Important Concepts

- Corners, holes, and stress points are more likely to fail
- A solid piece is stronger than two bonded pieces
- More glue means more weight!
- Safety first!
Safety – General

- Causing bodily harm is usually a bad thing
- Always be mindful of yourself and your surroundings
- Slip, trip, or fall – keep workspaces clean
- Dress appropriately
- If you’re not 100% sure, ask
- If you don’t know what something is, don’t drink it
- Buddy system and PPE for power tools
- Think before you act!
Tools – Cutting

X-acto knife

Utility knife
Tools – Cutting

Razor saw

Razor blade
Tools – Cutting

Balsa stripper

Razor plane
Tools – Cutting

Band saw

Circular saw
Tools – Cutting

Laser Cutter
Tools – Cutting

4-axis Foam Cutter
Tools – Sanding

Bar sander

Belt sander, Grinder
Tools – Rotary
Safety – Cutting

- When possible, push blades away from body
- Keep hands, fingers, face, etc. out of the way
- Take your time – may need multiple cuts
- If blade gets stuck, do not force it through
- For hand tools, put more pressure downwards than laterally
- Make sure your part is firmly secured
Tools – Adhesives

CA Glue

Epoxy
Tools – Adhesives

Cyanoacrylate (CA) Glue – “Super Glue”
- Comes in three viscosities (thin, medium, thick)
- Thick gives stronger bond but longer set time, thin can fit into smaller spaces
- Sets within <1min, about 5s with accelerator

Epoxy
- Various cure times (5-30min, 1-24hr)
- Comes as resin/hardener, needs to be mixed to be adhesive
- Remains a little “gooey” and flexible when cured, performs well in high-stress applications
- Can be mixed with various materials to change properties
Working on Plans

- Usually, building wooden frames is easier when done on a printout of plans.
- Plan is made from a cross-section of CAD model, then printed full-size.
- Covered with wax paper to protect the paper, especially against glue.
- Ensures that every part goes exactly where we want.
Working on Plans
Working on Plans

- Initially, use mechanical fit (notches) or holders (pins) to make sure components stay where we want.
- After everything is set, use glue (usually CA) to adhere everything.
- This (usually) prevents stress points caused by bending or stretching of parts.
Sheeting with Balsa

- Balsa sheets act as a skin over the frame
- Can be used in both wing and fuselage
- Used mostly for structural strength – helps frame withstand pressure and torsional loads
- For DBF, 1/32”-1/16” balsa is usually enough
- Denatured alcohol will wet balsa enough to bend around a curved surface, without damaging the cellular structure
Sheeting with Balsa
Fuselage – Stringers

- One option of building a fuselage is using frames and stringers
- Frames run radially, stringers run longitudinally
- Difficult to build, but lightest way of building a fuselage
Fuselage – Stringers
Monokote

- High-gloss polyester film
- Strong, light, and easy-to-clean way of covering wood frames
- Pretty colors
- Heat-activated adhesive that bonds well to wood (but not to Monokote)
- Shrinks with heat
- Econokote is a similar, low-temperature covering compatible with foam
Monokote

Monokote iron

Heat gun
Monokote
Other methods

Foam wing
Other methods

Fiberglass fuselage
Questions?