

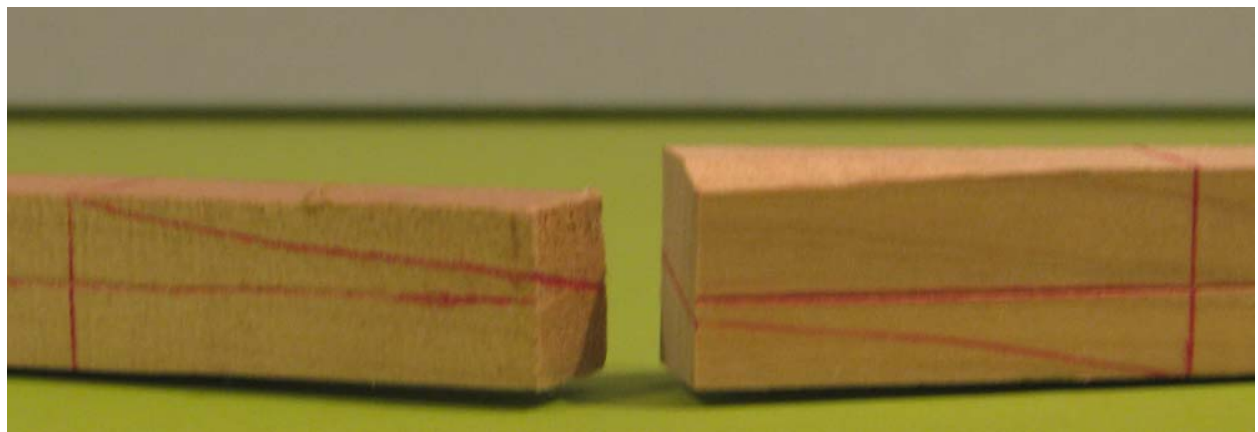
Creating Multi Blade Propellers and Propeller Hubs

This article outlines a method to fabricate a propeller hub which is removable from the fuselage. The pictures are based upon the propeller blades and hub for a 1/32 scale P-51D Mustang. The approach should also be viable for 1/48 and smaller scale models. The propeller outlines and profiles will be airplane specific. In this case the propellers are based upon the P-51D propeller blades with cuffs.

Figure 1
Propeller Twist Profile

Twist profile on top half of left side

Mirror profile on bottom half of right side



Pieces of $\frac{3}{4}$ " x $\frac{3}{4}$ " (19 mm x 19 mm) are sawn. A profile on the top half of one side and a mirror profile on the bottom half of the other side facilitates creating the propeller twist. Material is removed to form a thin section slightly thicker than the scale propeller blade thickness.

I have used maple for strength (1000 or higher on the Janka* scale) in the past. However, it is somewhat difficult to shape and so I have landed on poplar (540 on the Janka scale) which is stronger than pine (400 on the Janka scale). Poplar is still being relatively easy to carve

* The Janka Scale measures the relative hardness of wood. Typically there is a relationship between the hardness and wood strength. I.e harder woods are typically stronger and more resistant to bending and breakage.

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Figure 2
Scarfs Cut to Facilitate Material Removal

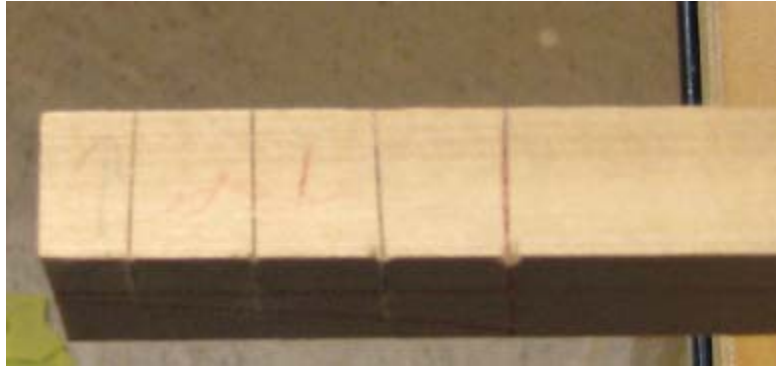
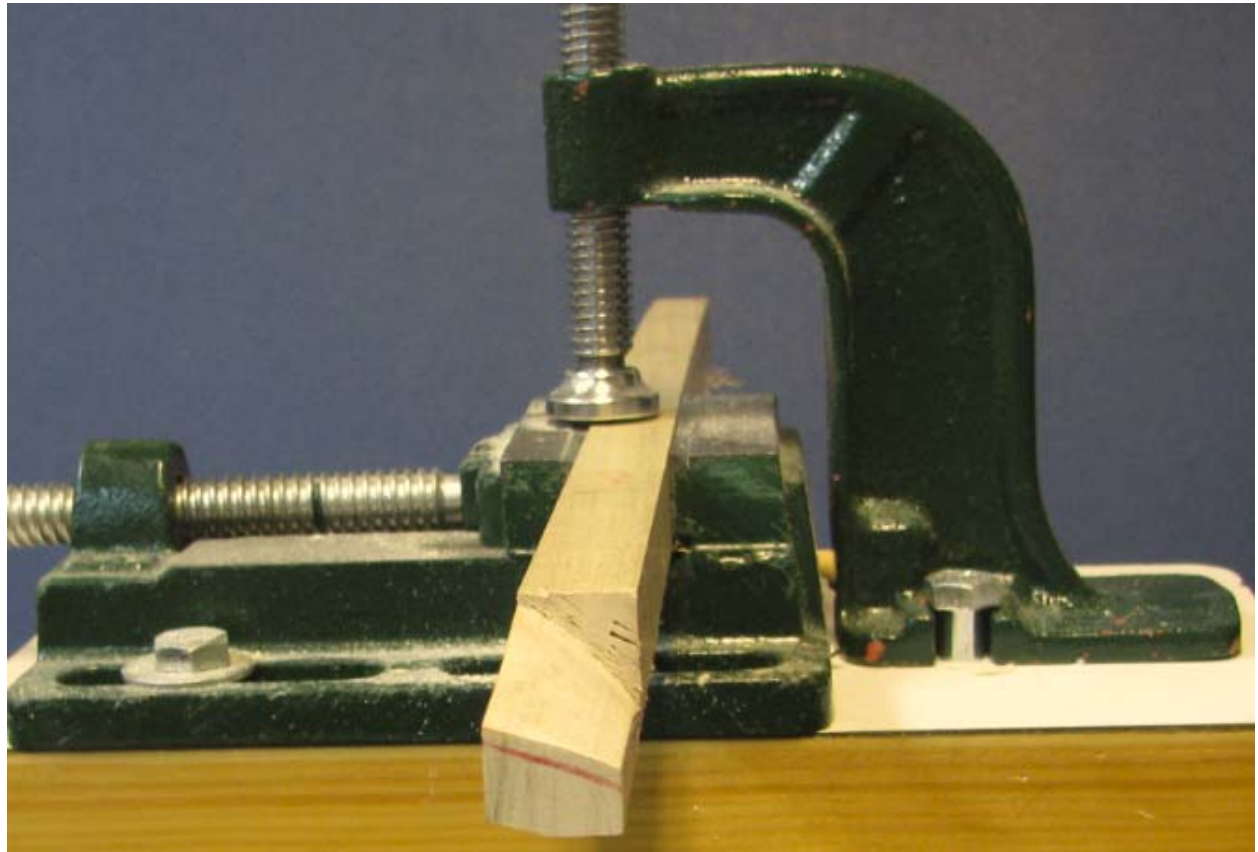


Figure 3
Material Removed from Top Half with Twist



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Figure 3

Bottom Contour Line Drawn Parallel to Top Surface

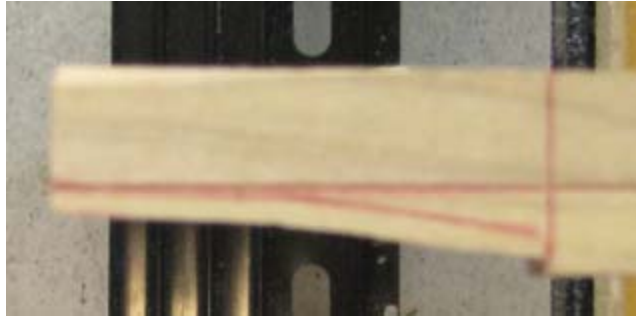
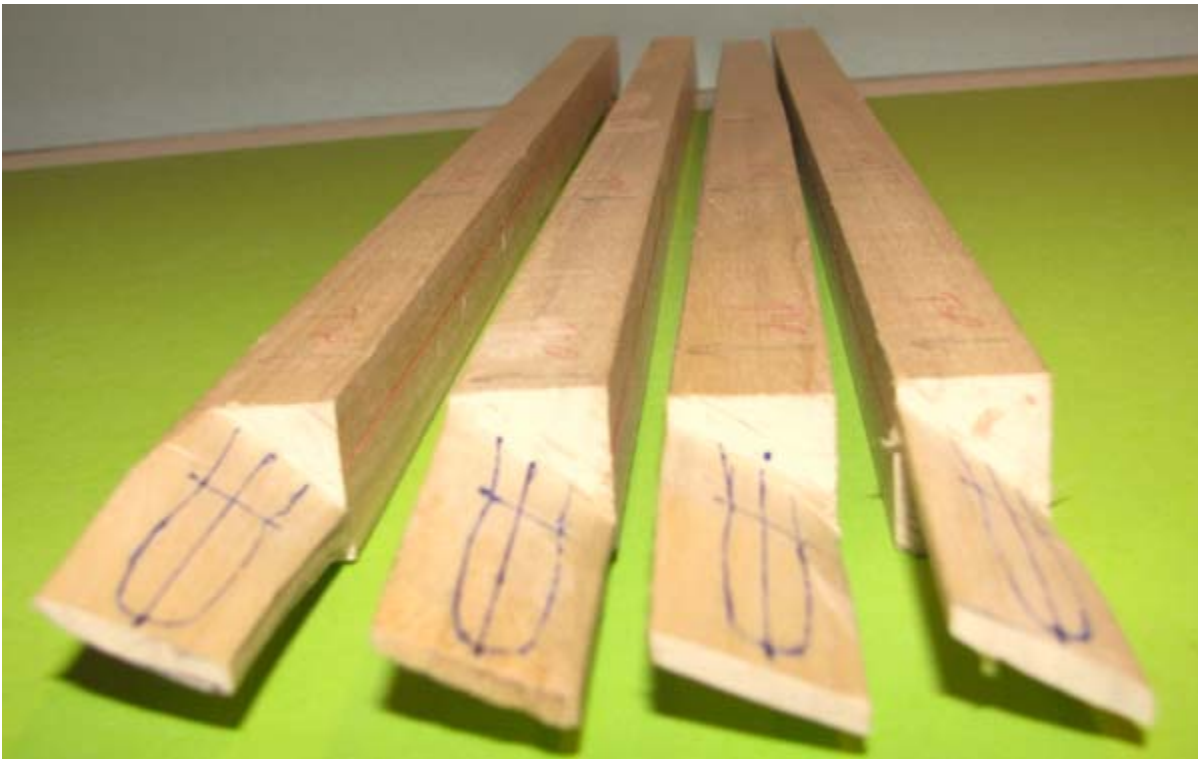


Figure 4

Top and Bottom Surfaces Carved with Propeller Blades Marked Out



After both surfaces have been carved, the outline of the propeller is added. The propeller outline will vary for each aircraft as blade length and propeller blade geometry are typically unique for each airplane. Not apparent in the photograph is the approximate 25 degree twist from tip to root.

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Figure 5
Blade Material Clamped in Carving Vice

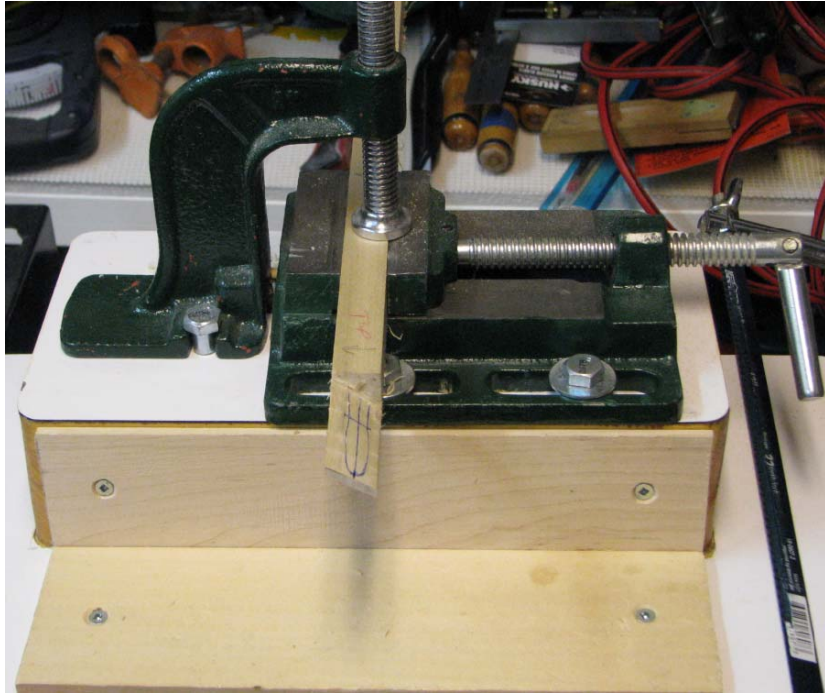
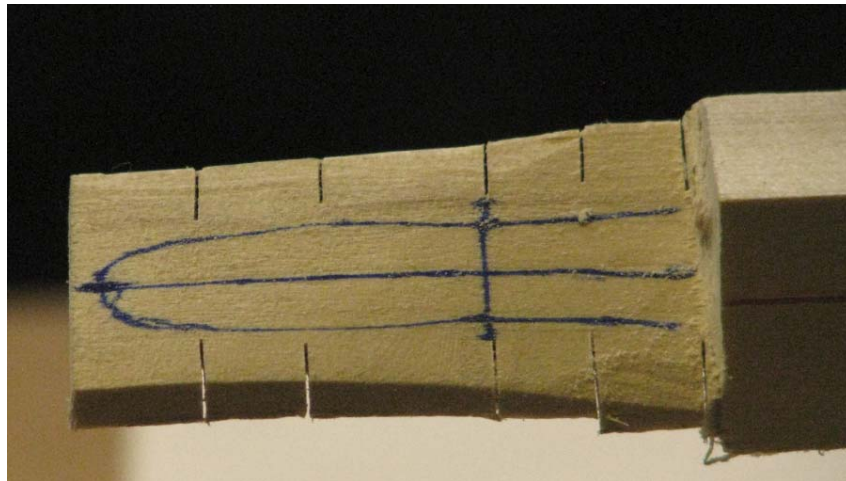


Figure 6
Saw Cuts in Waste Material to Facilitate Carving Propeller Shape



The saw cuts minimize the impact of the wood grain during chiseling and shaping

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Figure 7
Propeller Blade Outlines Carved



Figure 8
Propeller Blades Shaped & Profiled



The rectangular bases will be trimmed to form a round shape for insertion in the propeller hub holes

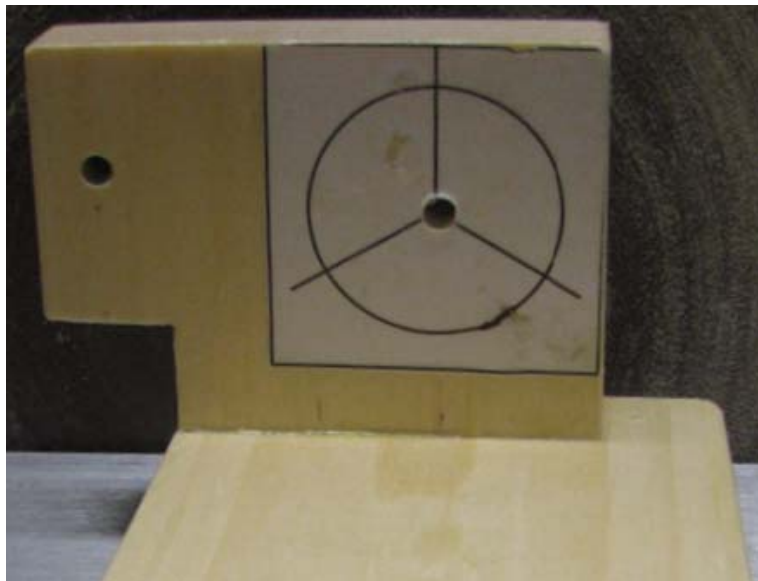
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Figure 9
Rough Shaping of Propeller Hub and Insertion of Bolt



Remove bolt head with hacksaw before inserting into hub. Picture shows T nuts which will be inserted into airplane body. This particular brand of T nuts is for model planes and has a smaller flange than those found in hardware stores and comes in various bolt sizes.

Figure 10
Fixture to Hold Hub for Rounding and Drilling Propeller Mounting Holes



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Figure 11
Rough Hub Mounted in Fixture with Turning Handle

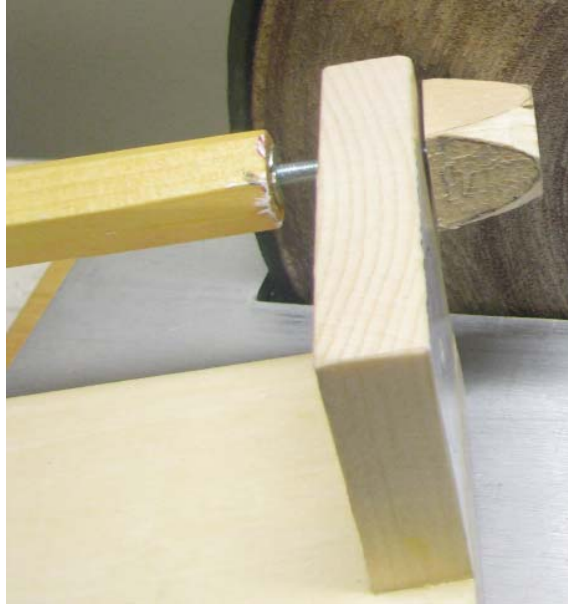
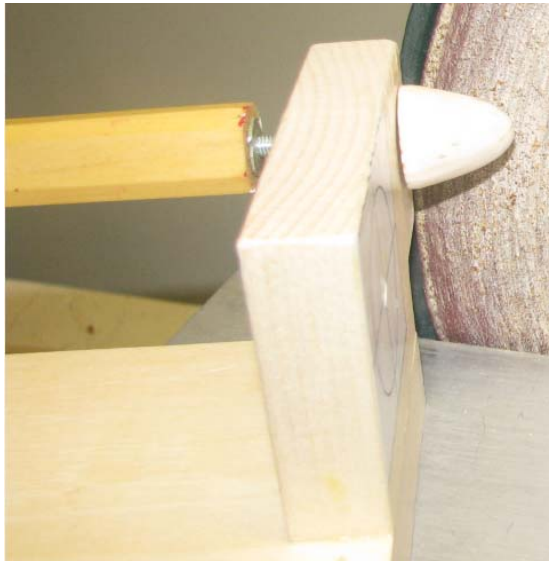


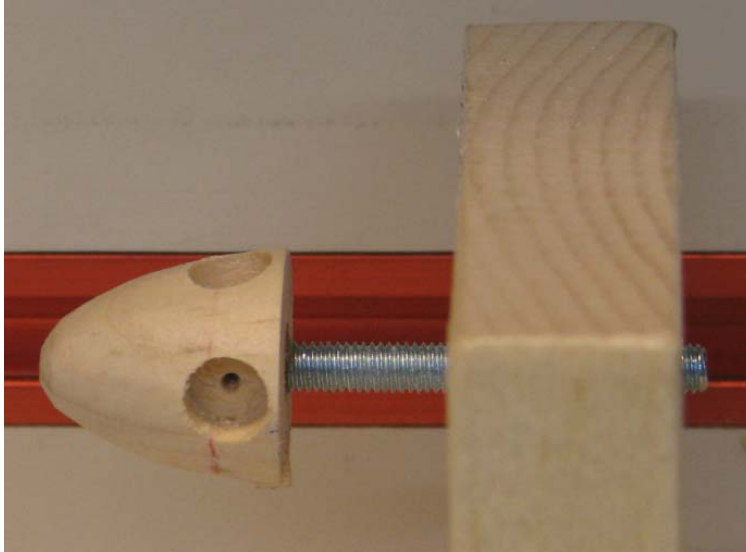
Figure 12
Propeller Hub Turned Against Disc Sander



Note: Sanding Disc can also be a sanding disc chucked in a secured portable drill

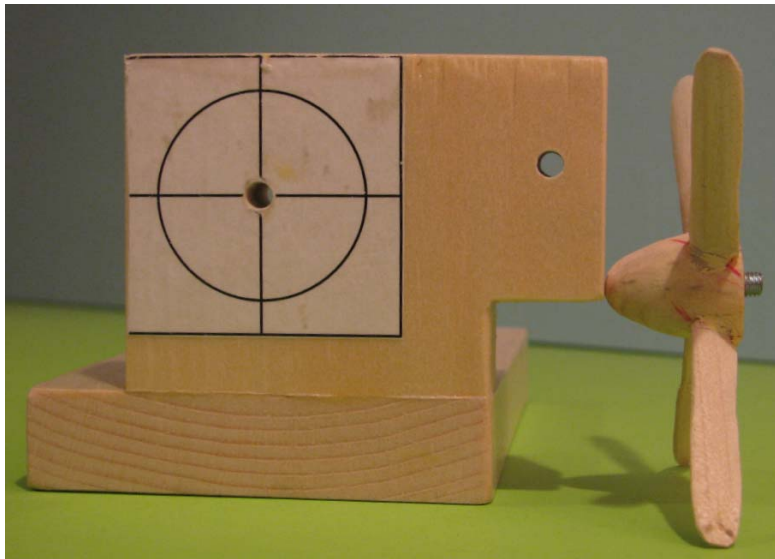
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Figure 13
Blade Holes Drilled in Propeller Hub



Note: Brad point drill bits provide a sharp point for starting the hole and create a flat surface at the bottom of the drilled hole

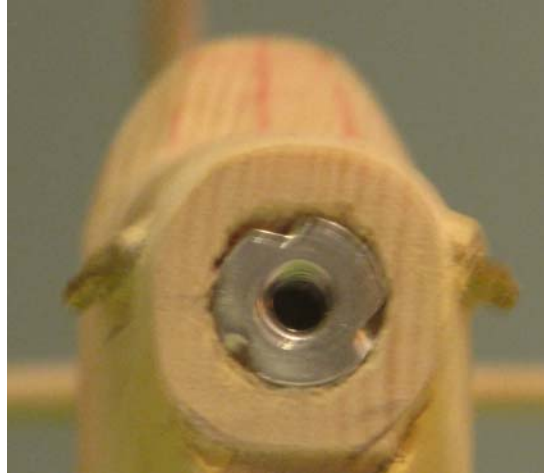
Figure 14
Completed Propeller Hub



Note: Fixture has 4 blade pattern on one side and 3 blade pattern on opposite side (see Figure 7) to assist with drilling propeller holes symmetrically

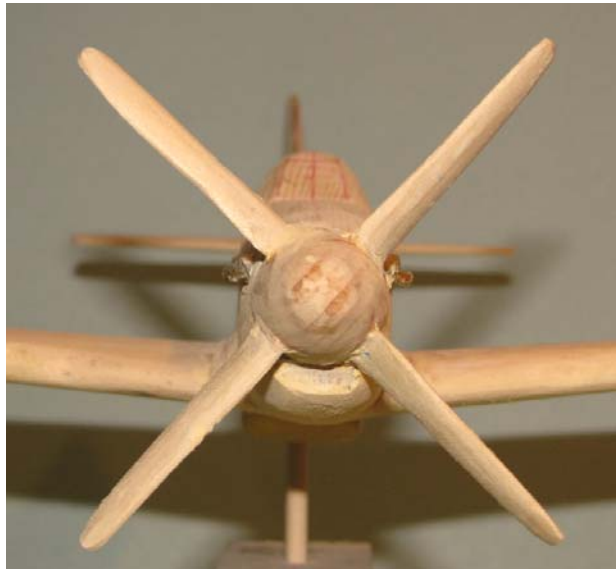
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Figure 15
Nut Recessed into Fuselage Body



Note: Nut should be epoxied into body

Figure 16
Propeller Screwed into Body



Final detailed shaping will be performed as part of the final sanding process