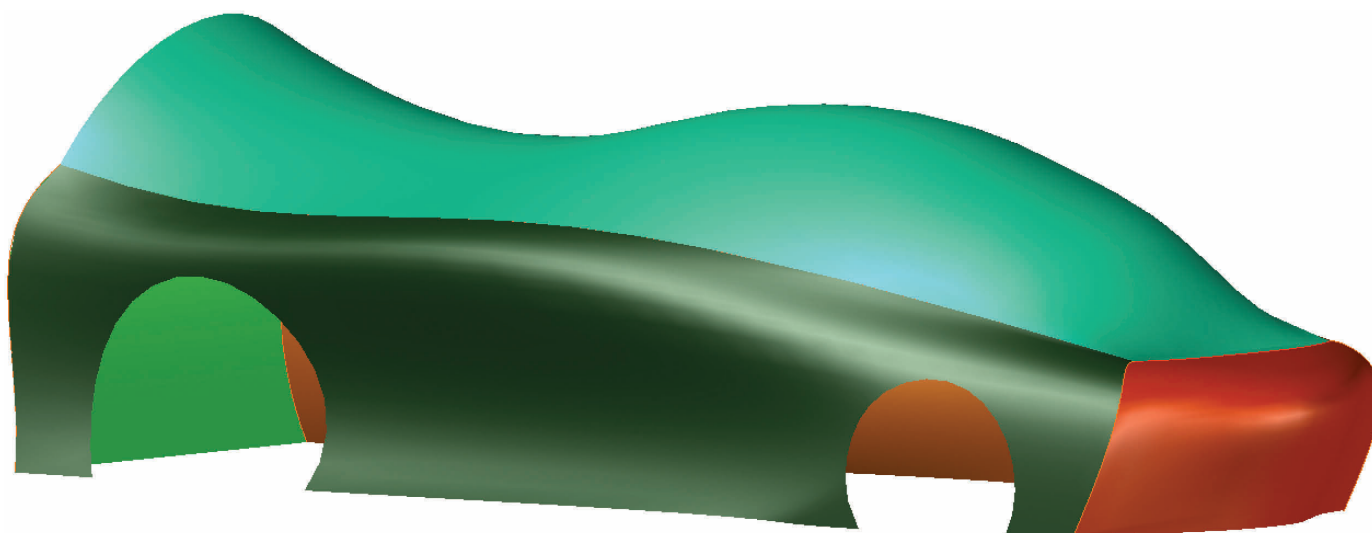# Surface Modeling Tutorial

Introduction

In this tutorial, you will create a toy race car body design using AutoCAD surface modeling techniques. The end result is shown in the illustration below.


Creating the Sides

1. Open the drawing Car_Body_Design.dwg available on the companion website. In the current view, the front of the car is to the right, the back is to the left, the right side is nearest to you, and the left side is farthest from you.

2. Make sure the **SURFACEMODELINGMODE** system variable is set to 0 so that procedural surfaces are created. In addition, make sure the **SURFACEASSOCIATIVITY** system variable is set to 1 (on) so that associative surfaces are created. These settings can be verified in the **Create** panel on the **Surface** tab of the ribbon. The **Surface Associativity** button should be on (blue) and the **NURBS Creation** button should be off (white).

3. Turn on selection cycling and set the visual style to Wireframe.

4. Set the Right_Side layer current. Freeze the Left_Side layer.

(Continued on the next page)

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5. Pick the **Loft** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **LOFT** command.
6. Select the long curves (top and bottom) as the cross sections and the short curves (front and back) as the guides for the loft. See the illustration below.

Guide

Cross section

Guide
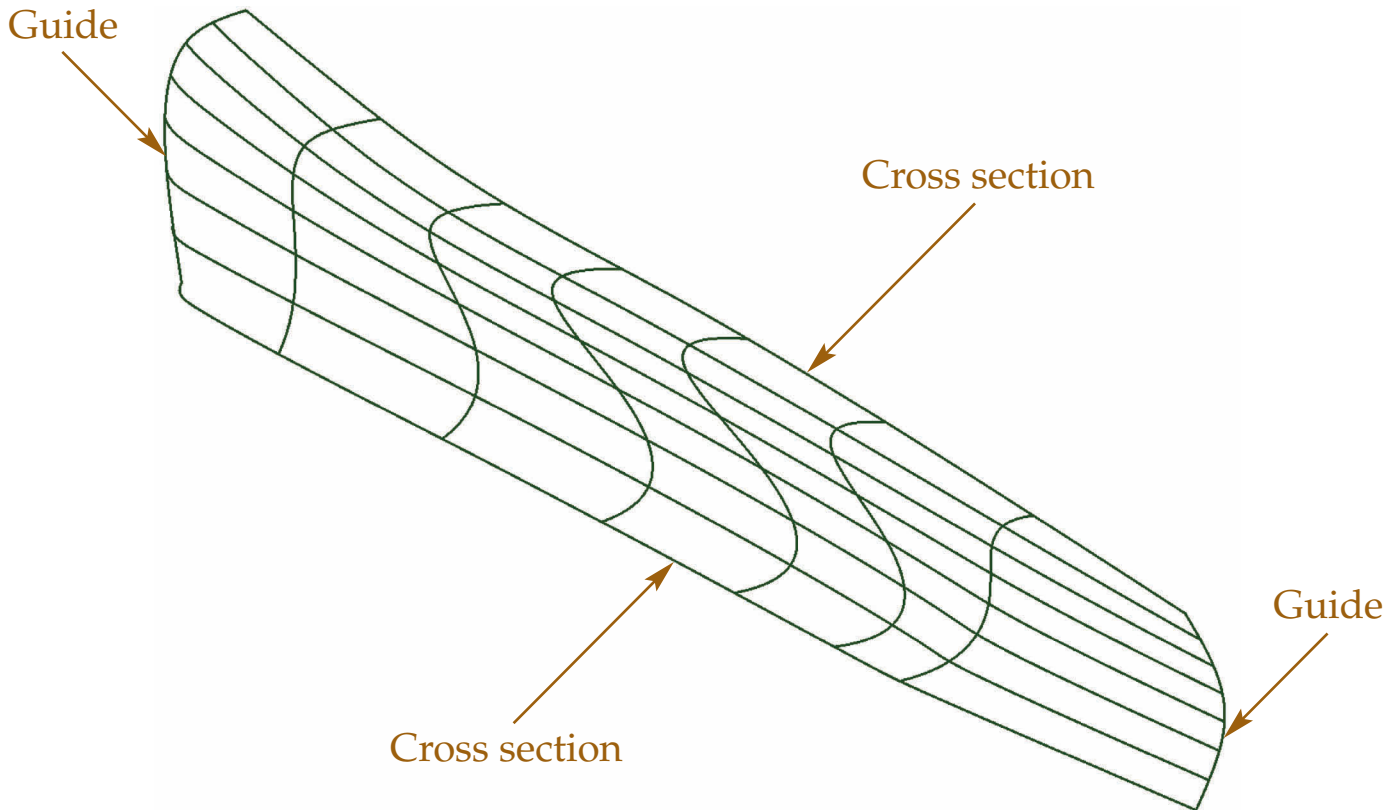
Cross section

7. Thaw the Left_Side layer and set it current. Freeze the Right_Side layer.
8. Loft the left side of the car body. Select the long curves (top and bottom) as the cross sections and the short curves (front and back) as the guides for the loft.
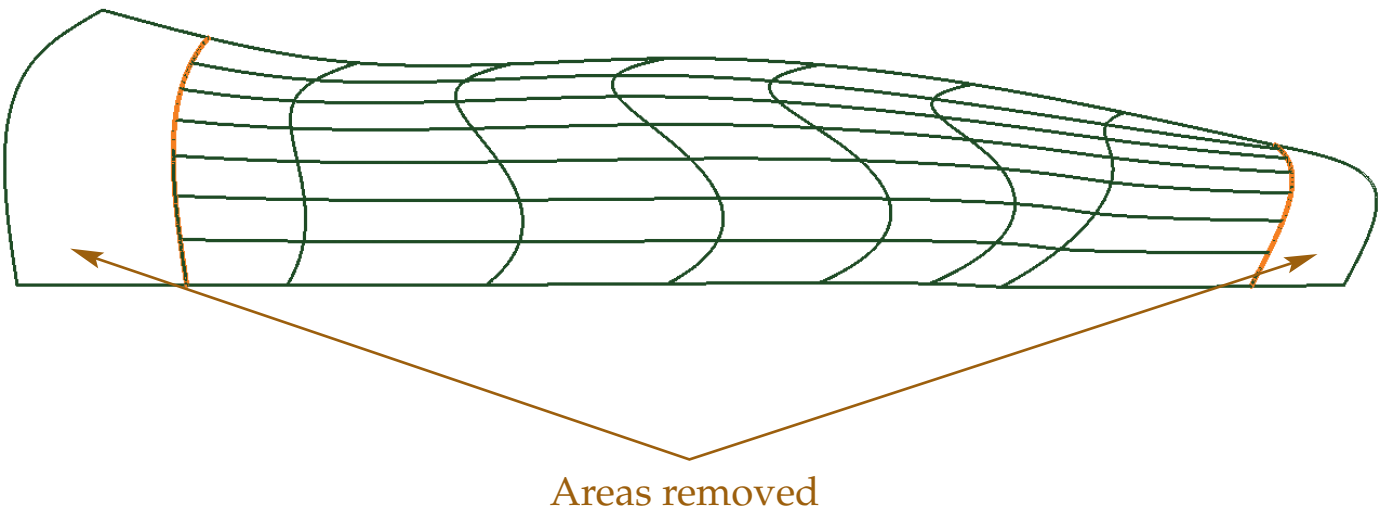
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Trimming the Sides

9. Thaw the Right_Side layer and set it current. Thaw the Right_Side_Rails layer. Freeze the Left_Side layer.

10. Using the view cube, set the view to the Right orthographic view. See the illustration below.

Curves for trimming
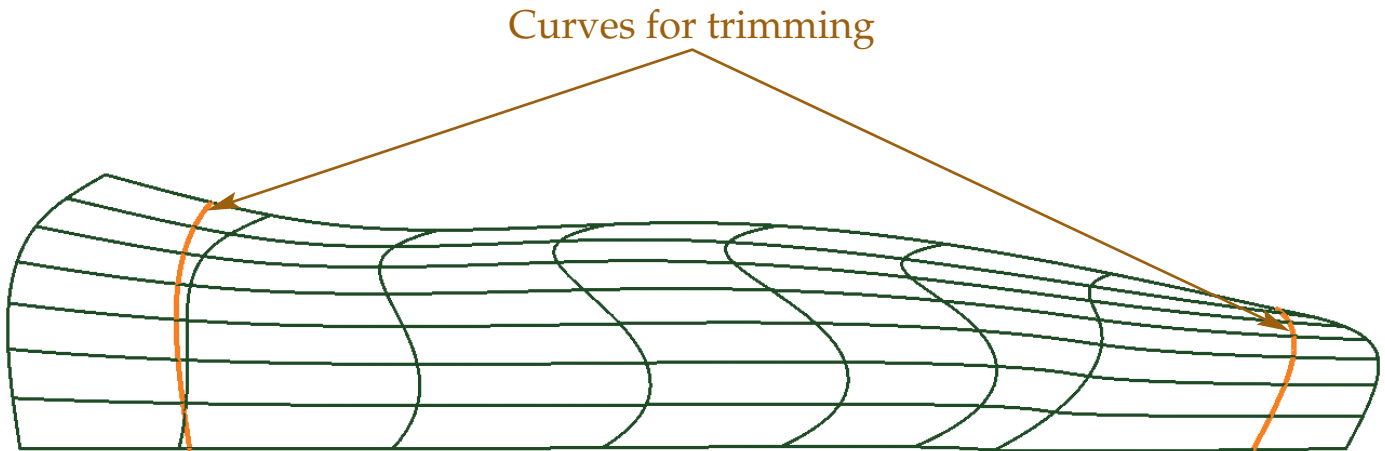
11. Pick the **Trim** button in the **Edit** panel on the **Surface** tab of the ribbon to initiate the **SURFTRIM** command.

12. Select the right-side surface as the surface to trim. Then select the two curves as the cutting curves. Finally, select the areas to the right and left of the cutting curves as the areas to remove. See the illustration below.
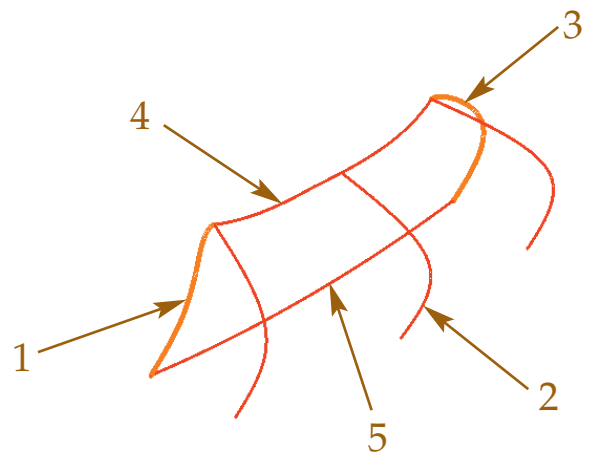
Areas removed

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13. Thaw the Left_Side layer and set it current. Thaw the Left_Side_Rails layer. Freeze the Right_Side and Right_Side_Rails layers.
14. Using the view cube, set the view to the Left orthographic view.
15. Pick the **Trim** button in the **Edit** panel on the **Surface** tab of the ribbon.
16. Trim the left side of the car body using the curves.
17. Thaw the Right_Side and Right_Side_Rails layers and use the view cube to restore the home view. See the illustration below.
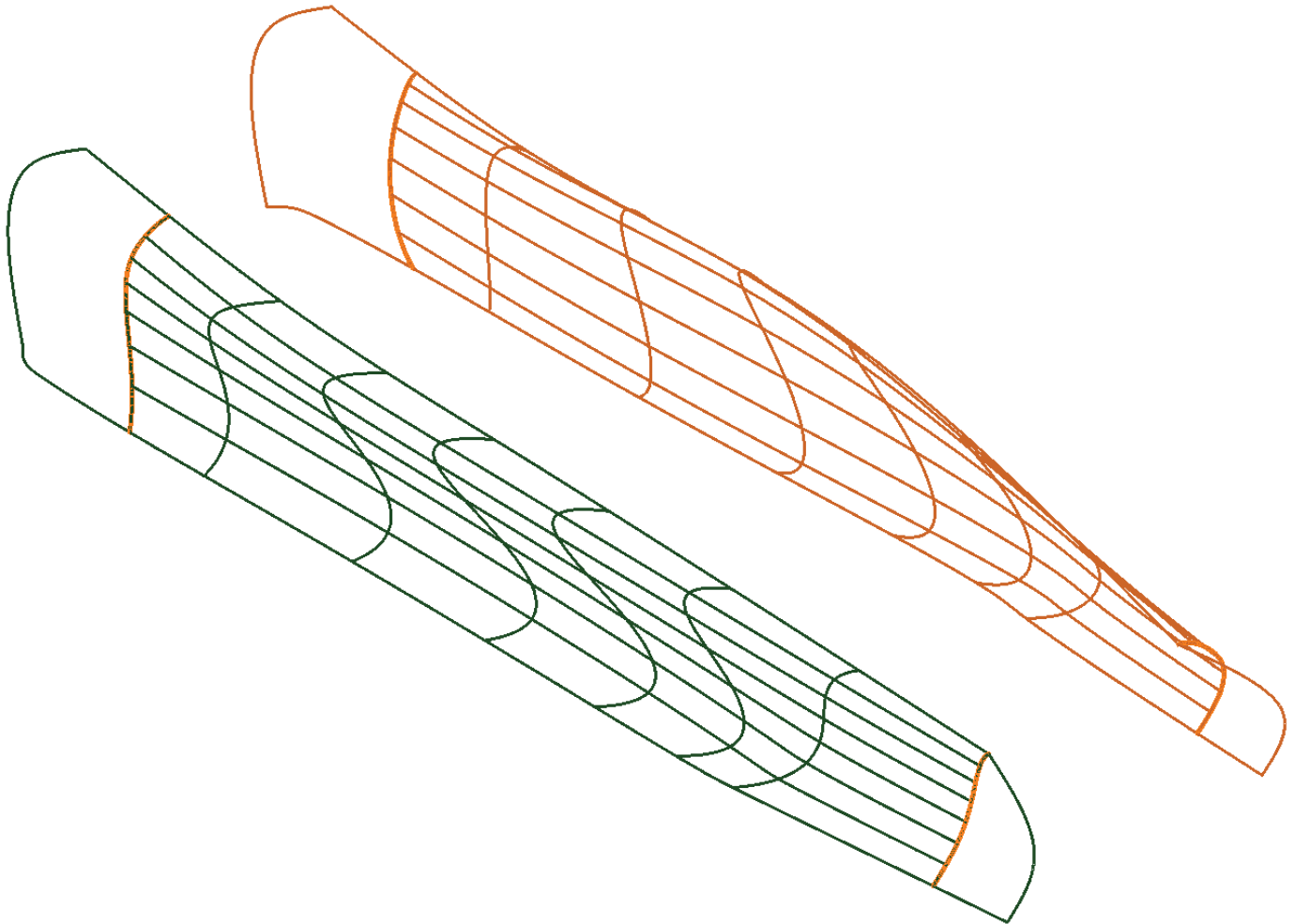
(Continued on the next page)

Creating the Front Bumper

18. Thaw the Bumper layer and set it current. Freeze the Right_Side and Left_ Side layers. Leave the "rails" layers thawed.

19. Pick the **Network** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **SURFNETWORK** command.

20. Refer to the illustration below. Select curves 1, 2, and 3 for the first direction and press [Enter].

21. Select curves 4 and 5 as the second direction and press [Enter]. This is the front of the car.

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22. Pick the **Loft** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **LOFT** command. Loft the two curves at the back of the car using cross sections only. See the illustration below.


Car Rear

Car Front
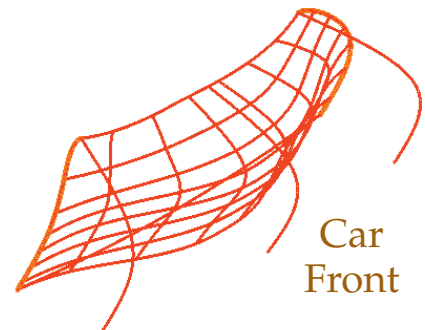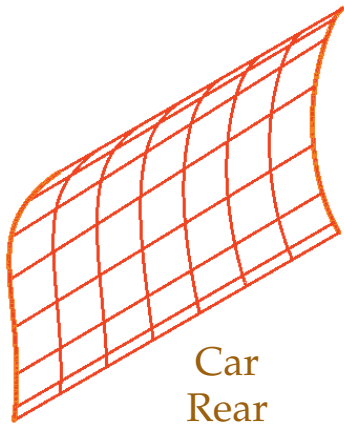
Blending the Surfaces

23. Thaw the Right_Side layer and set it current. Thaw the Left_Side layer. Freeze the Right_Side_Rails and Left_Side_Rails layers.

24. Create a new layer. Name the layer Top and set the color to ACI 120. Set the Top layer current.

25. Pick the **Blend** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **SURFBLEND** command.

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Appendix B—Surface Modeling Tutorial   6

26. Refer to the illustration below. For the first edge, select edge 1 and press [Enter]. For the second edge, select edge 2 and press [Enter].
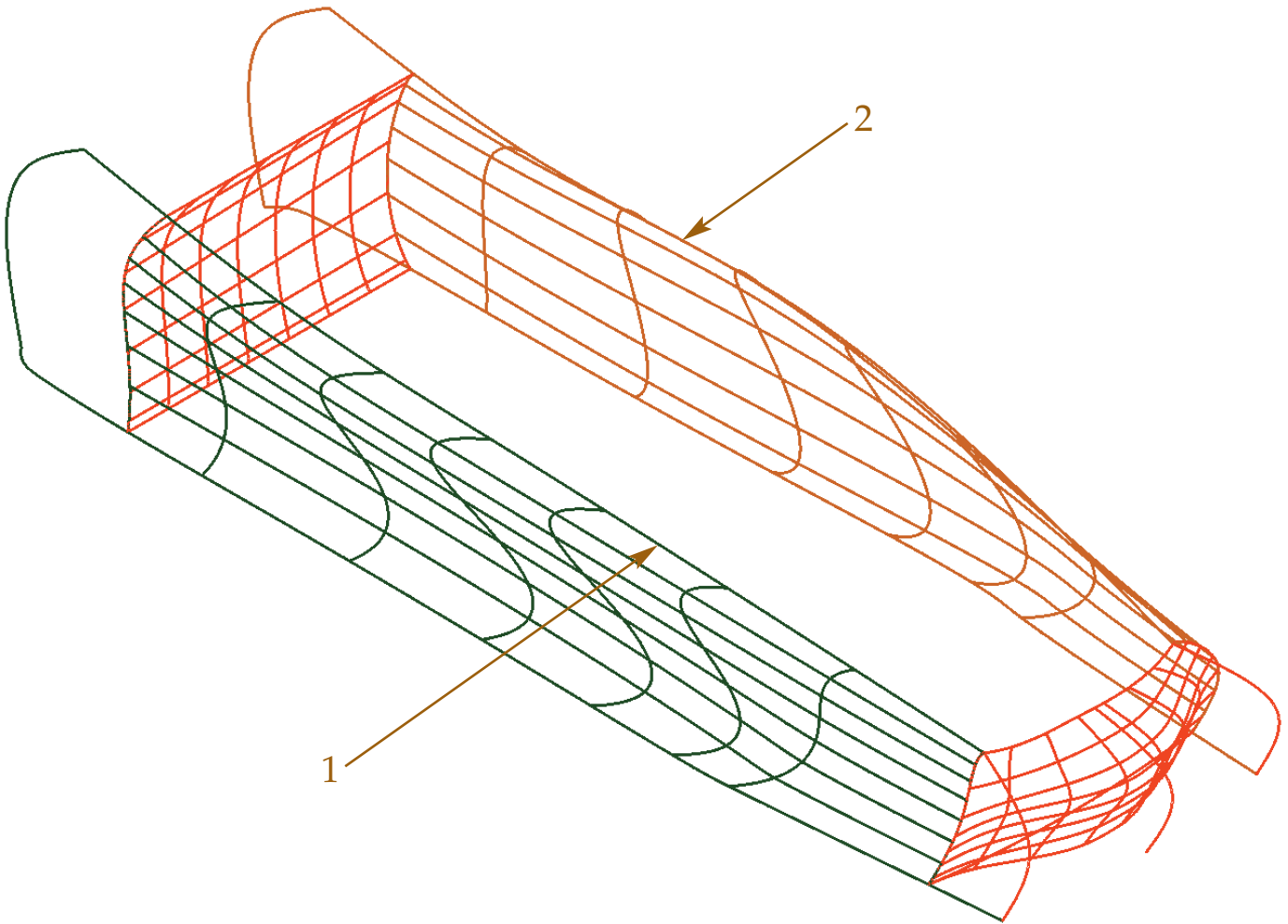
27. Using the **Continuity** and **Bulge magnitude** options, set the start and end continuity to G1 and set the start and end bulge magnitude to 1.5.

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28. Set the visual style to Shaded. See the illustration below.


Needs to be patched
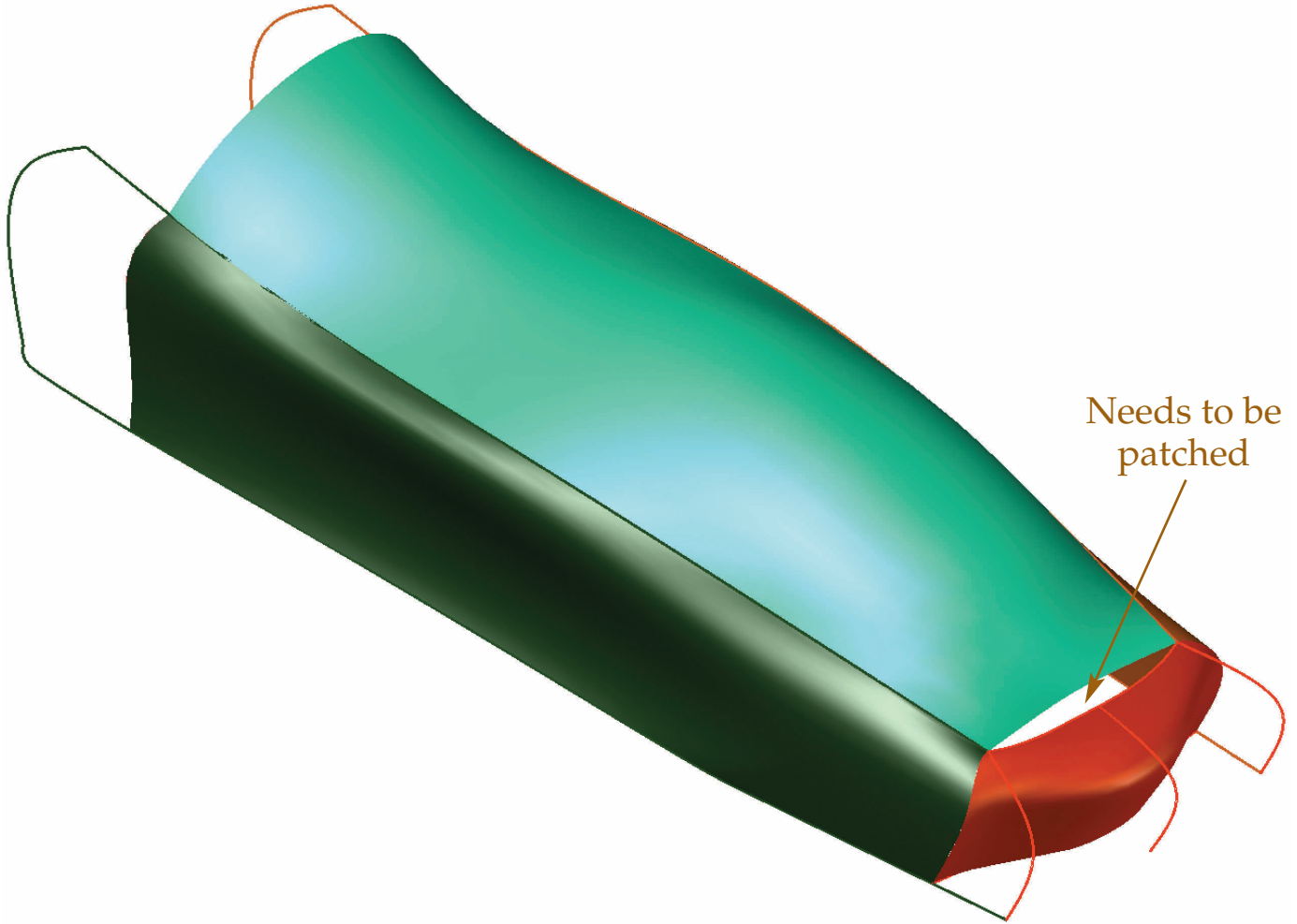
Patching the Model

You will need to patch the front and back of the car to close the body. The bottom of the car body will be left open for this design.

29. Zoom to the front of the car. Make sure the Top layer is set current.
30. Pick the **Patch** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **SURFPATCH** command.

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31. Refer to the illustration below. Select surface edges 1 and 2 for the patch and press [Enter].
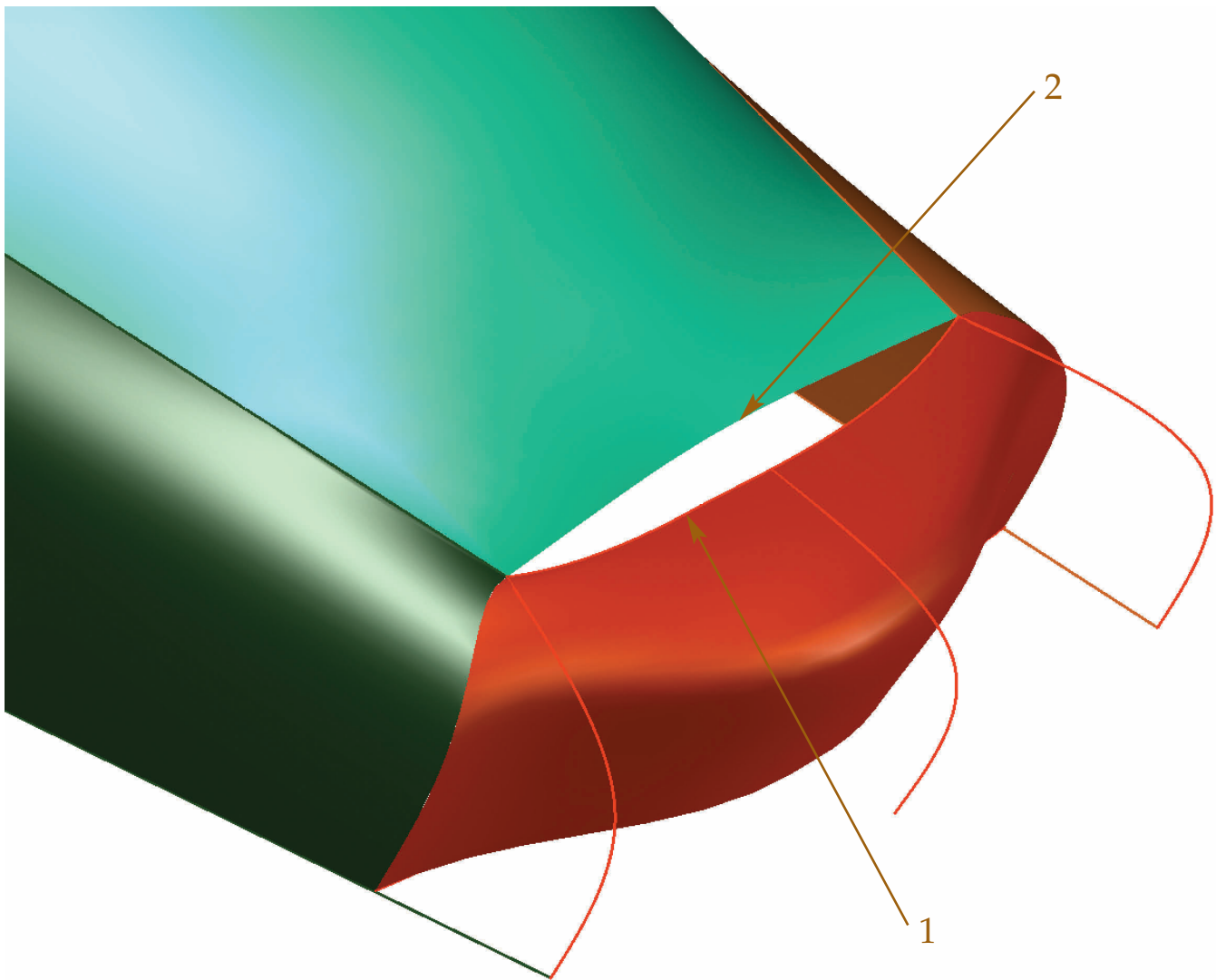

32. Using the **Continuity** and **Bulge magnitude** options, set the continuity to G1 and set the bulge magnitude to .2.
33. Rotate the view to see the back of the car.
34. Make sure the Top layer is set current.
35. Pick the **Patch** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **SURFPATCH** command.

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36. Select the two surface edges to close the gap. Set the continuity to G2 and the bulge magnitude to .9. This creates a spoiler on the back of the car. See the illustration below.

Patch creates
a spoiler
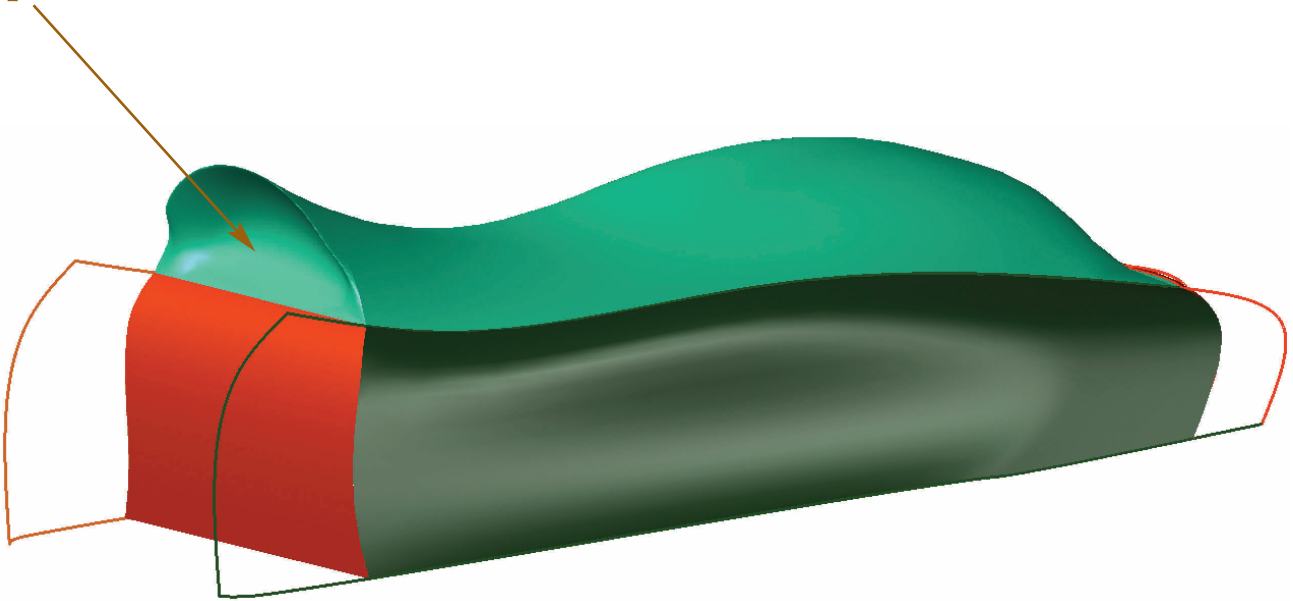
37. Restore the home view. Also, thaw the Wheels layer and set it current.
38. Pick the **Extrude** button in the **Create** panel on the **Surface** tab of the ribbon to initiate the **EXTRUDE** command.

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39. Select the two circles and extrude them three units so the extrusions pass through the body. These extrusions will act as trim edges to create the wheel wells. See the illustration below.
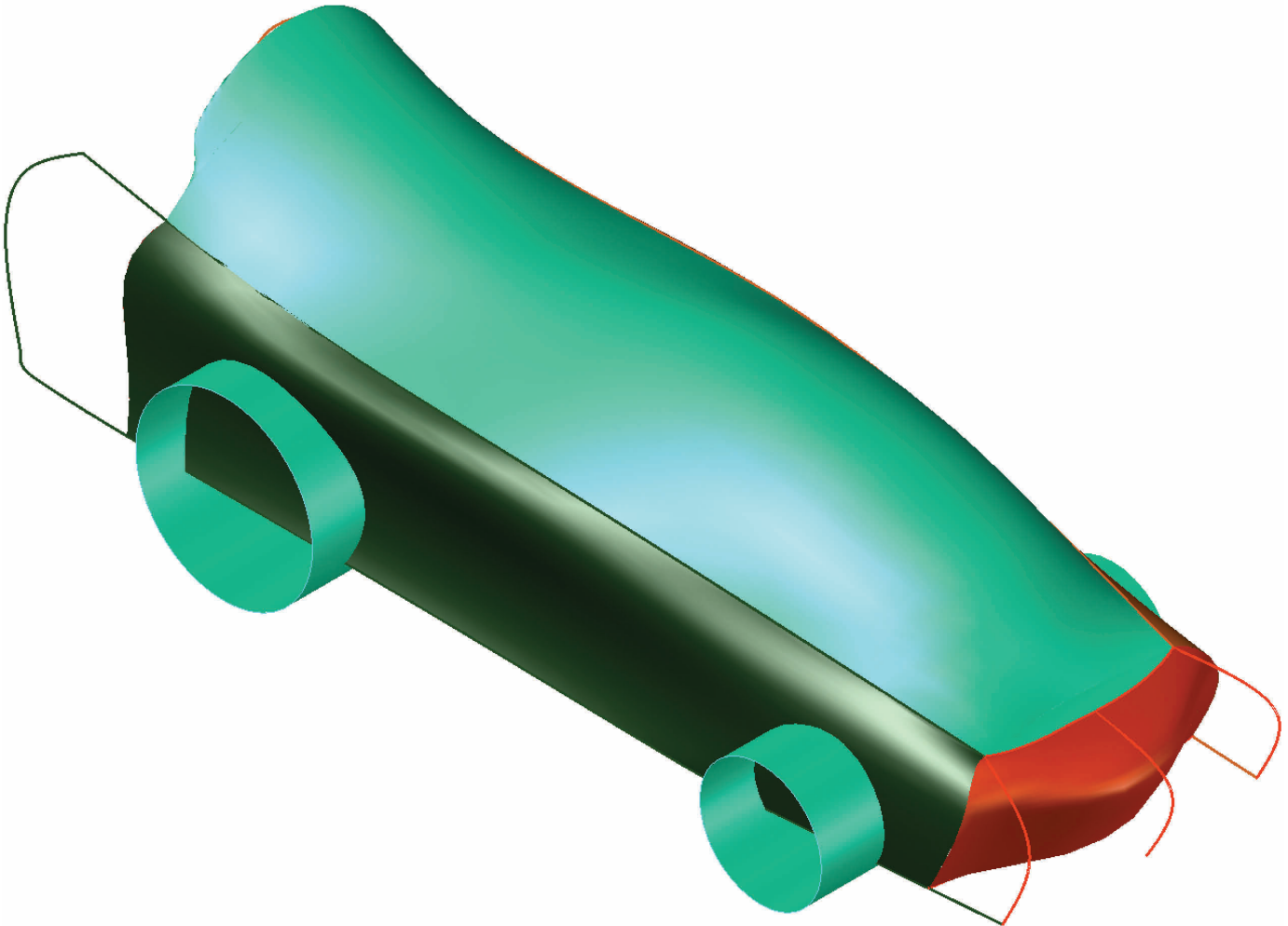
40. Pick the **Trim** button in the **Edit** panel on the **Surface** tab of the ribbon to initiate the **SURFTRIM** command.

41. Select both the left and right sides as the surfaces to trim. Select the two extruded circles (surface extrusions) as the cutting edges. Select the areas within the extruded circles as the areas to remove.

42. Set the Top layer current and freeze the Wheels layer.

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43. Create a new layer named Construct, move any construction geometry curves to that layer, and freeze the layer. See the illustration below.
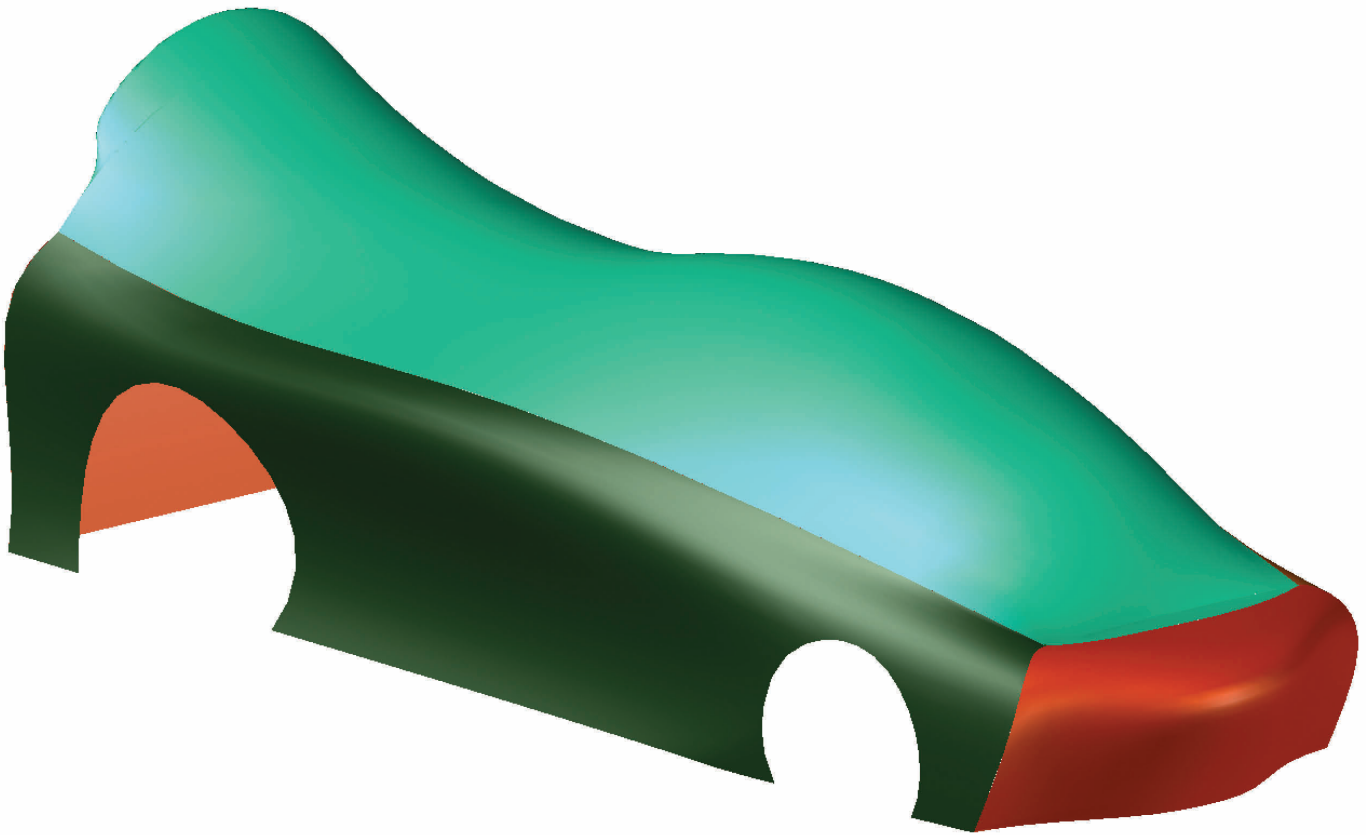
44. Save the drawing as Toy_Car_Body.dwg.