
Property Checked: Display 1D Section (Thickness)

	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(v)	Unit Weight(γ) (KN/m^3)
C350	27,325,838	0.167	23.53596



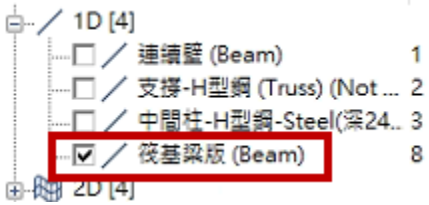
FOUNDATION SLAB -1D BEAM

Name: Raft Foundation Slab /
Property: Raft Foundation Slab



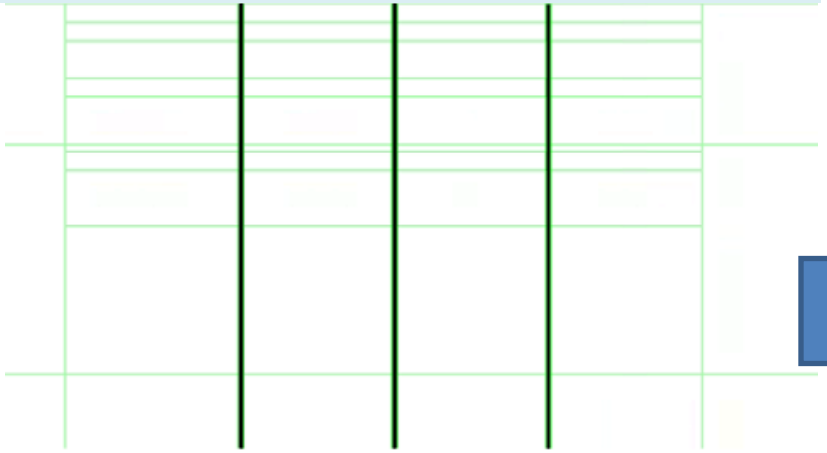
	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(v)	Unit Weight(γ) (KN/m^3)
C350	27,325,838	0.167	23.53596

Property Checked: Display 1D Section (Thickness)

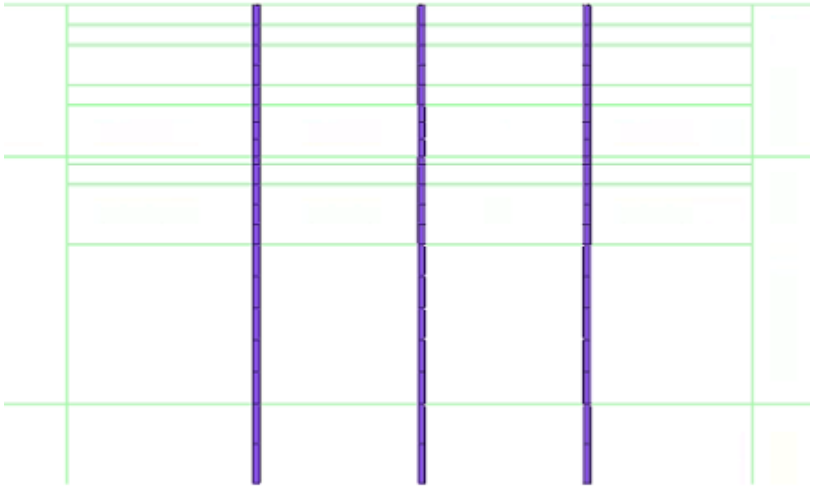


INTERMEDIATE COLUMN - 1D BEAM

Use Edge Features to Extract 1D Elements for Intermediate Columns

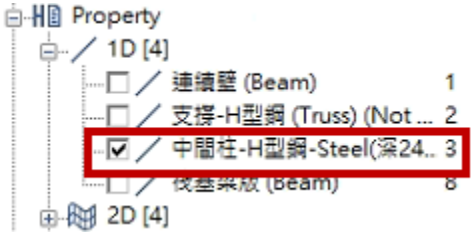


Intermediate Column **(深24m)**
(H350 ×250 ×12 ×19)-Beam



	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(ν)	Unit Weight(γ) (KN/m^3)
Steel	**210,000,000**	**0.3**	**77**

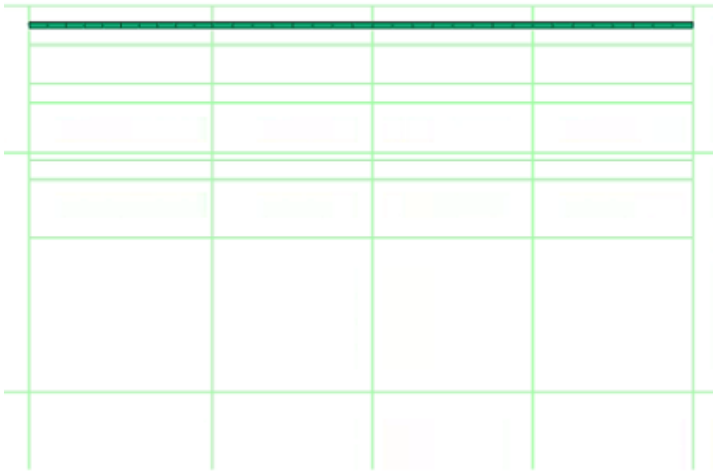
Property Checked: Display Beam Section



HORIZONTAL STRUT 1-1D TRUSS

Use Edge Features to Extract 1D Elements for Horizontal Strut 1

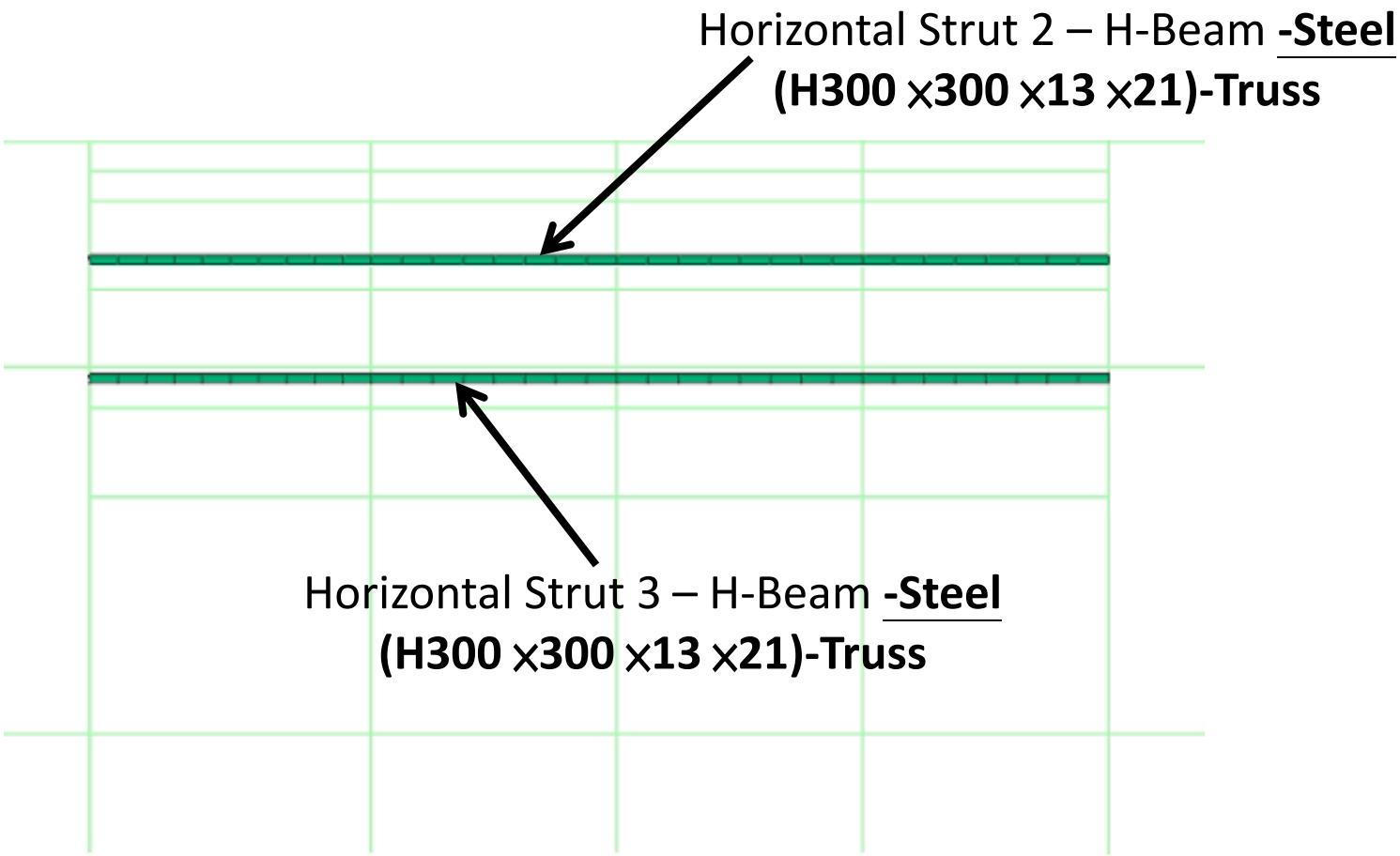
Horizontal Strut 1 – H-Beam **-Steel (H300 ×300 ×13 ×21)-Truss**



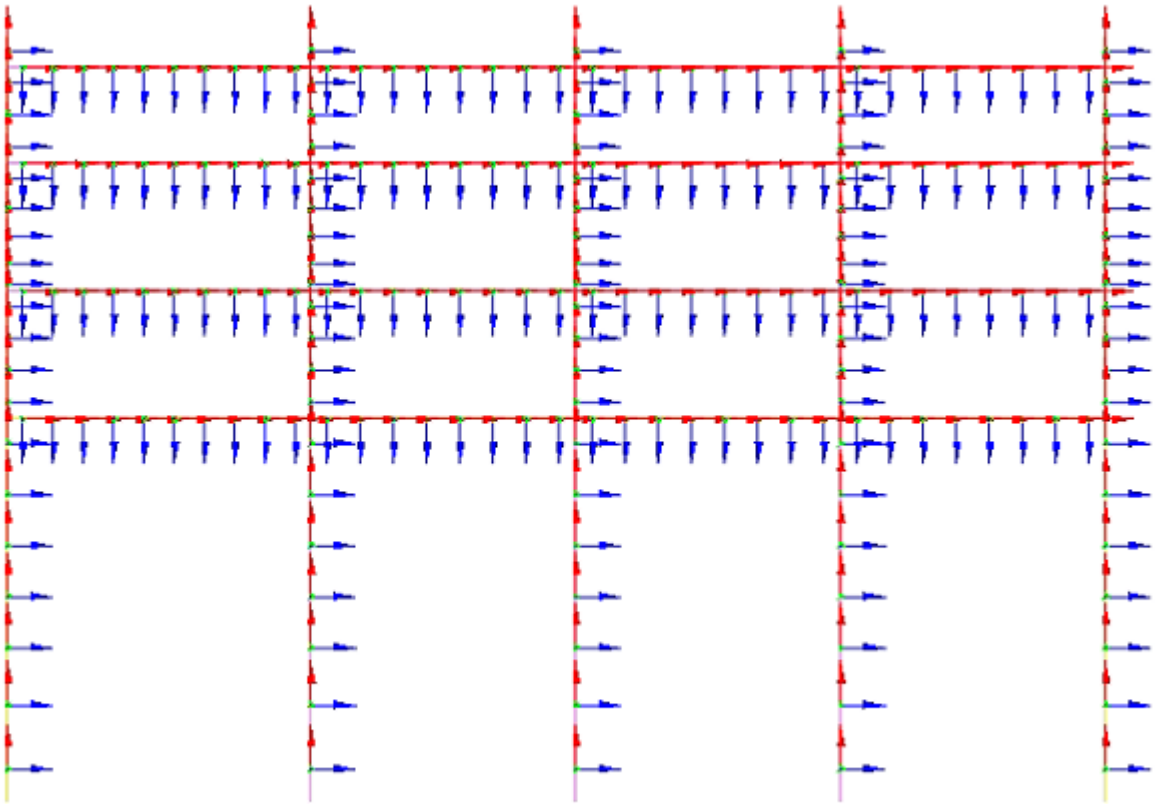
	Modulus of Elasticity(E) (KN/m^2)	Poisson's Ratio(ν)	Unit Weight(γ) (KN/m^3)
Steel	**210,000,000**	**0.3**	**77**

Property Checked: Display Truss Section

HORIZONTAL STRUT 2 3 - 1D TRUSS



ELEMENT ORIENTATION ADJUSTMENT

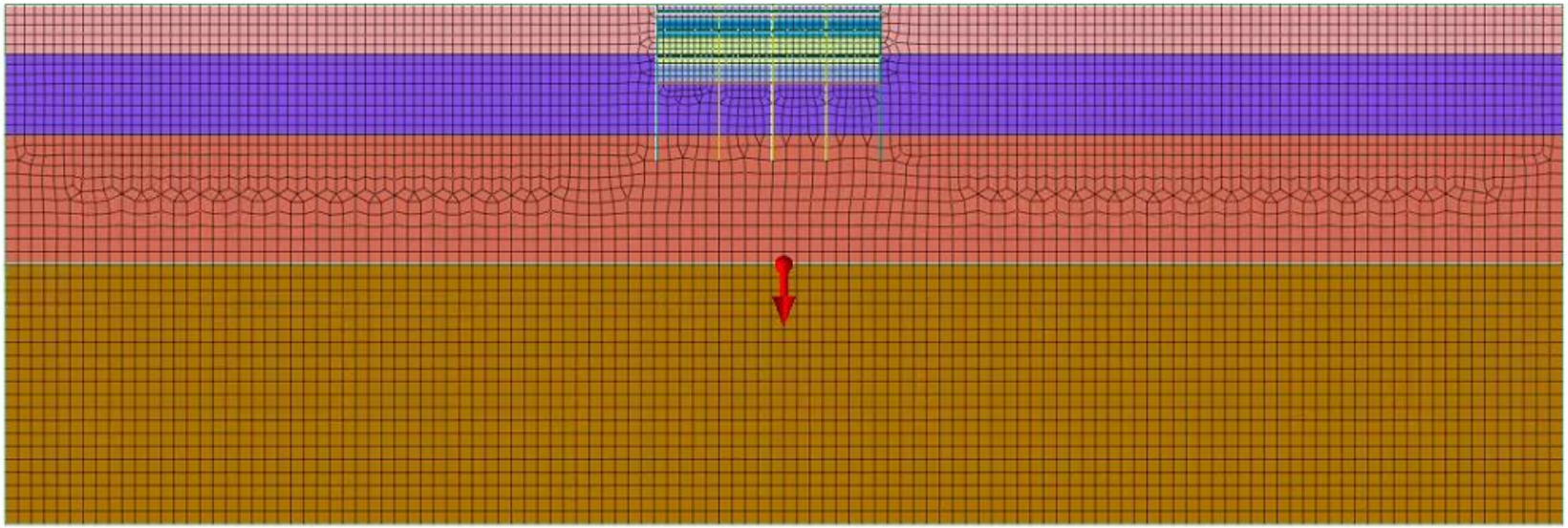


MIDAS

PART 4
BOUNDARY CONDITIONS

台灣邁達斯

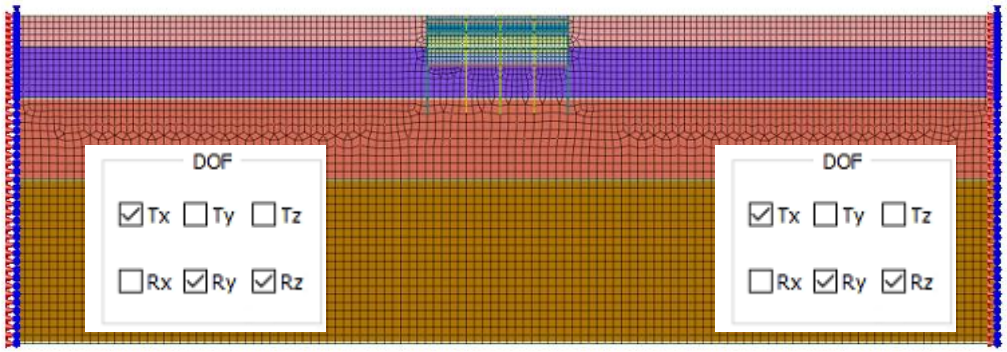
SELF-WEIGHT

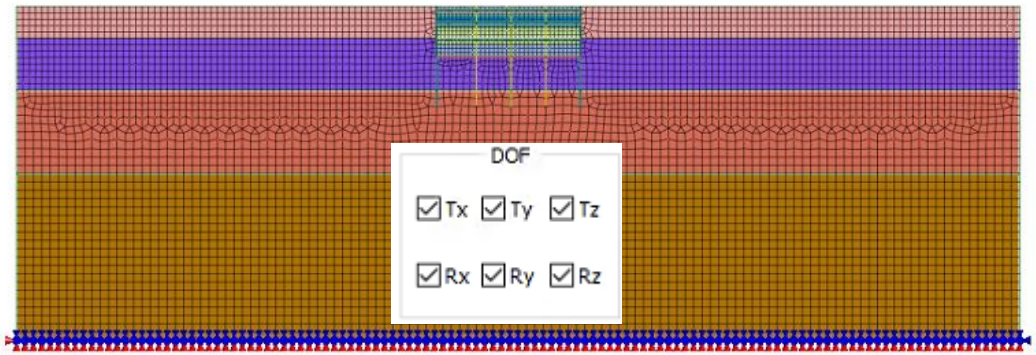


註:GTS NX2024版自重為預設條件。

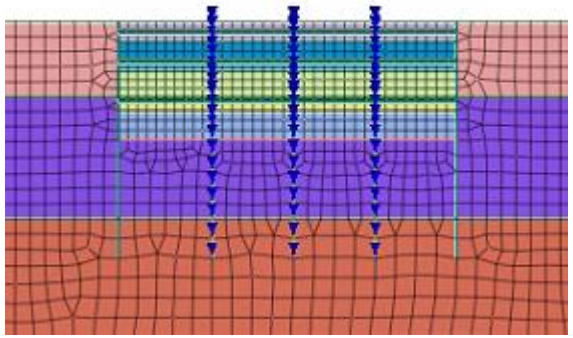
BOUNDARY CONDITIONS – CONSTRAINTS

Select Nodes Using Edge Features

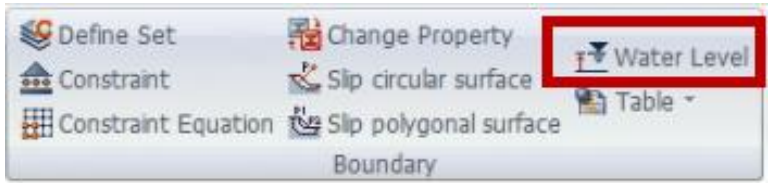


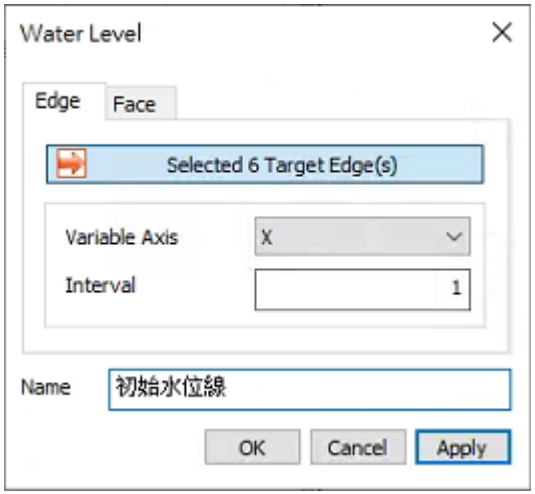


Intermediate Column Rotational Degree of Freedom Ry

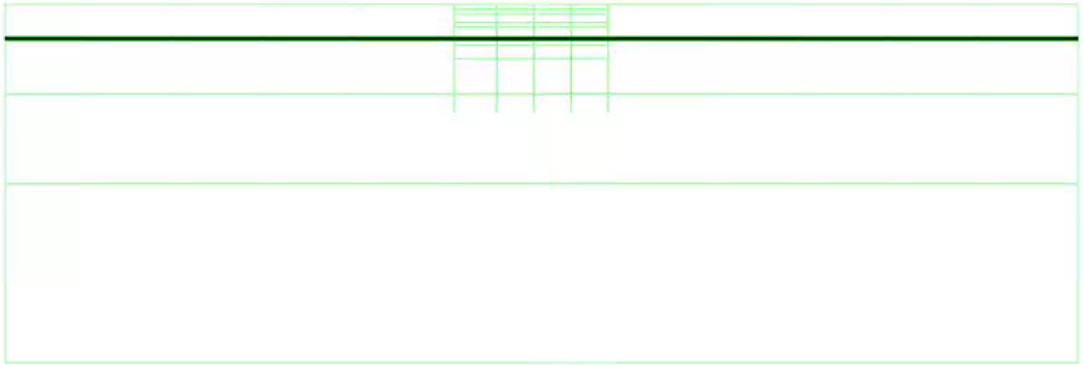


INITIAL WATER LEVEL LINE

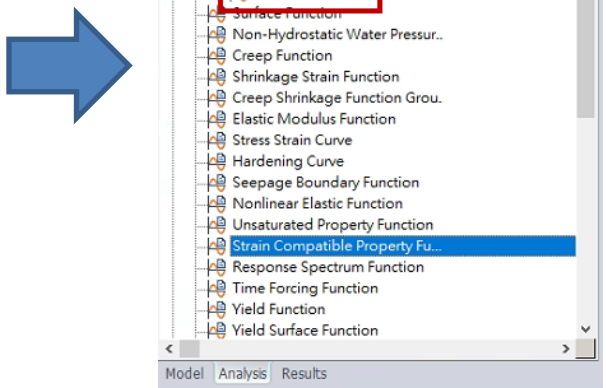


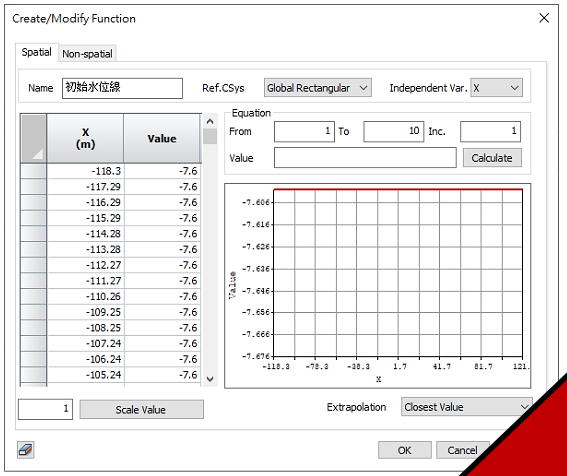


Select Line Feature

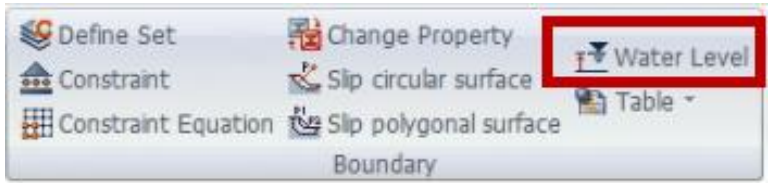


Automatically Convert to Spatial Function

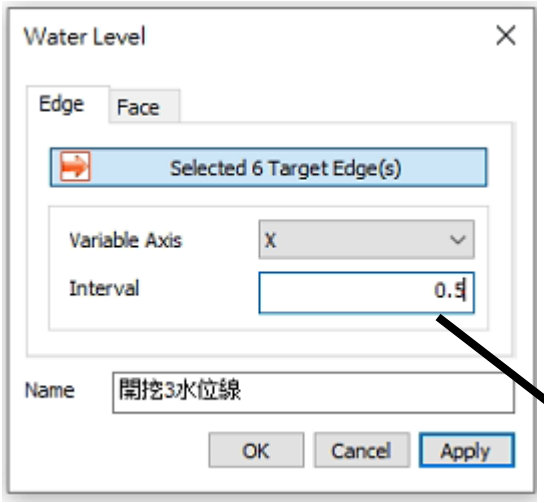




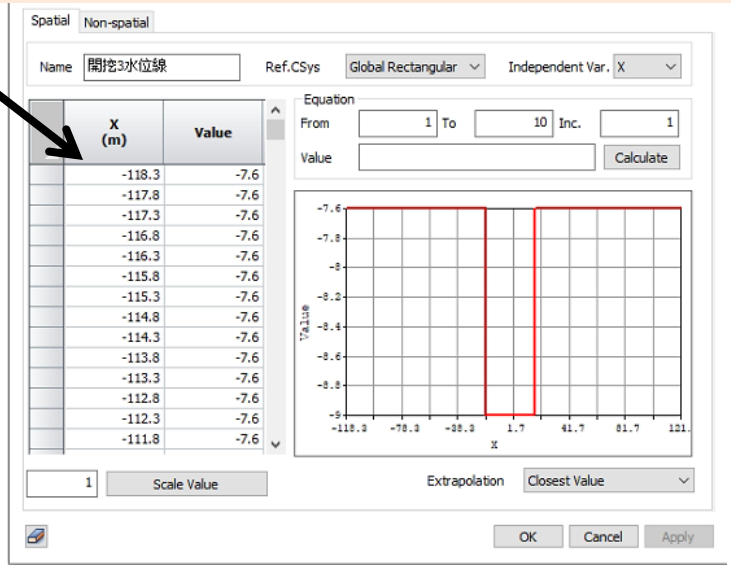
EXCAVATION 3 WATER LEVEL LINE



Select Line Feature

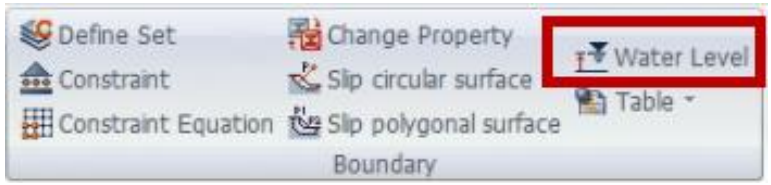


Automatically Convert to Spatial Function

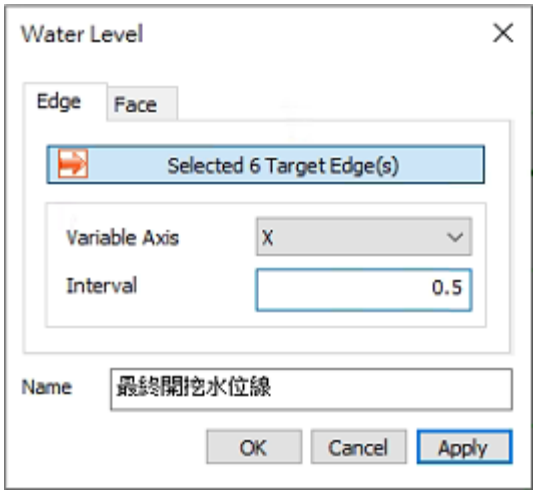


Generate a Set of Water Level Line Functions at 0.5 m Intervals

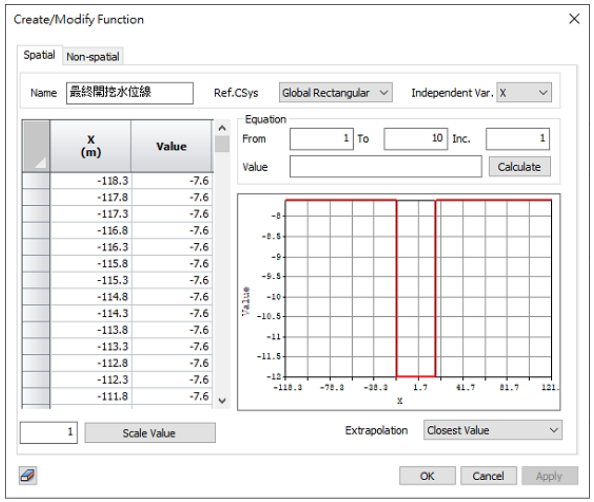
FINAL EXCAVATION WATER LEVEL LINE



Select Line Feature



Automatically Convert to Spatial Function



PART 5
INTERFACE ELEMENTS

台灣邁達斯

INTERFACE ELEMENT DEFINITION

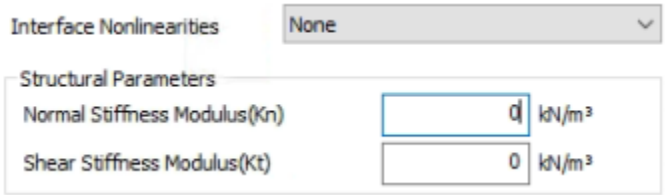
GTS NX Interface Element Wizard Mode

- Automatically Estimate Normal Stiffness (Kn) & Shear Stiffness (Kt)

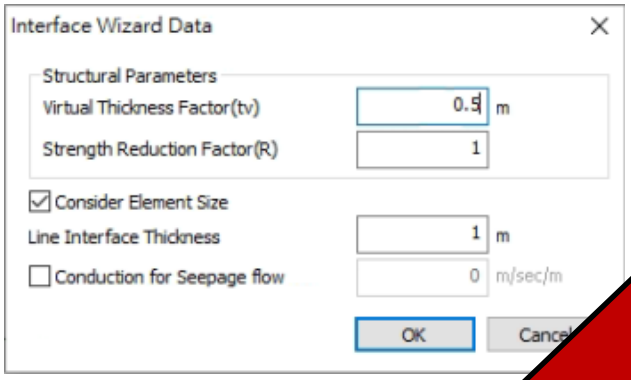
- **Virtual Thickness Factor 虛擬厚度係數 (tv)**
  - Value Range: 0.01–0.1.
  - Use Smaller Values for Higher Stiffness.

- **Strength Reduction Factor 強度折減係數(R)**
  - Sandy soil/Steel material = R : 0.6~0.7 砂土/鋼材
  - Clay/Steel material = R : 0.5黏土/鋼材
  - Sandy soil/Concrete = R : 1.0~0.8 沙土/混凝土
  - Clay/Concrete = R : 1.0~0.7 黏土/混凝土

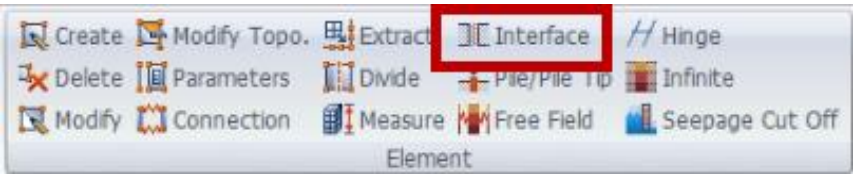
Interface Element Parameters – Manual Definition

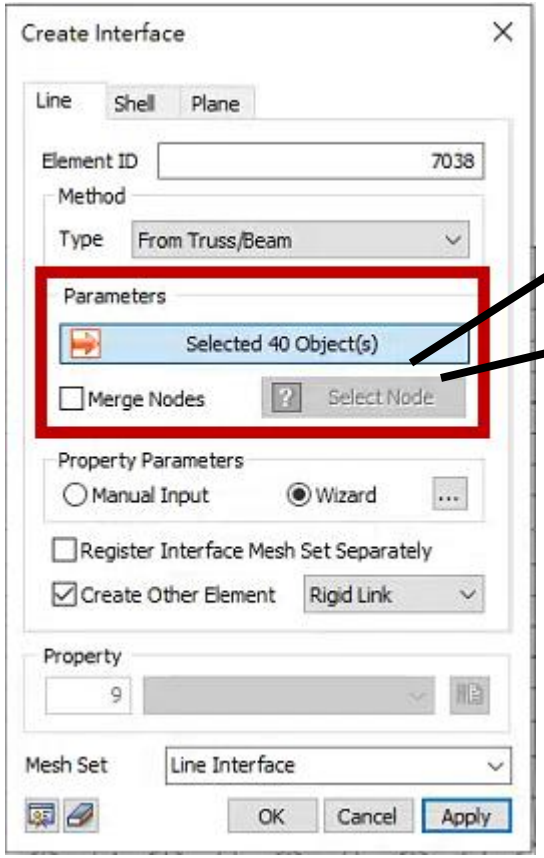


Interface Element Parameters – Wizard Mode Automatic Derivation

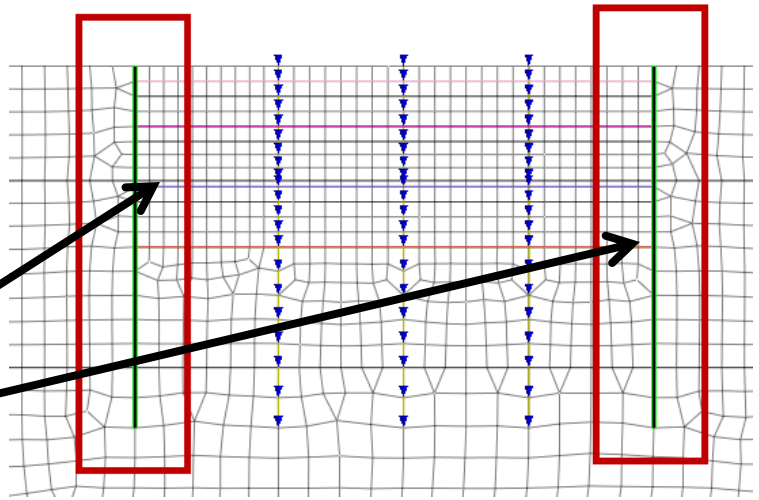


INTERFACE ELEMENT DEFINITION



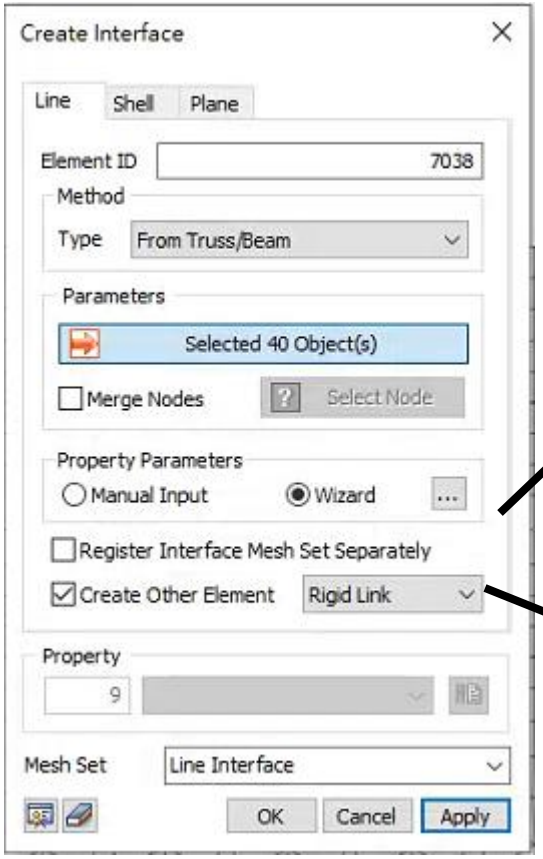


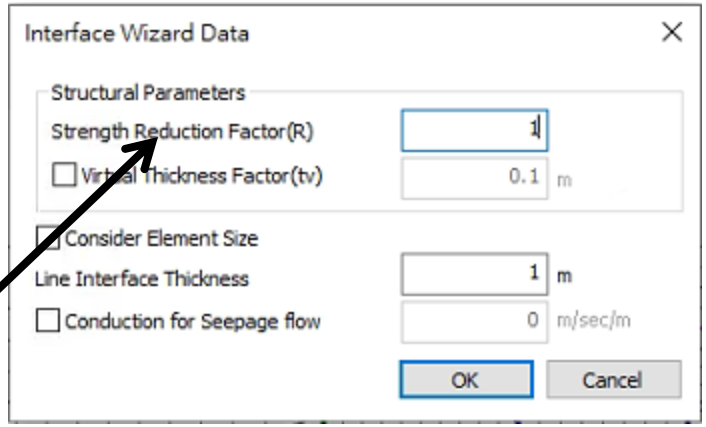
Select Diaphragm Wall 1D Beam Elements



INTERFACE ELEMENT DEFINITION

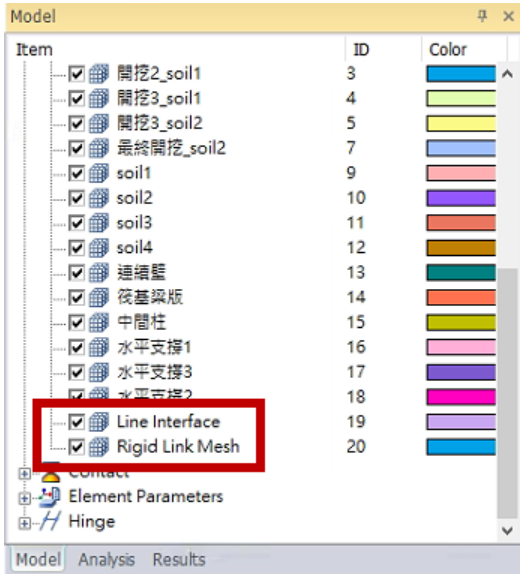
Strength Reduction Factor (R): 1
Virtual Thickness Coefficient (tv): 0.1



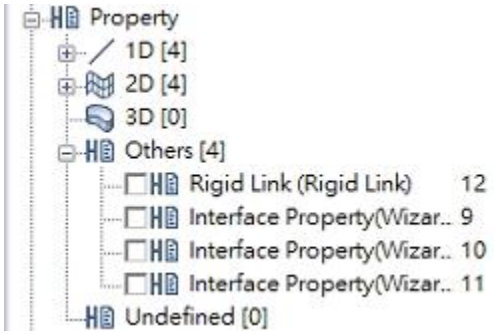


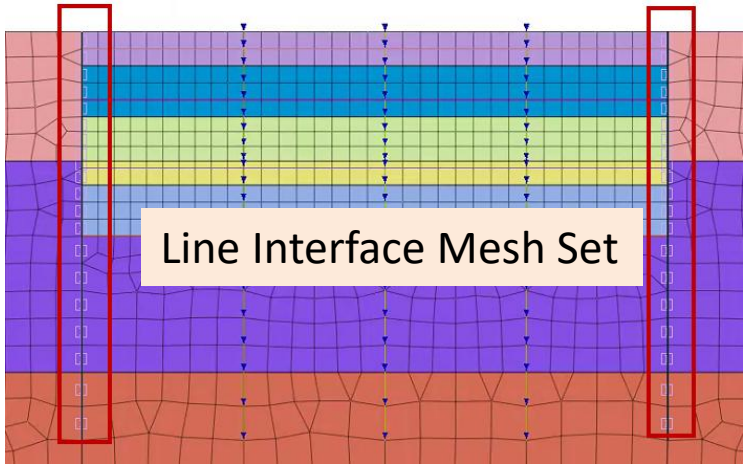
Automatically Generate Rigid or Elastic Links Between Diaphragm Wall and Soil
(Used Before Installing Slabs or Piles to Assume Soil Connection)

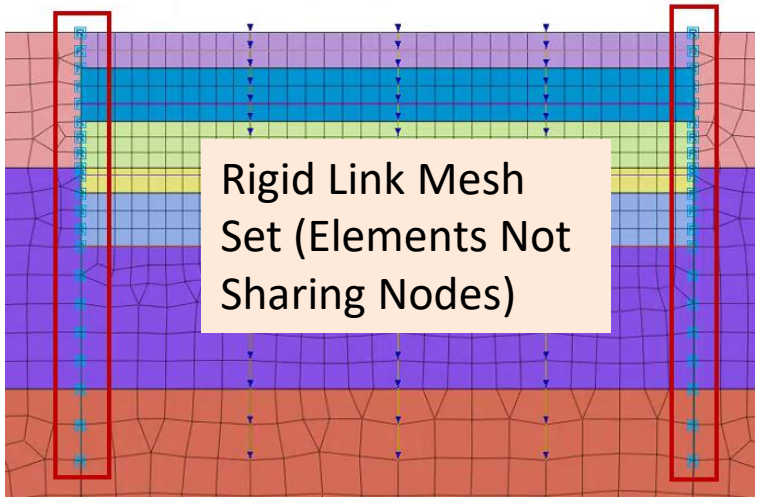
INTERFACE ELEMENT DEFINITION



Automatically Estimate Normal Stiffness (Kn) & Shear Stiffness (Kt)



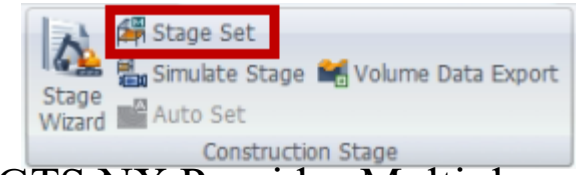




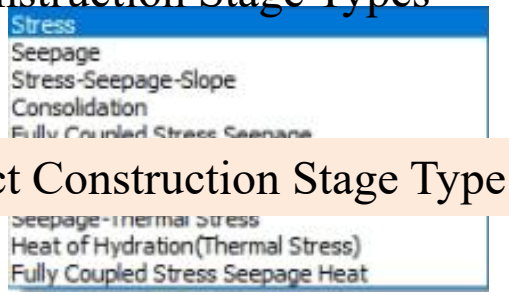
PART 6
CONSTRUCTION STAGES

台灣邁達斯

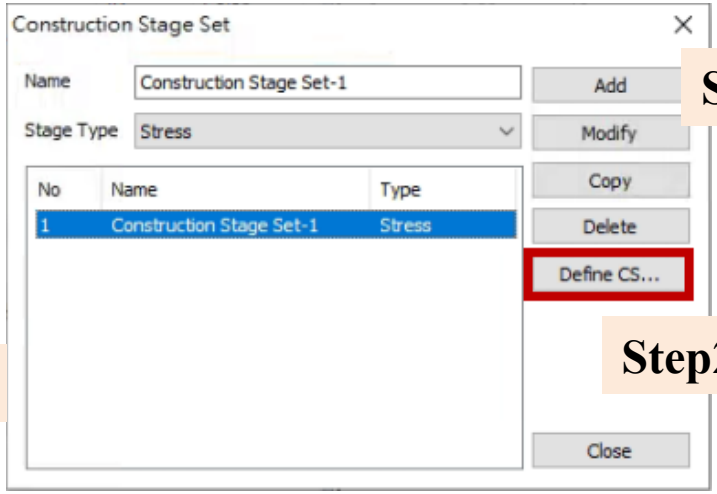
CONSTRUCTION STAGE DEFINITION



GTS NX Provides Multiple Construction Stage Types

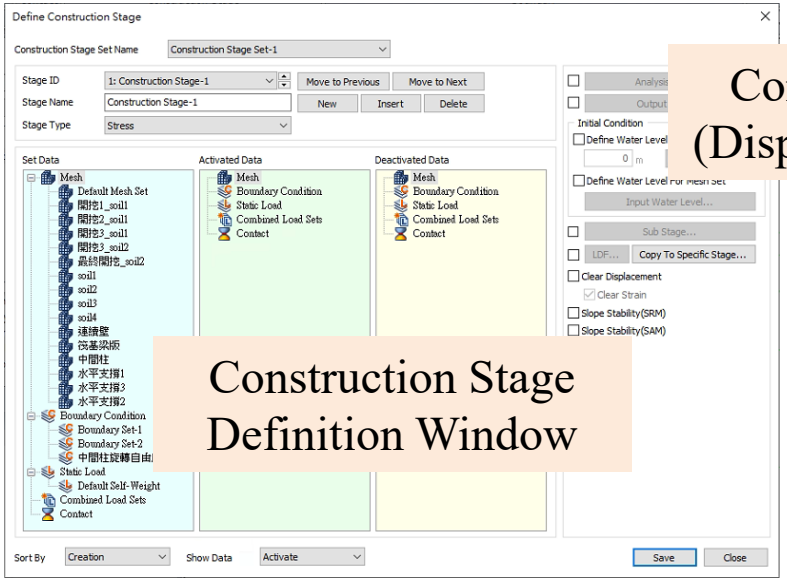


Select Construction Stage Type: Stress



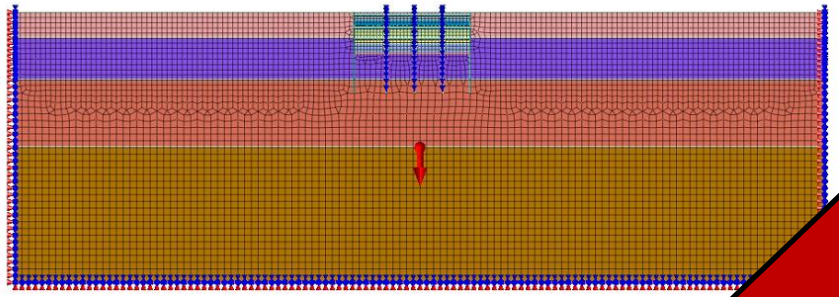
Step1. Add

Step2. Edit Definition



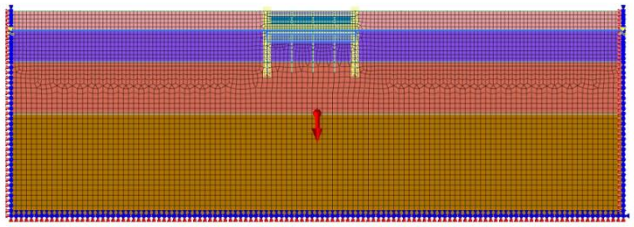
Construction Stage Definition Window

Construction Stages Provide Synchronized View
(Display All Mesh Sets / Boundary Sets / Load Sets)

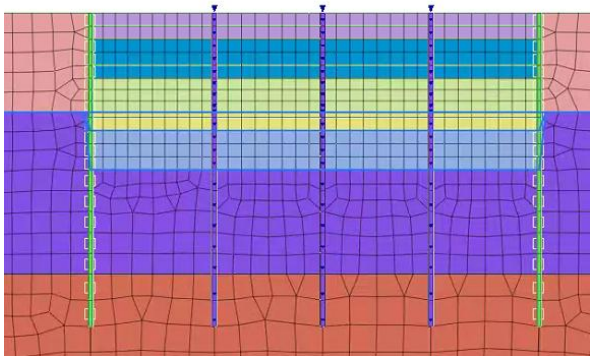


CONSTRUCTION STAGE DEFINITION

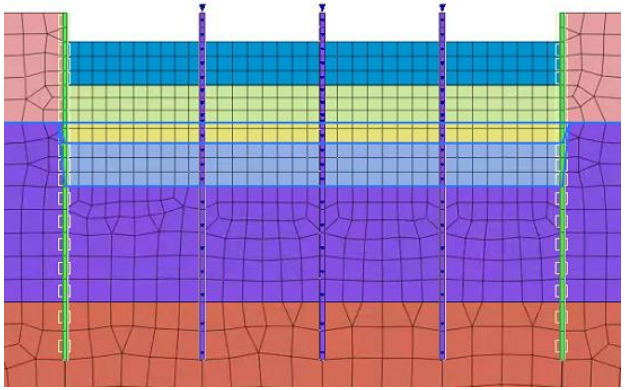
Stage 0 – Before Construction
Stage 1 – Diaphragm Wall (24 m) and Intermediate Columns Installation
Stage 2 – Excavation 1 (Depth −2 m)
Stage 3 – Horizontal Strut 1 at −1 m
Stage 4 – Excavation 2 (Depth −5 m)
Stage 5 – Horizontal Strut 2 at −4 m
Stage 6 – Excavation 3 (Depth −9 m)
Stage 7 – Horizontal Strut 3 at −8 m
Stage 8 – Final Excavation (Depth −12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)



Stage0



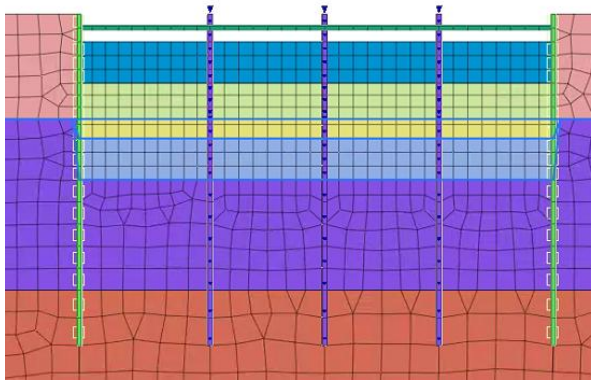
Stage1



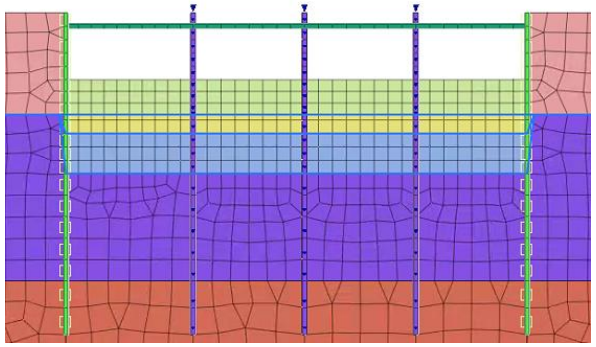
Stage2

CONSTRUCTION STAGE DEFINITION

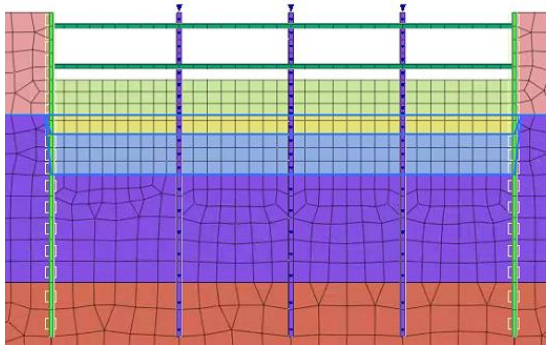
Stage 0 – Before Construction
Stage 1 – Diaphragm Wall (24 m) and Intermediate Columns Installation
Stage 2 – Excavation 1 (Depth −2 m)
Stage 3 – Horizontal Strut 1 at −1 m
Stage 4 – Excavation 2 (Depth −5 m)
Stage 5 – Horizontal Strut 2 at −4 m
Stage 6 – Excavation 3 (Depth −9 m)
Stage 7 – Horizontal Strut 3 at −8 m
Stage 8 – Final Excavation (Depth −12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)



Stage3



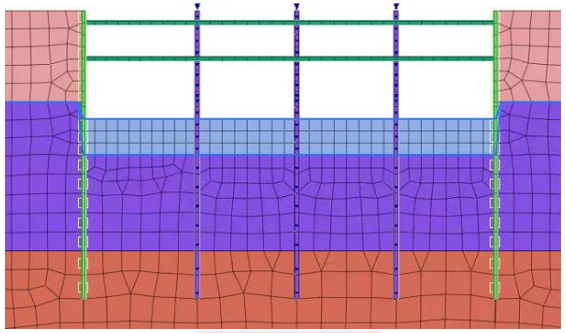
Stage4



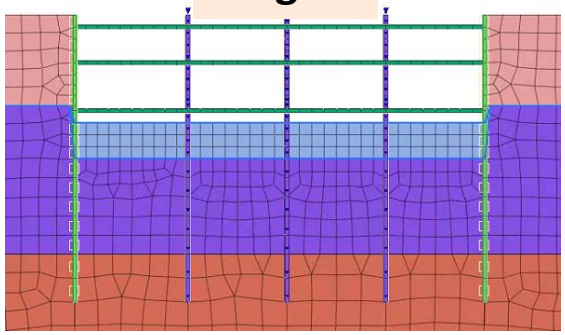
Stage5

CONSTRUCTION STAGE DEFINITION

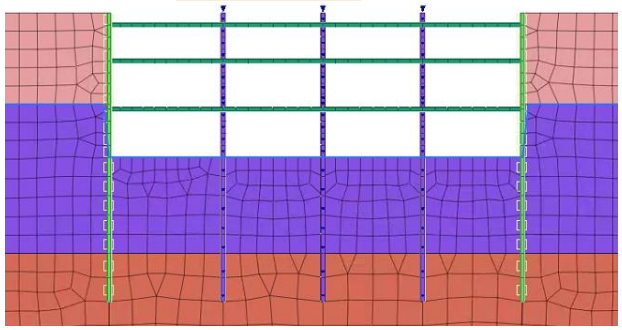
Stage 6



Stage 7

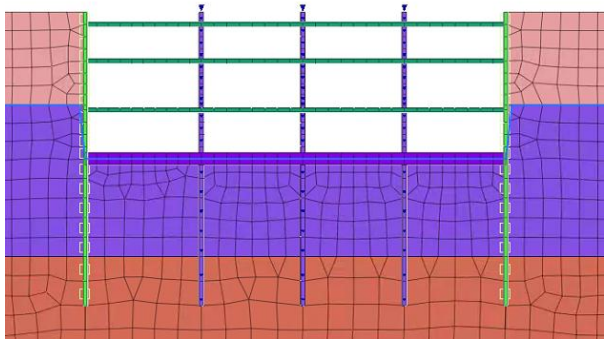


Stage 8



Stage 0 – Before Construction
Stage 1 – Diaphragm Wall (24 m) and Intermediate Columns Installation
Stage 2 – Excexcavation 1 (Depth −2 m)
Stage 3 – Horizontal Strut 1 at −1 m
Stage 4 – Excavation 2 (Depth −5 m)
Stage 5 – Horizontal Strut 2 at −4 m
Stage 6 – Excavation 3 (Depth −9 m)
Stage 7 – Horizontal Strut 3 at −8 m
Stage 8 – Final Excavation (Depth −12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)

Stage 9



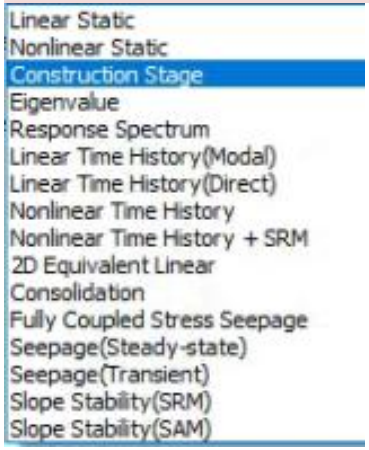
PART 7
ANALYSIS CASE

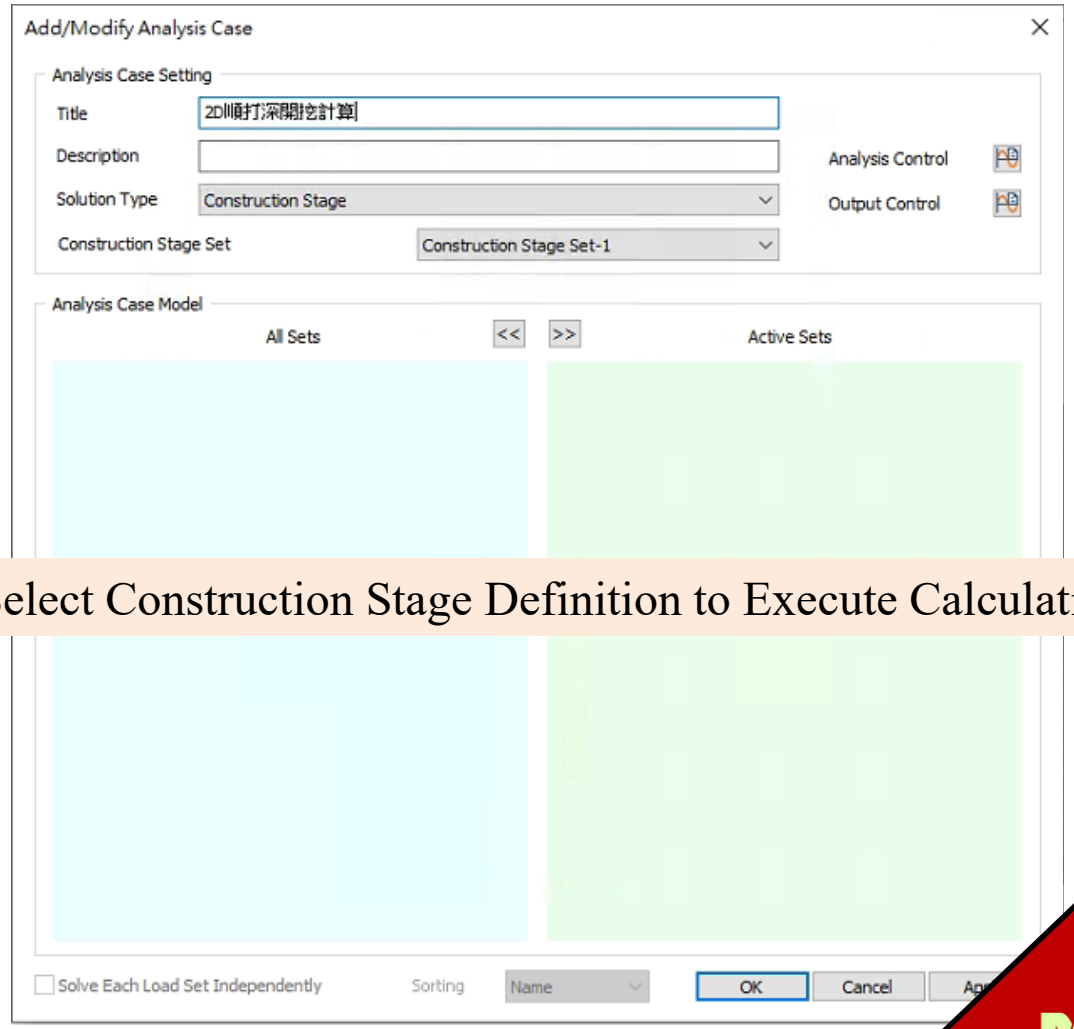
台灣邁達斯

ANALYSIS DEFINITION

Analysis Name:
Analysis Type: Construction Stage

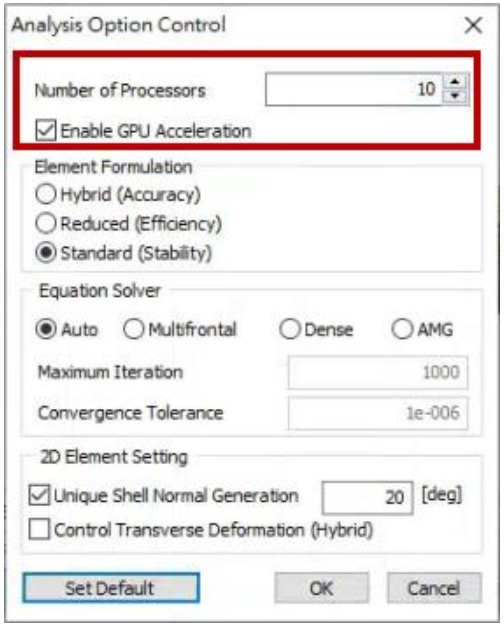
Construction Stage

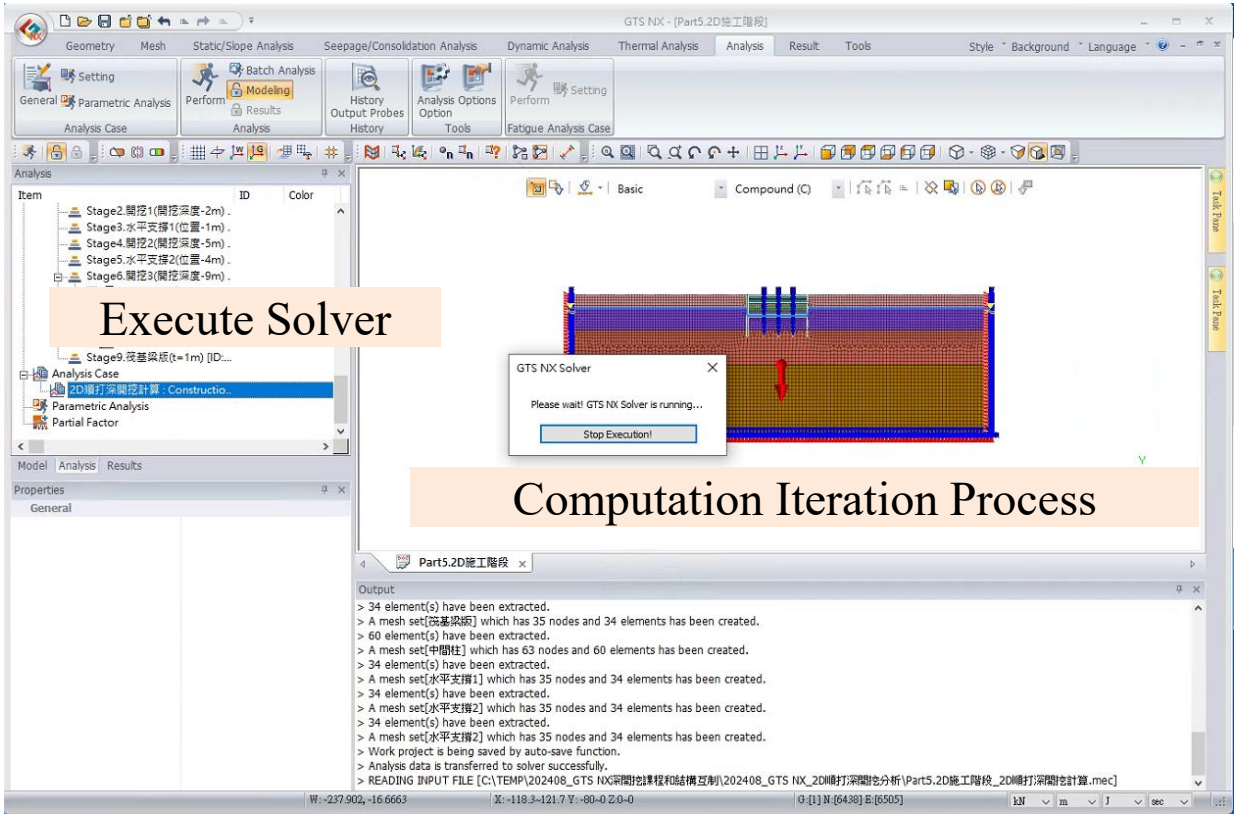




Select Construction Stage Definition to Execute Calculation

RUN AND ANALYSIS OPTIONS



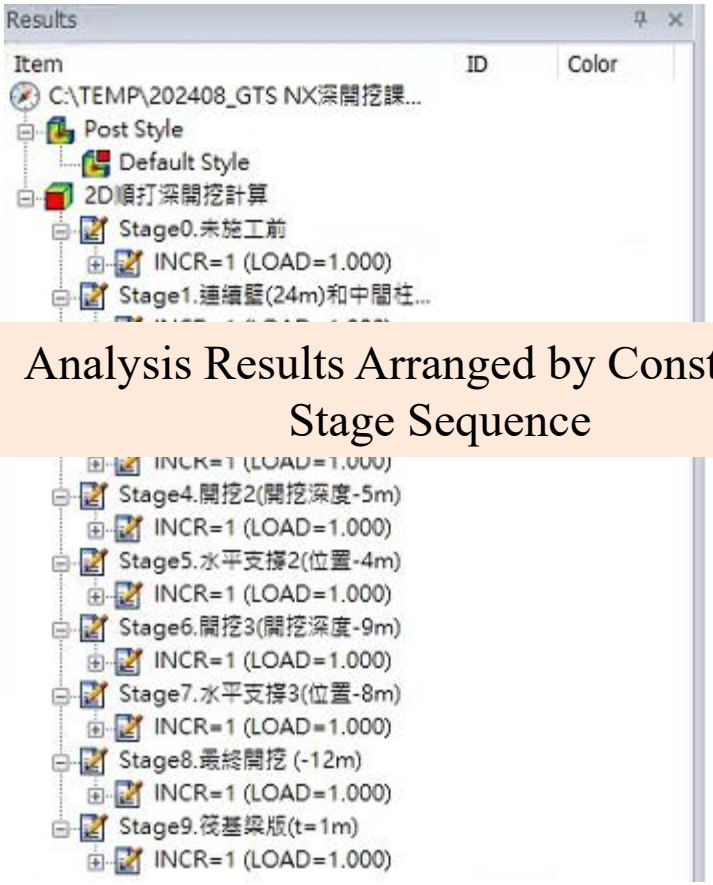


Enable Multi-Core Computing / GPU Computing

PART 8
RESULT ANALYSIS

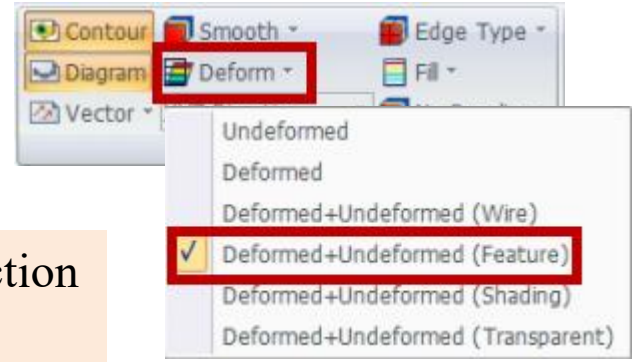
台灣邁達斯

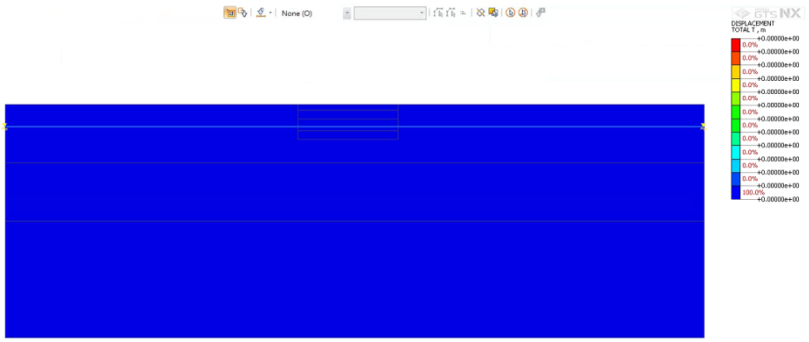
RESULT ANALYSIS



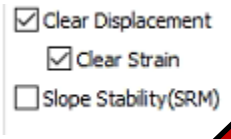
Analysis Results Arranged by Construction Stage Sequence

Show Deformed Shape with Undeformed (Original) Geometry





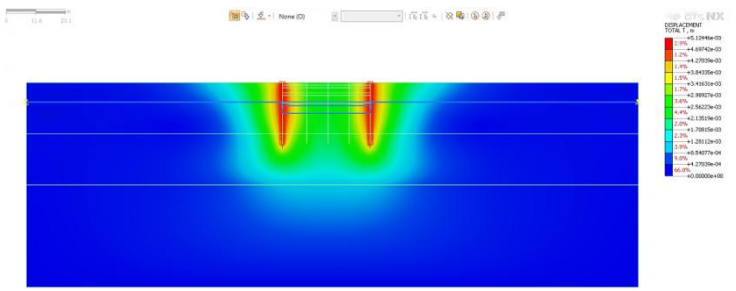
Construction Stage 0: Before Construction



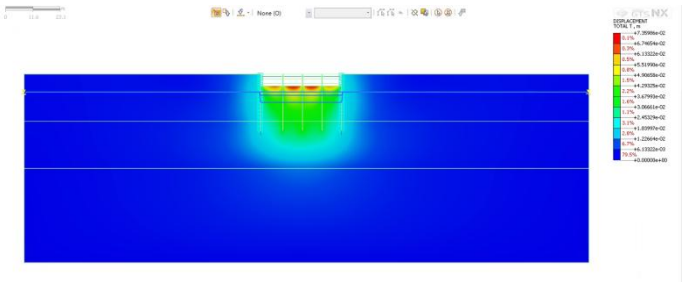
ANALYSIS RESULTS | TOTAL TRANSLATION

Stage 0 – Before Construction
Stage 1 – Diaphragm Wall (24 m) and Intermediate Columns Installation
Stage 2 – Excavation 1 (Depth −2 m)
Stage 3 – Horizontal Strut 1 at −1 m
Stage 4 – Excavation 2 (Depth −5 m)
Stage 5 – Horizontal Strut 2 at −4 m
Stage 6 – Excavation 3 (Depth −9 m)
Stage 7 – Horizontal Strut 3 at −8 m
Stage 8 – Final Excavation (Depth −12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)

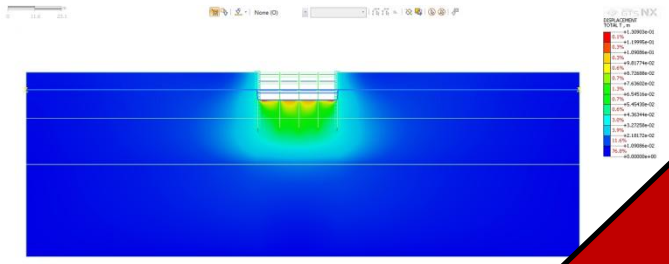
Stage1



Stage4



Stage9



PART 9
SEEPAGE CONDITIONS

台灣邁達斯

POROSITY DEFINITION

Switch Units

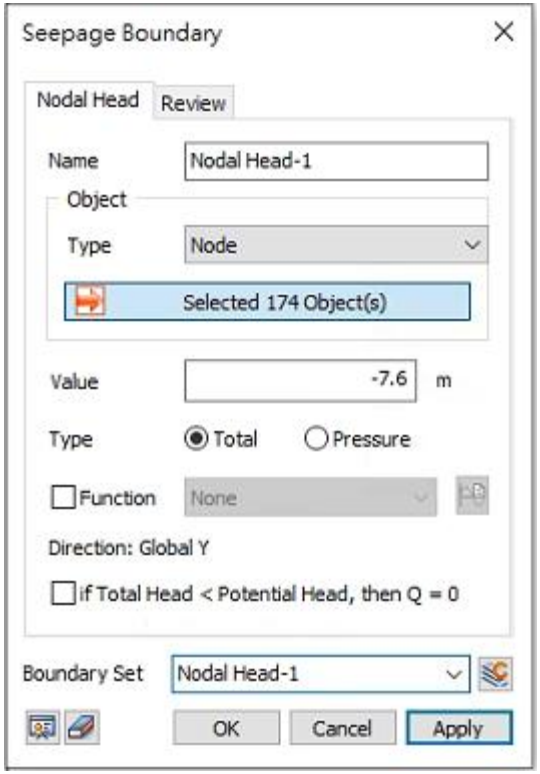
Geotechnical Material

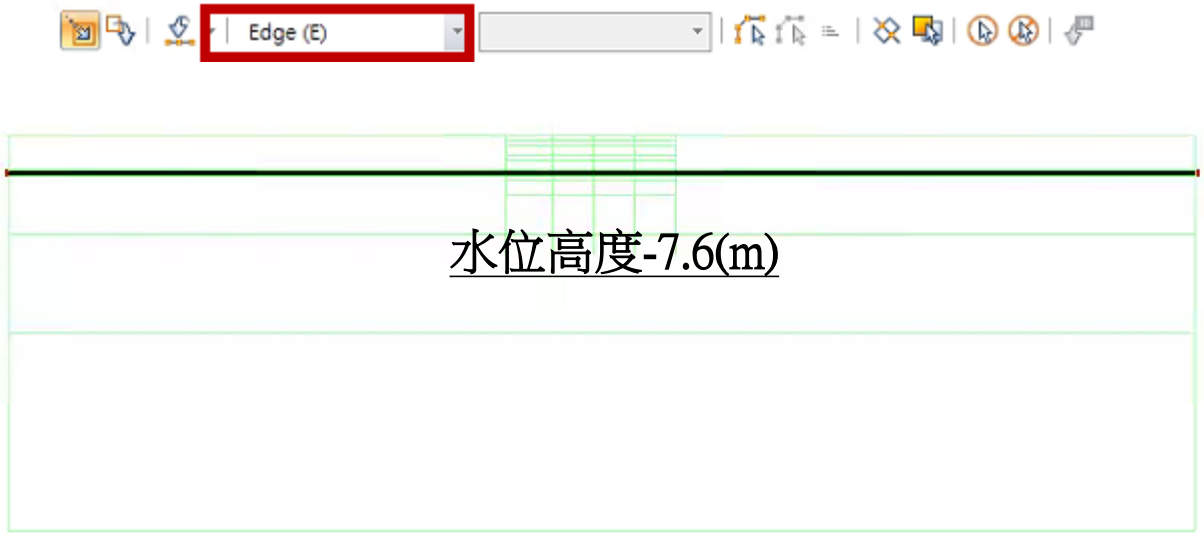
Soil Type	Coefficient of permeability(K) (m/day)
沖積層	0.1
粉砂層	1
風化土壌	1
風化岩石	0.001

Note 1: Seepage analysis requires defining **porous material parameters**.
Note 2: If **unsaturated parameters** are not defined, the soil is treated as **saturated** during seepage calculation.
Note 3: For **seepage–stress coupled analysis**, both **geotechnical** and **porous material parameters** must be defined.

WATER HEAD (水頭) | INITIAL WATER LEVEL

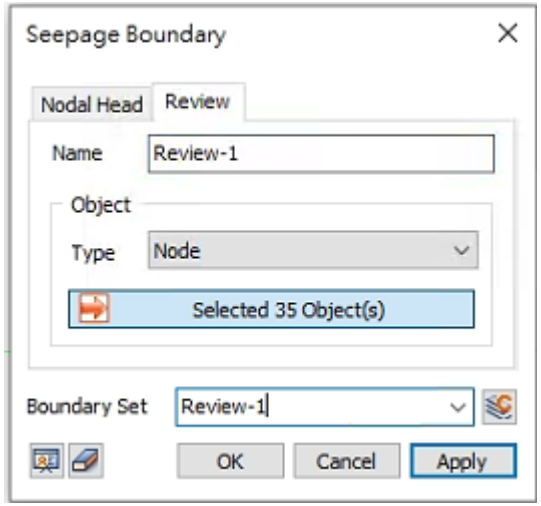
Association Between Elements and Geometric Features Exists;
Nodes Can Be Selected via Geometric Features





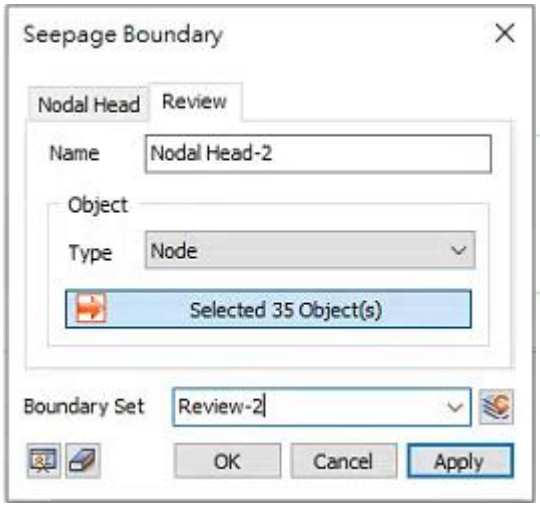
WATER HEAD (水頭) | INITIAL WATER LEVEL

Association Between Elements and Geometric Features Exists; Nodes Can Be Selected via Geometric Features



WATER HEAD (水頭) | INITIAL WATER LEVEL

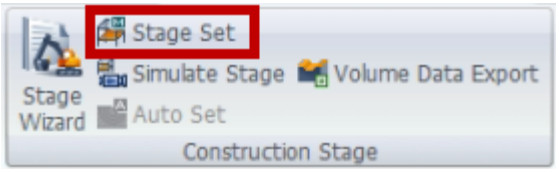
Association Between Elements and Geometric Features Exists; Nodes Can Be Selected via (



PART 10
Coupled Stress-Seepage Construction Stage

台灣邁達斯

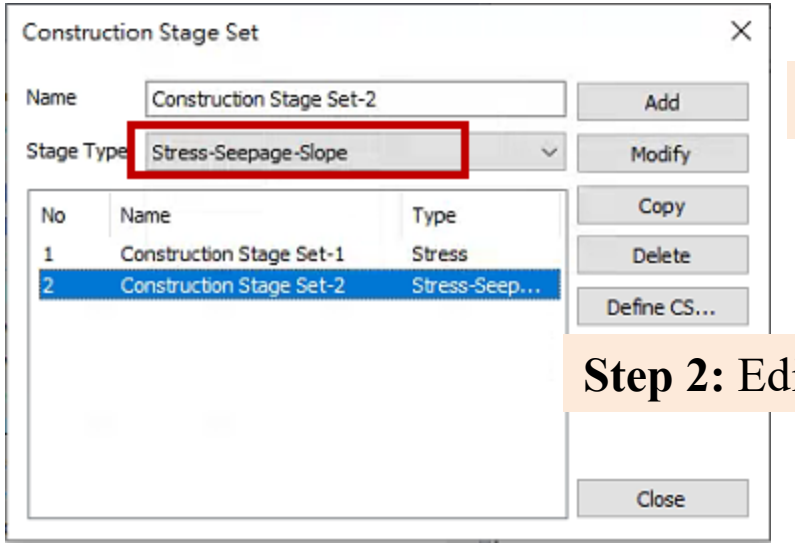
STRESS-SEEPAGE CONSTRUCTION STAGE



GTS NX Provides Multiple Construction Stage Types

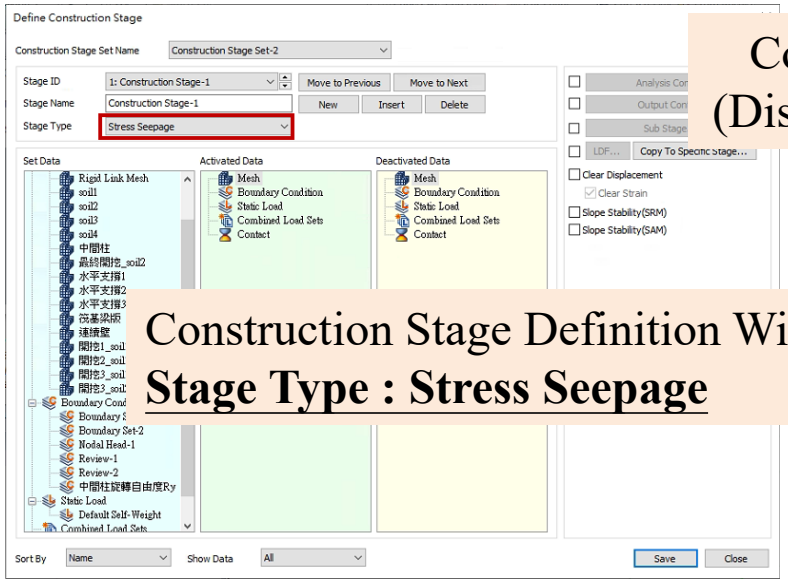
施工階段選擇
Stress-Seepage-Slope

Heat Transfer
Seepage-Thermal Stress
Heat of Hydration(Thermal Stress)
Fully Coupled Stress Seepage Heat



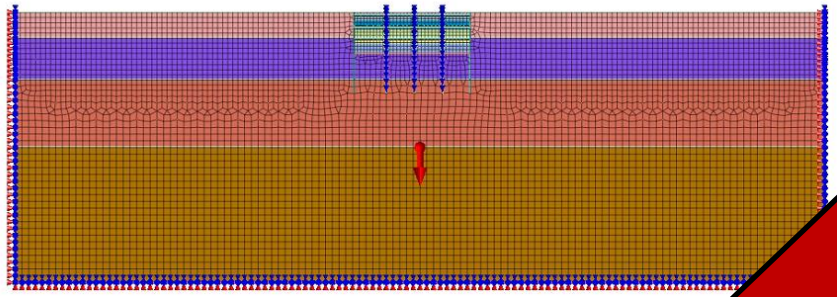
Step 1: Add

Step 2: Edit Definition



Construction Stage Definition Win
Stage Type : Stress Seepage

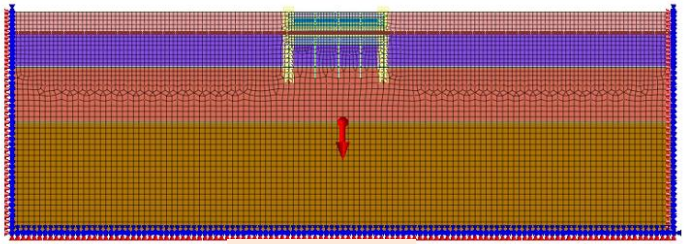
Construction Stages Provide Synchronized View
(Display All Mesh Sets / Boundary Sets / Load Sets)



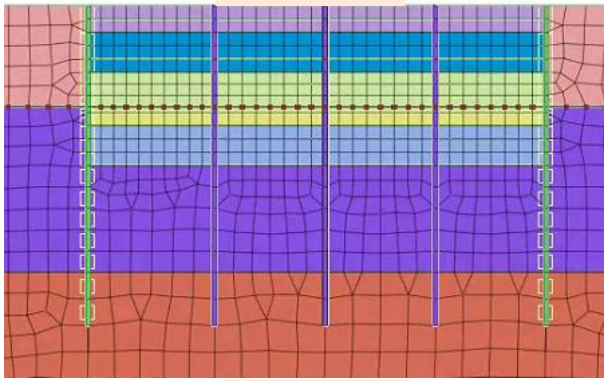
CONSTRUCTION STAGE

Stage 0 – Before Construction
Stage 1 – Diaphragm Wall (24 m) and Intermediate Columns Installation
Stage 2 – Excavation 1 (Depth −2 m)
Stage 3 – Horizontal Strut 1 at −1 m
Stage 4 – Excavation 2 (Depth − 5 m)
Stage 5 – Horizontal Strut 2 at − 4 m
Stage 6 – Excavation 3 (Depth − 9 m)
Stage 7 – Horizontal Strut 3 at − 8 m
Stage 8 – Final Excavation (Depth − 12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)

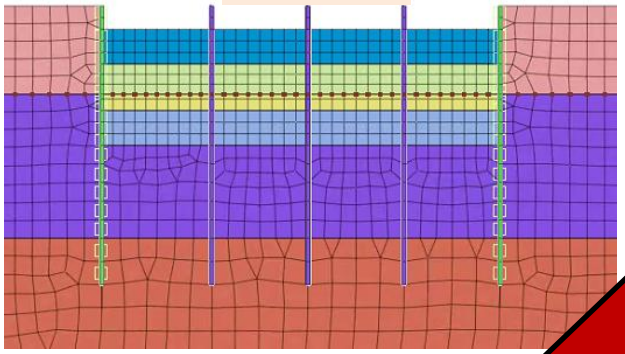
Stage 0 初始水頭位置



Stage 1



Stage 2



CONSTRUCTION STAGE

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Stage 8 – Final Excavation (Depth −12 m)
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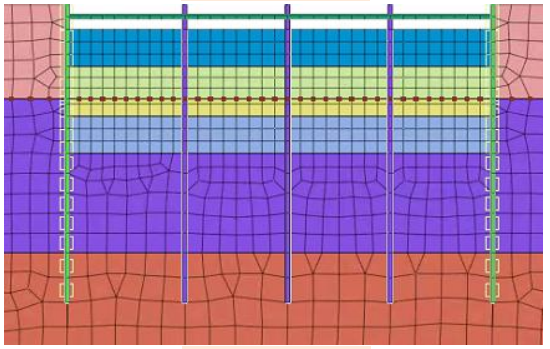
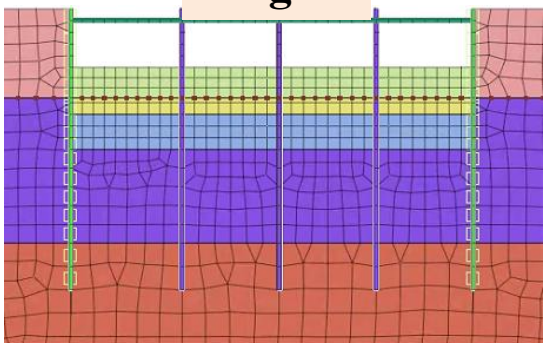
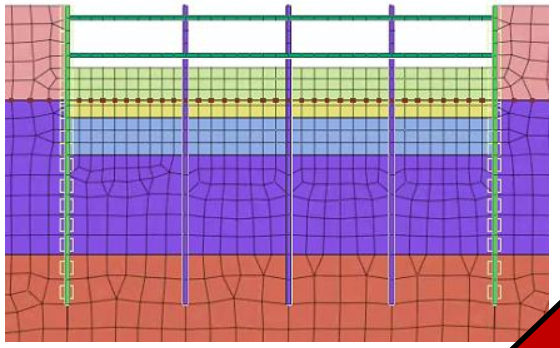
Stage 3



Stage 4



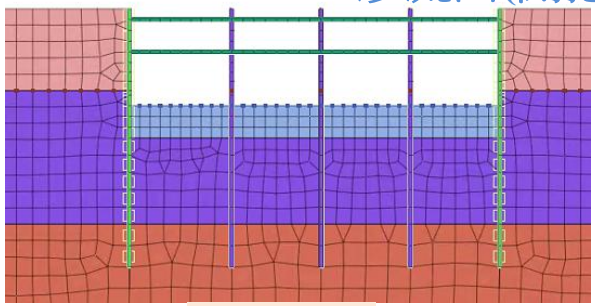
Stage 5



CONSTRUCTION STAGE

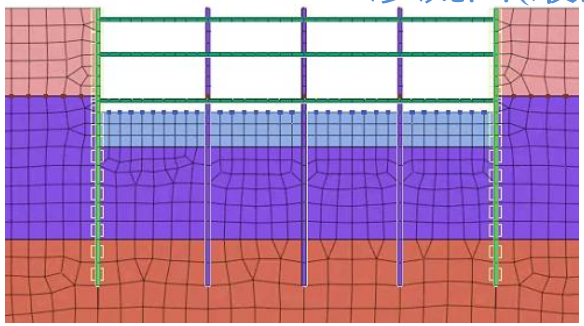
Stage 6

滲流面(開挖3)

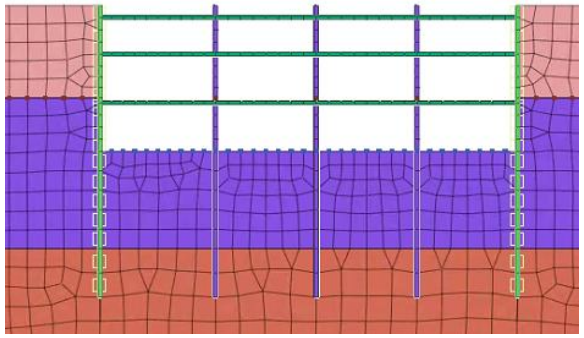


Stage 7

滲流面(最終開挖)



Stage 8



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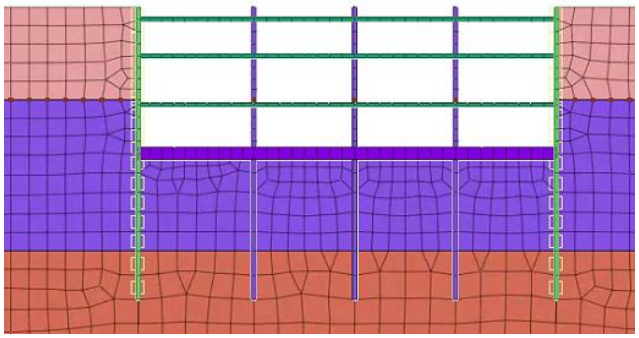
Stage 7 – Horizontal Strut 3 at − 8 m
Stage 8 – Final Excavation (Depth −12 m)
Stage 9 – Raft Foundation Slab (t = 1 m)

Stage 9



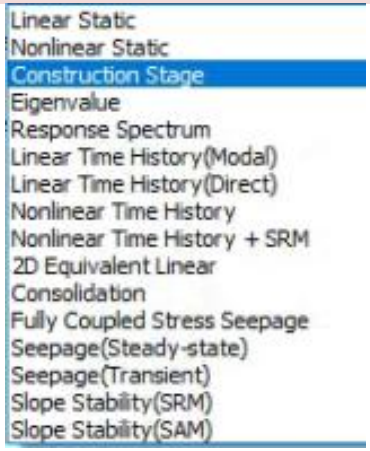
PART 11
Coupled Stress–Seepage Analysis Settings and Solver

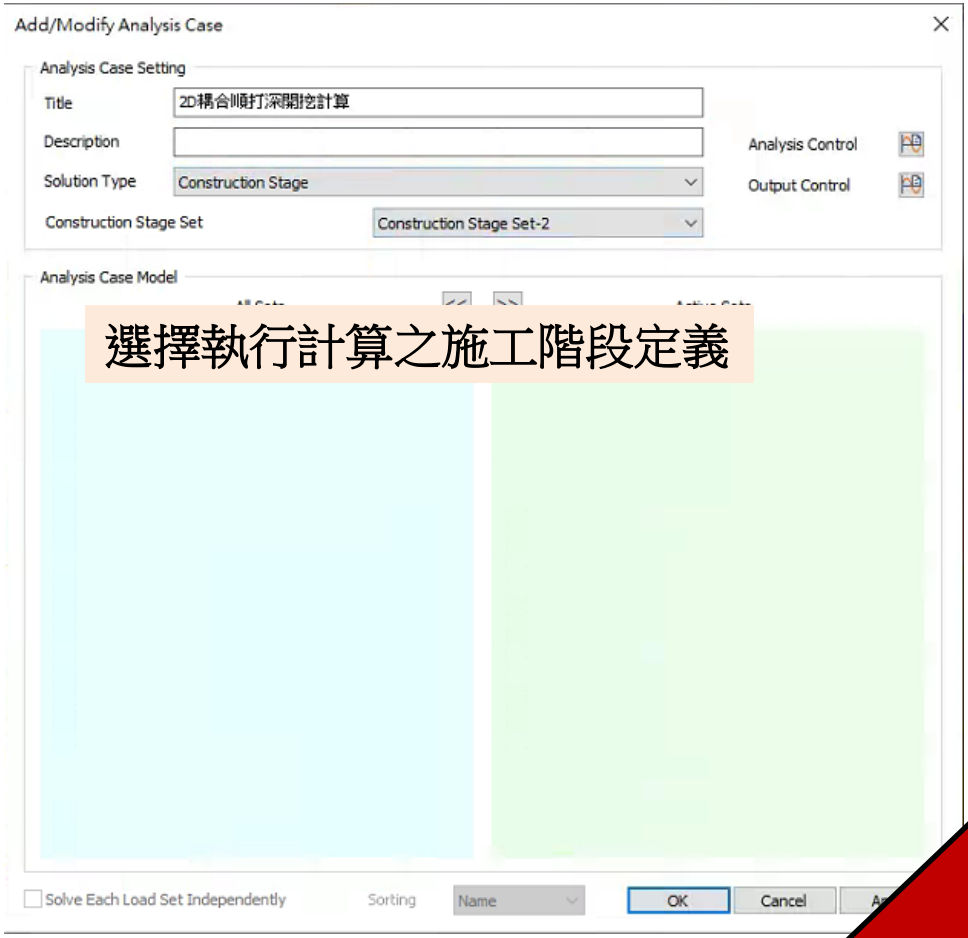
台灣邁達斯

ANALYSIS SETTING

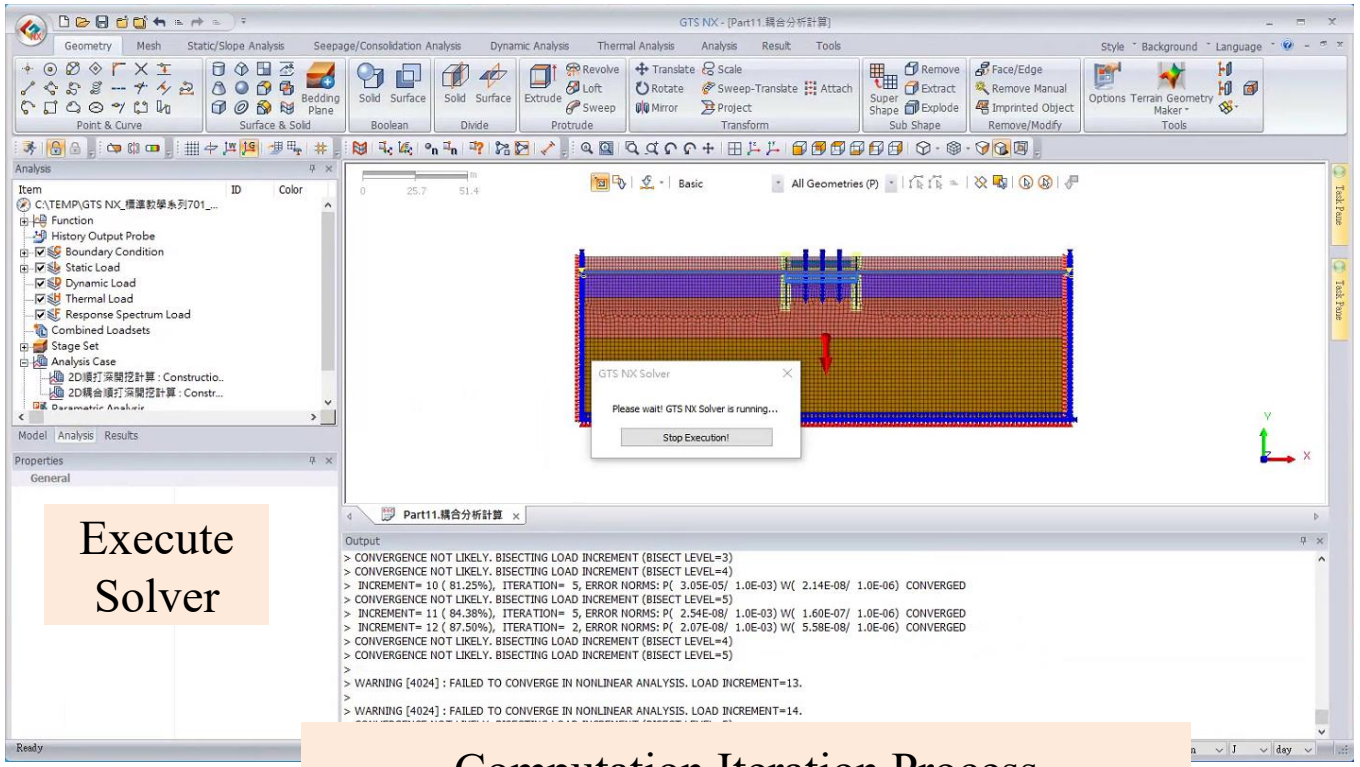
分析名稱:2D耦合順打深開挖計算
分析類型:Construction Stage

Construction Stage





SOLVER



Execute Solver

Computation Iteration Process
(Relatively Unstable During Calculation)

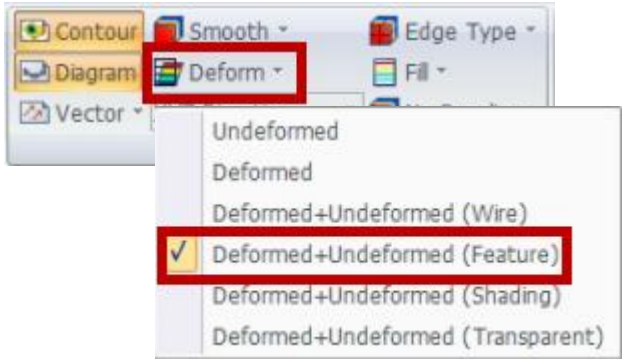
PART 12
ANALYSIS RESULTS

台灣邁達斯

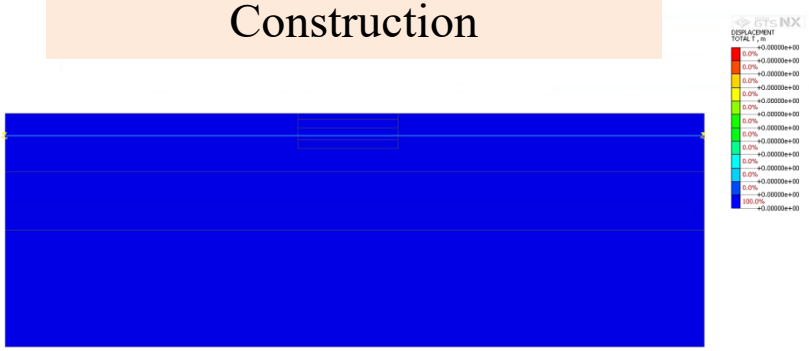
ANALYSIS RESULTS

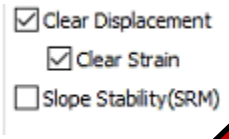
Both Seepage and Stress Results Available

Show Deformed Shape with Original Geometry



Construction Stage 0: Before Construction





ANALYSIS RESULTS

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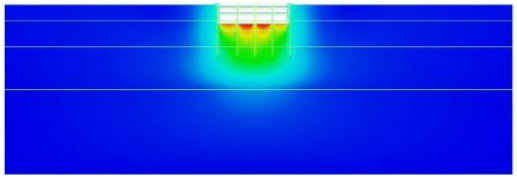
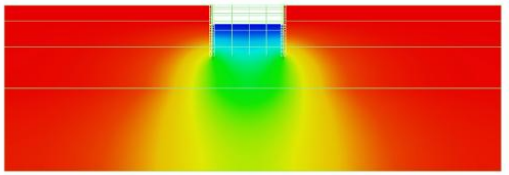
Stage 6

Total Translation(m)

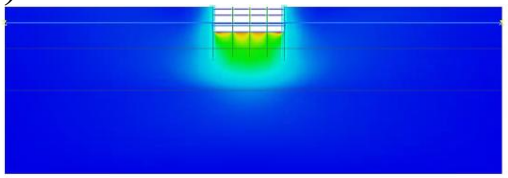


Total Head(m)



Stage 9

Total Translation(m)



Total Head(m)