CADMAS-MESH user manual

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1. Outline

This section provides an overview of CADMAS-MESH.

1.1 Flow of operation

A typical CADMAS-MESH operation flow is shown in Figure 1.

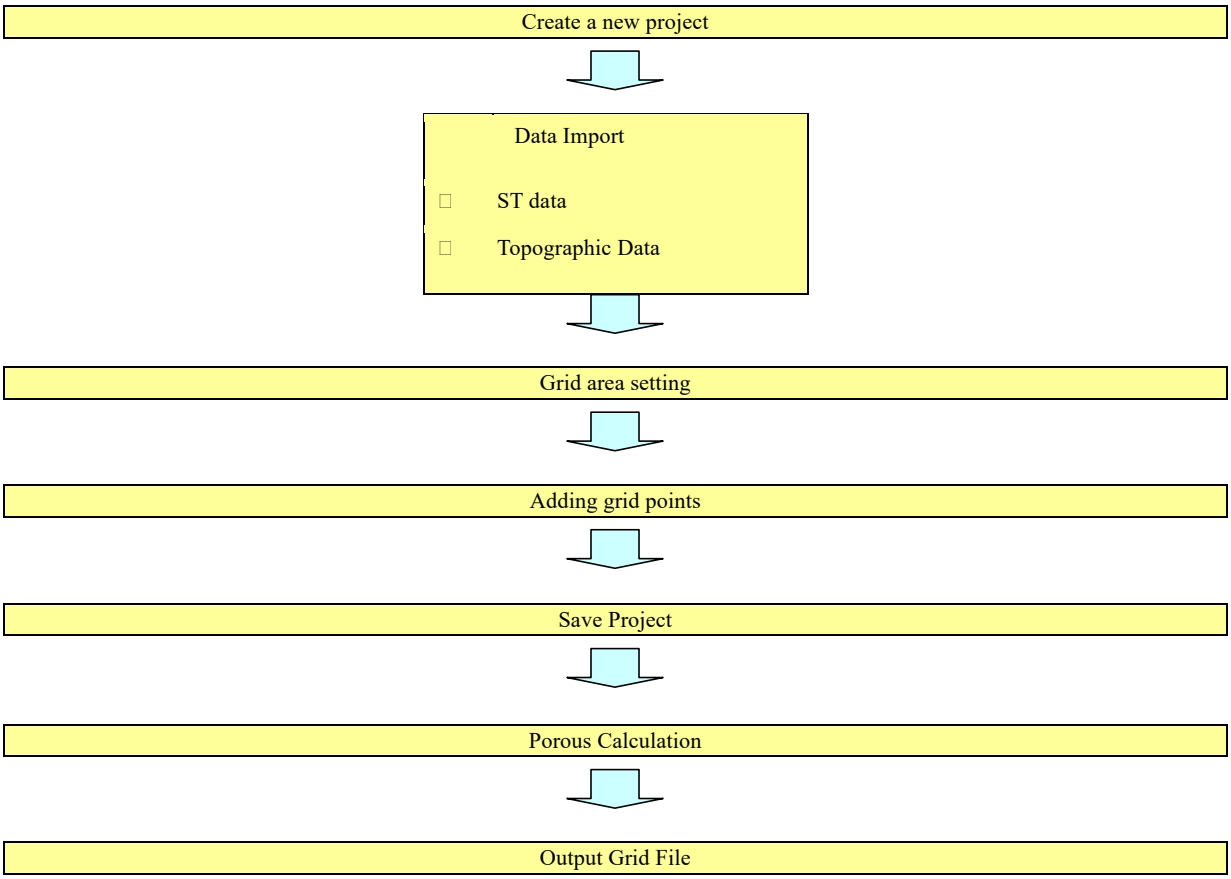

Figure 1 Typical CADMAS-MESH operation flow

1.2. Screen configuration

The CADMAS-MESH screen configuration is shown in Figure 2.

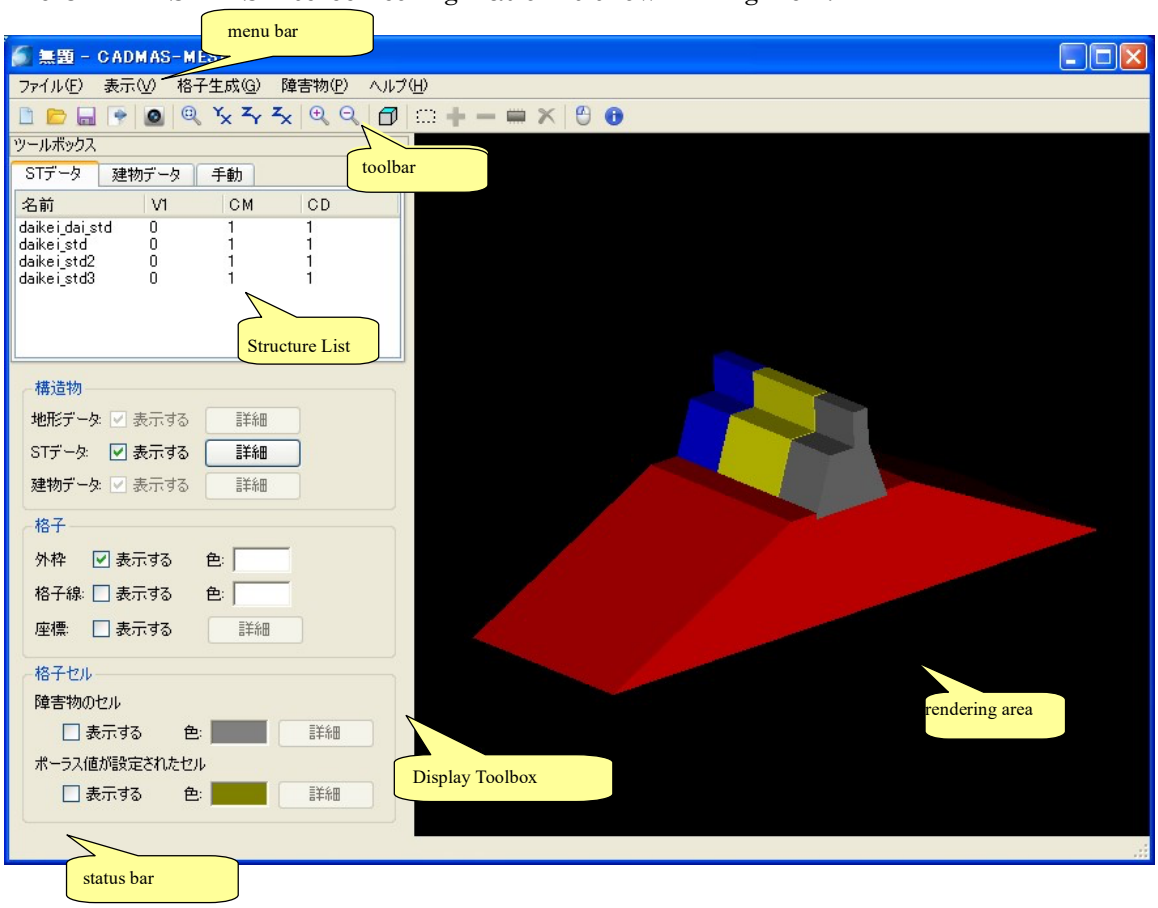

Figure 2 CADMAS-MESH Screen Structure

Menu bar

Functions are grouped by category.

Toolbar

Frequently used functions are displayed as icons.

Image area

Structures and generated grids are displayed.

Status bar

If necessary, the current status will be displayed.

Display Toolbox

Change the display settings for structures and grids in the drawing area.

Structure List

ST data, structures loaded from building data, and manually generated structures are displayed on their own tabs. The display contents for each tab are as follows.

ST data: Name of each structure read from ST data, percentage of water in the structure (V1), coefficient of inertia (CM), coefficient of resistance (CD)

Building data: name of each structure read from the building data, percentage of water in the structure (V1), coefficient of inertia (CM), coefficient of resistance (CD)

Manual: Name of manually created obstacle, type, percentage of water in structure (V1), coefficient of inertia (CM), coefficient of resistance (CD)

1.2.1. Menu Structure

Table 1 shows the menu structure of CADMAS-MESH.

表 1 CADMAS-MESH Menu Structure

menu		Contents	page
File(F)	New projects (N)	Start a new project	8
	Open project (O)	Open the project file	8
	Save the project (S)	Save the project	9
	Save the project As (A)	Save the project to a file with a name	9
	Loading grid data (L)	Loads grid data	10
	Output of grid data (E)	Outputs grid data	11
	CADMAS grid file output (C)	Output grid data in the format for CADMAS-SURF/3D.	11
	Topographic data (G)	Input and output of terrain data.	13
	ST data(T)	Input and output of ST data.	15
	Building Data (B)	Input and output of building data.	17
	Saving screenshots(C)	Outputs a screenshot of the drawing area to an image file.	19
	Recent projects(R)	Open a recently opened or saved project.	
	Termination (X)	Close CADMAS-MESH.	19
Display (V)	Toolbar (T)	Toggles the toolbar between shown and hidden.	20
	Status bar (S)	Toggles the status-bar between shown and hidden.	20
	Initial display(F)	Initialize the display to fit the structure and particles within the screen.	20
	XY plane(X)	Move the viewpoint to display the XY plane.	21
	YZ plane(Y)	Move the viewpoint to display the YZ plane.	21

	XZ plane(Z)	Move the viewpoint to display the XZ plane.	22
	Expansion (I)	Enlarge the screen.	22
	Reduction (O)	Reduce the screen.	23
Grid generation(G)	Area setting(R)	Set the grid area	24
	Adding grid points(A)	Add grid points	25
	Deleting grid points (D)	Delete grid points	27
	Porous calculation (P)	Calculates the porous value of each cell	28
	Delete the entire grid(L)	Delete the grid.	29
Obstacle (P)	ST data Movement (T)	Sift ST data.	30
	ST data rotation (R)	Rotate ST data in 90 degree increments.	30
	ST data enlargement / reduction (S)	Enlarge or Reduce ST data.	31
	ST data physical properties edition (E)	Edit physical property values of ST data.	31
	Edition building data physical properties	Edit physical properties of building data	32
	Manual data group addition (G)	Add a group of manual data	33
	Manual data group renaming(R)	Edit the name of a group of manual data.	34
	Manual data group deletion(D)	Delete a group of manual data.	34
	Manual data addition(A)	Add manual data.	35
	Manual data editing(I)	Edit manual data.	37
	Manual data deletion(L)	Delete manual data.	37
	Manual data area deletion (O)	Delete manual data by specifying an area.	38
	Obstacle threshold setting (L)	Set the threshold for outputting obstacle to the CADMAS grid file.	38
Help(H)	Mouse operation (M)	Display a help-dialog on how to operate the mouse in the drawing area	39
	Version information (A)	Display version information of CADMAS-MESH.	39

1.2.2. Toolbar

Table 2 shows the toolbar structure of CADMAS-MESH.

table 2 CADMAS-MESH toolbar configuration

Button	Title	Description	page
	New project	Start a new project.	8
	Open project	Open the project file.	8
	Save project	Save the project.	9
	CADMAS grid file output	Output grid data in the format for CADMAS-SURF/3D.	11
	Saving screenshot	Outputs a screenshot of the drawing area to an image file.	19
	Initial display	Initialize the display to fit the structure and particles within the screen.	20
	XZ plane	Move the viewpoint to display the XY plane.	21
	YZ plane	Move the viewpoint to display the YZ plane.	21
	XZ plane	Move the viewpoint to display the XZ plane.	22
	Enlargement	Enlarge the screen.	22
	Reduction	Reduce the screen.	23
	ST data physical properties edition	Edit physical property values of ST data.	31
	Area setting	Set the grid area	24
	Adding grid points	Add grid points	25
	Deleting grid points	Delete grid points	27
	Porous calculation	Calculates the porous value of each cell	28
	Delete the entire grid	Delete the grid.	29
	Mouse operation	Display a help-dialog on how to operate the mouse in the drawing area	39
	Version information	Display version information of CADMAS-MESH.	39

1.3. Basic operation

1.3.1. View operation

In the drawing area, the Ctrl key, left drag, middle drag (scroll button), and right drag are used to manipulate the view. Table 3 shows the correspondence between functions and operations.

Table 3 View operation method

Function	Operation	Cursor
movement	Ctrl key + left drag	
Zoom in/out	Ctrl key+ medium drag	
rotation	Ctrl key + right drag	

2. File(F)

2.1. New Projects(N)

Start a new project. Follow the steps below.

Menu:File(F)→New Projects(N)

Toolbar:

The open project is discarded and a new project is started.

2.2. Open project (O)

Opens a previously saved project and restores it to the state it was in when it was saved. Follow the steps below.

Menu:File(F)→Open Projects(O)

Toolbar:

The dialog shown in Figure 3 will appear. Select the project file you wish to open and press the "Open" button to restore the status of the file at the time it was saved.

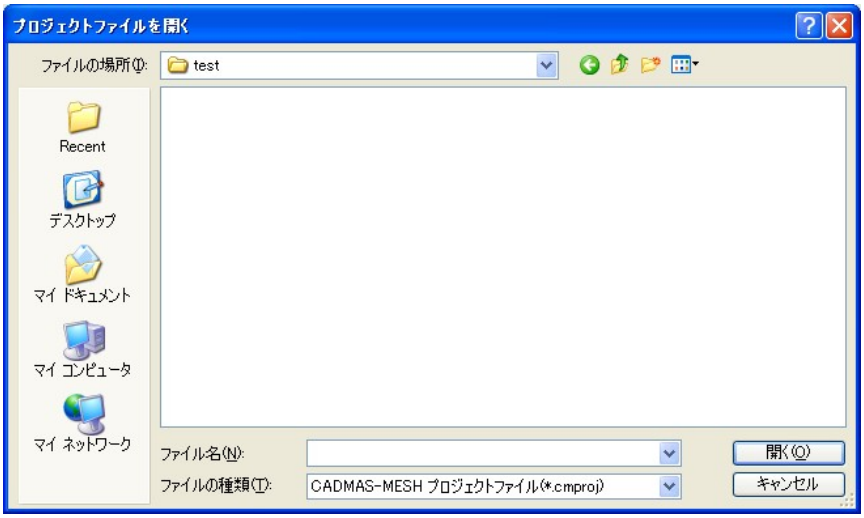

Figure 3 Example of dialog display for opening a project file

2.3. Save the project (S)

Save the current project. Follow the steps below.

Menu:File(F)→Save the Projects(S)

Toolbar:

If a project file is opened or if the project has already been saved once, the project file will be overwritten and the message shown in Figure 4 will appear in the status bar.

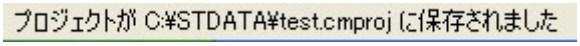

Figure 4 Status bar message when saving a project

When saving for the first time, the operation is the same as "Save Project As" shown in 2.4.

2.4. Save the project as (A)

Saves the current project to a project file with a name. Follow the steps below.

Menu:File(F)→Save the project as(A)

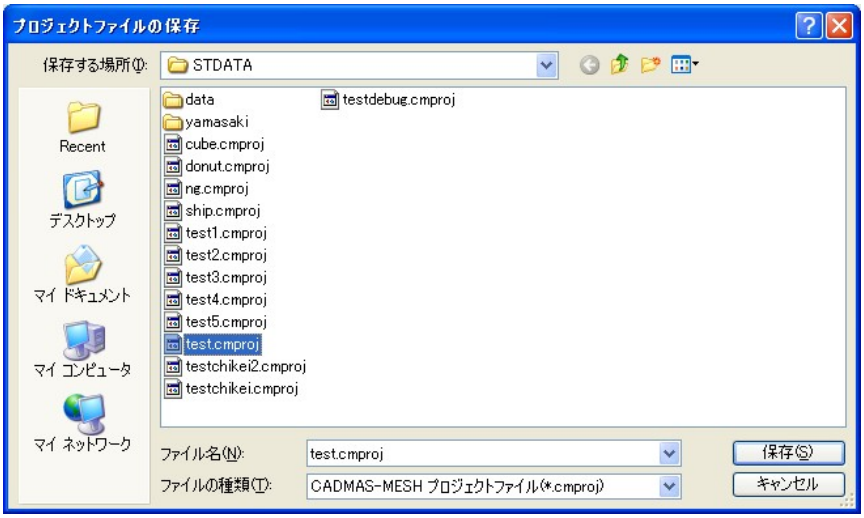

Figure 5 Example of dialog display for saving a project file

2.5. Loading Grid Data.

Reads grid data from a grid file. Follow the steps below.

Menu:File(F)→ Loading Grid Data

The dialog shown in Figure 6 appears. Select the grid data you wish to load and press the "Open" button. The grid data is then loaded and displayed. Figure 7 shows an example of a loaded grid. For more information on grid files, please refer to section 7.1.

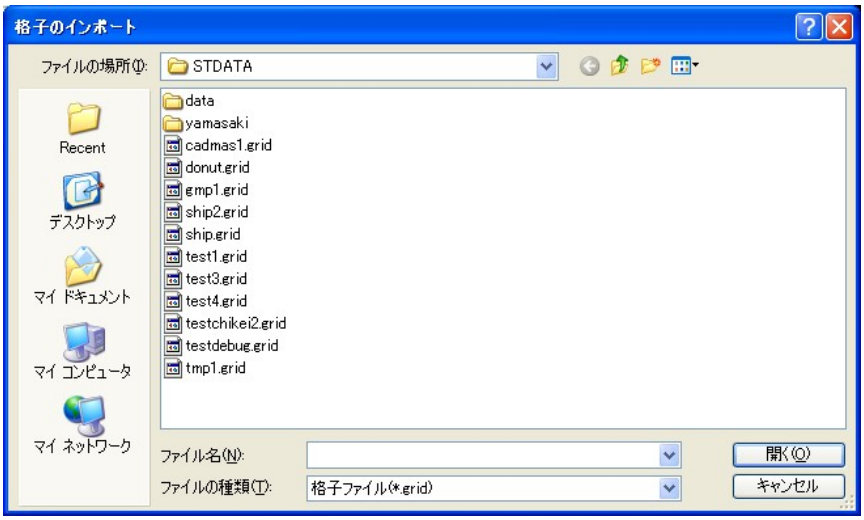

Figure 6 Example of dialog display for the import grid

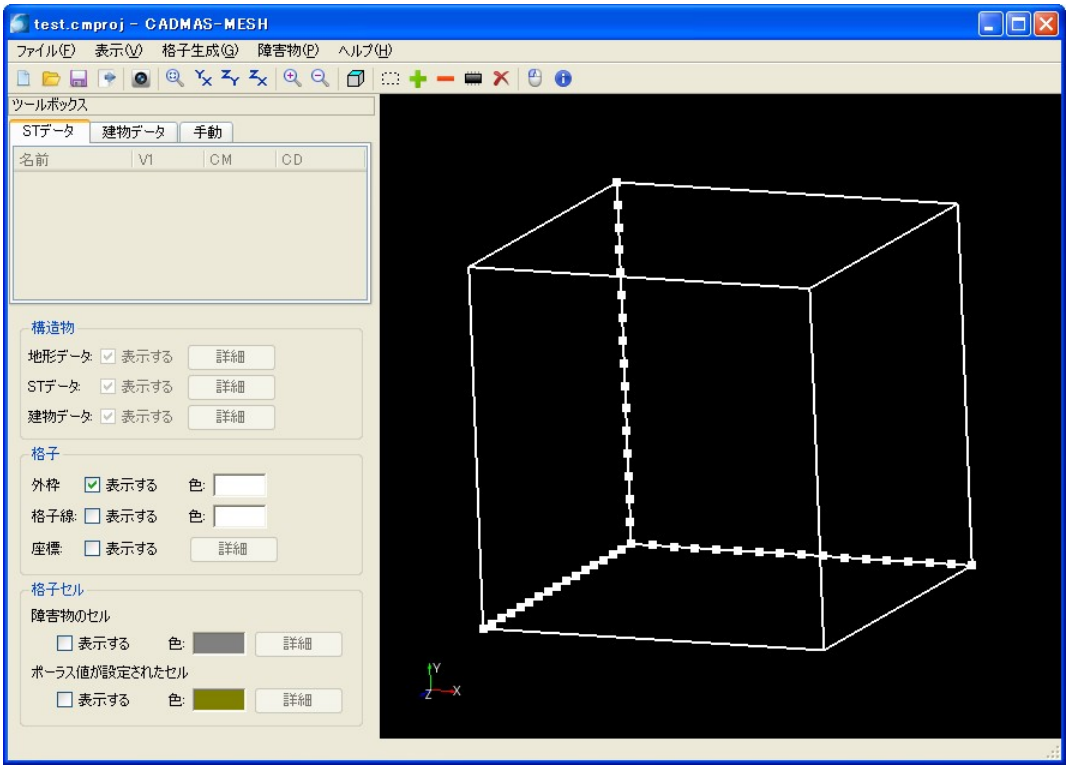

Figure 7 Example of display of loaded grid

2.6. Outputting Grid Data (E)

Outputs the grid data to a file. Follow the steps below.

Menu:File(F)→ Outputting Grid Data (E)

The dialog box shown in Figure 8 appears. Specify the name of the grid file you wish to save and press the "Save" button. Then the grid data is saved in the specified file and the message shown in Figure 9 appears on the status bar. For more information on grid files, please refer to section 7.1.

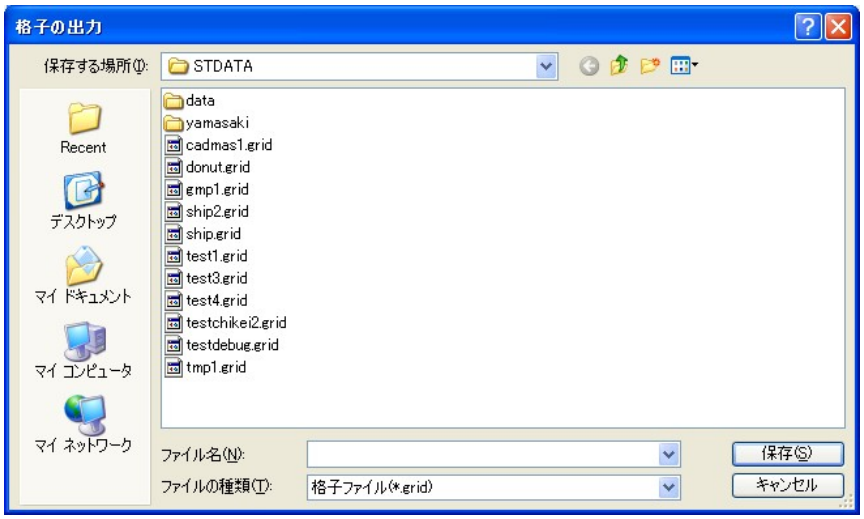

Figure 8 Example of dialog display for the export grid

格子が C:¥STDATA¥tmp1.grid へ出力されました

Figure9 Status bar message when saving a project

2.7. Output of CADMAS Grid Files (C)

Outputs a grid file that can be used as input for CADMAS-SURF/3D. Follow the steps below.

Menu:File(F)→ Output of CADMAS Grid Files (C)

The dialog shown in Figure 10 is displayed. Specify the name of the lattice file you wish to save and press the "Save (S)" button. A dialog box similar to the one shown in Figure 11 will then appear and the output of the lattice data file will begin.

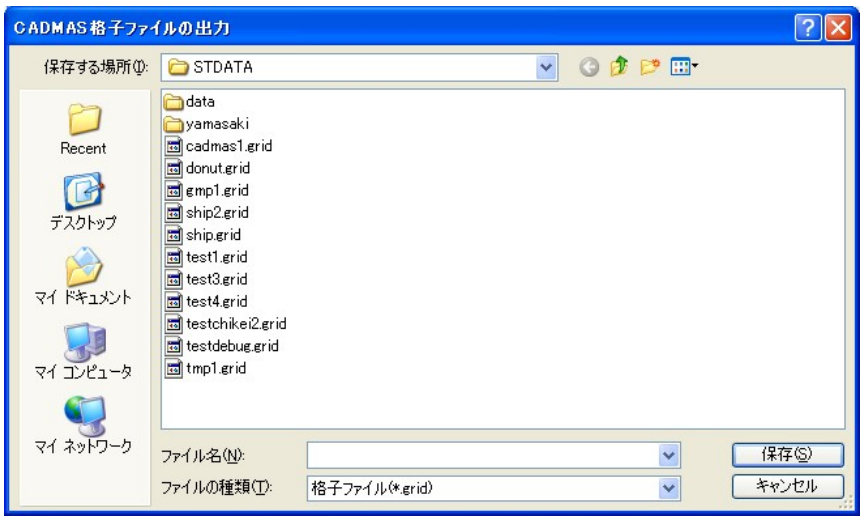

Figure10 CADMAS grid file output dialog

Figure 11 CADMAS grid file output progress dialog

2.8. Topographic Data (G)

Manipulate topographic data.

2.8.1. Loading (L)

Loads terrain data. Follow the steps below.

Menu: File(F)→ Topographic Data(G)→ Loading (L)

The dialog shown in Figure 12 is displayed. Select the topographic data you wish to load and press the "Open" button. Figure 13 shows an example of the loaded topographic data.

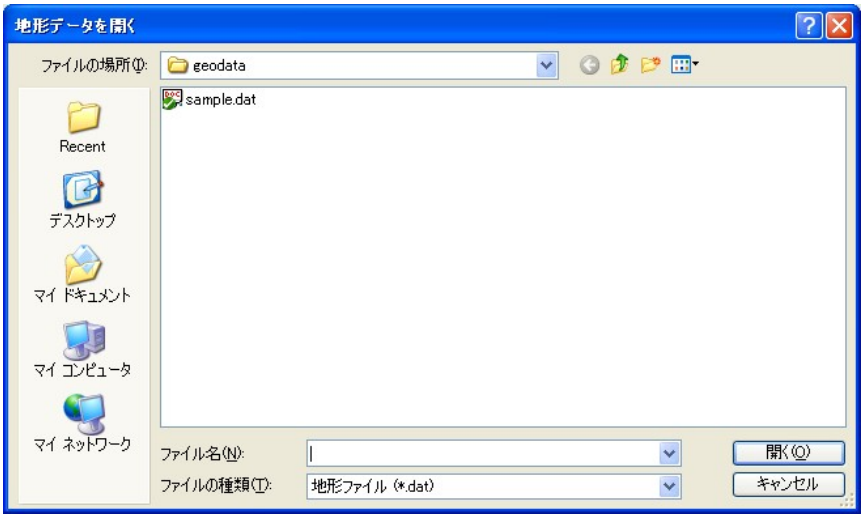

Figure 12 Dialog of opening topographic data

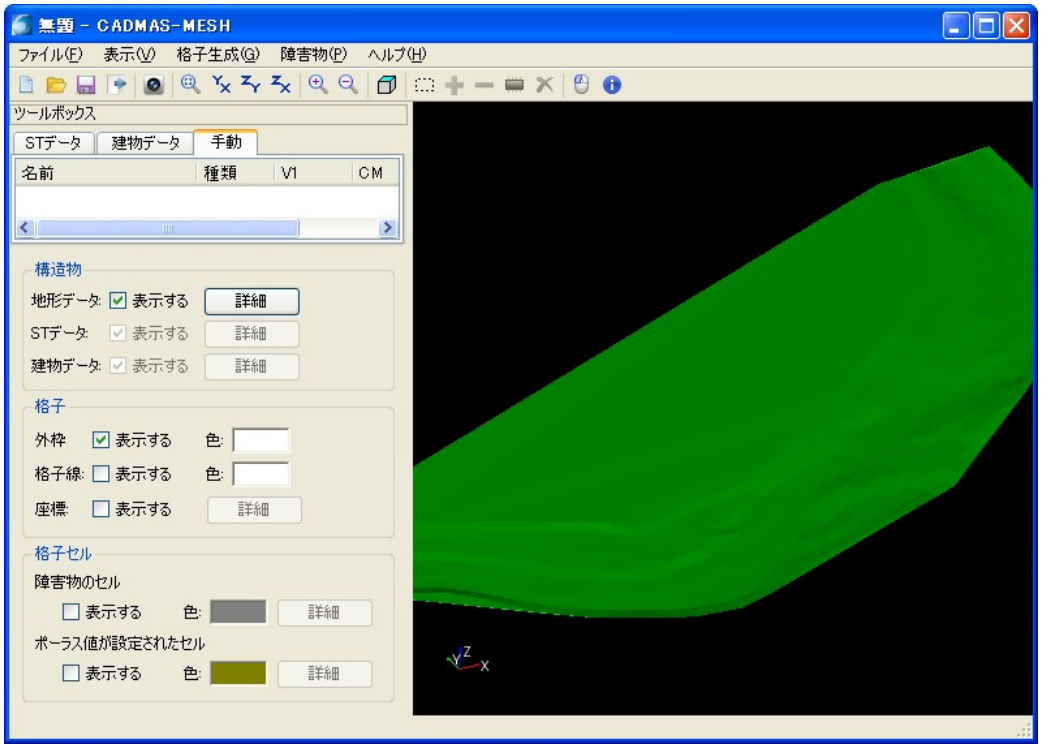

Figure 13 Example of laoding topographic data

2.8.2. Destruction (G)

Discard loaded topographic data. Follow the steps below.

Menu: File(F)→ Topographic Data(G)→ Destruction (G)

The dialog shown in Figure 14 is displayed. Press the "Yes" button.

Figure 14 Confirmation dialog fore discarding topographic data

2.9. ST data(T)

Manipulate ST data.

Please refer to section 7.4 for ST file format.

2.9.1. Loading (L)

Load structure data from ST data. Follow the steps below.

Menu: File(F)→ ST data (T) → Loading (L)

The dialog shown in Figure 15 is displayed. Select the ST data you wish to load and press the "Open (O)" button. The ST data is then loaded and the structure is displayed. Figure 16 shows an example of the loaded structure.

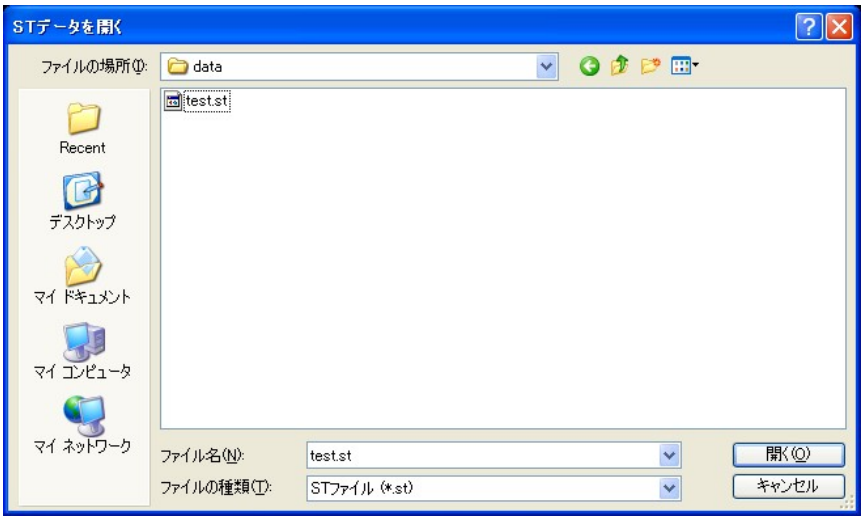

Figure 15 Example of dialog display for the ST data selection

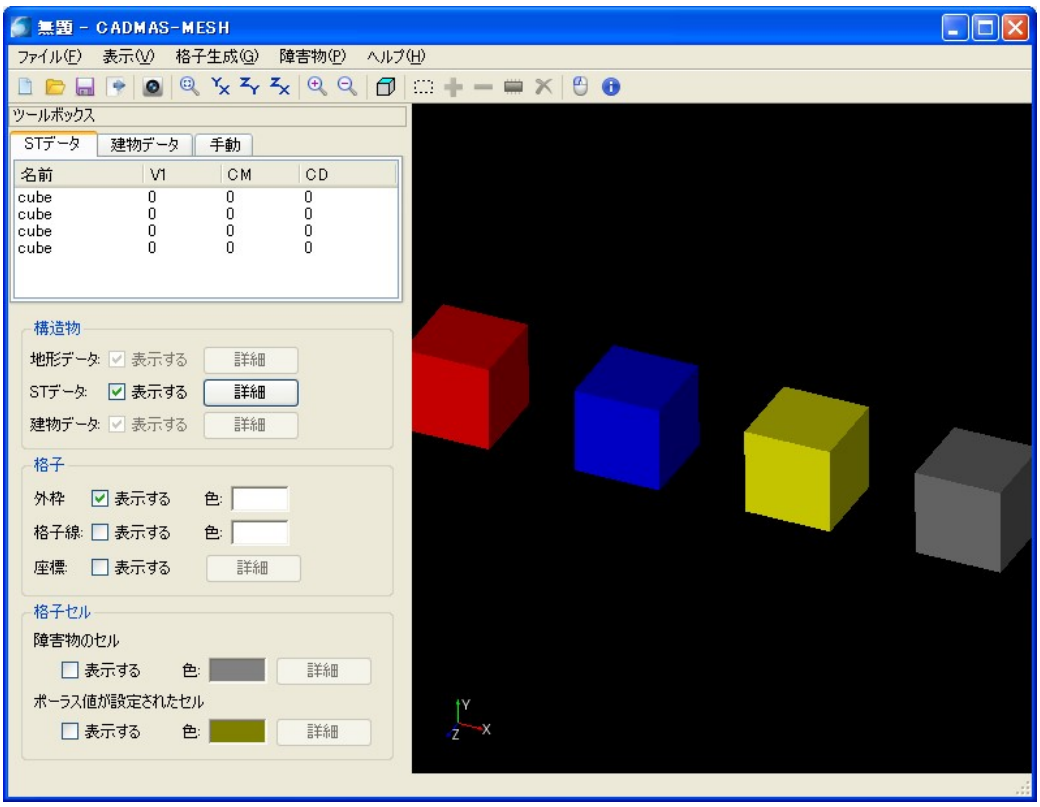

Figure 16 Example of display of loaded structures

2.9.2. Save(S)

Saves edits to the loaded ST data. Follow the steps below.

Menu: File(F)→ ST data (T) → Save (S)

When the save is complete, a message similar to the one shown in Figure 17 appears in the status bar.

STデータ C:¥KOUKEN¥STD¥CADMAS-MESH-Tests¥cubes¥cubes.st が上書き保存されました

Figure 17 Status bar message when saving ST data

2.9.3. Destruction (D)

Discard ST data read. Follow the steps below.

Menu: File(F)→ ST data (T) → Destruction (D)

The dialog shown in Figure 18 is displayed. Press the "Yes" button.

Figure 18 Example of ST Data Discard Confirmation Dialog Display

2.10. Building Data (B)

Manipulate building data.

Please refer to section 7.5 for ST file format.

2.10.1. Loading (L)

Load the structure data from the building data. Follow the steps below.

Menu: File(F)→ Building data (B) → Loading(L)

The dialog shown in Figure 19 is displayed. Select the building data you wish to load and press the "Open" button. The building data is loaded and the structure is displayed. Figure 20 shows an example of the loaded structure display.

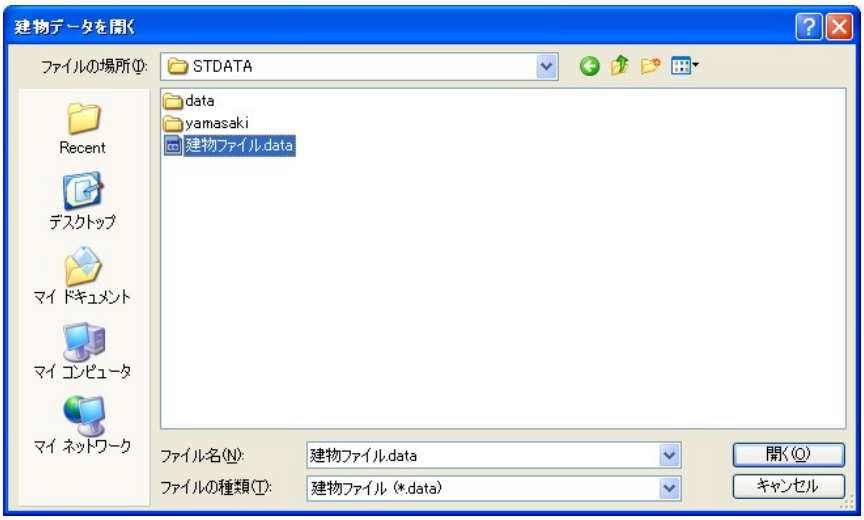

Figure 19 Example of Building Data Selection Dialog Display

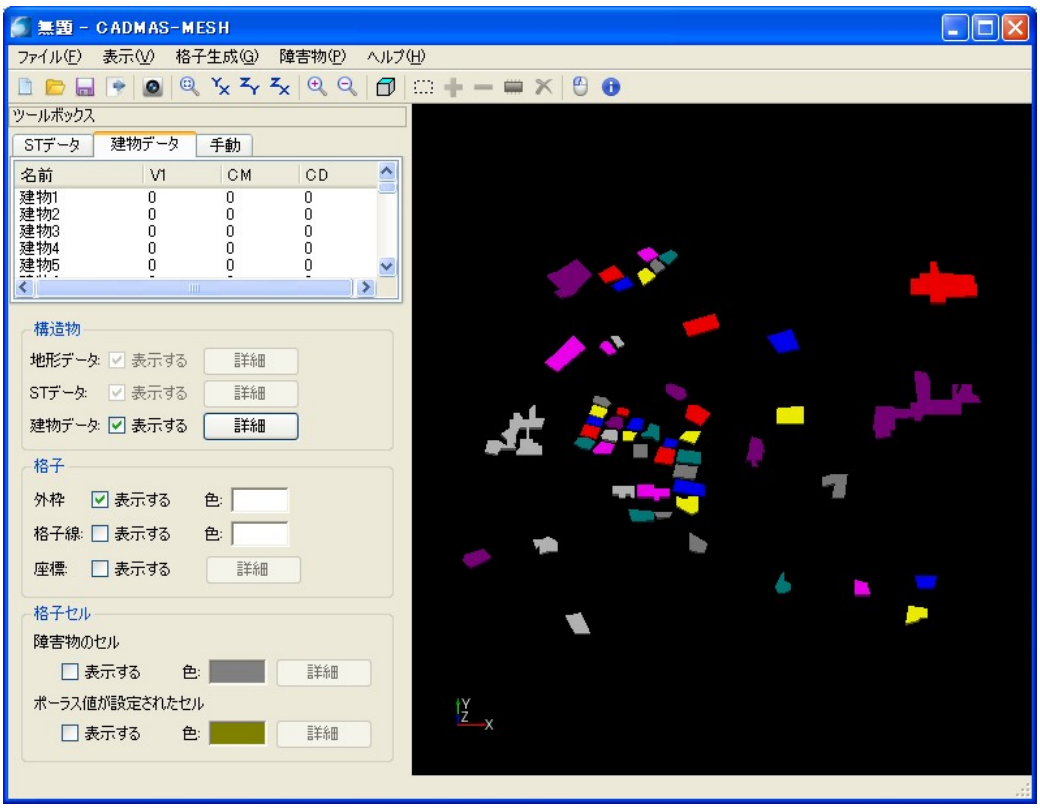

Figure 20 Example of display of loaded structures

2.10.2. Destruction (D)

Discard ST data read. Follow the steps below.

Menu: File(F)→ Building data (B) → Destruction (D)

The dialog shown in Figure 21 is displayed. Press the "Yes" button.

Figure 21 Example of Building Data Discard Confirmation Dialog Display

2.11. Saving screenshots

Outputs a screenshot of the drawing area to an image file. Follow the steps below.

Menu: File(F)→ Saving screenshots

The dialog shown in Figure 22 is displayed. Specify a file name to save and press the "Save" button to save the screenshot to the specified file.

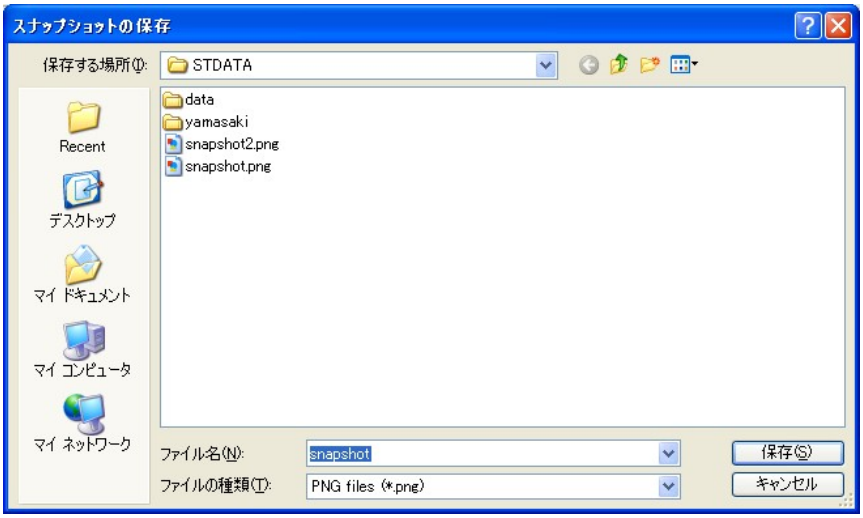

Figure 22 Example of dialog display for the screenshot saving

2.12. Termination (X)

Close CADMAS-MESH. Follow the steps below.

Menu: File(F)→ Termination (X)

3. Display (V)

3.1. Toolbar (T)

Toggles the toolbar between shown and hidden. Follow the steps below.

Menu: Display (V) → Toolbar (T)

When the toolbar is displayed, the menu is checked.

3.2. Status Bar (S)

Toggles the status bar between shown and hidden. Follow the steps below.

Menu: Display (V) → Status Bar (S)

When the status bar is displayed, the menu is checked.

3.3. Initial display (F)

Initialize the display so that topographic data, grid, and structure data fit on the screen. Follow the steps below.

Menu: Display (V) → Initial display (F)

Toolbar:

Figure 23 shows an example of initial display operation.

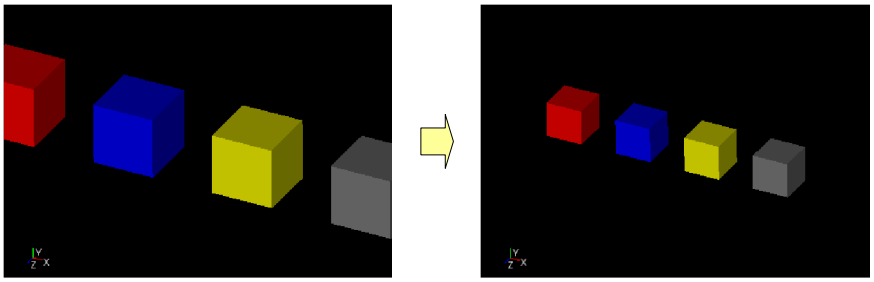

Figure 23 Example of Initial display Operation

3.4. XY Plane (X)

Move the viewpoint so that the X plane is displayed facing right and the Y plane is displayed facing up. Follow the steps below.

Menu: Display (V) → XY Plane (X)

Toolbar:

Figure 24 shows an example of XY plane operation.

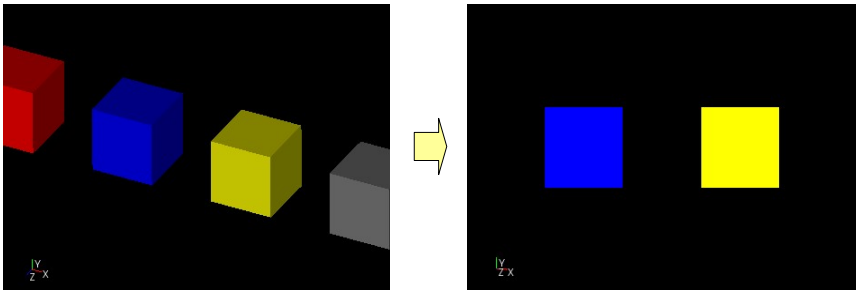

Figure 24 Example of XY plane Operation

3.5. YZ Plane (Y)

Move the viewpoint so that the Y plane is displayed facing right and the Z plane is displayed facing up. Follow the steps below.

Menu: Display (V) → YZ Plane (Y)

Toolbar:

Figure 25 shows an example of YZ plane operation.

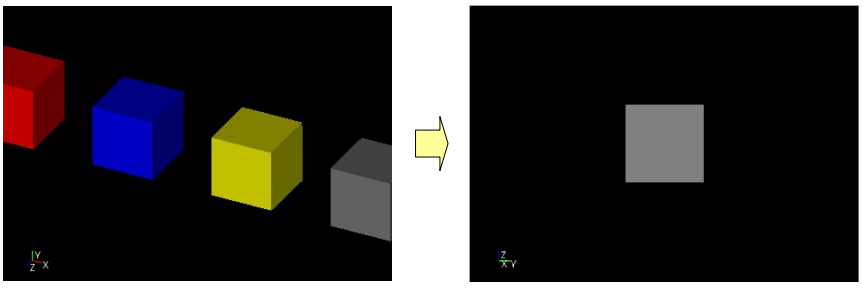

Figure 25 Example of YZ plane Operation

3.6. XZ Plane (Z)

Move the viewpoint so that the X plane is displayed facing right and the Z plane is displayed facing up. Follow the steps below.

Menu: Display (V) → XZ Plane (Z)

Toolbar:

Figure 26 shows an example of XZ plane operation.

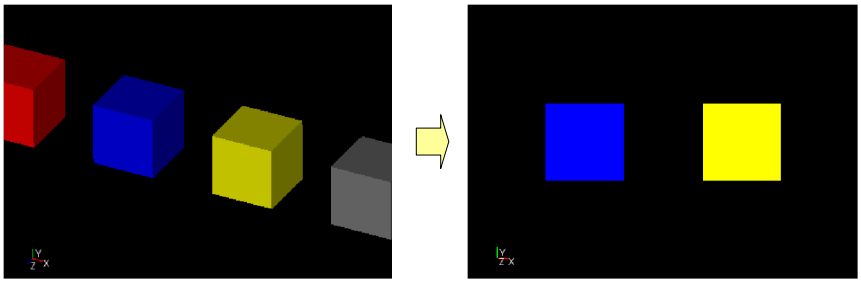

Figure 26 Example of XZ plane Operation

3.7. Expansion (I)

Zoom in for a larger view. Follow the steps below.

Menu: Display (V) → Expansion (I)

Toolbar:

Figure 27 shows an example of enlargement operation.

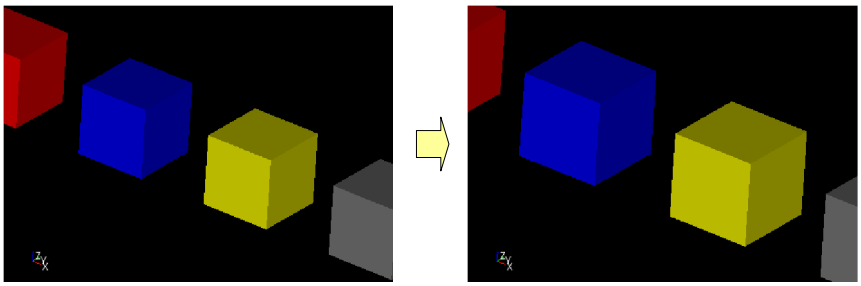

Figure 27 Example of Enlarge Operation

3.8. Reduction(O)

Zoom out for a reduced view. Follow the steps below.

Menu: Display (V) → Reduction (O)

Toolbar:

Figure 28 shows an example of reduction operation.

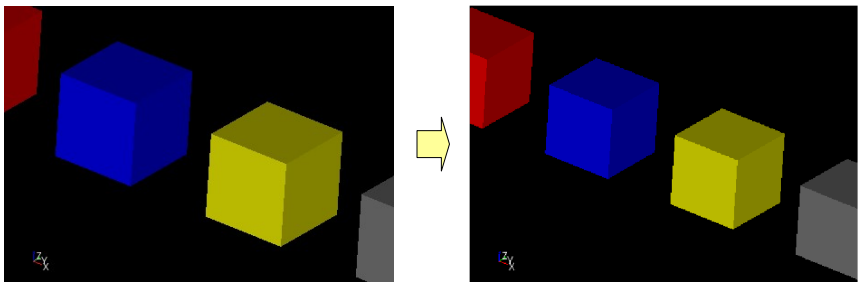

Figure 28: Example of Reduction Operation

4. Grid generation (G)

4.1. Region setting (R)

Sets the region where the grid will be generated. Follow the steps below.

Menu: Display (V) → Region setting (R)
Toolbar:

The dialog shown in Figure 29 will appear. Set the region and press the "OK" button. The specified region will then be displayed in the drawing area. Figure 30 shows an example of the screen display after setting the region.

Figure 29. Region Setting Dialog

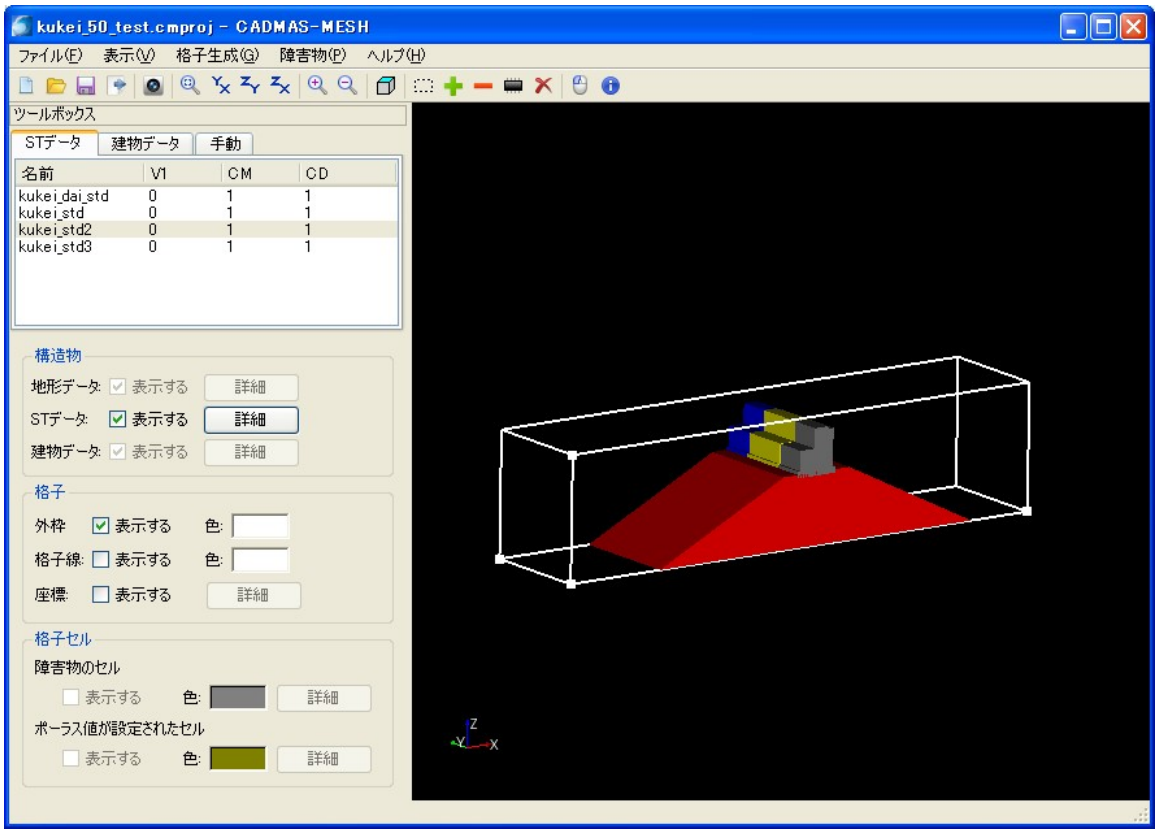

Figure 30 Example of screen display after region setting

4.2. Adding grid points (A)

Add a grid point. Follow the steps below.

Menu: Display (V) → Adding grid points (A)
Toolbar:

Once executed, the dialog shown in Figure 31 will appear.

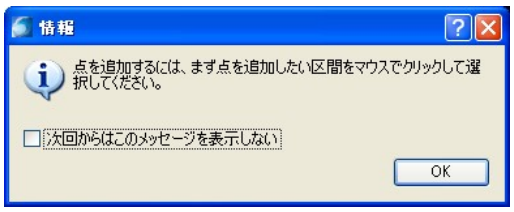

Figure 31 Add Grid Point Info Dialog

After confirming the contents and pressing the "OK" button, in the drawing region, click with the mouse on the section to which you want to add grid points. When a section is available for selection, the selected section will be indicated by a bold line (see Figure 32).

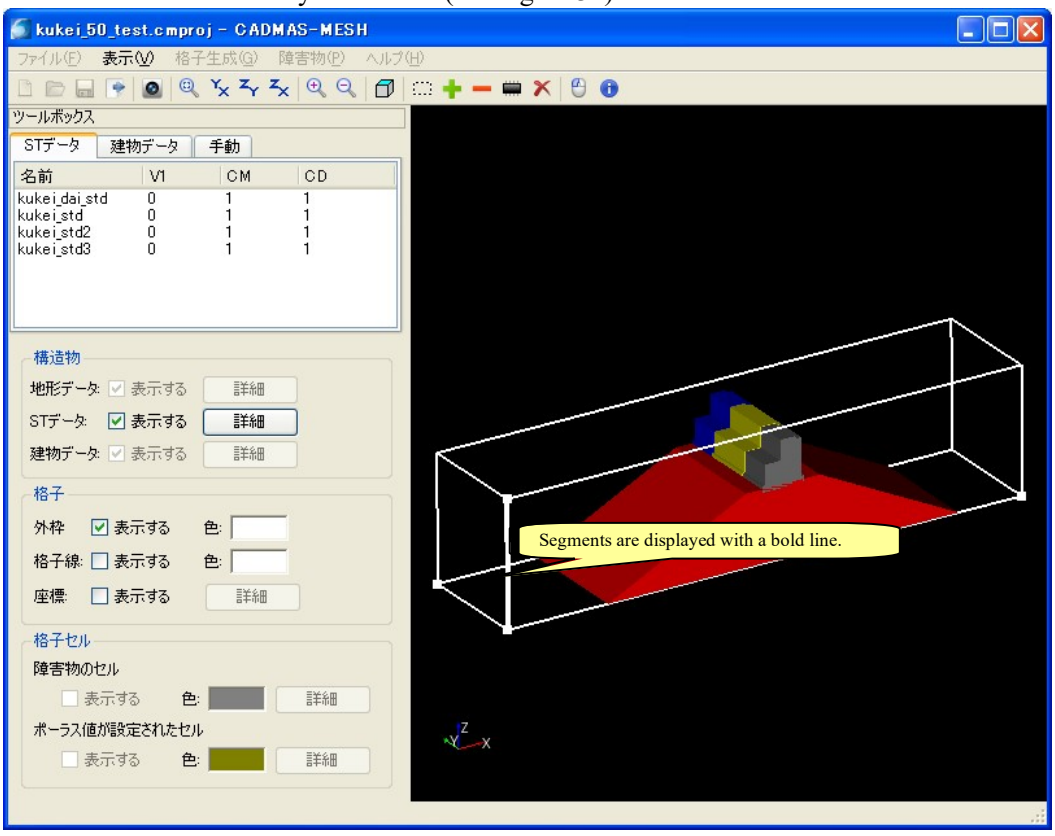

Figure 32 Example of screen display when selecting a section

After selecting a section, the dialog shown in Figure 33 appears. After selecting a section, the dialog shown in Figure 33 is displayed. Figure 34 shows an example of the screen display after grid points have been added.

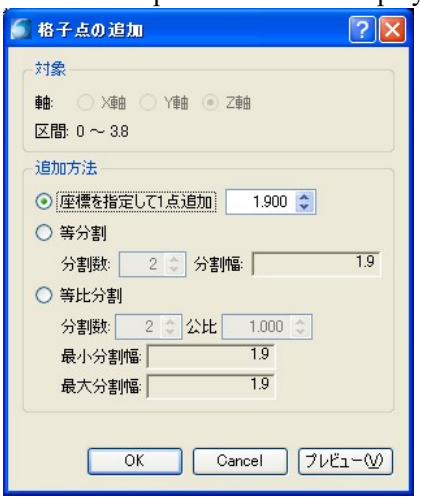

Figure 33 Add Grid Point Dialog

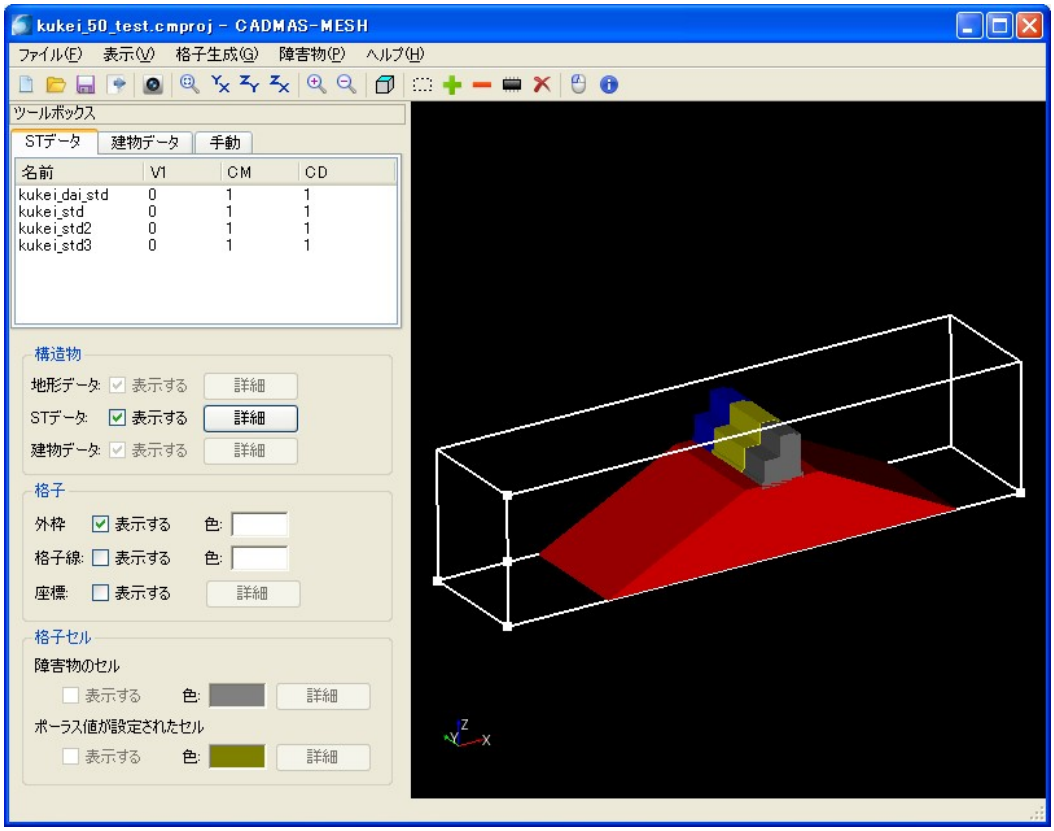

Figure 34 Example of screen display after grid points are added

4.3. Deleting grid points (D)

Delete a grid point. Follow the steps below.

Menu: Display (V) → Deleting grid points (D)
Toolbar:

Once executed, the dialog shown in Figure 35 will appear. In the drawing region, the grid points that will be deleted under the current settings are displayed in red.

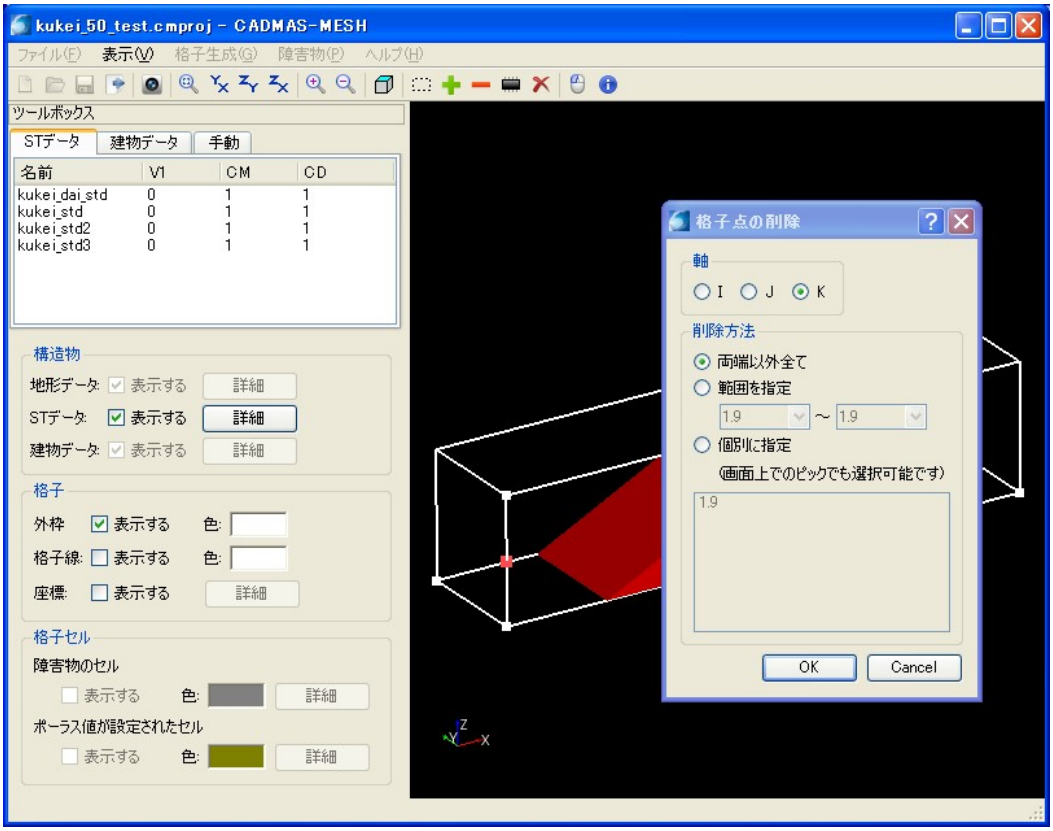

Figure 35 Add Grid Point Info Dialog

Specify the conditions for deletion and press the "OK" button to delete the grid points.

4.4. Porous Calculation (P)

Calculate the porous value for each cell based on the grid geometry and obstruction information. Follow the steps below.

Menu: Display (V) → Porous Calculation (P)
Toolbar:

Once executed, the dialog shown in Figure 36 appears; when 100% is reached, the dialog closes, the drawing region is updated, and the obstacle cells and cells with porous values are displayed. An example display is shown in Figure 37.

Figure 36 Porous Calculation Progress Display Dialog

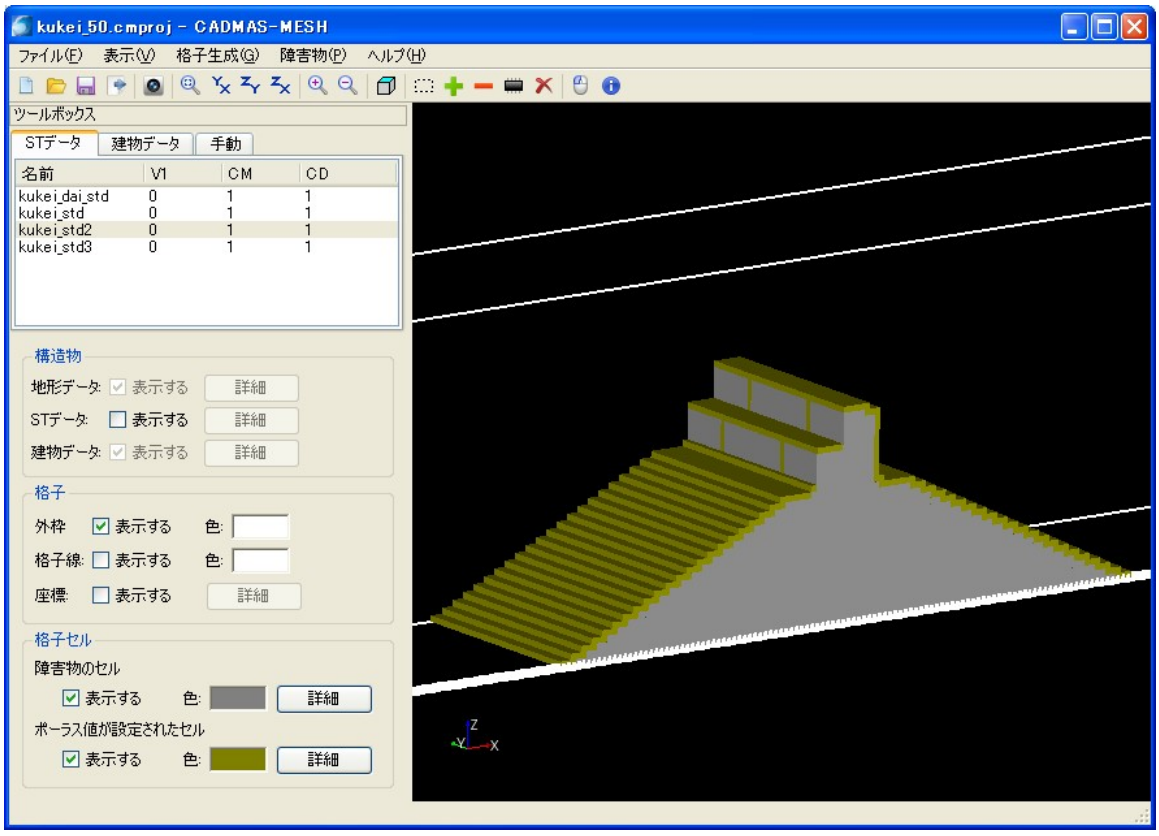

Figure 37: Example of screen display after completion of porous calculation

4.5. Delete all grids (L)

Delete the grid. Follow the steps below.

Menu: Display (V) → Delete all grids (L)
Toolbar:

Once executed, the dialog shown in Figure 38 will appear. Press "Yes" to delete the grid.

Figure 38 Delete all grids Confirmation Dialog

5. Obstacle (O)

5.1. ST Data Transfer (T)

Moves the ST data structure selected on the "ST Data" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → ST Data Transfer (T)

Once executed, the dialog shown in Figure 39 will appear. Specify the amount of movement of the structure and press the "OK" button to move the structure.

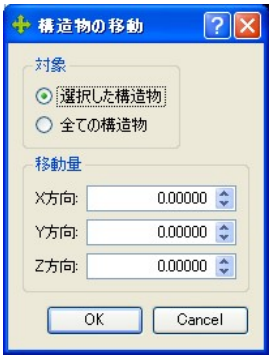

Figure 39 Move Structure Dialog

5.2. ST Data Rotation (R)

Rotate the ST data structure selected on the "ST Data" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → ST Data Rotation (R)

Once executed, the dialog shown in Figure 40 will appear. Specify the conditions for rotation of the structure and press the "OK" button to rotate the structure.

Figure 40 Structure Rotation Dialog

5.3. ST Data Enlarge/Reduce (S)

Enlarge or reduce the size of the ST data structure selected on the "ST Data" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → ST Data Enlarge/Reduce (S)

Once executed, the dialog shown in Figure 41 will appear. Specify the magnification factor for enlargement or reduction of the structure and press "OK" to enlarge or reduce the structure.

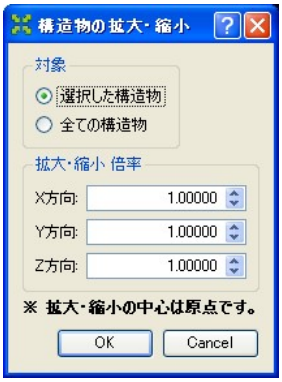

Figure 41 Enlarge or Reduce Structure Dialog

5.4. ST Data Physical Properties Edit

Edits the physical property values of the structure in the ST data selected in the "ST Data" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → ST Data Physical Properties Edit (E)

Once executed, the dialog shown in Figure 42 will appear. Edit the property values and press "OK" to reflect the settings in the structure list.

Figure 42 Obstacle Properties Dialog

5.5. Editing Building Data Physical Properties

Edits the physical properties of the structure for the building data selected on the "Building Data" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → Building Data Physical Properties Edit (E)

Once executed, the dialog shown in Figure 43 will appear. Edit the property values and press "OK" to reflect the settings in the structure list.

Figure 43 Obstacle Properties Dialog

5.6. Manual Data Group Addition (G)

Add a group of manual data. Follow the steps below.

Menu: Obstacle (O) → Manual Data Group Addition (G)

Once executed, the dialog shown in Figure 44 will appear. Enter a group name and click "OK" to add the group to the "Manual" tab of the structure list. An example of the screen display after adding a group is shown in Figure 45.

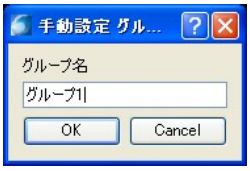

Figure 44 Manual Data Group Addition Dialog

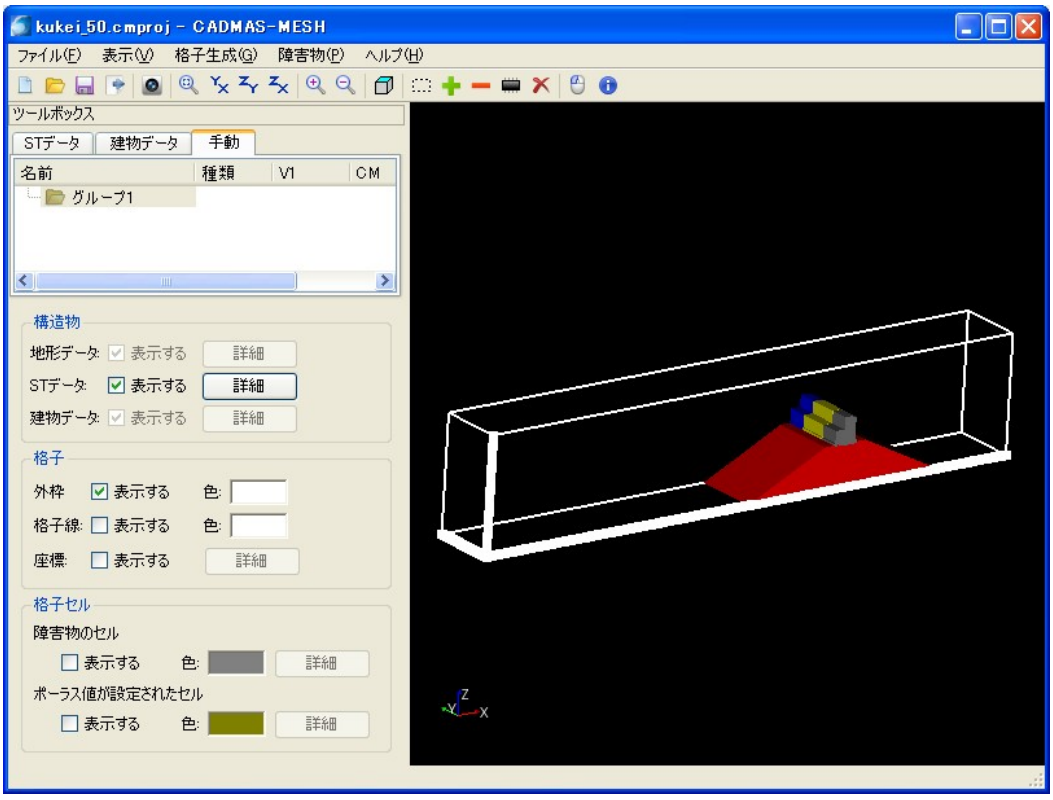

Figure 45 Example of screen display after manual data group addition

5.7. Manual Data Group Renaming (R)

Rename the group selected in the "Manual" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → Manual Data Group Renaming (R)

Once executed, the dialog shown in Figure 46 will appear. Enter a new group name and press "OK" to rename the group.

Figure 46 Manual Data Group Rename Dialog

5.8. Manual Data Group Deletion (D)

Delete the group selected in the "Manual" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → Manual Data Group Deletion (D)

Once executed, the dialog shown in Figure 47 will appear. Press "Yes" to delete the group.

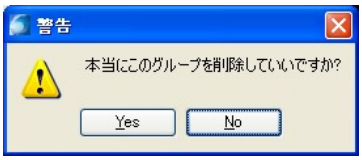

Figure 47 Manual Data Group Deletion Confirmation Dialog

5.9. Manual data addition (A)

Add manual data. Follow the steps below.

Menu: Obstacle (O) → Manual data addition (A)

Once executed, the dialog shown in Figure 48 will appear. Configure the obstacles you wish to add from the screen and press the "Create" button, and manual data will be added according to the settings. By repeatedly changing the settings and pressing the "Create" button, multiple obstacles can be created in succession.

Figure 48 Add Manual Data Dialog

Pressing the "Specify by mouse operation" button in the dialog shown in Figure 48 will display the dialog shown in Figure 49. Pressing the "OK" button displays the dialog shown in Figure 50. You can specify the range of the index by the settings in this dialog and by mouse operation in the drawing region. After specifying the range and pressing the "OK" button, the dialog shown in Figure 48 appears.

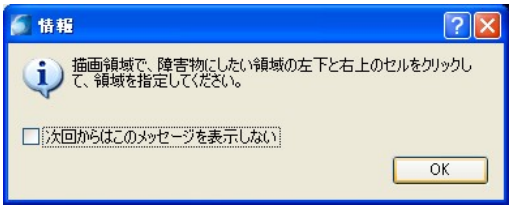

Figure 49. Information dialog about mouse operations

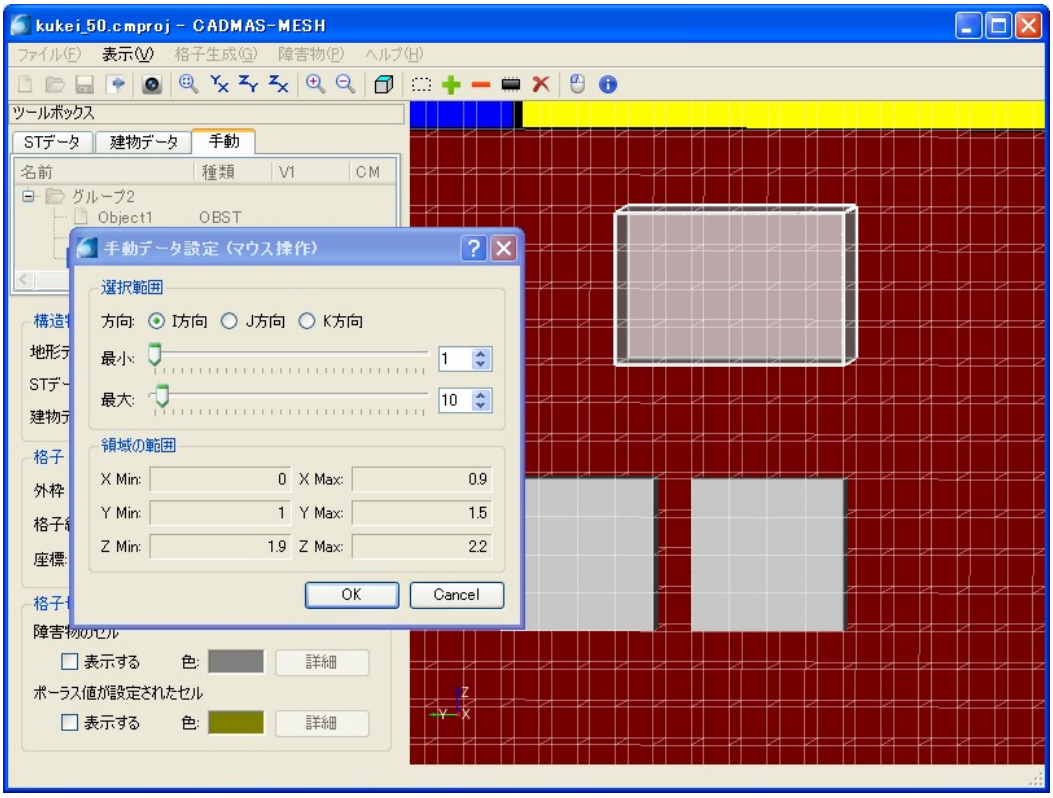

Figure 50 Manual Data Setup (Mouse Operated) Dialog

5.10. Manual Data Editing (I)

Edit the manual data selected in the "Manual" tab of the structure list. Follow the steps below.

Menu: Obstacle (O) → Manual Data Edit (I)

Once executed, the dialog shown in Figure 51 will appear. Change the settings and press "OK" to change the manual data settings.

Figure 51 Manual Data Group Rename Dialog

5.11. Manual Data Deletion (L)

Delete the manual data selected in the "Manual" tab of the structure list. Follow the steps below. Menu:

Obstacle (O) → Manual Data Delete (L)

Once executed, the dialog shown in Figure 52 will appear. Pressing the "Yes" button deletes the manual data.

Figure 52 Manual Data Deletion Confirmation Dialog

5.12. Manual data Area delete (O)

Delete manual data by specifying regions. Follow the steps below.

Menu: Obstacle (O) → Manual data Area delete (O)

Once executed, the dialog shown in Figure 53 will appear. Specify a range and press "OK" to delete all manual data contained within the specified range.

Figure 53 Manual Data Region Deletion Dialog

5.13. Obstacle threshold setting (L)

Sets the threshold for outputting obstructions to the CADMAS grid file. Follow the steps below.

Menu: Obstacle (O) → Obstacle threshold setting (L)

Once executed, the dialog shown in Figure 54 will appear. Make your settings and press the "OK" button.

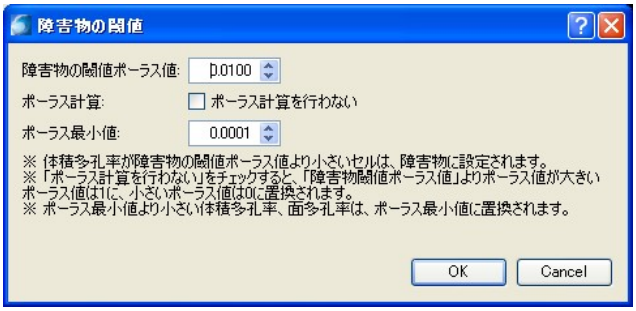

Figure 54: Obstacle Threshold Setting Dialog

6. Help (H)

6.1. Mouse Operation (M)

Displays a help dialog for mouse operations. Perform the following operations

Menu: Help (H) → Mouse Operation (M) Toolbar:

The dialog shown in Figure 55 appears.

Figure 55 Example of mouse operation dialog display

6.2. Version Information (A)

Displays version information. Perform the following operations

Menu: Help (H) → Version Information (A) Toolbar:

The dialog shown in Figure 56 appears.

Figure 56 Example of Version Information Dialog Display

7. Related Files

This section describes the files that CASMAS-MESH uses for input and output.

7.1. Grid file (*.grid)

Used to load and save grid data in CADMAS-MESH. It holds information on the dividing positions of the grid. See Sections 2.5 and 2.6 for details on loading and saving grid data.

An example of a grid file is shown in Table 4

Table 4 Example of grid file

```
GRID  X
-3.00000000000000e+01
-2.40000000000000e+01 -1.80000000000000e+01
(omission)

2.70000000000000e+02
END
GRID  Y
-3.00000000000000e+01 -2.40000000000000e+01
(omission)

3.00000000000000e+01
END
GRID  Z
-3.00000000000000e+01 -2.40000000000000e+01
(omission)

3.00000000000000e+01
END
POROUS LIM  1.00000000000000e-04
```

7.2. CADMAS Grid File (*.grid)

A grid file to be read by CADMAS-SURF/3D, containing information on obstacle cells and porous settings in addition to the grid file information shown in 7.1.

An example of a CADMAS grid file is shown in Table 5.

Table 5 CADMAS Grid File Example

```
GRID  X
-3.00000000000000e+01
-2.40000000000000e+01 -1.80000000000000e+01
(omission)
2.70000000000000e+02
END
GRID  Y
-3.00000000000000e+01 -2.40000000000000e+01
(omission)
3.00000000000000e+01
END
GRID  Z
-3.00000000000000e+01 -2.40000000000000e+01
(omission)
3.00000000000000e+01
END
OBST     4    3    3    6    8    8
(omission)
OBST    32    3    3   34    8    8
POROUS LIM  1.00000000000000e-04
POROUS V     4    2    2    6    2    2     0.0000000000e+00     9.4444444000e-01
(omission)
POROUS X     3    2    2    3    2    2     0.0000000000e+00     9.6913580000e-01
(omission)
POROUS Y     4    3    2    6    3    2     0.0000000000e+00     8.0555555500e-01    (中略)
POROUS Z     4    2    3    6    2    3     0.0000000000e+00     8.0555555500e-01    (後略)
```

7.3. Topographic File (*.dat)

Used in CADMAS-MESH to load terrain.

An example of a terrain file is shown in Table 6.

Table 6 Example of topographic file

```
497
-57143.000098 -97348.699902 11.100000
-57009.000098 -97371.100003 11.290000
(omission)
-51909.900000 -94090.800000 12.650000
```

Number of data points

X,Y,Z coordinates of data points (space delimited)

7.4. ST File (*.st)

Used in CADMAS-MESH to load structures.

The ST file references an external STL file and holds information about the deformation matrix of the STL file and the physical property values to be set for each STL structure.

An example ST file is shown in Table 7.

Table 7 ST File Example

```
cube.stl 0 2 0 0 10 0 0 0 0 10 0 0 0 0 10 0 0 0 0 1 cube.stl
0 2 0 0 10 0 0 0 0 10 0 0 0 0 10 0 40 0 0 1 cube.stl 0 2 0
0 10 0 0 0 0 10 0 0 0 0 10 0 80 0 0 1 cube.stl 0 2 0 0 10 0
0 0 0 10 0 0 0 0 10 0 120 0 0 1
```

An ST file consists of several columns, each line separated by spaces. The meaning of each column is shown below.

- Column 1 : name of referenced STL file (relative path)
- Column 2: Percentage of water (V1)
- Column 3: Scale factor (for simple enlarge or reduce. Usually 1)
- Column 4: Coefficient of inertia (CM)
- Column 5: Coefficient of resistance (CD)
- Columns 6-21: Elements of the transformation matrix to be applied to the STL structure. If column 6 is written as m6 and column 21 as m_{21}, then $m_6 \sim m_{21}$ are used as elements of the transformation matrix shown in Figure 57.

$$\begin{pmatrix} x' \\ y' \\ z' \\ 1 \end{pmatrix} = \begin{pmatrix} m_6 & m_{10} & m_{14} & m_{18} \\ m_7 & m_{11} & m_{15} & m_{19} \\ m_8 & m_{12} & m_{16} & m_{20} \\ m_9 & m_{13} & m_{17} & m_{21} \end{pmatrix} \begin{pmatrix} x \\ y \\ z \\ 1 \end{pmatrix}$$

Figure 57 Conversion matrix by ST file elements

7.5. Building File (*.data)

Used in CADMAS-MESH to load structures.

An example building file is shown in Table 8.

Table 8 Example of building file

name = height=3.000000 step =0 stype =0 roof =0 pos =181.000000 184.000000 178.000000 177.000000 188.000000 174.000000 191.000000 181.000000
***** name = height=3.000000 step =0 stype =0 roof =0 pos =184.000000 190.000000 182.000000 185.000000 191.000000 182.000000 193.000000 187.000000 *****

A building file consists of several lines of text, separated by "*****". The meaning of each attribute is as follows

- name: The name of the building. If left blank, an appropriate name such as "Building 1" will be set.
- height: Building height (in meters).
- step: The number of floors in the building, set to 2 for a two-story building.
- stype: Style (0: unspecified, 1: wood, 2: steel, 3: reinforced concrete)
- roof: Roof (0: unspecified, 1: tile, 2: slate, 3: concrete)
- pos: The coordinates of the polygon as seen from above, starting from the first one: X coordinate, Y coordinate... X coordinate, Y coordinate... X coordinate, Y coordinate.

Note that only one of height and step can be set.