Roland

Scanning Tips

Table of Contents

Introduction

This document describes some tips and tricks for scanning a wide variety shapes with a 3D scanner.

It is assumed that the Dr. PICZA scanning program from Roland DG Corp. is used to operate the scanner.

The explanations in this document also assume an understanding of the basic operation of Dr. PICZA.

1 Shortening Scanning Times

Using the Rescan Feature

When using the Rescan function, you can perform scanning with partial changes in scanning pitch. After performing coarse scanning of the entire object, you can perform fine scanning for a specific area. Because you can optimize the scanning pitch according to the shape, judicious use of this can shorten scan times.

1. Mount the object to be scanned on the 3D scanner.

2. Set the scanning conditions (scanning area, scanning pitch, and so on).

3. Click [SCAN].

4. After scanning has finished, leave the object mounted on the scanner.

5. Click .

6. Specify the area for rescanning.

7. Set the X-axis scanning pitch and the Y-axis scanning pitch for rescanning.

Adjusting the Mounted Orientation

Scan times are shorter for shapes moving downward along the X axis (descending-slope surfaces) than for shapes moving upward (ascending-slope surfaces).
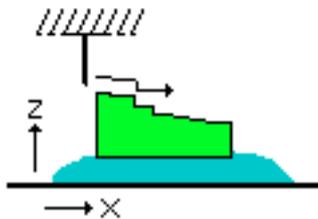This quality can be put to use to for shorter scan times.

When the shape is like that shown above, mounting the item as in B results in a shorter scanning time than when mounted as in A.

A   Scanning an ascending-slope surface

The scan object

Clay
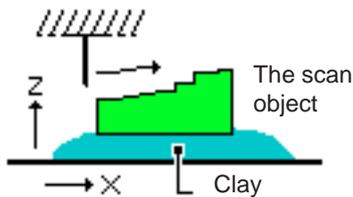
B   Scanning a descending-slope surface

# 2   Cutting a Solid Object Identical to the Scan Object

An Overview

This explains how to use the modeling machine and MODELA Player to cut a solid object identical to the scan object.
This explanation has been divided into four stages (steps 1 through 4), which can be summed up as follows.

> Step 1: Scan the object as separate upper and lower halves
> Step 2: Cut the lower half
> Step 3: Cut the base and secure the material in place
> Step 4: Cut the upper half

Step 1: Scan the Object As Separate Upper and Lower Halves
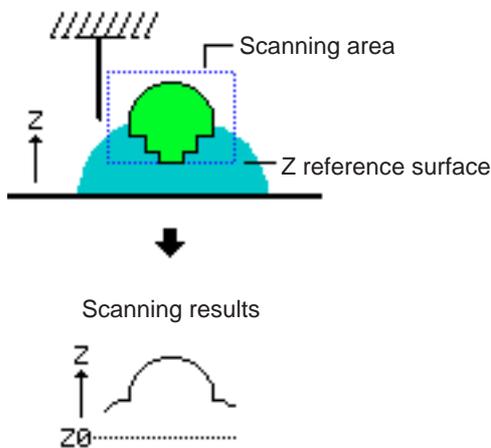
Scan

Dividing (parting) line

The scan object
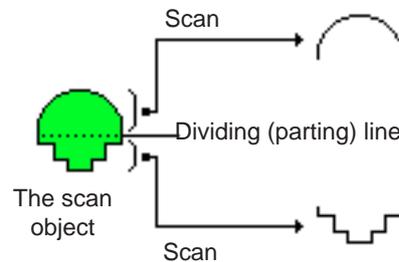
Scan

1. Press the object to be scanned into the clay to hold it in place.
    As shown in the figure, apply the clay along the scan object's parting line.
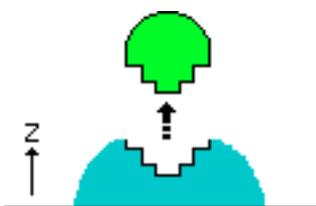
The scan object

Clay
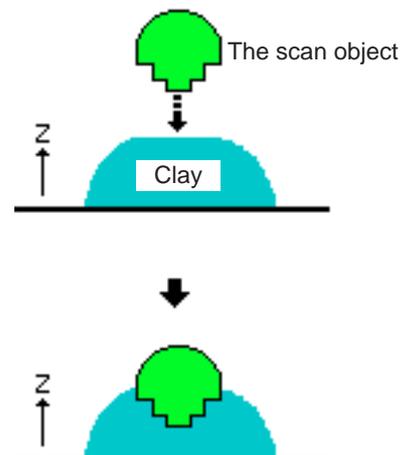
2. Make the settings for the scanning area and scan the upper half of the scan object.
Set a scanning area that encloses the scan object completely. Set [Z Bottom] to a height lower than the lowest plane of the scan object.


Scanning area

Z reference surface

Scanning results

3. Make a note of the lengths at the three locations shown below.
These values will be used in steps 2 and 3.

A Length of the scanning area along the X axis

B Length of the scanning area along the Y axis

C Height from the Z reference surface to the top plane of the scan object

Z reference surface
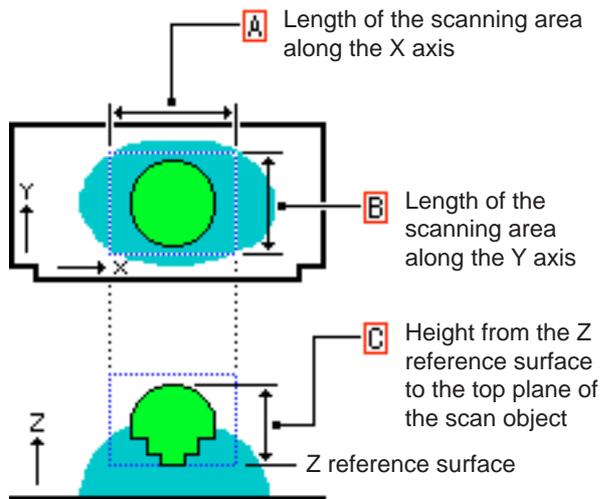
4. Save the scan data as a Dr. PICZA file (in later steps this will be called the "upper-half data").
Carry out the next operations without changing any of the scanning-area settings on Dr. PICZA.

5. Carefully remove the scan object from the workpiece plate, taking care not to alter the shape of the clay.


6. The clay left on the workpiece plate holds an impression of the scan object's lower half. Scan this shape in the clay. Perform this scanning without changing any of the scanning-area settings on Dr. PICZA.

Scanning results
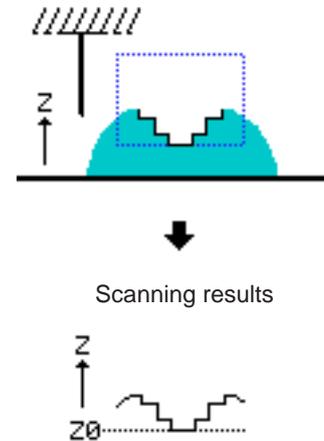
7. Save the scan data as a Dr. PICZA file (in later steps this will be called the "lower-half data").

Step 2: Cut the Lower Half

Step 2

Cut the lower half ▶ Turn over and secure in place ▶ Cut the upper half
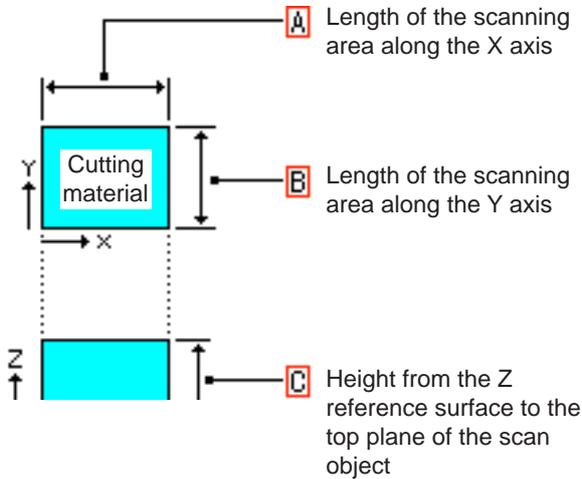
Cut base
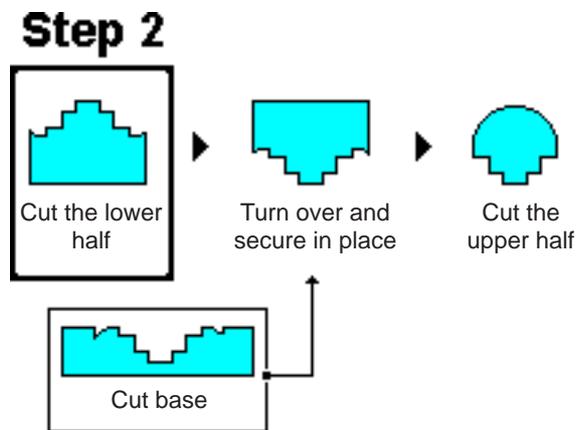
1. Open the lower-half data on Dr. PICZA.

2. Click [Run Postprocessor] button.

MODELA Player is launched, and the lower-half object is read in.
Watch the MODELA Player screen and note the object's depth. This value will be used in steps 3 and 4.
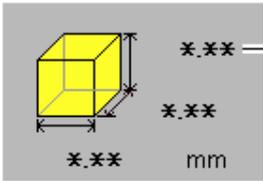
D Make a note of this value.

3. Prepare material having the dimensions you noted down in item 4 of step 1.
If necessary, use MODELA Player's surface-leveling function to trim the cutting material to the required thickness. For more on the surface-leveling function, refer to MODELA Player's help.
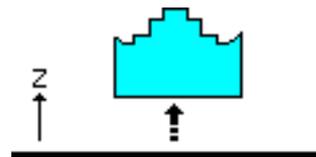

A Length of the scanning area along the X axis

B Length of the scanning area along the Y axis

C Height from the Z reference surface to the top plane of the scan object

4. Load the prepared material on the modeling machine, and set the reference point for the depth direction (i.e., the Z-axis origin point) to the material's surface.
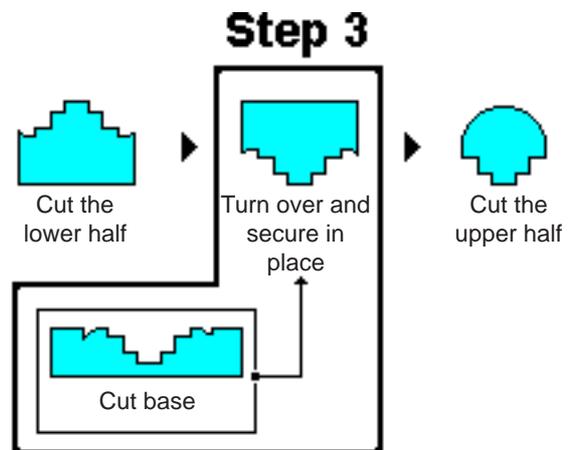For more information, refer to the manual for the modeling machine.

5. Use MODELA Player to cut a three-dimensional object from the direction shown in the figure.
For the cutting depth, enter the object's depth. Do not change the object's size.

Cutting surface

Click this button.
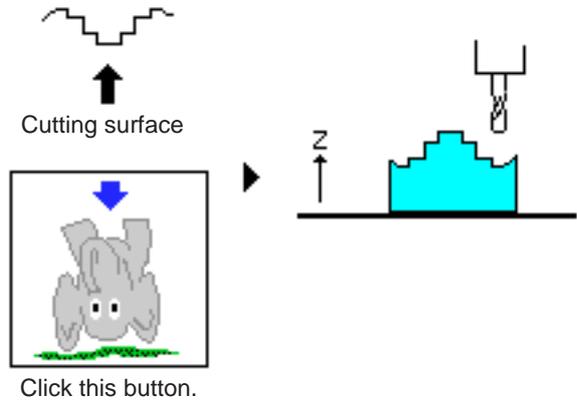
6. When cutting is finished, remove the object from the workpiece plate.

Step 3: Cut the Base and Secure the Material in Place

Step 3

Cut the lower half

Turn over and secure in place

Cut the upper half

Cut base

1. Prepare cutting material having the X- and Y-axis dimensions you noted down in item 4 of step 1 and the height you noted in item 2 of step 2.
   If necessary, use MODELA Player's surface-leveling function to trim the cutting material to the required thickness. For more on the surface-leveling function, refer to MODELA Player's help.

A Length of the scanning area along the X axis

B Length of the scanning area along the Y axis

D Depth of object

2. Load the prepared material on the modeling machine, and set the reference point for the depth direction (i.e., the Z-axis origin point) to the material's surface.

3. Use MODELA Player to cut a three-dimensional object from the direction shown in the figure.
   For the cutting depth, enter the object's depth. Do not change the object's size.
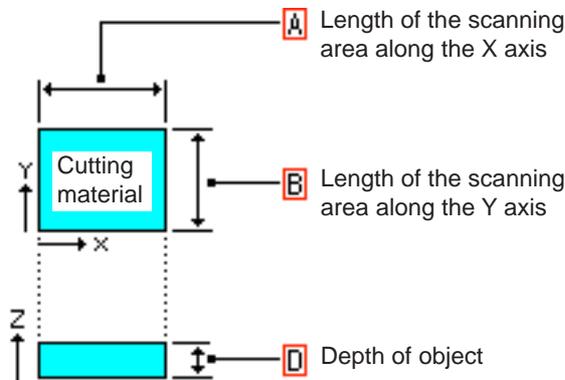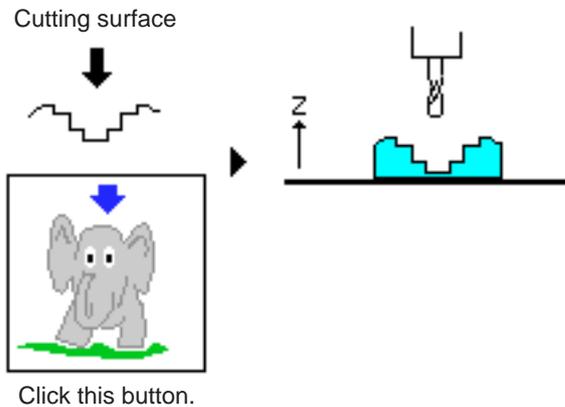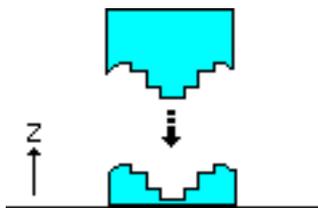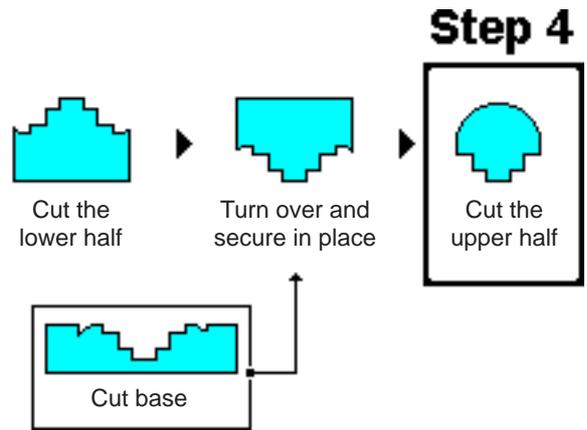   When cutting is finished, leave the object as it is. Don't remove it from the workpiece plate.

Cutting surface

Click this button.

4. Take the object you removed in step 2, fit it onto the object now mounted, and secure it in place.

Step 4: Cut the Upper Half

Step 4

Cut the lower half

Turn over and secure in place

Cut the upper half

Cut base

1. Open the upper-half data on Dr. PICZA.

2. Click [Run Postprocessor] button.

3. Set the reference point for depth on the modeling machine (the Z origin point) to the surface of the base. Add the thickness of the upper half above the parting line and set a new Z origin point for cutting this upper half.
   Here, add the thickness of the upper half above the parting line. In the next operation, raise the spindle by an amount equal to this thickness and set the Z origin again.
   Check the depth of the object's upper half. Assuming this value is E, find the difference between E and the depth (D) you noted down in item 2 of step 2 (E - D).
   In this example, we'll assume this difference is 1.5 mm (0.06 in.).

4. Move the spindle on the modeling machine by an amount equal to this thickness and set the reference point for depth.

5. Use MODELA Player to cut a three-dimensional object from the direction shown in the figure.
   For the cutting depth, enter the object's depth. Do not change the object's size.
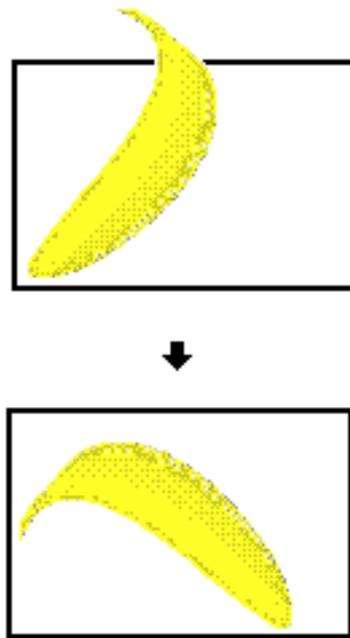
Cutting surface
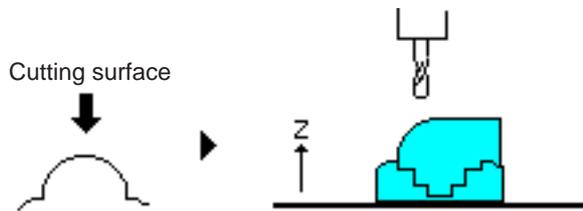
6 You're done!
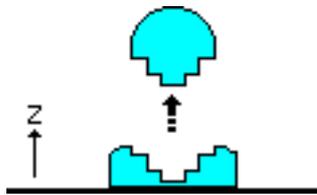
# 3   Setting Up the Scan Object at a Slant

If the scan object sticks out past the workpiece plate, it may be possible to fit the entire object within the scanning area by securing it to the table at an angle.


To obtain the horizontal for an object that's been scanned at an angle, open the [Edit] menu and choose [Adjust Slant on...].

4 Transferring the Surface Shape to Clay

If the scan object doesn't fit completely within the scanning area, or if securing the scan object in place is difficult, the object can still be scanned by transferring the shape of its surface to clay.
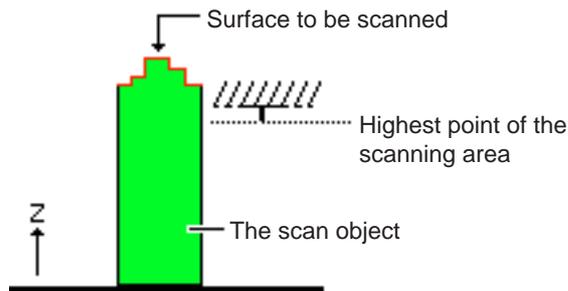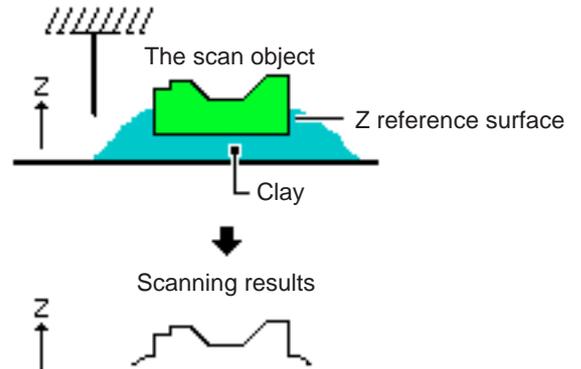

1. Apply clay to the place where the scan object is to be secured in place.

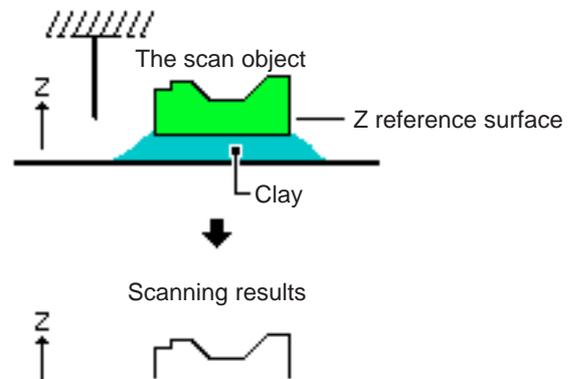2. Press the scan object into the clay to make a mold of its surface in the clay.
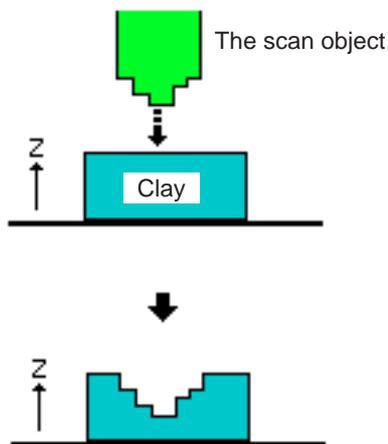
3. Perform scanning.

4. When scanning is finished, click the [Invert] button to invert the image (turning it inside-out).

5 To Avoid Scanning the Clay on the Base...

When set up as shown in the figure, the clay on the base is scanned.


Arrange the setup so that the clay is below the reference surface.

6 A Simple Way to Set the Upper Limit for an Area...

The upper limit of the scanning area is set at the highest point of the scan object.

When the object's highest point cannot easily be determined, or the range for the highest point is narrow and setting is difficult, the highest point can be set by placing a sheet of paper over the object as shown below.
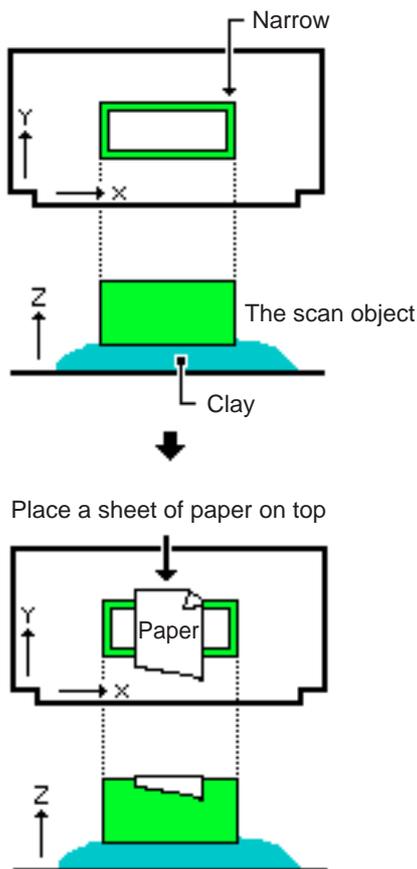

Lower the sensor to the paper and set the upper limit for the scanning area.

When specifying a number of areas for rescanning, this method cannot be used. This is because the upper limit is set before each scan of the second and subsequent areas. If the upper limit set there is lower than the highest point within the area, the upper-limit setting is reset to the highest point of the 3D scanner.

7 Difficult Shapes

The sensors perform scanning as they move up and down, so features that are not apparent when viewed from above cannot be scanned.

The light-blue portion cannot be scanned
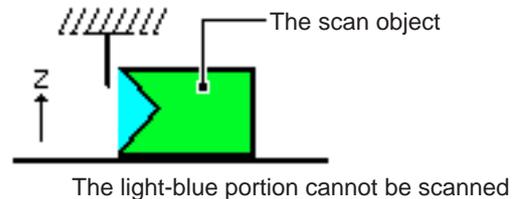
8 Scanning Multiple Objects at One Time

You can scan a number of objects at one time, exporting some of them to files and performing cutting for the others.

However, because the scanning area is larger than if each object was scanned one at a time, this requires a long scanning time. This function is handy when the 3D scanner can be allowed to operate unattended for several hours.

1. Mount a number of scan objects on the 3D scanner.

2. Set the scanning area and start scanning.

3. After scanning, use the Select tool ([Area Polygon, [Area Ellipse], [Area rectangle]) to select an object.

4. To export the data to a file, click [Export] and select the file format.
   Only the selected object is saved.

5. To perform cutting, click [Run Postprocessor].
   Only the selected object is exported to the cutting software.

Roland