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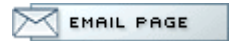
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Suggested Technique for Modeling a Chain Assembly (Similar to a Bicycle Chain)

Procedure

1. Create a new assembly and default assembly datum planes. In this document, all references to datum planes follows the assumption that default datums are being used.

Create a datum curve of the path that the chain should follow. Make sure that the length of the curve is a value that can be evenly divided by the length of each link. Select **Datum, Curve**, from the **Insert** pulldown menu then **Sketch, Done**, (Pick the sketch plane ADTM3), **Okay** for the direction, **Top**, (Select the horizontal reference plane ADTM2). Sketch two horizontal lines of length 5 each and two Tangent End arcs of radius 1.59155 each. To determine the length of the curve, select **Measure** from the **Analysis** dropdown menu, select **Curve Length** from the **Type** list and select **Chain** from the **Curve/Edge** list, then select the curve and make sure that the entire curve is highlighted as red. The curve length will be shown in the **Results** field. In this example, the curve length is 20.

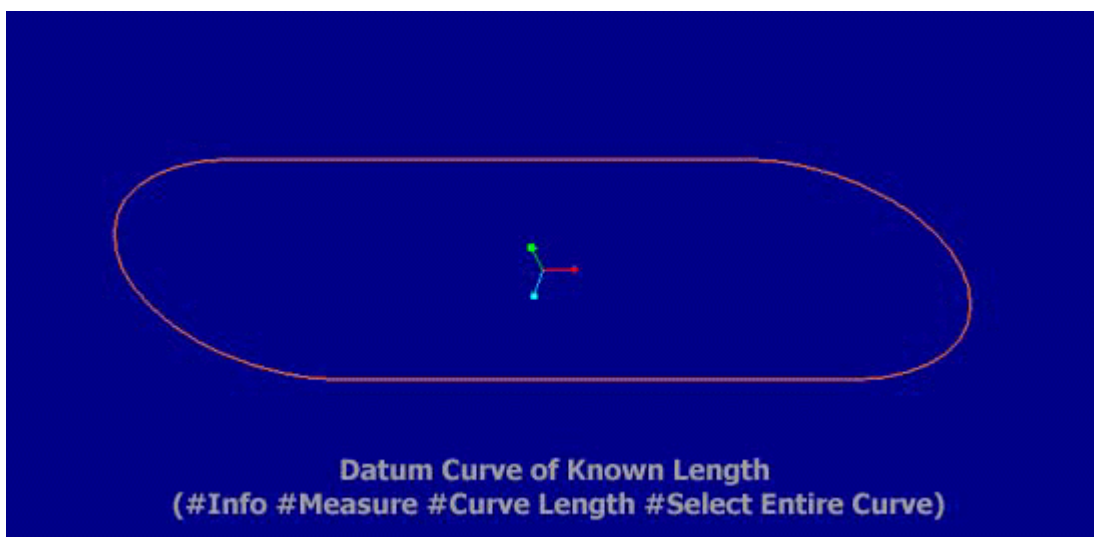


Figure 1

2. Create two link parts with the distance between the pins/holes specified. In this example the distance is 0.5 between the pins/holes of each link. One link has the shafts, the other link has the holes. First create a new part called "link_seg1". Create default datum planes and create two round protrusions on Both Sides of DTM3 with the distance between the center of each protrusion equal to 0.5. Create two more protrusions for the side plates. Create two datum points that lie on DTM3 and the axis of each round protrusion. Repeat this to create a part named "link_seg2" but create the protrusions with holes in them that are also a distance of 0.5 apart. Make sure that the overall width of link_seg2 will fit inside of the side plate protrusions of link_seg1. Create two datum points on DTM3 and the axis of each hole in link_seg2.

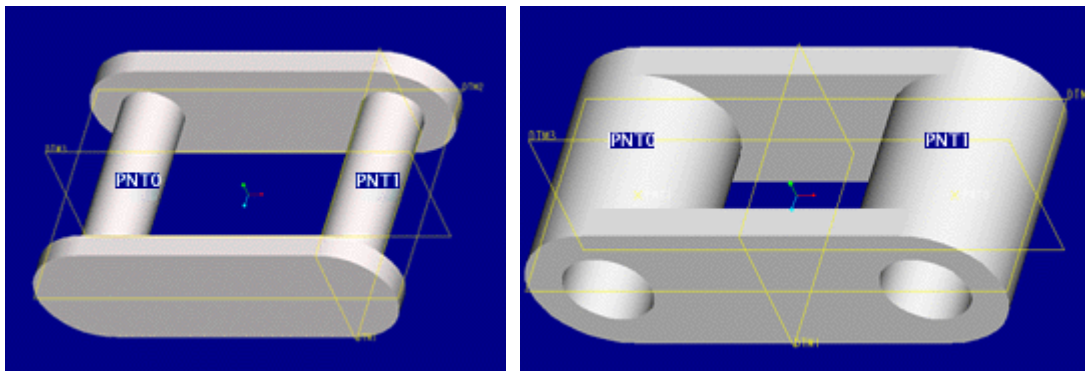


Figure 2

3. Create two length ratio (LR) datum points on curve, with the first point LR = 0.0 and the second point LR = 0.025. The length ratio can be computed by dividing the link length by the overall length of the chain. In this example, $LR = 0.5 / 20 = 0.025$. Select **Datum, Point** from the **Insert** pulldown menu then **On Curve, Length Ratio**, (Pick the datum curve), **Done Sel**, enter 0.00 for the first datum point. Before selecting **Done**, again select **On Curve, Length Ratio**, (pick the datum curve), **Done Sel**, and enter 0.025 for the length ratio. Finally, select **Done** to end the datum point creation. This creates the datum points together as a single feature to facilitate the points being patterned together.

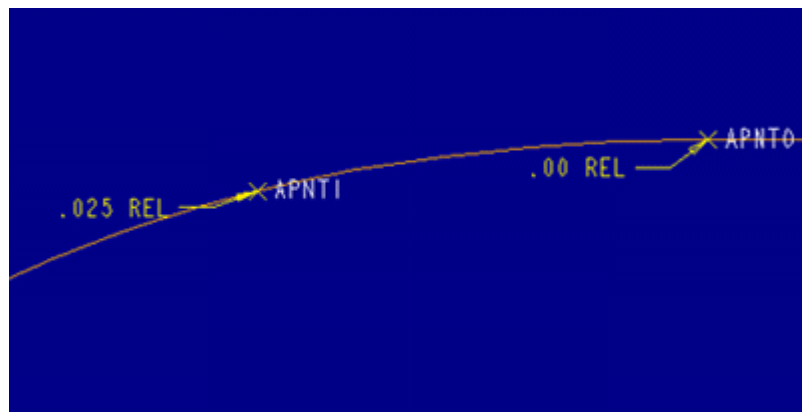


Figure 3

4. Pattern these two points around the curve by selecting **Pattern**, (pick one of the datum points), (pick the 0.00 dimension), and enter the curve length ratio increment of 0.05. The curve length ratio increment is equal to the length ratio multiplied by 2. When prompted to

"Select another dimension for FIRST direction..." (pick the 0.025 dimension), and enter 0.05 again for the curve length ratio increment. Select **Done** and enter 20 for the total number of instances. The total number of instances should be half of the total number of links because these points will represent the "link_seg1" part. The number of links is equal to the datum curve length divided by the link length, or in this example 40 links. Therefore, the total number of instances for this first pattern should be $40 / 2 = 20$. When prompted to "Select pattern dimension for SECOND direction..." hit **Done** to create the pattern. This will create 40 total points around the datum curve.

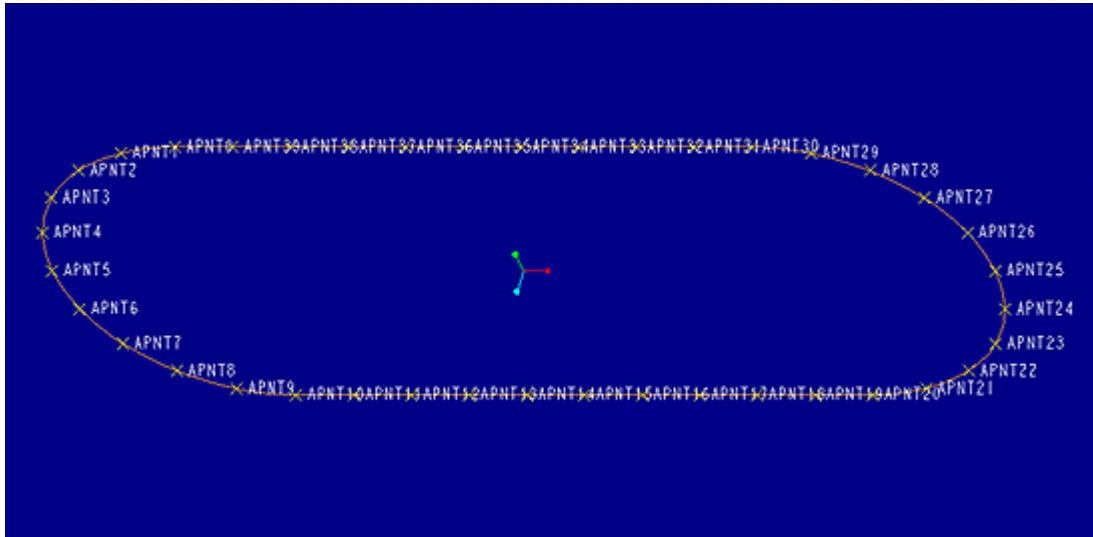
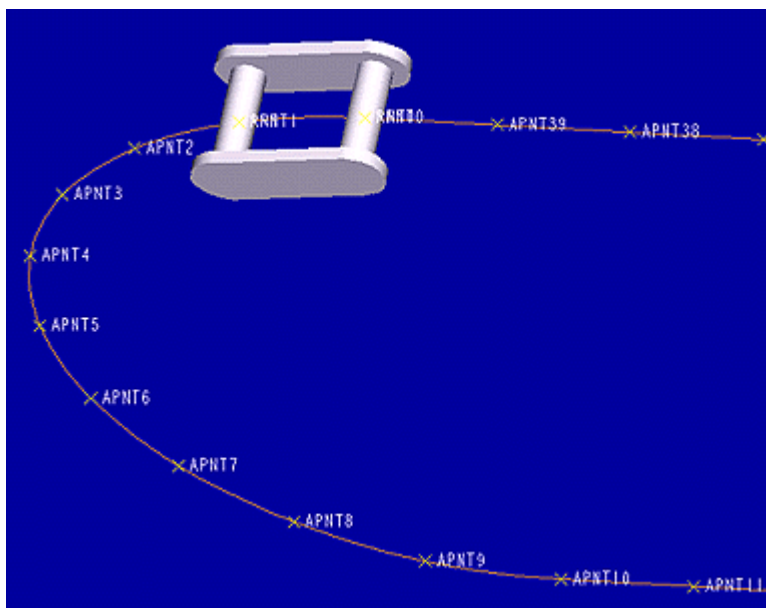


Figure 4

5. Assemble "link_seg1.prt" and align PNT0 and PNT1 to APNT0 and APNT1, respectively. Also align DTM3 to ADTM3 to fully constrain the component.



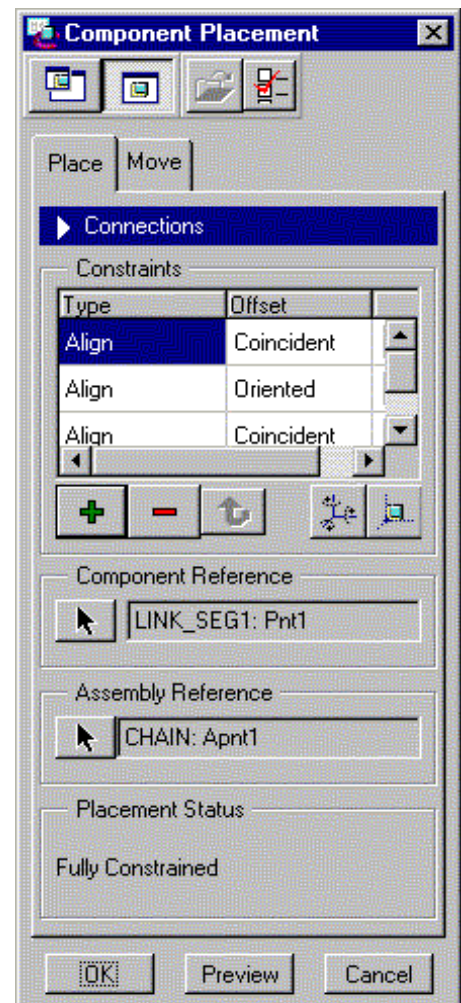


Figure 5

6. Select **Component, Pattern**, (pick the "link_seg1" component), **Ref Pattern, Done**. This will pattern the "link_seg1" component around the datum curve with a space between each link for the "link_seg2".

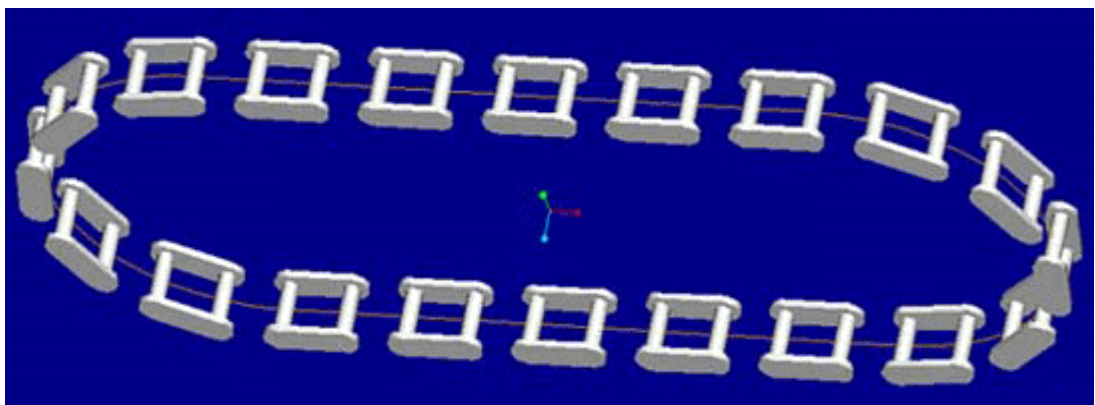


Figure 6

7. Create two more datum points as before in step #3 that are offset by one length ratio, so the first point's length ratio should be 0.025 (rather than 0.0) and second point's length ratio should be 0.05 (rather than 0.025). These points will lie on top of APNT1 and APNT2 from the first pattern of points.

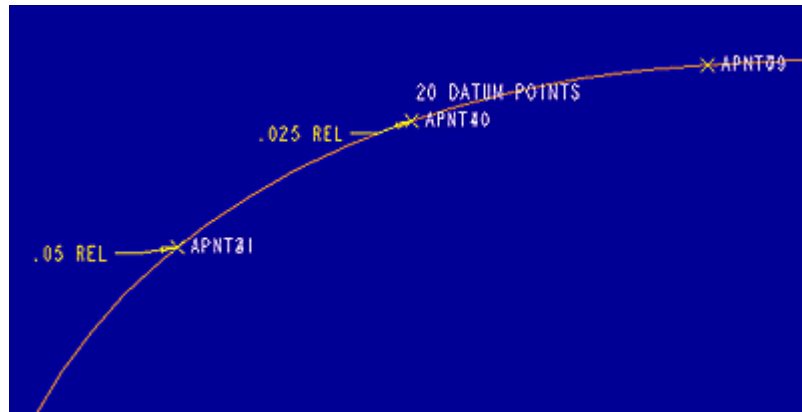


Figure 7

8. Pattern these points (APNT40 and APNT41), the same as in step #4.

9. Assemble "link_seg2.prt" and align PNT0 and PNT1 to APNT40 and APNT41, respectively. Also align DTM3 to ADTM3 to fully constrain the component.

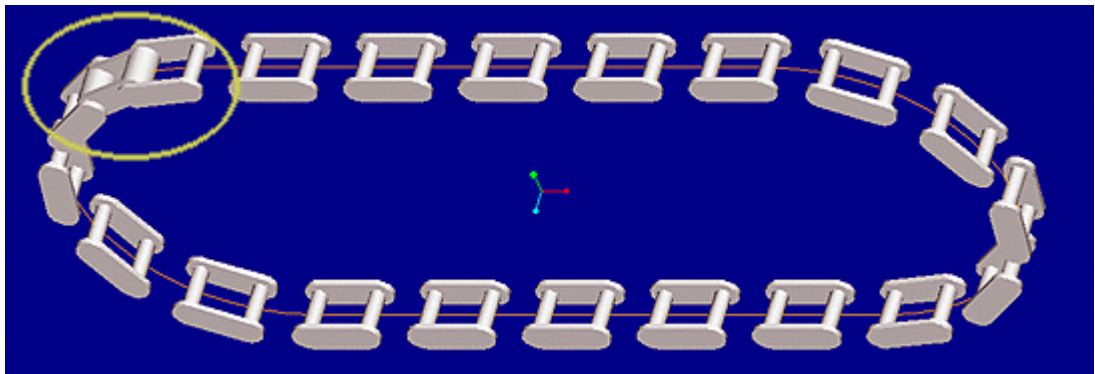


Figure 8

10. Select **Component, Pattern**, (pick the "link_seg2" component), **Ref Pattern, Done**. This will pattern "link_seg2" around the datum curve, completing the chain assembly.

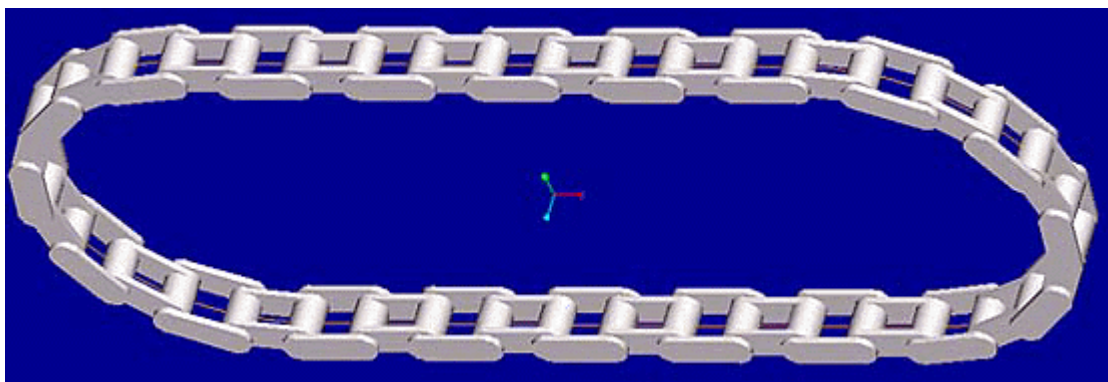


Figure 9

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