EAA Chapter 81 Meeting Minutes

June 20, 2009

Meeting was called to order at 1010 by President Duane Boyd at the Ryan Field meeting room.

Treasurer's Report: Mick Myal reports $3415 in the Chase account. There is $170 in the memorial fund, which is earmarked for Young Eagles. When the question arose from the floor, (and what he was doing on the floor, I'll never know) "what the heck do we do with the money," Mick reminded us that there is a $277 annual insurance premium to EAA covering Chapter 81 events, $10 to the Corporate Commission annually, $20 per month for the meeting room, and the occasional payment for coffee. Occasional other expenses arise and are paid from the treasury with the approval of the Board of Directors, and reported at Chapter Meetings.

Secretary's Report: a summary of the Project Meeting held at Eric Witherspoon's hangar at Marana Regional Airport on May 16 was read by Bob Miller.

Lottery Tickets were distributed for two books, copies of the Chapter roster were made available, and Copperstate Fly-In pens were distributed gratis. The lottery was obviously rigged, as two of the club officers won the books.

Aside from the above, there was no Old Business.

New Business: Tim Mitchell suggested that we take out a free ad in the Tucson Weekly and volunteered to write the ad! What a guy. The idea is to let folks know that we are what we are and generate some young blood in the chapter. Along similar lines, Eric Wolf cites the Casa Grande chapter's website, which advertises upcoming events. Ours could also offer links to other related websites. Other sources suggested by members for getting the word out are the Davis-Monthan newsletter and the University of Arizona Engineering Dept bulletin board. It was suggested that a list of Airventure attendees should be generated with phone numbers, so they can coordinate travel plans, and they agreed to meet at the base of the new tower on Thursday at noon. Joe Seibold, who had the brains to get out of Tucson before summer descended upon us like a curtain of molten lead, drives the Courtesy Shuttle at Airventure; his # is (231) 536-7295. If you are flying in, call for a ride upon arrival.

Other news: Bill Paul is in TMC hospital. Roy McCaldin is ill, and has put his replica DeHavilland DH-4 U.S. Mail biplane up for sale, asking $60K. Roy engineered the replica from plans for the original, scaling it down to use a conventional opposed engine. He is a meticulous crafter and engineer and wants this beautiful bird to be flown as it should be. He even hand-carved the prop! He has also built an SE-5 and has assisted in building another. Bob Hasson, former Chapter 81 President, is selling his hangar, complete with bathroom, cooler, and lottsa electrical outlets.

At this point, even the notoriously long-winded Secretary Bob Miller had to pause for a breath, and Erik Fjerstad took this opportunity to leap into his educational presentation on riveting. He strongly recommended that those who have considerable riveting ahead of them, and need to acquire the skills, attend one of the RV Sport Air workshops. One will need to devote somewhere in the ballpark of $1200 to $2400 in tools; Erik invested about $2000, largely from Cleveland Tools. Necessary hand-tools include sheet metal shears, files, de-burring tools, Scotch-Brite (to polish off sharp edges which act as stress risers), and a variety of clamps. Sheet metal shears come in different types: the green-handled ones like to turn right, the red-handled ones left, and the yellow ones straight ahead. Clamps include the Cleco, a temporary rivet which holds the sheet metal together in the proper alignment before riveting. Clecoes come in many varieties: the copper-colored ones fit #30 holes, and the silver ones #40 holes. The flat clamping ones have been known to cause blood blisters, says Erik. Before going into the riveting itself, Erik described the types of materials to be riveted: the most common type of sheet aluminum used is 2024 T3 al-clad. The aluminum alloy is 2024, the T3 designates the heat treatment, and al-clad refers to a thin coating of pure aluminum, which is much softer and weaker than the 2024 alloy, but much more corrosion-resistant. Another aluminum alloy used in aircraft construction is 6061, which is not as strong as 2024 T3, but is more inherently corrosion-resistant. The sheet aluminum is supplied with a thin plastic skin (to prevent scratching), which must be removed before riveting. Non al-clad 2024 aluminum must be protected from corrosion with zinc chromate primer or with a process known as "Alodine", a chemical chromate conversion coating which leaves a sacrificial layer over the aluminum. Erik dazzled us with a description of the many types of rivets and riveting techniques: for example, there are blind rivets (also known as pulled rivets), i.e. Cherry rivets (a name brand, not a type of rivet). A much weaker, but widely available non-aviation example of a pulled rivet would be the Pop Rivet, available in your local hardware store. Blind riveting is done when there is only access to one surface (no opportunity to buck the other side of the rivet). Aircraft pulled rivets can be quite strong, as many leave the shank of the center post within the rivet, breaking off to fill the hole. Other, weaker types pull the shank all the way out, leaving a hole. They can be made of many materials, including monel, mild steel, and, of course, aluminum. The main disadvantage of blind, or pulled rivets, is that they are quite expensive compared to driven rivets. Driven rivet types include round-head, and flush rivets, the latter fitting into a dimpled hole in the sheet metal (or countersunk hole in thicker metal), and are hypothetically flush with the surface, presenting less aerodynamic drag. Erik demonstrated dimpling of sheet aluminum with a C-arm device, and presented a pass-around example of several types of riveting, ranging from flush to not-so-flush, and from perfect to atrocious. Apparently, there is a learning curve to this art! Driven rivets can be hammered in with the C-arm, squeezed with a hand squeezer, or driven with a pneumatic gun. The latter comes in a number of sizes: 1X, 2X, 3X in order of increasing size and power. Erik uses a 3X, but a 2X is adequate for most homebuilt construction. A larger gun is heavier, but is likely to drive the rivet with fewer hits; too many lighter hits can work-harden the rivet before it is properly formed. The pneumatic tools get a drop of oil before each use and are never "blipped," (operated without a load) as this can damage them. Erik showed us how to drill metal over a fiberboard base using a pneumatic drill (always disconnect the air-tool from the air supply when chucking), how to de-burr the

hole, and what happens when one leaves out this important step (the rivet cannot fit flush with the metal). A marker punch is used to make a tiny dimple in the metal to guide the drill bit; if not used, the drill can "walk" and the hole is drilled off-center. Another technique is to manually turn the drill against the metal to create the indentation. The order is indent, drill, de-burr, dimple. If the pneumatic rivet gun is not held perpendicular to the rivet, it can walk off the head and leave an unintentional dimple in the metal, known as a "smiley face." These are cosmetic, rather than structurally compromising, but still undesirable. Driven rivets must be bucked from the opposite side. Normally, a rivet is driven from the outside surface and bucked from the inside. A variation known as back-riveting applies the pneumatic rivet gun to the opposite side of the rivet, reducing the likelihood of creating a smiley face where it can be seen. The head of the rivet driven by the gun is the "manufactured", or "factory" head, and the head formed by the bucking bar is the "shop" head. A gauge is used to measure the depth and width of the shop head to determine whether it was properly formed. In the act of riveting, the rivet deforms, filling the hole and clamping the pieces of sheet metal together. Erik demonstrated the art removing an unacceptable rivet (improperly formed) by drilling a hole in the rivet head and breaking the rivet by bending it with a punch. If the hole has been damaged and is now oversized, it can be drilled to the next larger size and an "oops" rivet with a thicker shank installed to fill this hole with minor structural compromise, and it cannot be visually distinguished from the other rivets. A variety of shapes and sizes of bucking bar were presented, each with its particular application. Erik sets his compressor regulator to 90 PSI and uses a length of extra-flexible hose at the working end, as it is easier to wield than the stiff standard hose. Regarding rivet sizes, a #3 rivet fits a 3/32" hole, and a #4 fits a 1/8" hole. The drill bits used are # 40 and #30 respectively, and make a slightly smaller hole than the above dimensions. Obviously, there is a lot to know about riveting, but one gets hundreds (or thousands) of opportunities to acquire the necessary skills, as even small aircraft use a multitude of rivets. Erik's presentation was very well-received and, to many of us, a real education in the fundamentals of sheet metal construction.

Meeting was adjourned at 1145. There will be no July Project Meeting (nor any other meeting) due to the proximity to AirVenture and the fact that it's just too #@$! hot. Next meeting will be at the Ryan Field meeting room on Saturday August 15.

Respectfully Submitted by
Secretary Bob Miller