pretty well tested taxiing in all kinds of winds since 1988, and flying with the canopy open in 1994. We like this installation because the gas spring exerts a downward force on the canopy when it is closed, and it slows down travel in either direction so it won't slam open when being opened, or slam down when g closed.

DATA PLATES

Builder John Epplin asked where other builders were locating their data plates? He said that Chicago FSDO said that part 45 does not apply to experimental and the data plate can be located anywhere it is likely to survive a crash, but is not required to be visible from the exterior. He said the DEA requires the make, model and serial number be located on the exterior, and can be a stick-on label.

Builder Robert Bounds volunteered that his local FSDO inspector said placing the data plate on the shoulder support, visible from the outside, was just fine. That location was acceptable for us in both Minnesota and Arizona.

David Domeier said that you should locate your data plate wherever FSDO says is acceptable.

HEAD ROOM

The Mark IV was designed so that the head room in the front seat could easily be increased for tall pilots. This is accomplished by raising the turtleback about 1 inch in the front (filling it in, of course, underneath) before installing the plastic canopy. The canopy is supplied oversize (taller than necessary), so this just means that less has to trimmed off the bottom. If you notice the side silhoutte of the fuselage, there is a little dip where the top of the canopy meets the turtleback, which has to be filled in to e a smooth curve, and there is also a slight break in curvature where the turtleback meets the cowling. Raising the front of the turtleback 1 inch actually improves both of these areas. We suggest that you don't make this change unless necessary, because increasing the cross section of the fuselage increases the parasite drag. This is one situation where short people have an advantage over taller people.

PROPELLOR INSTALLATION

We have heard reports, from time to time, of propellors coming off in flight; fortunately none on Cozys, as far as we know. Vance Atkinson told us about one coming off on a Long EZ in Dallas. When it came off, the engine was ruined from overspeeding, the engine mount was badly bent, and the prop extension was damaged. The builder-pilot was able to make a successful emergency landing without damage to the airframe. The prop was later recovered from a farm field, intact. Vance showed us the prop extension. The bolts were AN7 bolts. Three had failed in shear, and the other 3 had pulled out of the lugs as the prop departed. The suspected cause was insufficient torque.

Wood propellors have many advantages over metal props. If properly installed and maintained, they should provide a long life of trouble-free service. If not properly installed and maintained, one runs the risk of losing the entire propellor in the air, with sible catastrophic damage to the engine, and possible damage he aircraft and injury to occupants in the ensuing forced landing.

The principles involved in a proper installation are quite simple. Engine torque is transmitted to the propellor by static friction between the propellor flange and the propellor hub, NOT by the lugs in the flange or the bolts. The static friction is obtained by compressing the hub between the crush plate (on the aft face of the propellor in a pusher) and the propellor flange. The only function of the bolts is to provide this compression by torquing (tensioning) them to the proper value. The only difference between a metal prop and a wooden one is that the wooden one can swell or shrink, with changes in the environment, so it is necessary to check bolt torque after the first flight on a new wooden prop, and frequently thereafter, until the torque values stabilize, and occasionally thereafter. The bolts will fail in shear, regardless of the bolt used, if not properly torqued, or can fail in time from fatigue, if either the metallurgy or the threads are not designed for this critical application. A few other important requirements should be mentioned before discussing propellor bolts in greater detail.

1) **Propellor hub extension.** The propellor hub extension is subjected to continuous high frequency vibration which could cause it to fatigue if not of the highest quality metallurgy and machining. The strongest available aluminum alloy is 2024 T3. 6061 T6 is a cheaper alloy, but it is not acceptable. It should have ample radiuses both inside and out where the diameter changes, and should be absolutely devoid of any machining marks. When you purchase an extension, you will be asked to specify the diameter of the propellor flange and the size of the bolts to be used. For 160 to 180 hp, we recommend the largest diameter flange available, i.e. 7 inches, to provide the greatest contact area between the prop and the flange, and the largest diameter bolts, i.e. ½ inch, to provide the greatest margin of safety in torquing the bolts. In our experience, the highest quality extensions with a zero failure rate to date are those made by our authorized supplier, Saber Mfg. Co.
2) **Crush plates.** The function of the crush plate is to distribute the compression force of the bolts uniformly over the greatest area of the hub. It should be the same diameter as the flange, i.e. 7 inches, and it should be ½ inches thick, so it will not deform.
3) **Bolt torque.** The bolt torque should be the maximum amount allowable without crushing the wood or overstressing the bolts. The proper value should be obtained from propellor manufacturer because it is a function of the type of wood used and the number of laminations, as well as the flange, crush plate, and bolt diameters. Recommendations could range from 30 to 42 ft-lbs for 1.2 inch bolts. We prefer the 42 ft-lb number for best margin of safety. The bolts should always be tested for length, to make sure they completely engage the lugs, without bottoming out, with sufficient threads remaining to allow for periodic retorquing. The threads should always be lubricated before each installation, and the bolts should be a good fit through the crush plate and prop hub, to avoid resistance to torquing. They should always be safetied with .041 safety wire, two bolt heads together, preventing each from loosening.