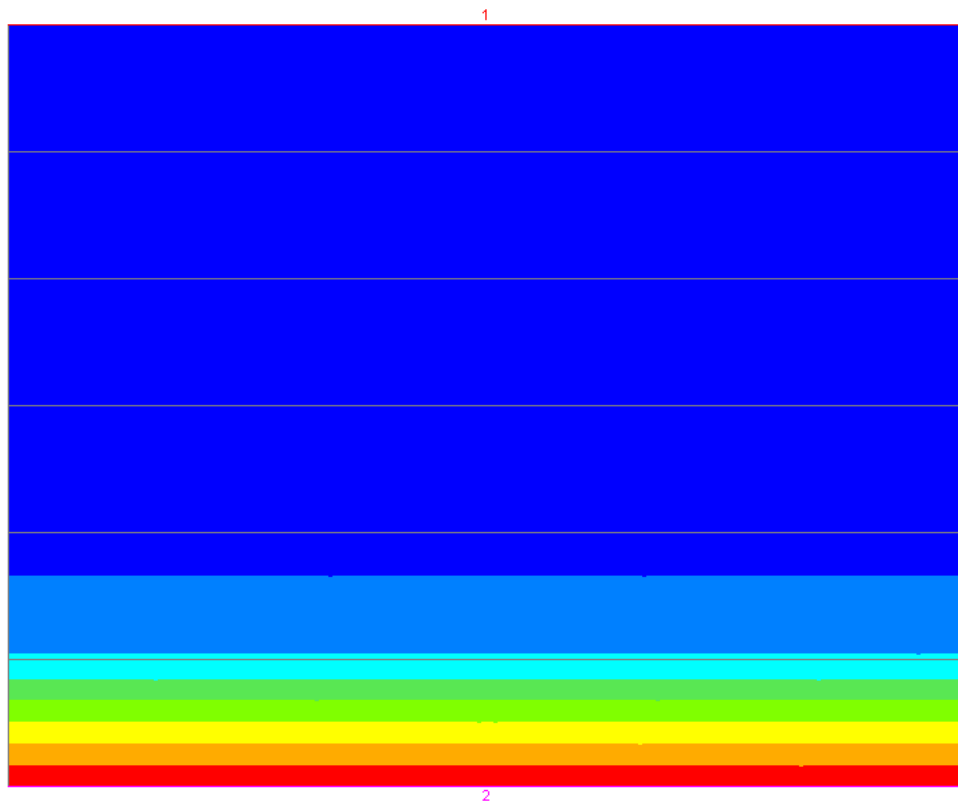


# Example for GiD-SAFIR TSH Thermal Analysis

## Exercise n°4 – Slab 2D

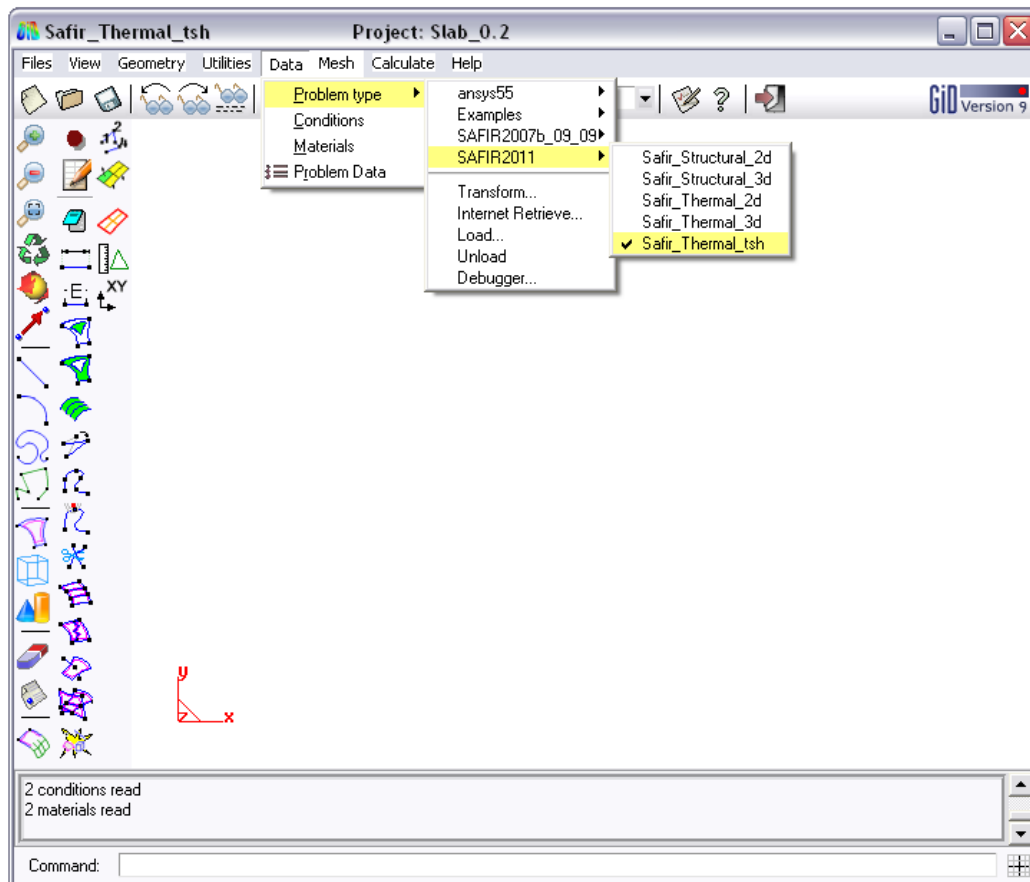


This example creates a shell element of a slab.

## 1. Create a project in 2D for TSH Thermal Analysis

From the pull down menu select:

► **Data->Problem type->SAFIR2011->Safir\_Thermal\_TSH**



To save the project select (or use icons on the left):

► **Files->Save**

or  or **[Ctrl + s]**

⚠ *If Caps lock is active on your keyboard, shortcut don't work*

Enter a file name, eg.: Slab

GiD creates a directory with the name Slab.gid

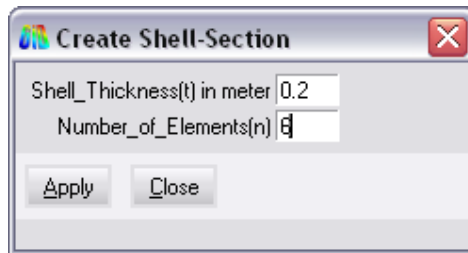
GiD creates a number of system files in this directory.

When you start the SAFIR calculation the Safir . IN, .OUT and .TEM files will be created in this directory.

## 2. Create the geometry in the xy-plane

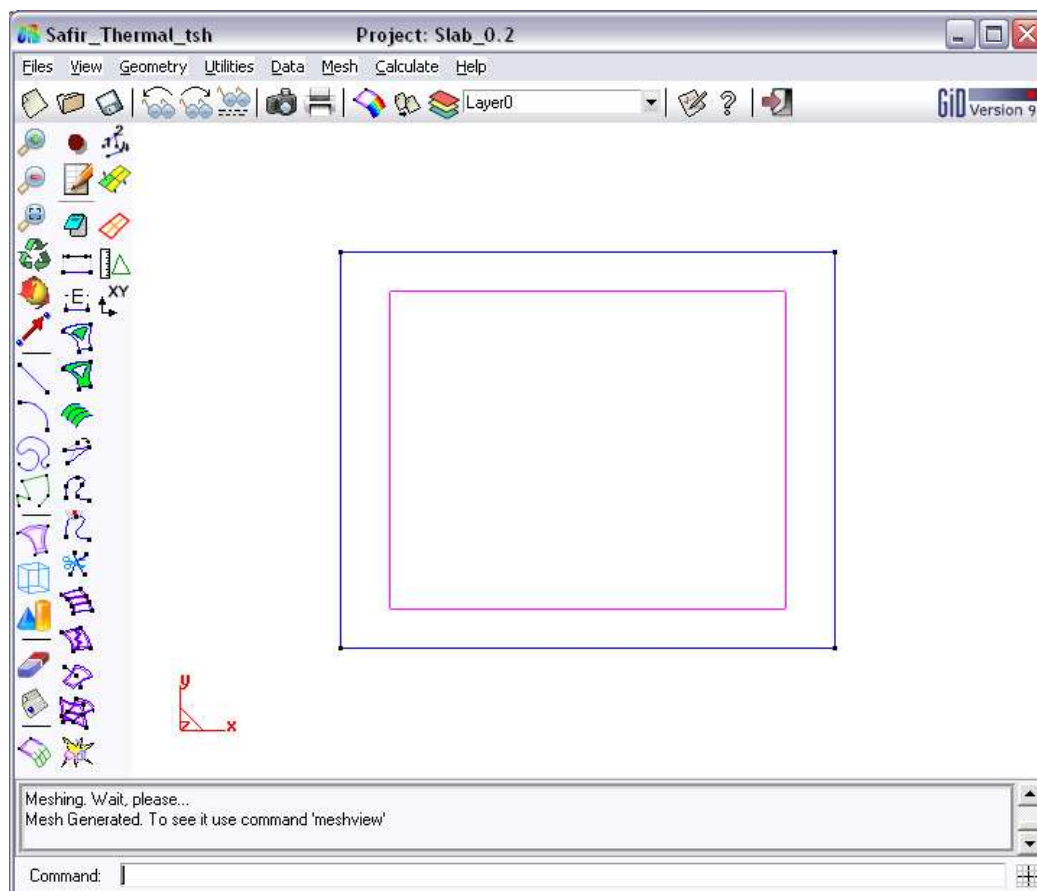
GiD will open automatically a new window.

Put **0.2** m as shell thickness and **6** as number of elements



⚠ *GiD create a section  $t = 0.2$  m height and  $(4/5) \times t = 0.25$  length.*

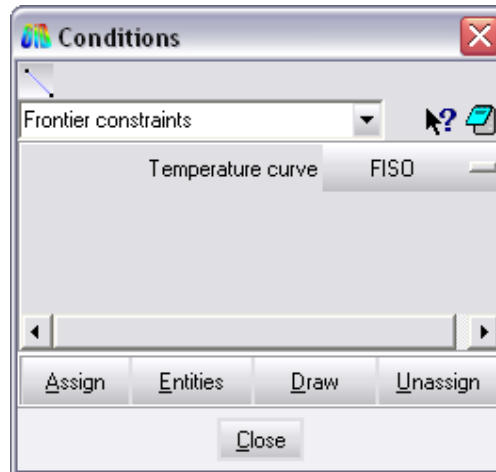
*(n)= 6 mean that Gid-Safir will generate meshes by cutting the element height in 6 parts.*



### 3. Assign a temperature curve

From the pull down menu select:

➤ *Data->Conditions*

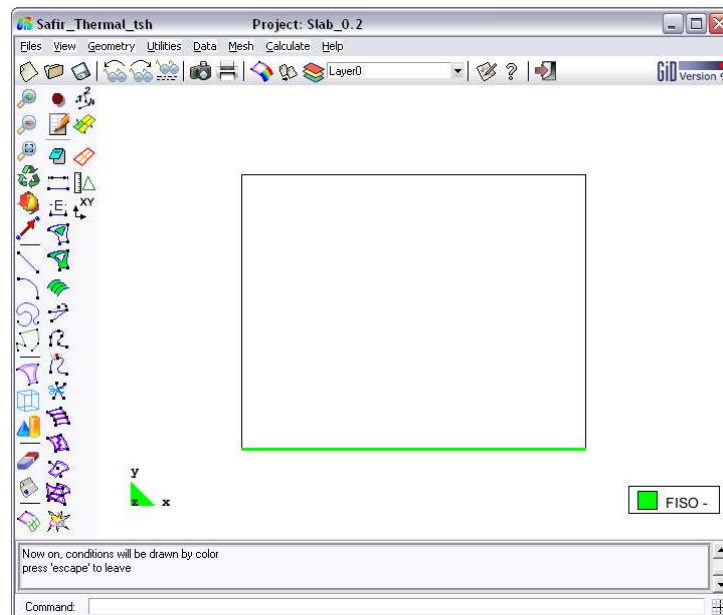


Select:

On the first pull down list: *Frontier constraints*

On the Temperature curve pull down list *FISO*

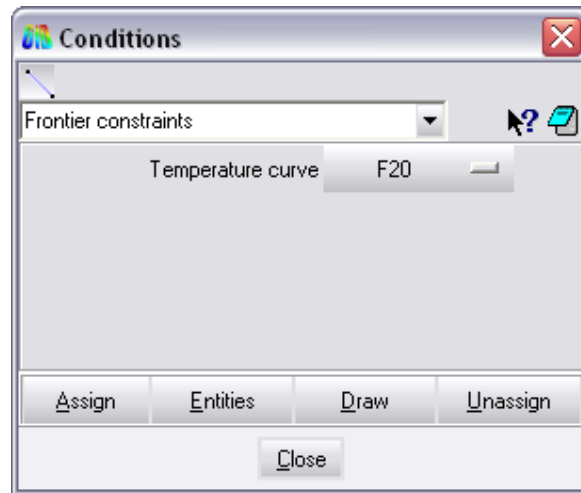
Click on the *Assign* button and assign it to the lower line as shown below



Press *[Esc]* or click on *Finish* to confirm

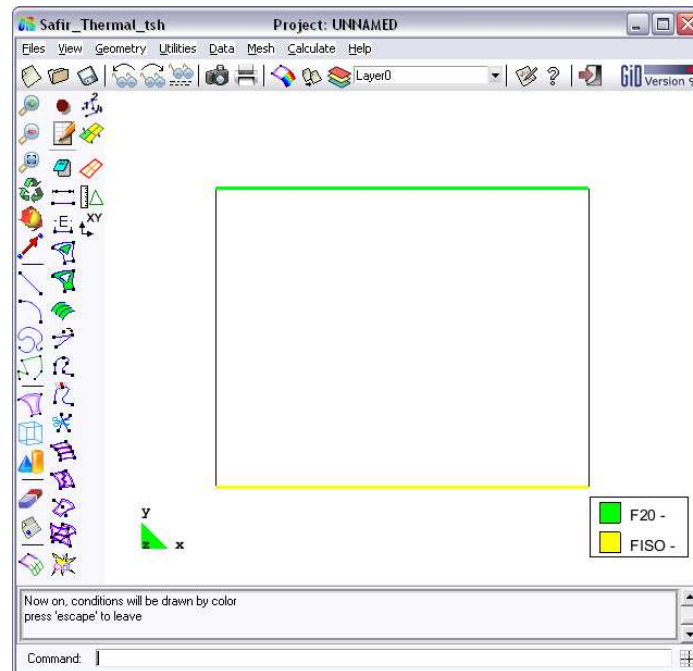
Select *DRAW->Colors* in the Conditions dialog box to display the frontier constraints

Press *[Esc]* or click on *Finish* to leave this view mode



On the Temperature curve pull down list **F20**

Click on the **Assign** button and assign it the upper line as shown below

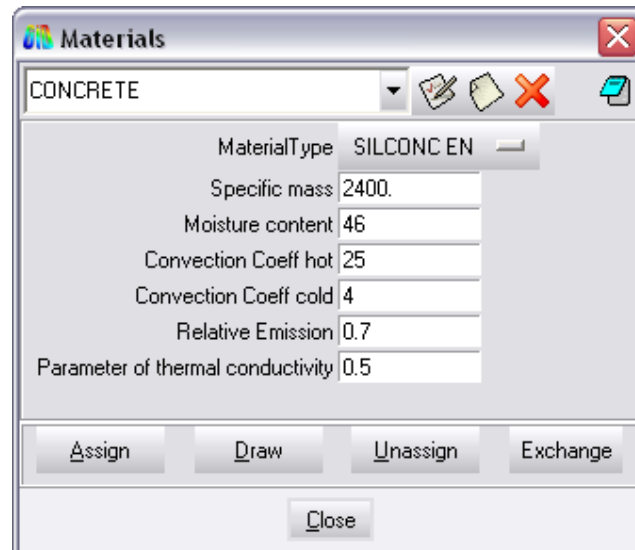


#### 4. Assign Material

From the pull down menu select:

➤ *Data->Materials*

Select **CONCRETE** from the dialog box pull down list



Then select:

**SILCONC EN** as Material Type

A specific mass of **2400**

A moisture content of **46**

A Convection Coeff hot of **25**

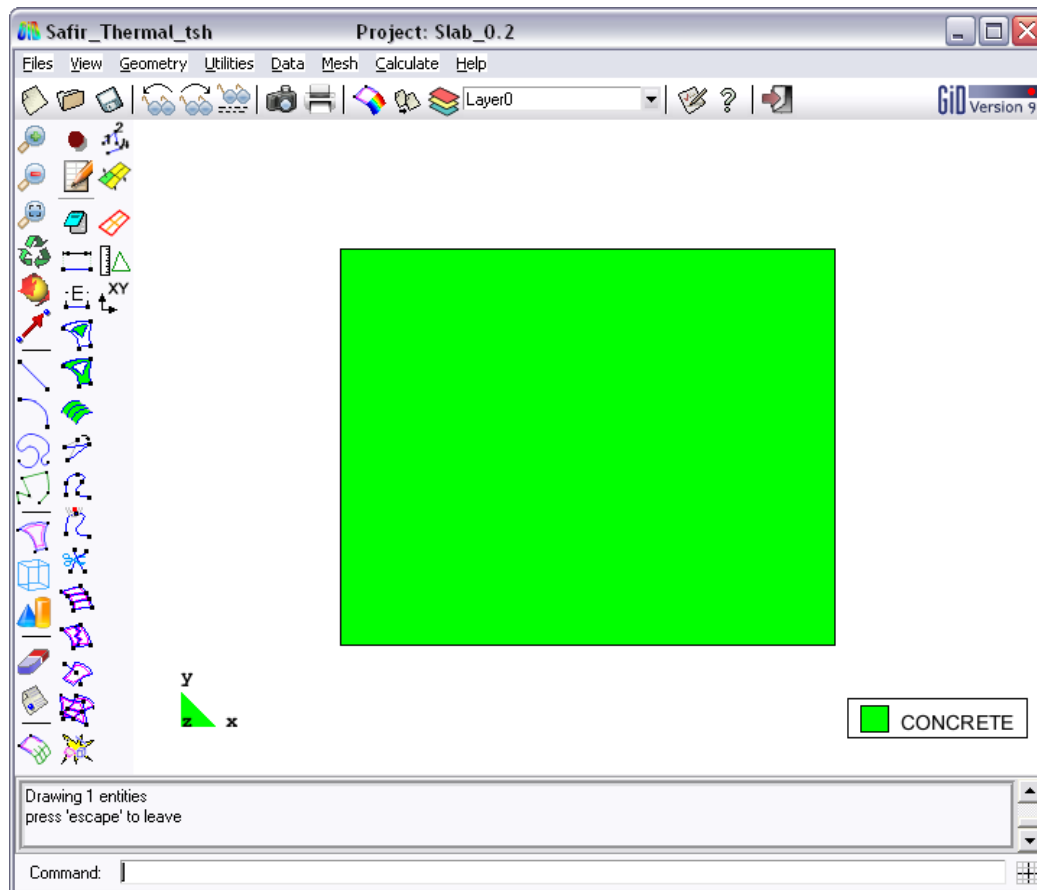
A Convection Coeff cold of **4**

A Relative Emission of **0.7**

A Parameter of thermal conductivity of **0.5**

Click on **Assign-> Surfaces** and assign it to the surface

Press **[Esc]** or **Finish** to confirm



Select **DRAW->all materials** in the Material dialog box to display Materials

Press **[Esc]** or **Finish** to leave

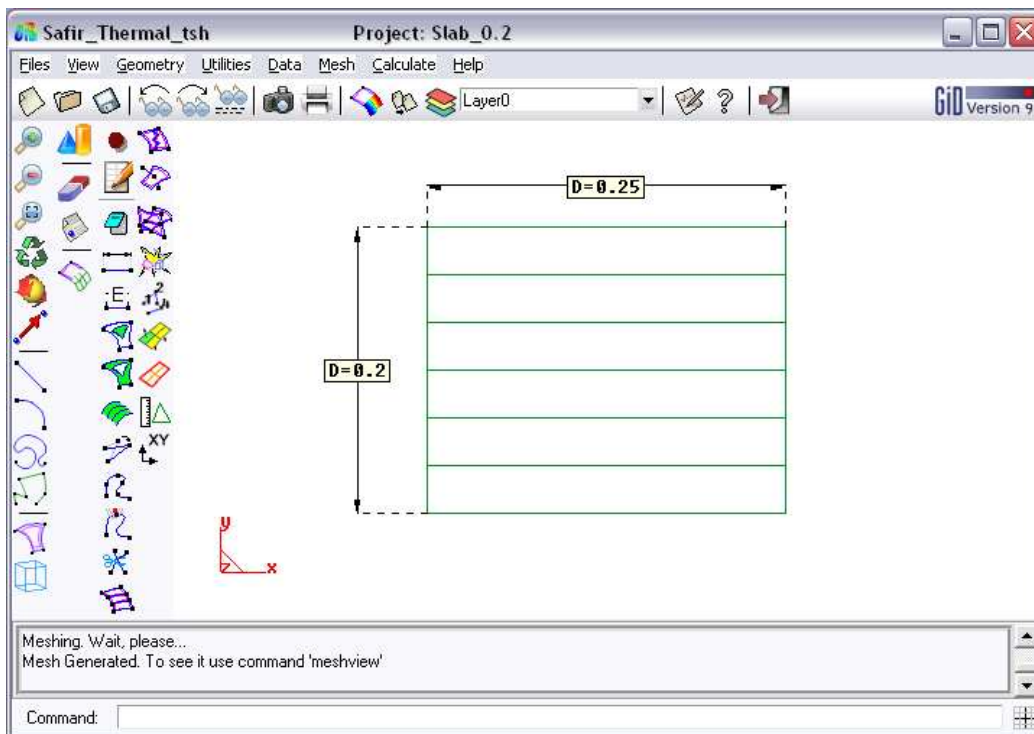
## 5. Meshes

⚠ As explained in the part 1, Meshes have already been set

To create meshes select from the pull down menu:

➤ **Mesh->Generate mesh**

or use **[Ctrl + g]**

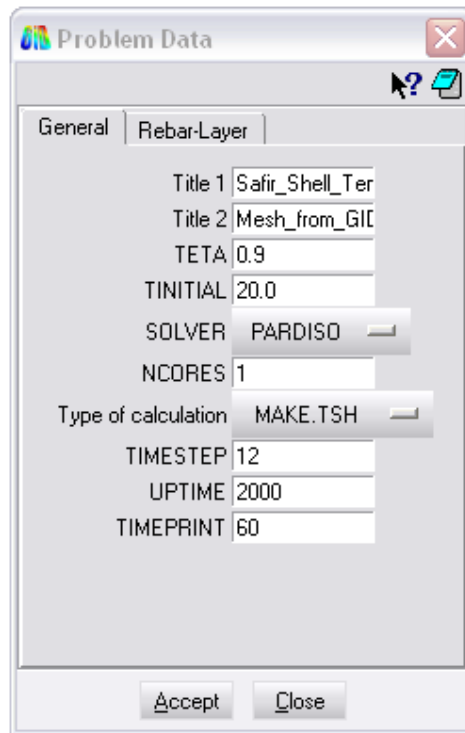




## 6. Assign General Data

From the pull down menu select:

► **Data->Problem Data**



In the Problem Data dialog mask enter:

TIMESTEP, UPTIME, TIMEPRINT as needed

⚠ When you click with the right button on one of the variables, GiD will display an online help message. The variables are also described in more detail in the SAFIR reference manual.

Click on the **Rebar-Layer** tab and fill as shown below:

**Problem Data**

General Rebar-Layer

Rebars 4

Rebar1 MATERIAL	2
Rebar1 SECTION	0.0010
Rebar1 LEVEL	-0.065
Rebar1 ANGLE	90.0
Rebar2 MATERIAL	2
Rebar2 SECTION	0.0010
Rebar2 LEVEL	-0.065
Rebar2 ANGLE	0
Rebar3 MATERIAL	2
Rebar3 SECTION	0.0010
Rebar3 LEVEL	0.065
Rebar3 ANGLE	90.0
Rebar4 MATERIAL	2
Rebar4 SECTION	0.0010
Rebar4 LEVEL	0.065
Rebar4 ANGLE	0

Accept Close

Click on the **Accept** data button

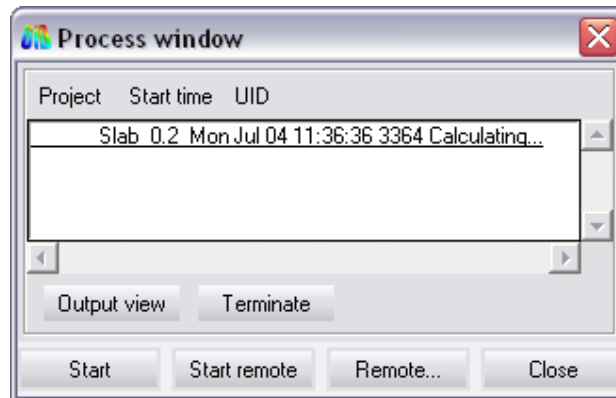
- ⚠ *Rebars is equal to the number of rebar layers in the section type*
- ⚠ *MATERIAL is the local number of this layer, in this case it is equal to 2 and you will not have to define to witch material this number is corresponding because GiD-Safir doesn't take into account rebars for thermal calculation. You will have to define the rebar material during the mechanical calculation.*
- ⚠ *SECTION is the cross sectional area of rebar1 in this layer in  $[m^2/m]$*
- ⚠ *LEVEL is the position of this layer in y axe with respect to the thickness (GiD-Safir always create new TSH section centered in Y)*
- ⚠ *Angle is the angle in degrees between the local x axis and the layer or rebars*

## 7. Start the calculation

From the pull down menu select:

➤ *Calculate->Calculate window*

Click the *Start* button



GiD creates a .IN file in the project directory and starts the calculation.

In the output window you can see the calculation progress from SAFIR and the GiD interface program which generates GiD postprocessor files from the .OUT file.

⚠ *If SAFIR found some errors in the .IN file you will see the error message in this window.*