





Wheel Spokes Assembly

A. Insert Rim and Tire.

- Step 1. Click File Menu > New, click **Assembly Metric** and OK.
- Step 2. Click **Keep Visible**  in the Property Manager, **Fig. 1**.
- Step 3. Click **Browse** in the Property Manager, **Fig. 1**.
- Step 4. Select your **REAR RIM SPOKE** file and click Open.



- Step 5. Click OK  in the Property Manager. This will place Rim origin at the assembly origin and fix the position so Rim cannot move. This fixed component should have a **(f)** before its name in the Feature Manager.

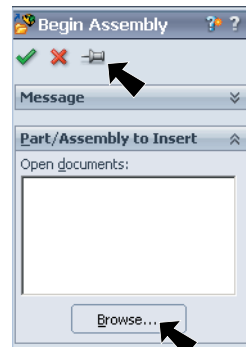


Fig. 1

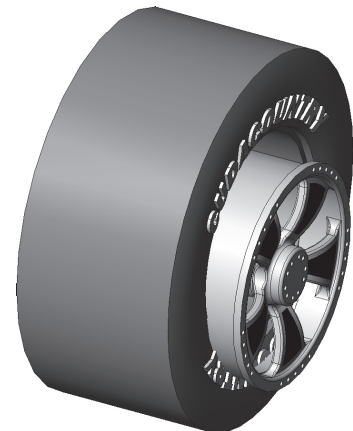



Fig. 2

- Step 6. Click **Browse** in the Property Manager, **Fig. 1**.
- Step 7. Select your **REAR TIRE** file and click Open.
- Step 8. Click approximately where Tire is positioned in **Fig. 2**. Click OK  in the Property Manager when done.

B. Save as "REAR WHEEL SPOKES ASSEMBLY".

- Step 1. Click File Menu > Save As.
- Step 2. Key-in **REAR WHEEL SPOKES ASSEMBLY** for the filename and press ENTER.



Fig. 3

C. Mate: Tire to Rim.





- Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)
- Step 2. Click **Mate**  on the Assembly toolbar.
- Step 3. Click **top outside edge of Tire** and **top outside edge of Rim**, **Fig. 3**.
- Step 4. Click Add/Finish Mate  to add **Coincident** mate and OK  in the Property Manager when done.
- Step 5. Save. Use Ctrl-S.



Fig. 4

D. Enable Toolbox Browser.

Step 1. If necessary, enable Toolbox Browser.

Step 2. Click Tools Menu > Add-Ins.

Step 3. Check **SolidWorks Toolbox Browser** to place a check in the both check boxes, then click OK, Fig. 5.

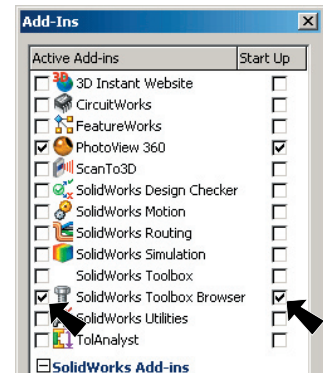




Fig. 5

E. Design Library.

Step 1. Click the **Design Library** tab  in the Task Pane (right side of drawing area), Fig. 6.

Step 2. Expand the **Toolbox**  Toolbox
 Expand **Ansi Metric** folder  Ansi Metric
 Expand **Bolts and Screws** folder  Bolts and Screws
 Click **Hex Head** folder  Hex Head

Step 3. In the lower pane, click **Heavy Hex Flange Screw**, Fig. 6 and drag screw into drawing, release the screw, Fig. 7.

Step 4. In the Property Manager, set:
Size to M5 Fig. 8
Length 8
 click OK 
 Click Cancel  when done.

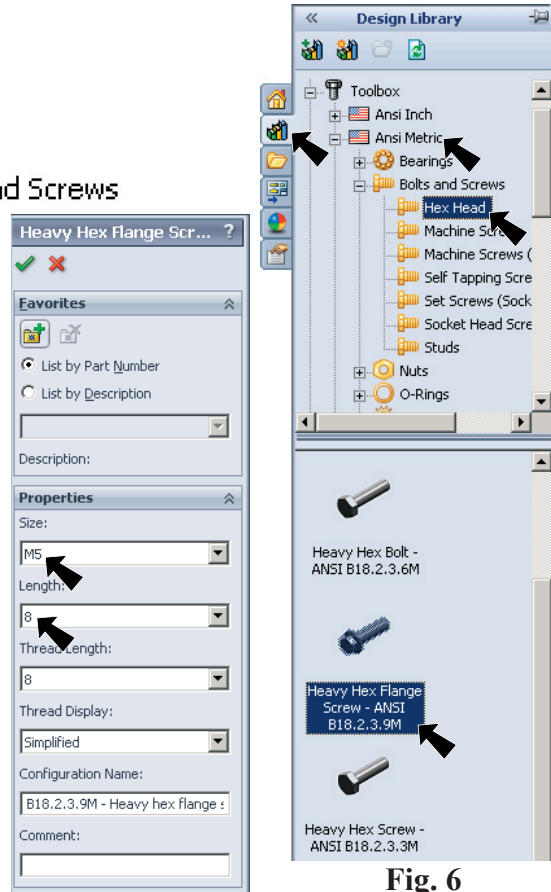


Fig. 8

Fig. 6



Fig. 7

F. Save As HEX FLANGE 072.

Step 1. Click the screw and click **Open** from the Content Menu, **Fig. 9**.

Step 2. Click File Menu > Save As.

Step 3. In the Save As dialog box:
 key-in **HEX FLANGE 072** for the filename.
 in the Save in dialog box, **navigate to My Documents/Tech Ed/Rail Car folder**.
 click Save button.

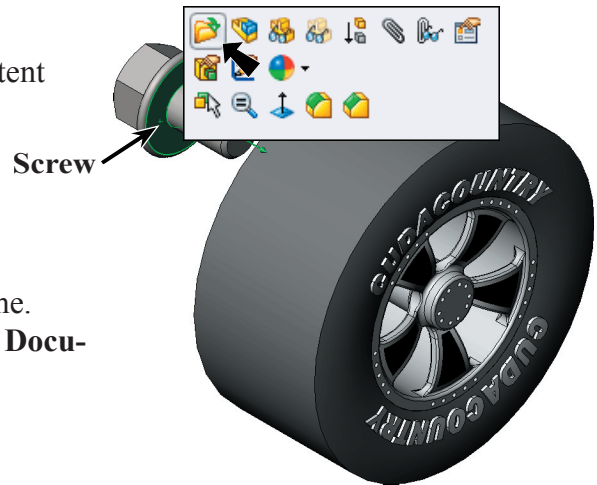


Fig. 9

G. Scale to .072.

Step 1. Click Insert Menu > Features > Scale.

Step 2. In the Scale Property Manager, set:

Check Uniform scale, Fig. 11

Scale Factor to .072

click OK

Step 3. Click **Zoom to Fit** (F) on the View toolbar.

Step 4. Save. Use **Ctrl-S**.

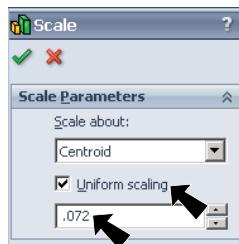


Fig. 11

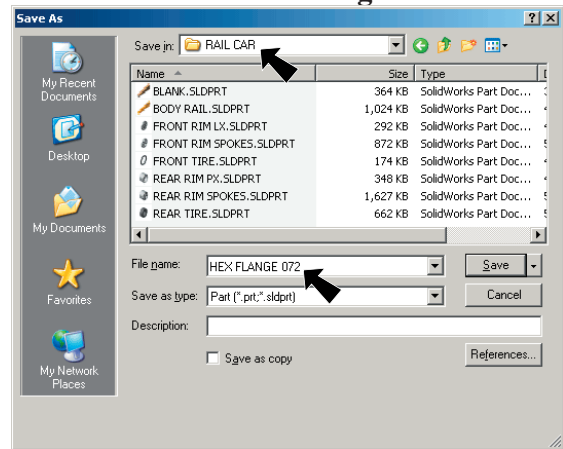


Fig. 10

H. Insert Scaled .072 Screw.

Step 1. Switch back to the Assembly file. Use **Ctrl-Tab**.

Step 2. Delete Screw, **Fig. 12**.

Step 3. Zoom in on **one "set" of holes in rim flange and hub, Fig. 12**. To **zoom**, hold down **Shift** key and drag middle mouse button (wheel). To **pan**, hold down **Ctrl** key and drag middle mouse button (wheel).

Step 4. Click **Insert Components** on the Assembly toolbar.

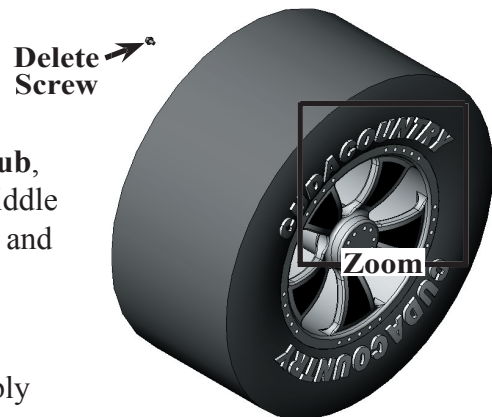





Fig. 12

Step 5. In the Insert Components Property Manager:
click **Keep Visible** , **Fig. 13**

under Open documents,
click your **HEX
FLANGE 072** file.

Move the tip of your
cursor to the edge of a hole,
Fig. 14. When the screw
snaps into place and the
pointer (cursor) changes to

 concentric and coin-
cident mate, release the
screw.

Repeat and place screw
in on **set of 5 holes on rim
flange and one set of 2
holes on hub**, **Fig. 14**.

click OK  when done.

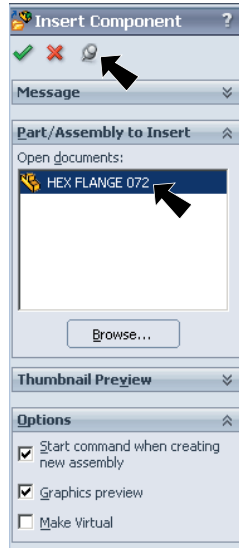


Fig. 13

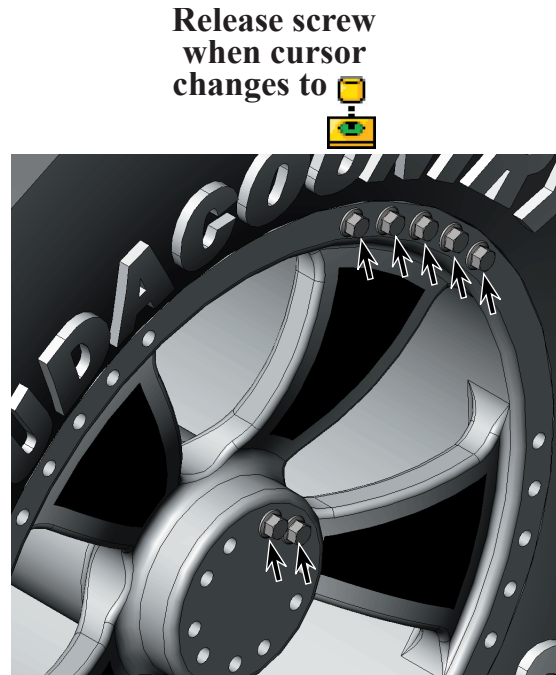


Fig. 14

I. Circular Pattern Screws.

Step 1. Click **Zoom to Fit**  (F) on the View toolbar.

Step 2. Click View Menu > Temporary Axes. (**Alt-V X**)

Step 3. **Shift click all the screws** in the Feature Manger. To Shift click all screws, click the first screw in Feature Manger and hold down Shift key and click the last screw, **Fig. 15**.

Step 4. Click Insert Menu > Component Pattern > Circular Pattern.

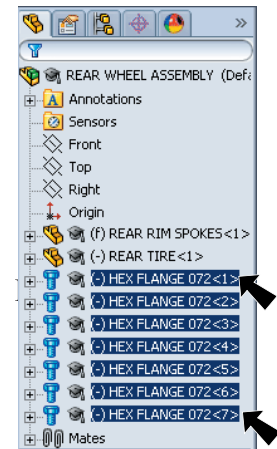


Fig. 15

Step 5. In the Circular Pattern Property Manager set:

under Parameters,

click in the **Pattern Axis**  box, **Fig. 16** and click **Temp axis** in drawing, **Fig. 17**

Number of Instances  to 5

Check Equal spacing, **Fig. 16**

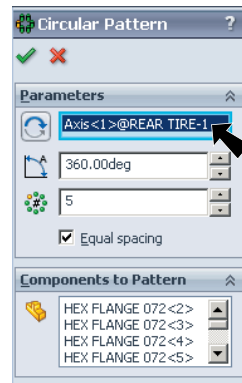


Fig. 16

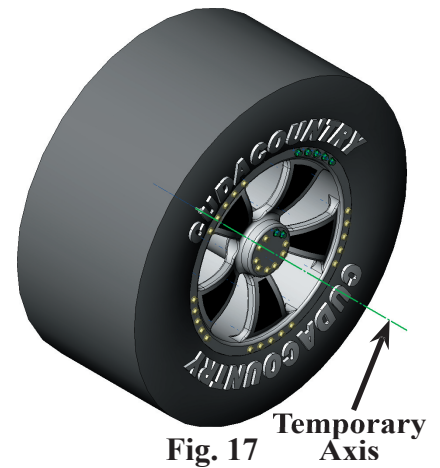


Fig. 17

click OK  in the Property Manager, **Fig. 18**.

Step 6. **Turn off** Temporary Axes. Click View Menu > Temporary Axes. (**Alt-V X**)

Step 7. Save. Use **Ctrl-S**.


J. Mate Reference.


Step 1. Rotate view slightly to view **inside of rim**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 19**.

Step 2. Click the **inside cylindrical face of axle hole** to select it, **Fig. 19**.



Fig. 18

Step 3. Click **Reference Geometry**  on the Features toolbar and **Mate Reference** from the menu.

Step 4. In the Mate Reference Property Manager click OK , **Fig. 20**.

Step 5. Save. Use **Ctrl-S**.

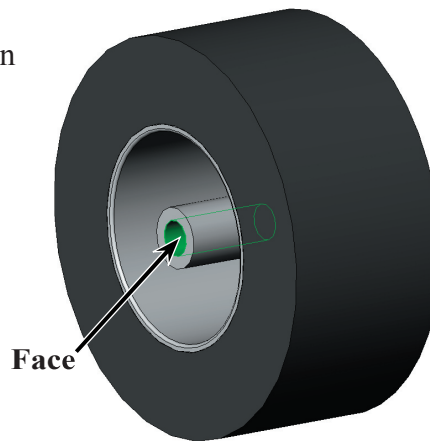


Fig. 19

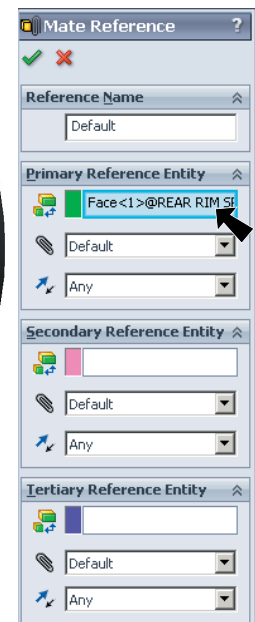


Fig. 20