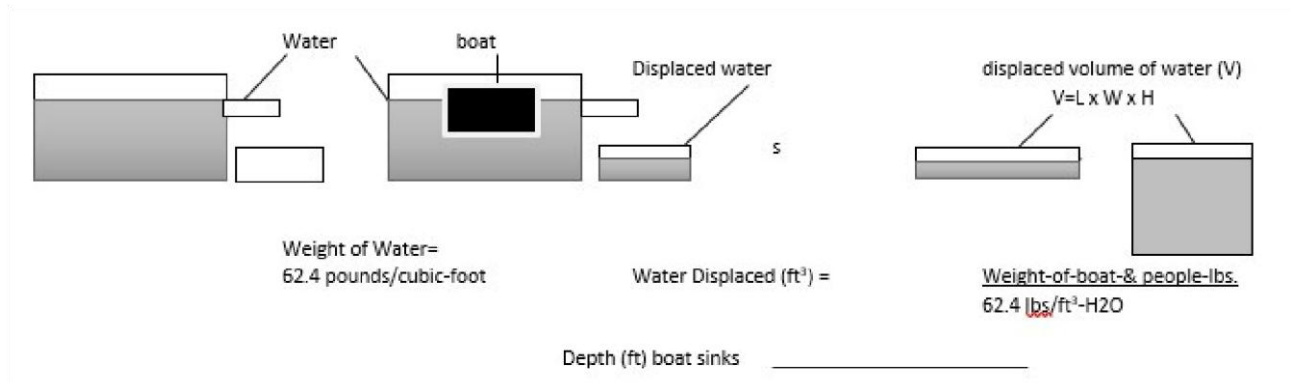


CARDBOARD BOAT PHYSICS

"How much will you sink?" - Displacement



EXAMPLE:

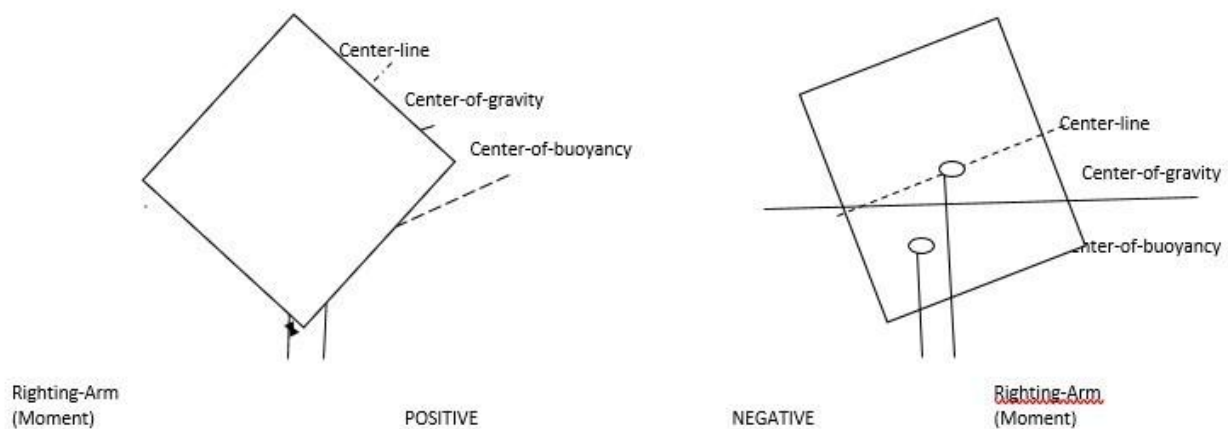
Box boat, 3ft x 6ft, 1 ft tall (high)

Boat volume = 3' x 6' x 1' = 18 ft³

Boat displacement = 18 ft³ x 62.4 lbs./ft³ = 1123.2 lbs.

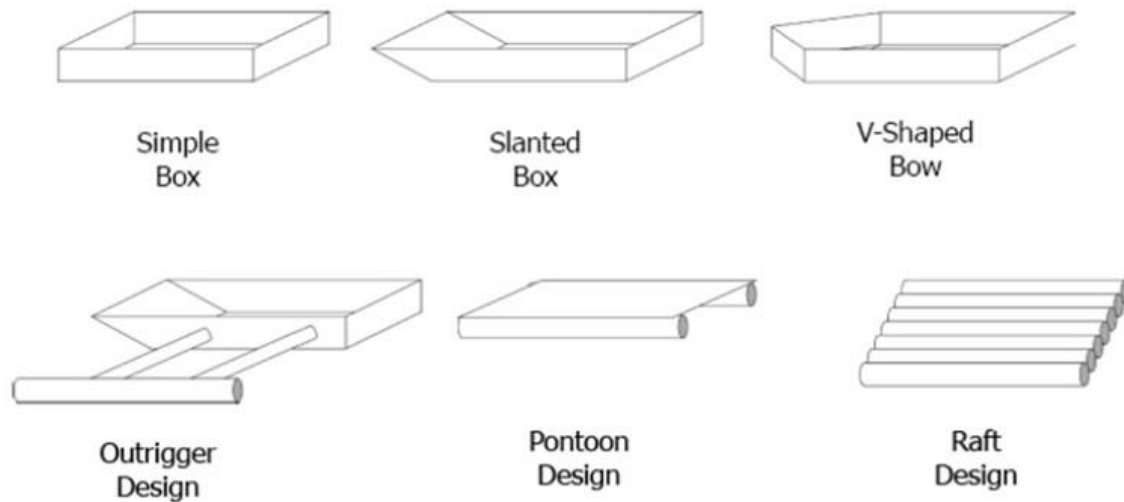
Which equates to 93.6 lbs. per inch of boat height

"Wider is better" – Center of Buoyancy



CARDBOARD BOAT PHYSICS

MOVEMENT THROUGH THE WATER



BOAT DESIGN SUGGESTIONS

- Long boats go fast – but are harder to turn
- Short boats (<8') – are difficult to keep straight
- Best Length: 8-12 feet
- Best Height: 18 inches
 - Allows room to sit/kneel & still paddle over edge
- Best width:
 - 18" – 30" (max) for 2 or more people front and rear
 - Minimum 48" wide for 2 people side by side
- Kneeling is a "power" position but sitting is more comfortable

CONSTRUCTION TIPS & TECHNIQUES

Cover all edges of cardboard – acts like a siphon.

- Cardboard tubes make great frames.
- Cut for joining & bending.
- Fasten tubes together.
- Cardboard Hull
 - 1-2 layers, fasten & cover the seams
 - With two layers, overlapping the seams & polyurethane in between.

Decorate, paint & varnish.

- Reinforce the area where you sit, kneel, or stand. Carpenter's
- glue and liquid nails work well.
- ◦ (hot-melt glues will melt in the heat and sun)

Duct tape only non-painted surfaces (tubes or frames that will

- be covered)

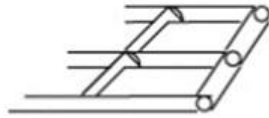
Duct tape shrinks when painted

- ◦ Duct tape should be covered with masking tape if you need to paint it.
- Clear tape melts when painted.
- Masking tape works well on glued edges & seams. Kraft
- paper with spray adhesive may also be used.

CONSTRUCTION TIPS & TECHNIQUES



Solid Tube
Frame

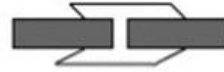


Center/Cross
Beam
Frame

FRAMES

CONNECTING TUBES

Cardboard
Wrapper for Tubes
End-to-End



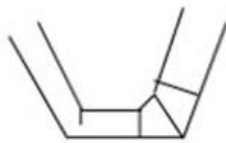
Cardboard
Wrapper for Tubes
At Right-Angles



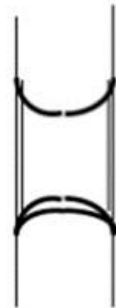
FRAME ANGLES



V-Shaped Cuts

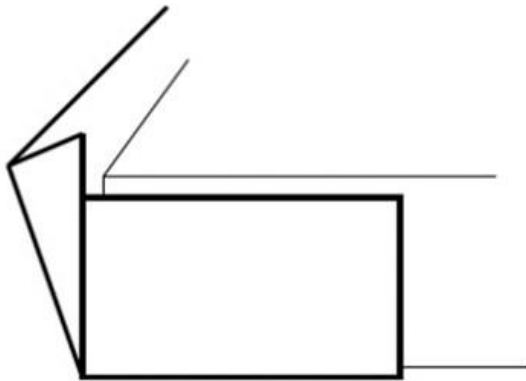


Multiple Cuts
for Sharper Angles



TUBE CUTTING TEMPLATE

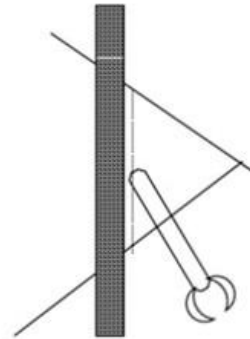
CONSTRUCTION TIPS & TECHNIQUES



FOLD & OVERLAP
CARDBOARD
AROUND CORNERS

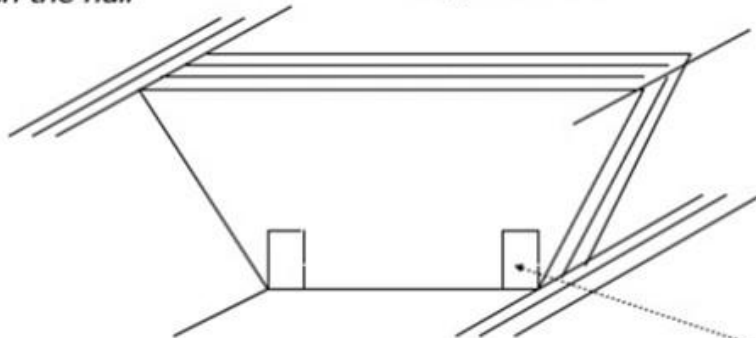
Crease/Score a line
for a nice

STRAIGHT
FOLD



Multiple cardboard layers
"glued" together on the sides
strengthen the hull

Multiple trapezoid-shaped pieces
"glued" together to form a
"support block"



A sheet of cardboard
could be folded &
"glued" together to
form *tubes/beams*

