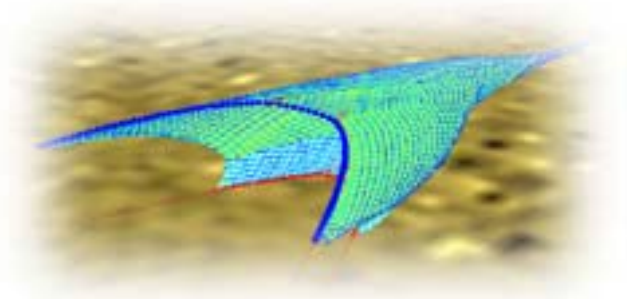
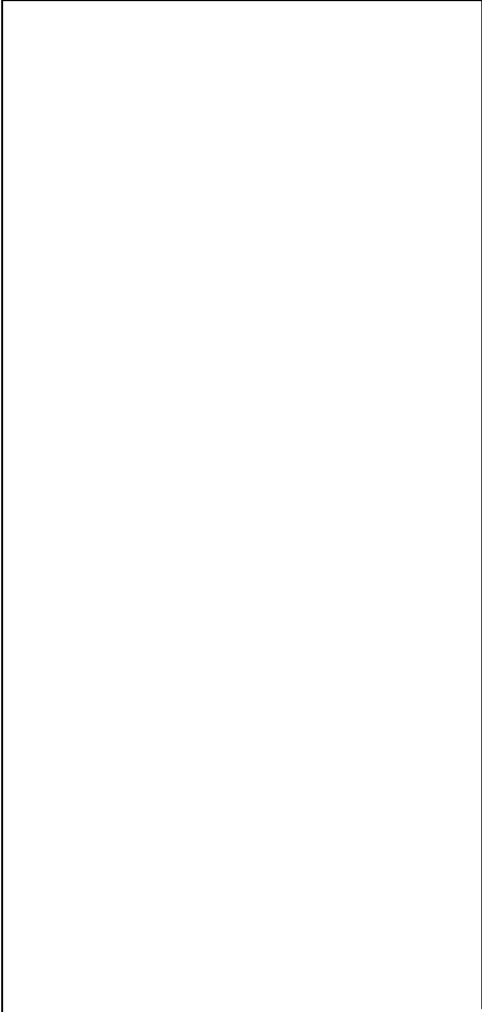


Exercises DynamiT



DynamiT

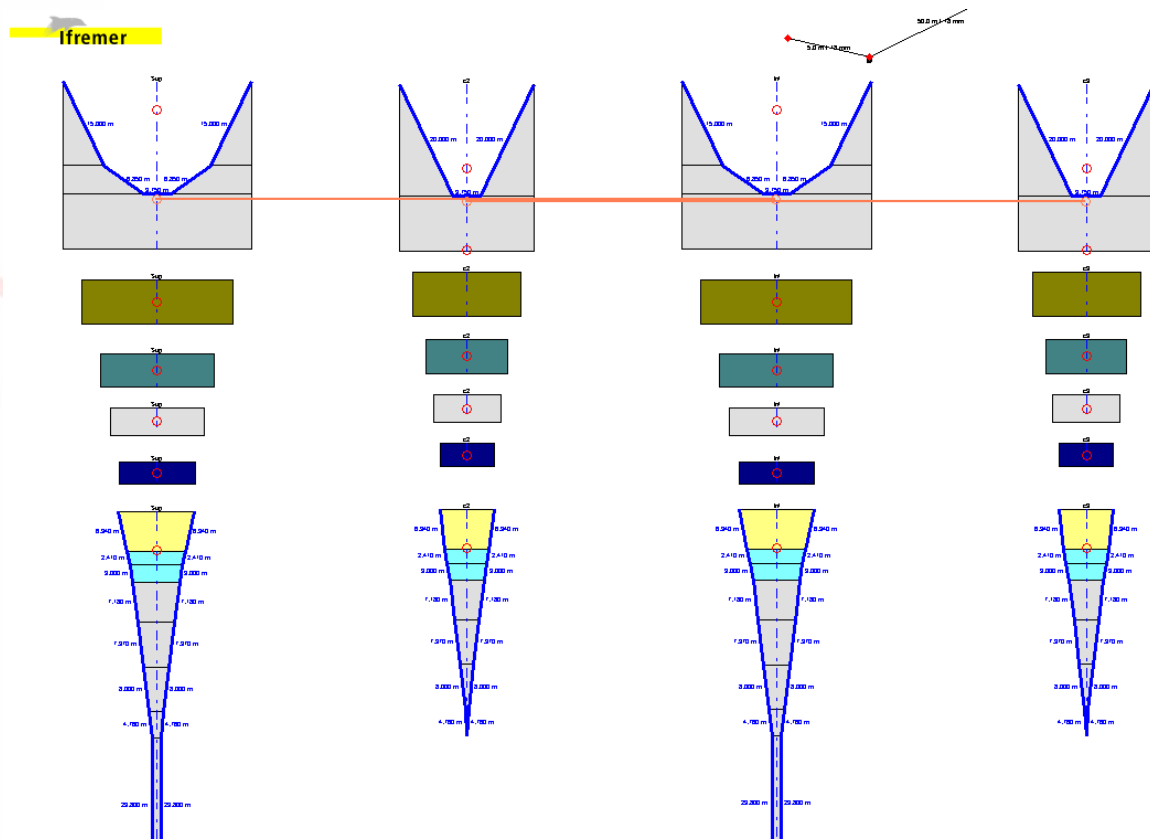
Ifremer

Training exercises
for new users

Using the Special Mesh tool

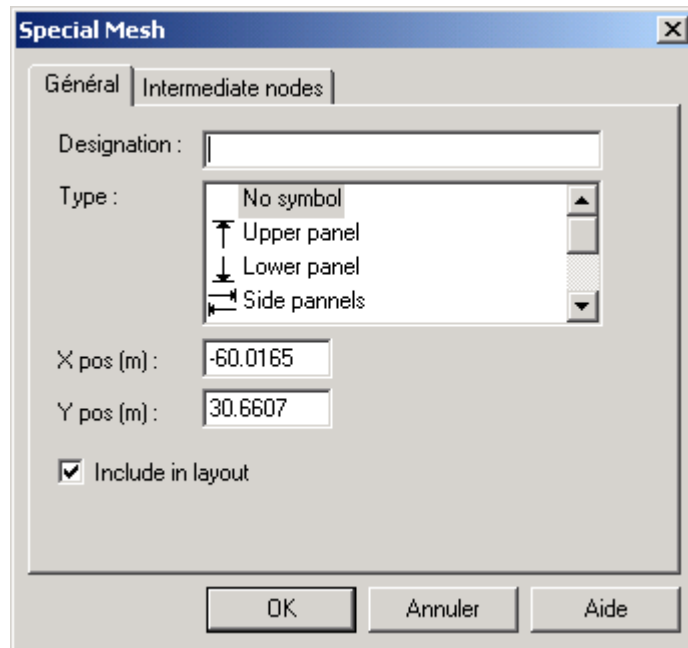
We propose in this tutorial to model once again the midwater trawl 47.75 x 43.73 using simple special meshes.
 We suppose the tutorial “TutorialLargeMeshesMidwater” has been done and understood.

- Open the file PTGM.trg. You should have the following design :



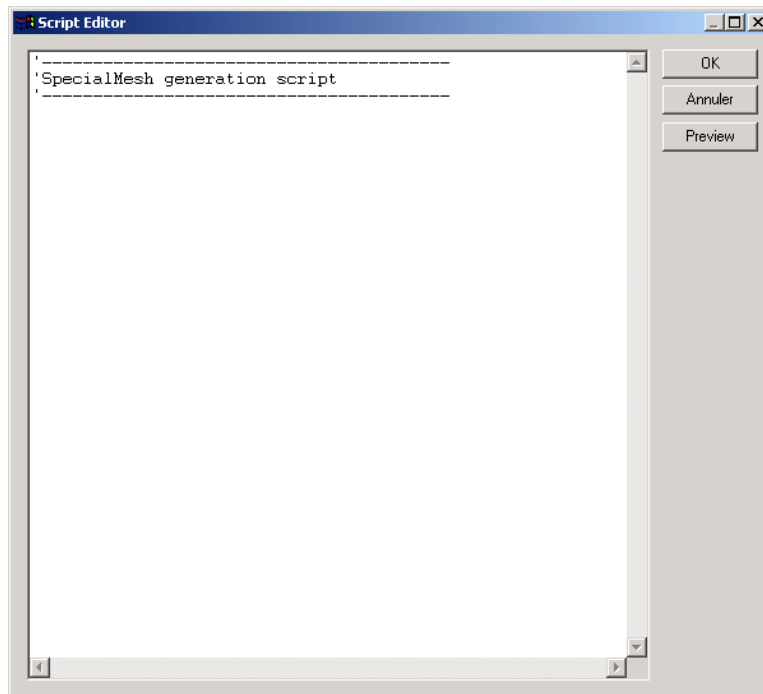
We are going to replace the 4 mid sections of each panel by a single special mesh.

- Remove these sections.
- Select the Special Mesh tool in the geometry mode.
- Click in the blank area, the Special Mesh dialog box appears.



- Designation : choose the name of the panel in order to line up the different DynamiT-panels in the design view.
- Hit OK.

A text editor appears :



- Look at the on line Help, section Special Meshes (or simply hit F1 once in the dialog box Special Mesh). You will see for instance the keyword AddRope with is described as follows :
AddRope(diameter,massPerMeter,stiffness,apparentWeightMultiplierFactor)
- Input the correct script. Use Preview to verify it is correct.

Notice bar lengths are given in meters (instead of mm in the nettings description) and the mass per meter of the ropes are given instead of the runnage (look at the on line Help).

You should get something looking like this, for the upper/lower panels :

```

-----
'SpecialMesh generation script
-----
Dim l_oRopeA2
Set l_oRopeA2 = SpecialMesh.AddRope(6, 0.016, 20000, 0.1)

Dim l_oBars
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,4)
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,4)

Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,3)
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,3)

Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2.5)
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,2.5)

Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2)
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,2)

```

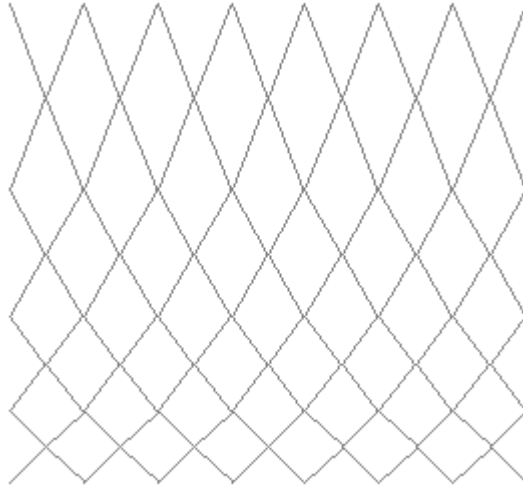
- The first line Dim is used to declare the variable l_oRopeA2.
- Then, this variable is defined with AddRope() : it is a rope of 6 mm diameter, 0.016 kg/m, stiffness of 20000 N and a multiplier coef of 0.1. This rope is added to the current SpecialMesh to be used later.
- Then we declare a new variable : l_oBars which will be a group of bars.
- Then we add a series of 14 bars of 4 m each made of the rope l_oRopeA2. The first bar of this series goes down (look at the resulting drawing). This create 7 half-meshes :



- Then we add a series of 14 bars of 4 m each made of the rope l_oRopeA2. The first bar of this series goes up (look at the resulting drawing). This create 7 half meshes that are stitched under the first series. Now we have defined 7 meshes.

- Etc ... the mesh sides are decreased for the following meshes (3 m, 2.5 m, 2 m).

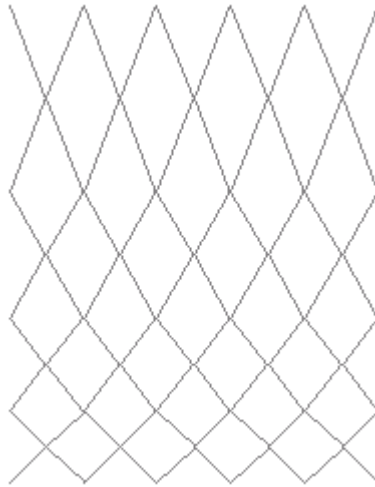
The result corresponding to this first Special Mesh (use the Preview button) is :



For the side panels :

```
'-----  
'SpecialMesh generation script  
'-----  
Dim l_oRopeA2  
Set l_oRopeA2 = SpecialMesh.AddRope(6, 0.016, 20000, 0.1)  
  
Dim l_oBars  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,10,4)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,10,4)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,10,3)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,10,3)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,10,2.5)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,10,2.5)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,10,2)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,10,2)
```

Corresponding to this mesh :



- Run a simulation and compare results with the initial method.

Till now, special meshes are not particularly useful !

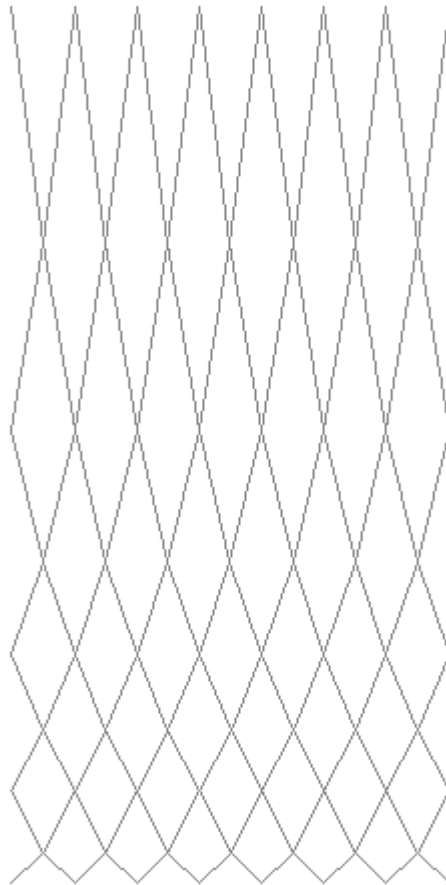
Now try to build an asymmetrical ***diamond*** mesh:

- Edit and modify the special meshes in order to build meshes where mesh side decreases more progressively.

You could use the script above, depending on the mesh size you want to create :

```
'-----  
'SpecialMesh generation script  
'-----  
Dim l_oRopeA2  
Set l_oRopeA2 = SpecialMesh.AddRope(6, 0.016, 20000, 0.1)  
  
Dim l_oBars  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,6)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,5)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,4)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,3)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2.5)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,2)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,1)
```

This builds the following asymmetrical diamond mesh :



➤ Now, build an asymmetrical *hexagonal* mesh.

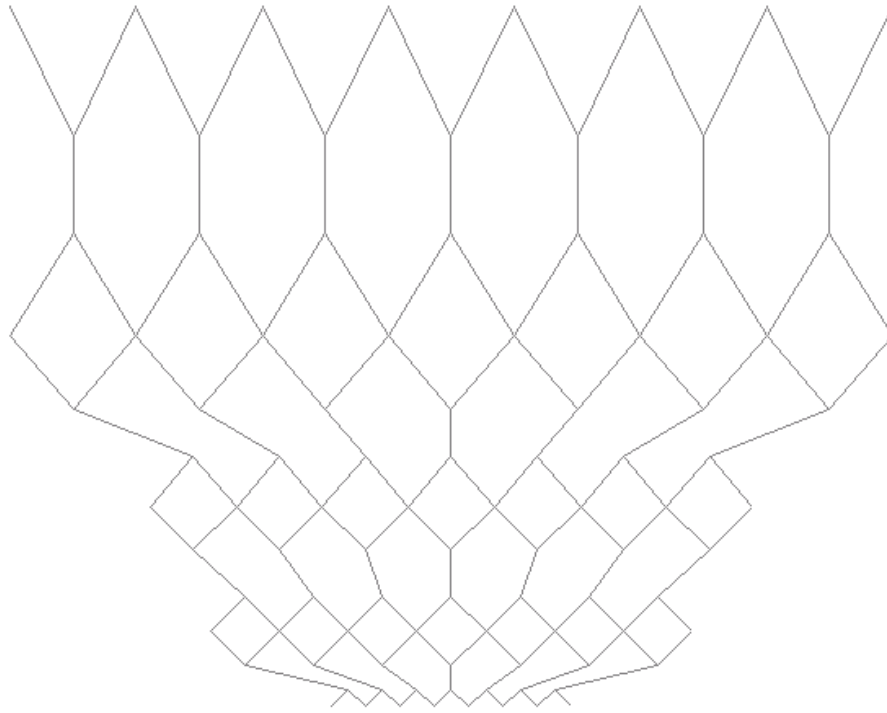
You just have to insert series of vertical bars using :

```
SpecialMesh.AddRow().AddGroup(grtVertical).AddIdenticalBars(l_oRopeA2,7,4)
```

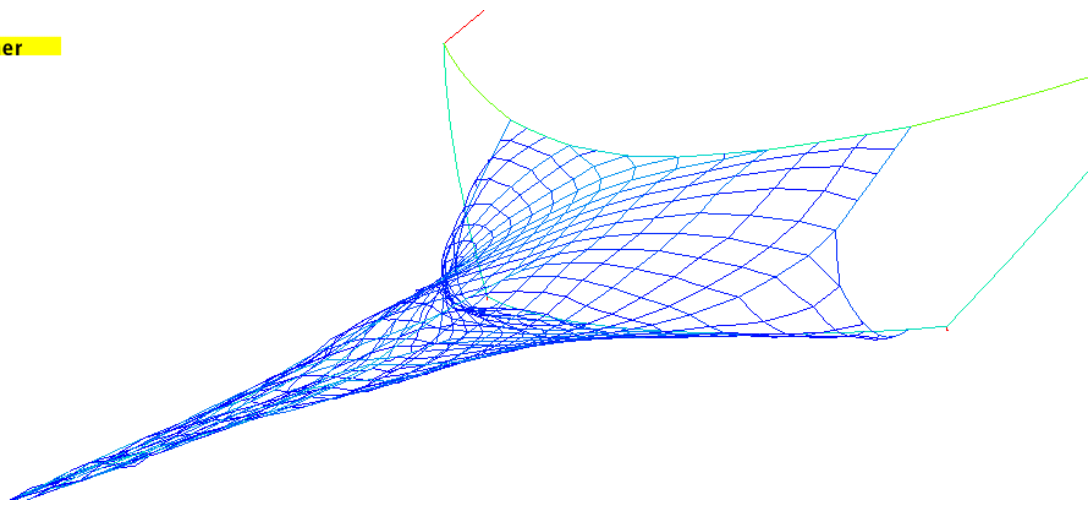
You could use the script above, depending on the mesh size you want to create :

```
'-----  
'SpecialMesh generation script  
'-----  
Dim l_oRopeA2  
Set l_oRopeA2 = SpecialMesh.AddRope(6, 0.016, 20000, 0.1)  
  
Dim l_oBars  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,6)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtVertical).AddIdenticalBars(l_oRopeA2,7,4)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,5)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,4)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtVertical).AddIdenticalBars(l_oRopeA2,7,2)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,3)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2.5)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtVertical).AddIdenticalBars(l_oRopeA2,7,2)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,2)  
  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtDown).AddIdenticalBars(l_oRopeA2,14,2)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtVertical).AddIdenticalBars(l_oRopeA2,7,1)  
Set l_oBars =SpecialMesh.AddRow().AddGroup(grtUp).AddIdenticalBars(l_oRopeA2,14,1)
```

This builds the following asymmetrical hexagonal mesh :

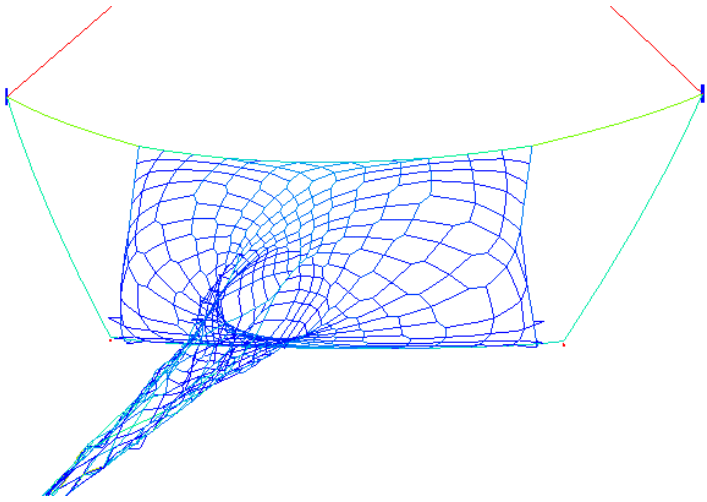


Ifremer



Initial design with diamond meshes

Ifremer



**Modified design using Special Meshes,
asymmetrical hexagonal meshes**