ADVENTURE

PLANS and ASSEMBLY INSTRUCTIONS

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INTRODUCTION TO THE ADVENTURE TAILWHEEL DRAWINGS

The prototype Adventure was modified to a taildragger version by George Mead prior to Oshkosh 1981. The interest in the conversion was sufficient to justify a plans supplement, which was finalized in January 1982, and is presented here. This supplement assumes that the builder intends to build the taildragger version of the Adventure from the start of the project and does not intend on conversion from or to a tricycle gear. It would be quite simple to hedge against a later change of mind by installing the inserts and glass reinforcements for both versions at the same time.

The supplement pages are numbered as total replacement pages for the original drawings. Here is a list of the pages:

NEW PAGE	OLD PAGE	NEW PAGE	OLD PAGE
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91 TW	91	119 TW	119
101 TW	101	120 TW	120
107 TW	107	A10 TW	A10

In addition page 144 rev 1 has been released as a replacement for page 144. This details a reinforcement flange around the flap latch tab. The original design was prone to getting bent.

FLYING THE TAILDRAGGER ADVENTURE

The Adventure is a very nice flying airplane. There are several precautions and recommendations I feel will be helpful to the Adventure test pilot. First and most important is that the 100 horsepower taildragger Adventure is a high performance airplane. The rudders are very light--get some Luscombe time. The ailerons are light--get some Varieze back seat time. The elevators are light--get some Taylorcraft time. The wing loading is high--get some heavy Cessna 210 time. And finally it has lots of power--get some Cessna 185 time. I'd recommend at least 20 hours of taildragger takeoffs and landings in at least four different types. Emphasize your wheel landing practice.

The taildragger Adventure does not like left crosswind takeoffs. With no wind the normal procedure is to use full right rudder and add right brake as needed. A slow continual application of power is the best answer to the directional control problem. Take it easy and you'll be OK.

Landing the Adventure is real easy--if you follow certain rules. Rule number 1, 2, 3 and 4 is to wheel land. My first three landings were full stall--all on the same approach. On my second approach I wheeled it on. In one sentence the Adventure does very good wheel landings and poor full stall landings. Keep the tail up as long as possible for better visibility and directional control, then lower it gently and you'll be OK.

The "numbers" for the Adventure are:

T.O. with 15^{0} flaps
Climb 100 mph indicated, retract flaps
Cruise 170-190 mph indicated
Stall 62 mph indicated with full flaps
Stall 75 mph indicated with flaps up
Downwind 130 mph indicated, 15^{0} flaps
Base leg 110 mph indicated, full flaps
Final 80-85 mph indicated, full flaps -- add 5 mph if gusty
Over fence 75-80 mph indicated -- add 5 mph if gusty
Landing - probably 70-75 indicated -- I've never looked
Runway requirement - at least 2500 feet, hard surfaced

These figures are for all wind and weight conditions.
HAVE FUN!

Dennis Brown

Introduction

Adventure plans and assembly instructions are published by the Mead Engineering Company as educational documentation of the methods and materials used in the construction of a prototype aircraft, N36ME. Mead Engineering Company makes no guarantees, expressed or implied that similar aircraft built using this document as a guide will exhibit performance or flying qualitites identical to the prototype.

The materials and working techniques used in the adventure are an adaptation of methods developed by the Rutan Aircraft Factory for the Vari Eze. No effort has been made in the adventure's documentation to teach basic foam shaping, laminating or metal working skills. Experimenters wishing to build components similar to those described in this document and unfamiliar with the materials used, may find Rutan's"moldless composite-sandwich aircraft construction" manual one method of gaining the required skills. This manual is sold by Aircraft Spruce and Specialty Company. The membership of the Experimental Aircraft Association and its affiliated chapters is also a highly recommended source of information and fellowship for the experimenter.

Materials and components used in the construction of the adventure were primarily obtained through the Aircraft Spruce and Specialty Company, Box 424, Fullerton, California and Ken Brock Manufacturing (11852 Western) Stanton, California. While other reputable sources of materials and fabricated components are certain to exist, these two maintain a close working relationship with Mead Engineering Company. The materials and components contained in this document are available through these suppliers. No effort has been made to "ram rod" other enthusiasts into doing business with Mead Engineering's associates. A number of components were used in the adventure which are the proprietary designs of other firms and no effort has been made to provide engineering documentation of them here.

Experimenters are welcome to try any alternative materials or processes they like. Innovation is what home building is all about.

Information Sharing

To enhance the educational and recreational value of the information contained in this set of instructions, Mead Engineering publishes a newsletter every other month. Revisions, updates, and expansion of the information presented here is included as well as providing a forum for the exchange of ideas and techniques developed by other experimenters. No subscriptions exist as such, but the distribution system works like this: Send a S.S.A.E. and one dollar to M.E.C. with the newsletter date marked on it. When published, the S.S.A.E.'s for that month are stuffed and mailed with a minimum of delay. No hard publication dates will be maintained. If circumstances dictate, newsletters may be delayed until late in the month or published early.

Specific questions, not necessarily of general interest may be forwarded to M.E.C. along with an S.S.A.E. for a prompt reply. Pressing problems may be pursued by phone.

Specialized Terminology

5 Min Refers to the quick-setting APCO 9935A/B epoxy resin system. This material is mixed 50-50 by volume and generally in small batches (less than one ounce). The mix ratio is maintained by eyeball only.

Epoxy Refers to the APCO 2426 resin used with APCO 2176 (fast) or APCO 2177 (slow) hardener in a 100 parts resin-20 parts hardener ratio. You may substitute other resin systems of equal physical properties. The workability and health hazards of substitute systems are potential problems.

BID Refers to 9 ounce per yard bi-directional fiberglass cloth of a specialized weave. This cloth is woven by both Hexel-Trevarno and Burlington and distributed by Aircraft Spruce and other firms. Many weaves of equivalent strength exist but few of acceptable working properties. A prefix, such as 45^{0} indicates the orientation of the glass fibers within the piece. 45^{0} BID is a piece of bi-directional cloth with the fibers oriented at 45 degrees to the length of the piece. $0\text{-}90^{0}$ BID specifies fiber orientation parallel and perpendicular to the length of the piece. A tailor would call $0\text{-}90^{0}$ BID "straight" cut and 45^{0} BID "bias" cut.

UNI Refers to a 6 ounce per yard unidirectional glass cloth supplied by Aircraft Spruce. No known substitutes exist. This is a highly specialized weave developed for the German sailplane industry and its use and availability are limited. As with BID, a fiber orientation prefix is used. 0^{0} UNI has the major fiber bundles oriented parallel to the length of the piece. Arrows may be used to graphically indicate fiber orientation.

Peel Ply Refers to dacron cloth of 2.7 ounce per yard weight which is used as an easy method of preparing a cured fiberglass/epoxy laminate for dry bonding. Use of peel ply is optional, it saves some work but isn't required. Where a follow on bonding operation is known to be required, the dacron cloth is laminated to the bonding surface along with the original material. Preparation for the following bond may be accomplished at any time (after cure) by "peeling" the dacron off of the surface. The alternative to peel ply is sanding. In some areas sanding is difficult and over single ply laminates is inadvisable.

Flox Is a mixutre of epoxy and flocked cotton fiber. This material is used in secondary joints and metal to glass bonding. Flox may be mixed wet (a free running mixture) or the consistancy of paste. For small jobs flocked cotton may be mixed with 5 Min.

Micro Is an epoxy and micro balloon mixture. Micro is used in a 50-50 micro balloon epoxy mix as a slurry to fill foam surface broken cells and provide good adhesion to the glass/epoxy facing plies. Wet micro is approximately 2 to 3 parts micro balloons to one part epoxy (by volume) used to join foam blocks. Dry micro is a filler material of 4 to 6 parts micro balloons to one part epoxy. Dry micro will not run at all and is a dry bread dough consistancy.

Styrofoam Refers to Dow Chemical Company Brand F.B. (7 x 14 blocks), Brand I.B. (24 x 96 billets in various thicknesses 1/2 to 4 inches), or Brand S.M. insulating foams. The large blocks of F.B. material aren't too common, being used primarily as pipeline insulation. Brand I.B. is commonly available material as is Brand S.M. and both are used in building insulation. If possible, stay with the Brand F.B. and I.B. in preference to brand S.M. These foams are all close to 2 lb/ft^3 density and blue in color.

P.V.C. foam is a tough, solvent resistent, expensive foam material used in areas requiring a high density, rigid panel. The 6 lb/ft^3 material used in the adventure is red in color. American Klegecel Corporation manufactures this material. Possibly others as well.

Sequence of Assembly

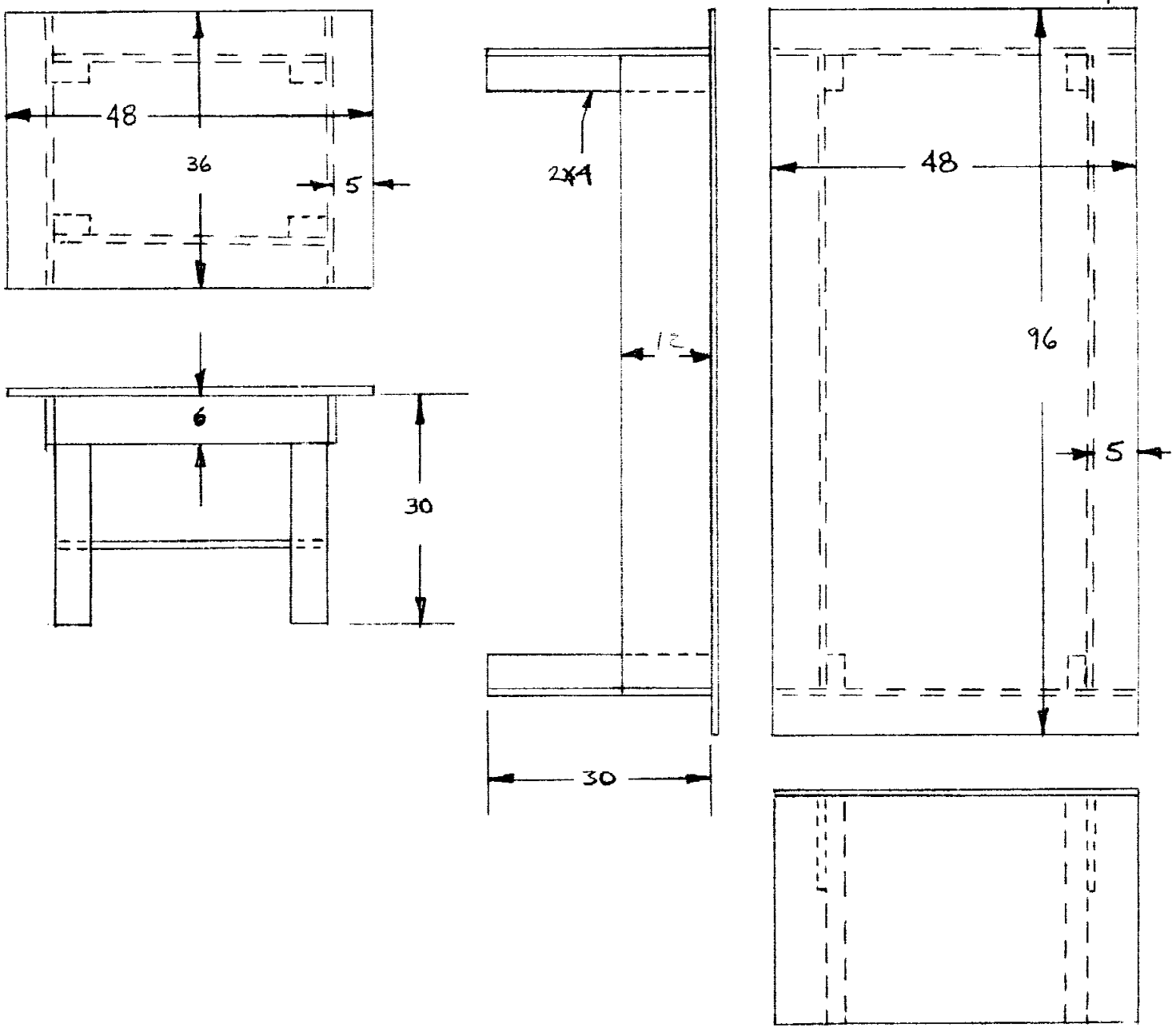
The adventure prototype was assembled in a sequence different from the presentation sequence in this set of instructions. The presentation was reorganized to provide better continuity of skills and methods required to build similar assemblies. There is no magic in the sequence of assembly.

Shop Facilities and Tools

The Adventure, and other similarly constructed aircraft, require relatively few high dollar tools to construct. One stringent requirement, however, is for some degree of climate control in your working area and good lighting. The workability of laminating resins deteriorates significantly in cold or very hot ambient conditions. Shop temperatures are acceptable between $65^{o}F$ and $95^{o}F$ while laminating or bonding. Cure period temperature control isn't as stringent, $50^{o}F$ to $120^{o}F$ being acceptable.

A flat, level working surface will help speed alignment and assembly. At times 10 feet of length is required and at least 3 feet of width.

Benches used on the prototype worked out very nicely without costing an arm and a leg and they were easy to build. The objective is simply to get flat, level working surface. Sheets of 4' x 8', 3/4 particle board, 2 x 4's and particle board shelving were used to make the tables shown below. Epoxy and flocked cotton (flox) were used to bond everything together. These benches were assembled up-side-down on a flat level floor, the parts spread with flox, then clamped in position to cure. For the prototype one 48 x 96 bench and two 36 x 48 were made. An intermediate shelf was added between the 2 x 4 legs of the small benches for rigidity and extra storage. One of the small benches and one large one will do the job if your shop space is limited.



Two different length hotwire cutters are useful, one about 45 inches long and one about 75 inches long. A simple safety wire wound "bug killer" hotwire power supply was used on the prototype, but this device can be very dangerous if carelessly handled. Safer but more expensive power supplies are available through Aircraft Spruce.

A good coping saw, hacksaw, and keyhole saw are useful. A 2 foot bubble level, chalk line, and framing square are also used a lot. You will need a sharp pair of cloth scissors, a box of flair pens, and a metal yard stick (or two). A 12 inch steel rule graduated in 10ths and 100ths of an inch and a 12 foot decimal inch tape measure (Stanly 61-112) are required. Buy good (no K-Mart specials) quality 10-32 and 8-32 taps. You will need an electric drill or equivalent and #40, #30, #21, #11 and 1/4 inch bits.

Find some rich folks who have a band saw, disc sander, set of hole saws, welder, and a 90^{0} drill attachment to borrow on ocassion.