

AdapaTool Quick Start Guide

In this guide, you will be walked through installing and using Adapas Rhino 5 plug-in, AdapaTool, to generate and export geometry for the Adaptive Mould technology. When finished with this guide, you will know enough to design and mould your own panels using our technology. For more detailed information, please refer to the user manual.

Table of Contents

- Installation
- Designing and preparing panel geometry
- Generating panel data
- Displaying panel information
- Exporting panels to the mould

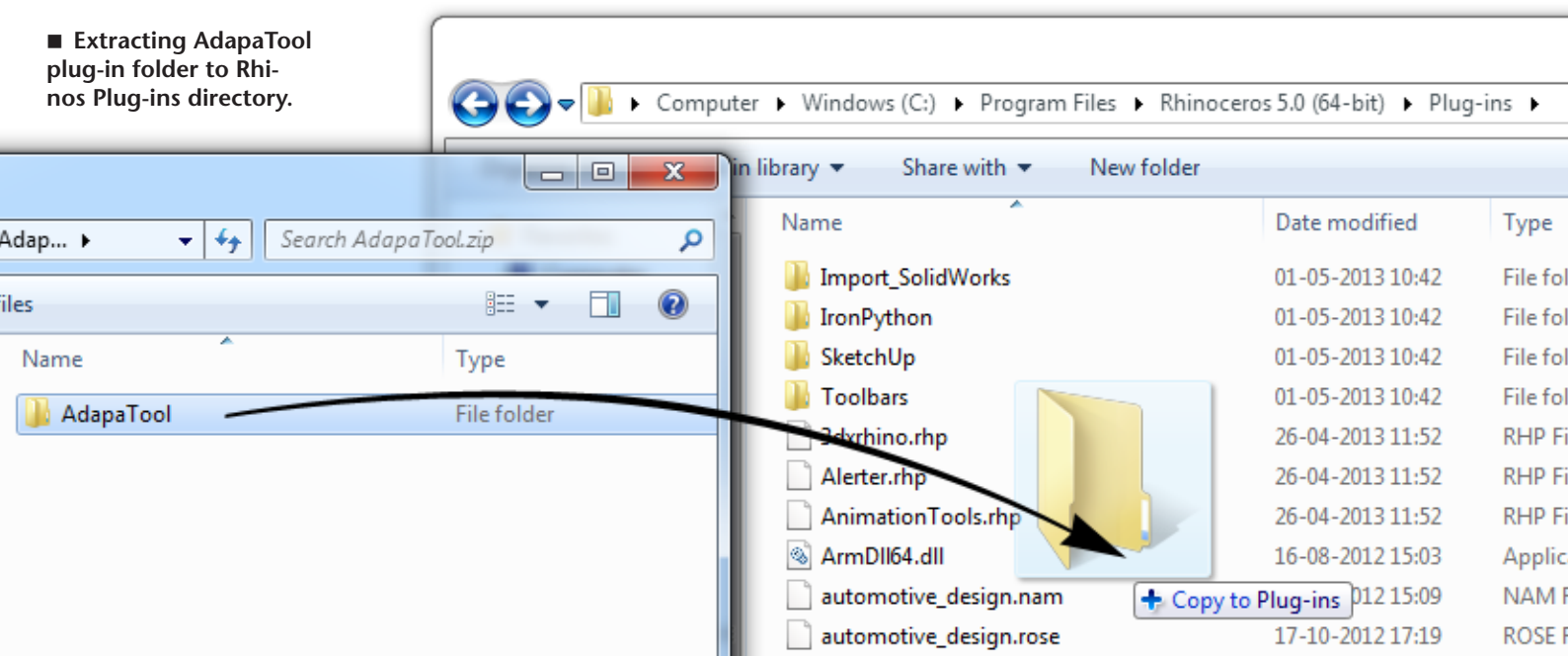
Installation

Before installing AdapaTool, make sure you have the latest service release of Rhino 5 installed. Then follow these steps to install AdapaTool:

1. Extract plug-in

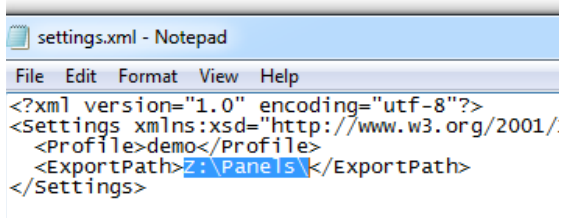
Extract the **AdapaTool** folder from **AdapaTool.zip** into the Rhino **Plug-ins** folder. This folder is usually located at **C:\Program Files\Rhinoceros 5.0 (64-bit)\Plug-ins**.

- Extracting AdapaTool plug-in folder to Rhinos Plug-ins directory.



2. Edit path to HMI

In the extracted folder, open the **settings.xml** file with **Notepad** or your favorite text editor. Edit the export path to point to a shared directory with the mould HMI.



```
settings.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="utf-8"?>
<Settings xmlns:xsd="http://www.w3.org/2001/
  <Profile>demo</Profile>
  <ExportPath>Z:\Pane 15</ExportPath>
</Settings>
```

⚠ Note

Alternatively, the path can be set to a local path on the PC. Exported project folders must then be moved manually to the HMI directory.

■ Editing the export path in settings.xml file

3. Load plug-in

Finally, open Rhino and drag and drop the **AdapaTool.rhp** file from the **AdapaTool** folder into the Rhino viewport.

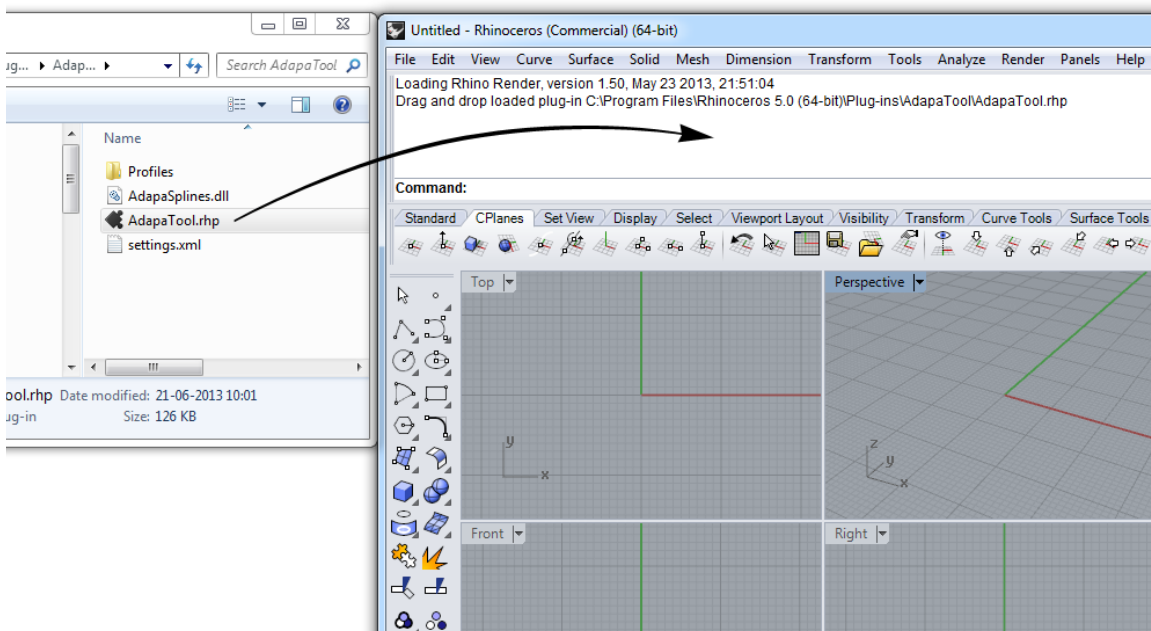
Rhino should return 'Drag and drop loaded plug-in C:\Program Files\Rhinoceros 5.0 (64-bit)\Plug-ins\AdapaTool\AdapaTool.rhp' in the command window.

Congratulations, you are now ready to start using AdapaTool!

⚠ Note

All AdapaTool commands are prefixed with 'Adapa'. To get a list of commands available, simply write 'Adapa' in the command window.

■ Drag and drop loading of the AdapaTool plug-in.



Designing and preparing panel geometry

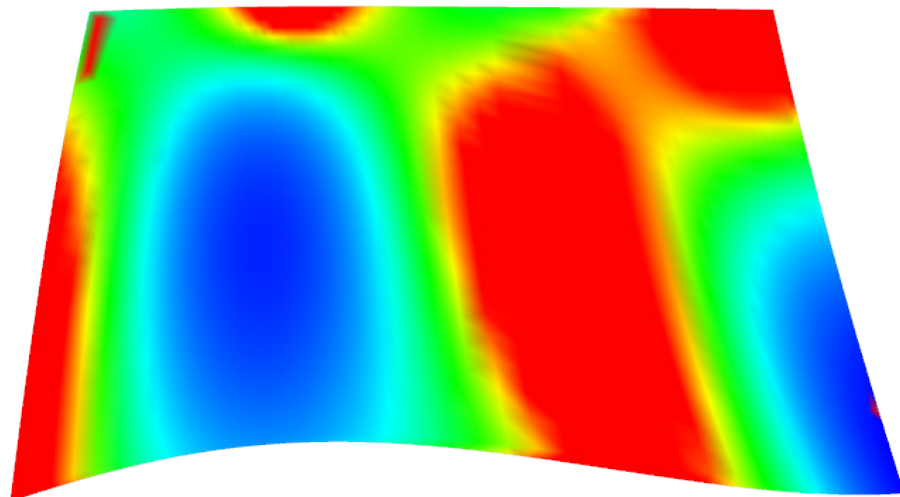
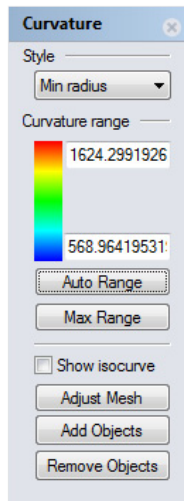
The AdapaTool software operates on closed solids in Rhino. That is, a panel is represented by a solid with two large opposing faces, and any number of smaller edge faces. The solid should not contain any seams and should be created from faces with rectangular uv coordinates. Panel data is attached to the solids in a Rhino document whenever panels are generated. This data is saved and loaded with the document so the data is not lost. However, if any changes are applied to a solid, even a translation, any panel data attached to that solid is removed to ensure the integrity of the panel data. It is therefore recommended to lock any layers containing panel geometry.

Before attempting to generate panels for a particular surface, the minimum curvature

⚠ Note

A solid can easily be created with the OffsetSrf command with the option 'Solid' set to 'Yes'.

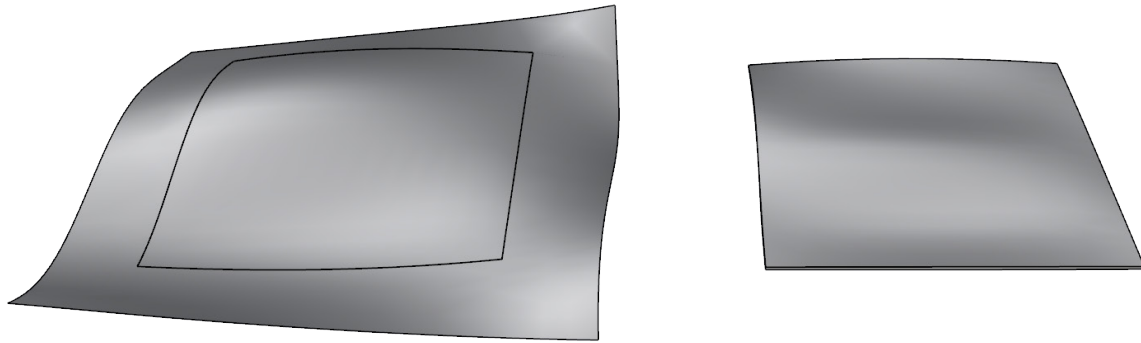
radius of the surface should be checked. Every mould is designed for a specific minimum curvature radius, and this sets a limit on the curvature that can be produced on the mould. To check the minimum curvature radius for your surface, select your surface and go to 'Analyze' > 'Surface' > 'Curvature Analysis'. Set the style to 'Min radius' and press 'Auto Range'. The second value in the curvature range is the minimum curvature radius for the entire surface. Check that this value is above the limit specified for your mould. If not, edit the problematic areas of the surface to satisfy the limit.



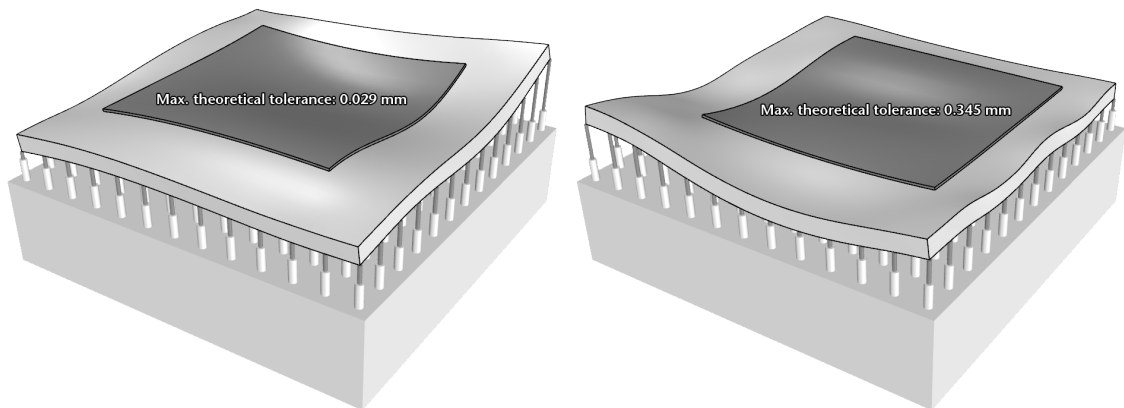
■ Curvature analysis dialog.

A panel can either be created by splitting a large surface into smaller parts or simply by creating a single NURBS surface for the panel. Although both ways are valid options, it is recommended to use the first option, i.e. to create a panel as a trim of a larger surface. Even if only a single panel is needed this is still the recommended procedure. The reason behind this is that the whole membrane of the mould needs to be a smooth surface. If a panel is made from

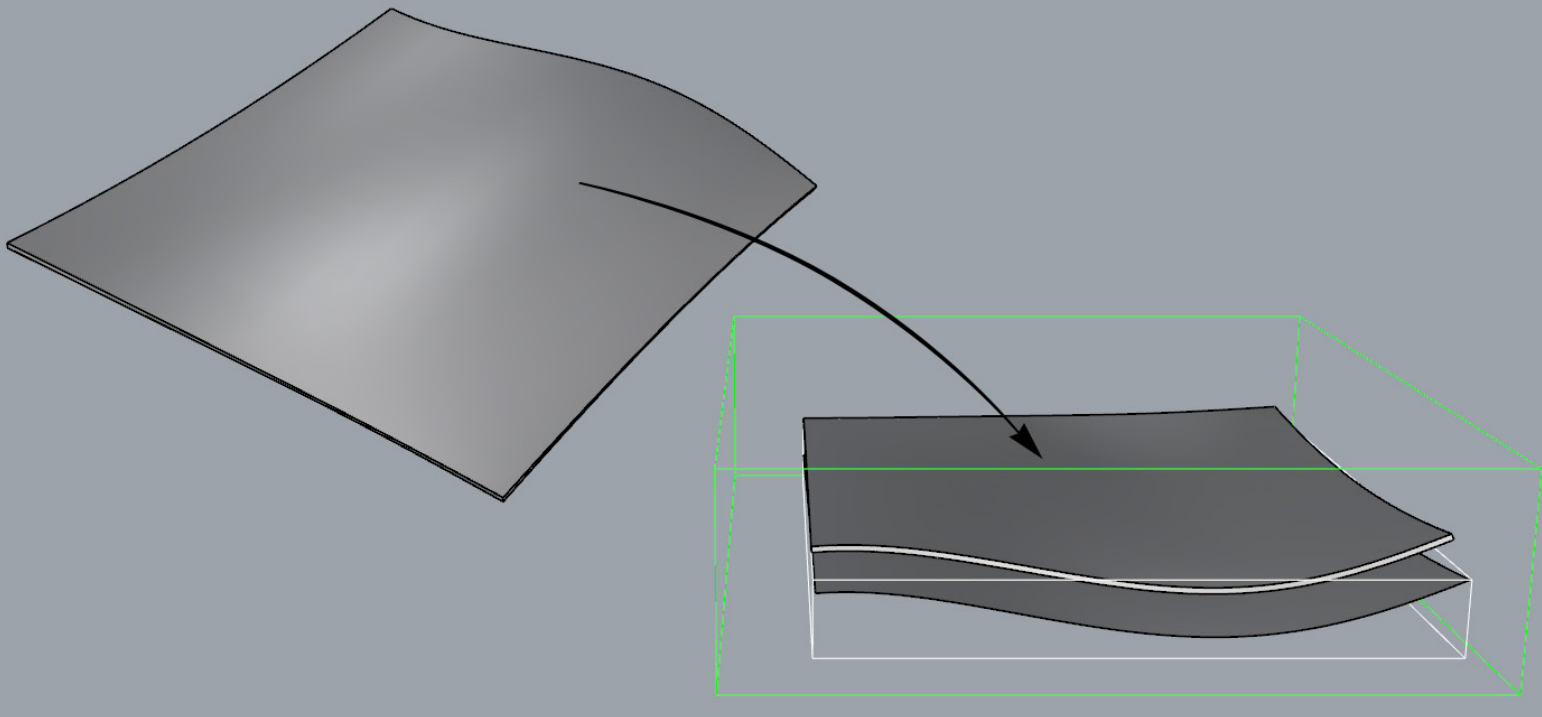
a trim of a large smooth surface, then the membrane will be able to take a shape similar to the bigger surface. If the panel isn't constructed from a larger surface, nothing is known of how the extended membrane surface will look like. If it turns out that the extended surface isn't smooth, the mould might not be able to attain that shape or might not be able to attain it with a good tolerance.



■ Two approaches to generating a panel solid. Left: Trimming a larger surface. Right: By lofting multiple curves.



■ Mould shape and the maximum theoretical tolerance of panels generated from the surfaces above. The trimmed surface has both a better tolerance and a smoother shape.



■ Reorientation of a panel to minimize the height. The white box outline is the dimensions of the offset of the panel. The green box outline is the dimension limits of the mould. Note that the dimensions of the offset of the panel might become larger than the original panel dimensions.

Another important aspect of splitting a surface into panels, is the dimensions of the panels. Because of the limited height a mould can reach, the software will reorient panels to minimize the height as much as possible (The 'FromViewport' command option when generating panels can override this behaviour). When reorienting is done, the width and length of the panel will

appear larger, if e.g. the panel is split from the front view. Depending on the method of splitting this may or may not become an issue. It should also be noted that the dimension constraints of the mould is not constraints on the actual panels dimensions but an offset of the panel. This is due to the thickness of the mould membrane. For more information, see the user manual.

Generating panel data

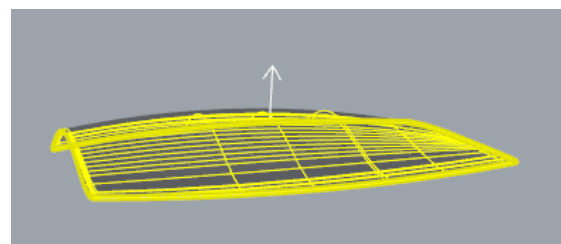
Generating panels is straightforward. Call the **AdapaGeneratePanels** command and go through the following steps:

1. Select solids

Select the solids you want to generate panel data for. You can select as many or as few solids you want. The more you select, the more time it will take to generate the panels. Press Enter when done selecting solids.

2. Select panel direction

Arrows appear at each solid. The directions of the arrows indicate the direction of the



■ Selecting mould direction of a solid.

mould membrane. Clicking a solid changes the direction of the arrow, and consequently which side should be facing the mould membrane. This depends on the material and production process. Furthermore, the command option 'FlipAll' will flip the direction of all the panels.

The 'FromViewport' option enables you to override the reorientation of the panels, and instead use the orientation seen from the currently selected viewport.

When you are happy with the directions and options, press Enter.

3. Panel generation

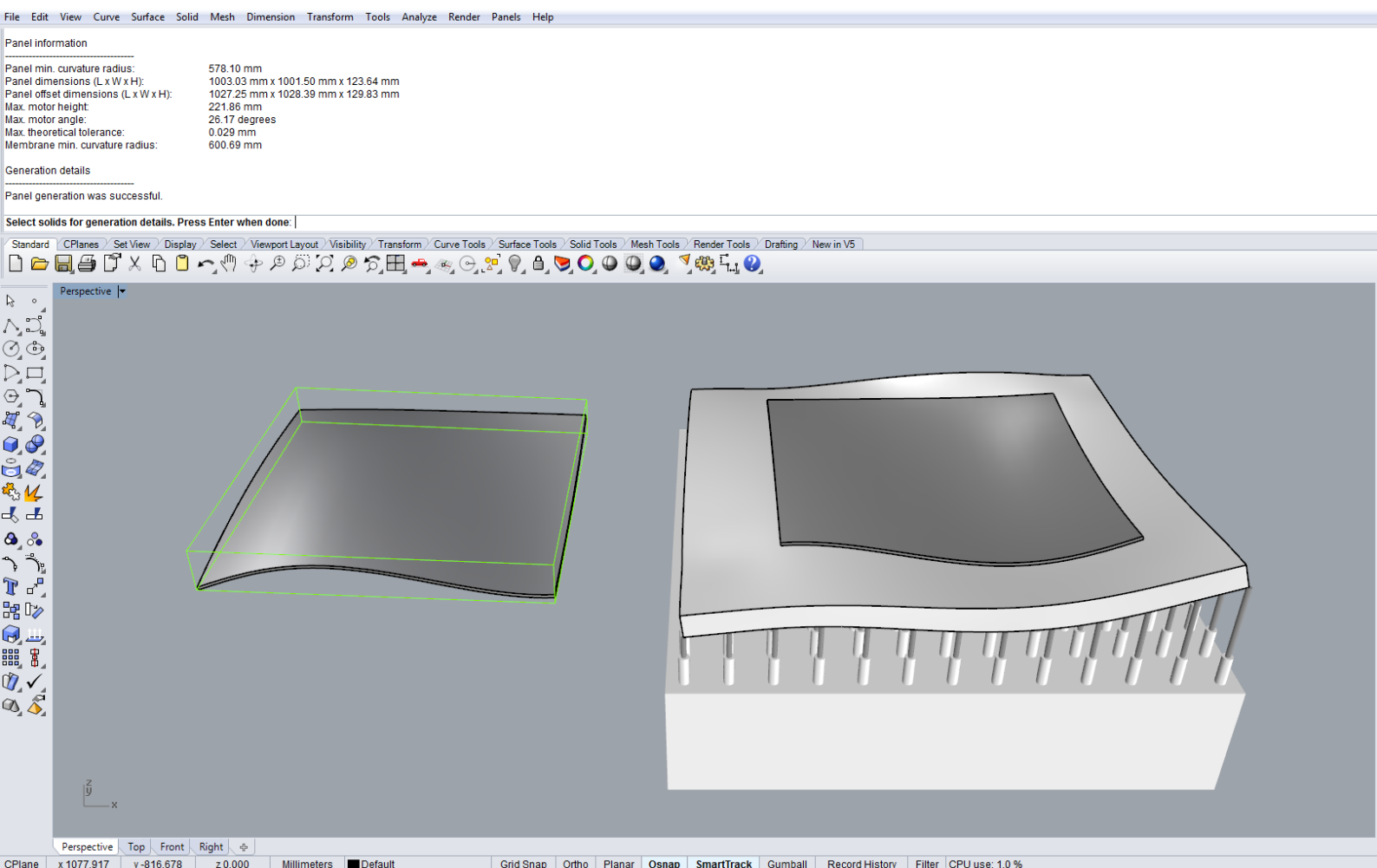
Panel generation now starts. The generation is split into two steps: Preparation of the solids and generation of the panel. The preparation step reorients and places each solid on the mould (if possible) and checks the minimum curvature radius of the panels. If an error occurs a red box will show up around the solid. It is possible to cancel the generation at any point by pressing the

Escape key, if e.g. an error occurred for a panel. When the preparation of the solids is done, the generation step starts automatically. This step is more time consuming and involves optimizing the membrane shape to the shape of the panel surface.

4. Generation details

When every panel has been generated a summary of the generation will be shown in the command window. At this point it is possible to click the individual solids to see detailed information about the panel generation as well as a preview of the mould shape at the origin of the document. If an error occurred, visual and textual feedback will be given when the solid is clicked.

■ Generation details for a generated panel.

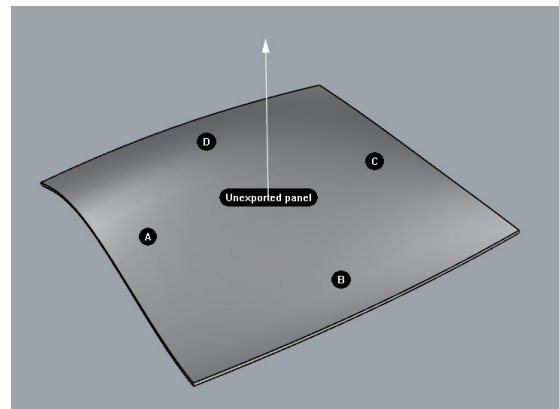


Displaying panel information

After you have generated some panels, you might want to go back and look at some information about the panels. The **AdapaDisplayPanels** command covers this need. Calling this command causes panel names for all panels in the document to show up. If a panel hasn't been exported to the mould it will simply show up as 'Unexported panel'. Otherwise, the panel is given a number, e.g. 'Panel 7'. Options exist to change what is displayed of the panel. These options are:

1. 'PanelNames'. The panel names that are on by default.
2. 'EdgeLetters'. Letters at the edges of a panel. These can be used to align multiple panels together under assembly.
3. 'MouldDirections'. Arrows indicating the direction of the mould membrane.

The detailed information that was available when generating the panel is also available in this command. Clicking a solid displays the information in the command window together with showing a preview of the mould shape at the origin of the document.



■ Panel name, edge letters, and mould direction displayed on a panel.

Exporting panels to the mould

Exporting panels to the mould is done by running the **AdapaExport** command. All unexported panels in the document will be exported and assigned a panel number. Exporting can be done once when all panels have been created or multiple times throughout generation of panels. Exporting only affects panels not already exported. If a panel is removed from the document, e.g. from deleting or moving the solid, the panel will still be present on the mould HMI. If you want to remove the panel from the HMI, call the **AdapaDele-**

teExported command followed by the **AdapaExport** command. The **AdapaDeleteExported** deletes all panels from the mould and resets all panel numbers. This command is also useful if you want to start over on a project. Note that all panels in the document will be kept but will return to the unexported status.

Congratulations, you are now ready to produce your own panels using Adapas Adaptive Mould technology!