Fabricating Structure Details with Styrene

Ron Hopkins

Background

- Building 1/4” Model of Moclips, WA station from original plans
- Needed unique windows, doors, corbels, and chimneys

Moclips, Village by the Sea

Railroad History, Early 20th Century

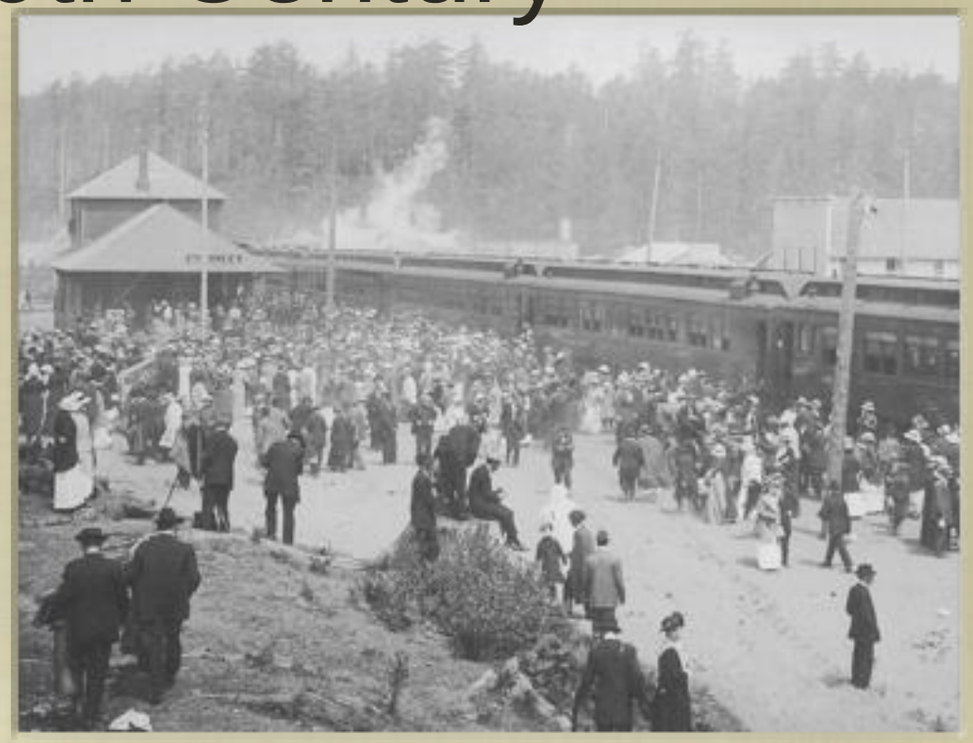
- Maybe 200 permanent residents today

- But early 1900‘s -- No roads

- Western-most Northern Pacific terminal -- Station opened 1906

- Thousands of visitors

- Huge hotels

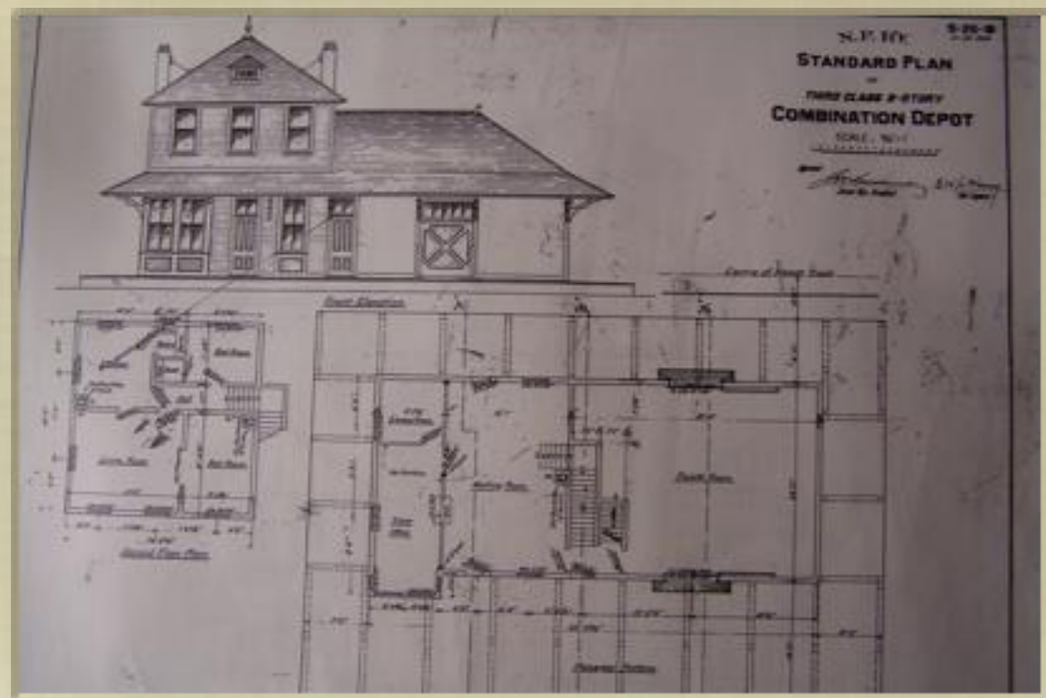


Contemporary

- Museum Hoping to rebuild station
- I built 1/4” model to facilitate fund raising
- Learned some things about windows, doors, corbels, and chimneys

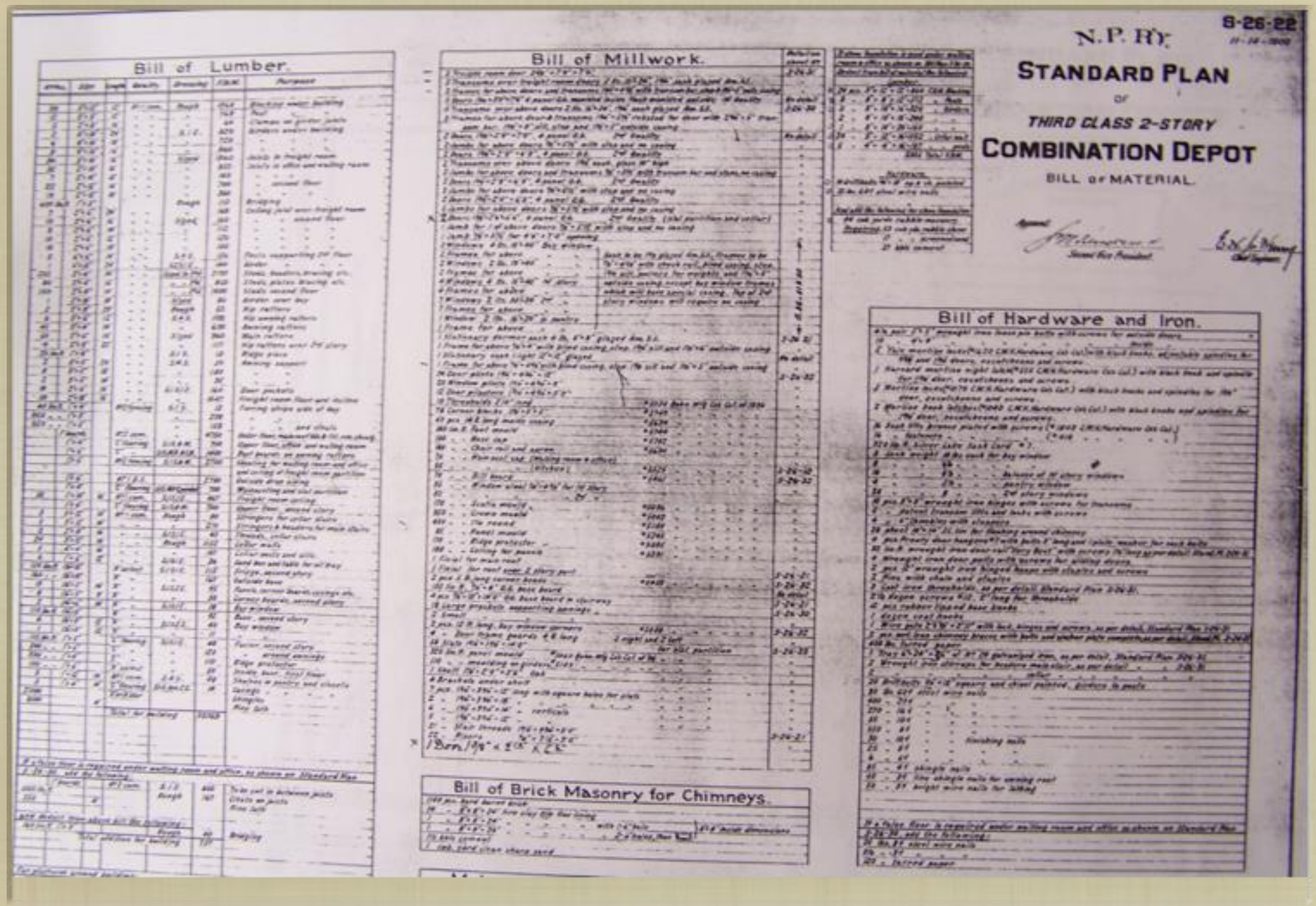
Station Project

- Had original plans and materials list



- Commercial castings not quite right

Materials list was very useful


N.P. Ry.

6-26-22

STANDARD PLAN

OF

THIRD CLASS 2-STORY

COMBINATION DEPOT

BILL OF MATERIAL

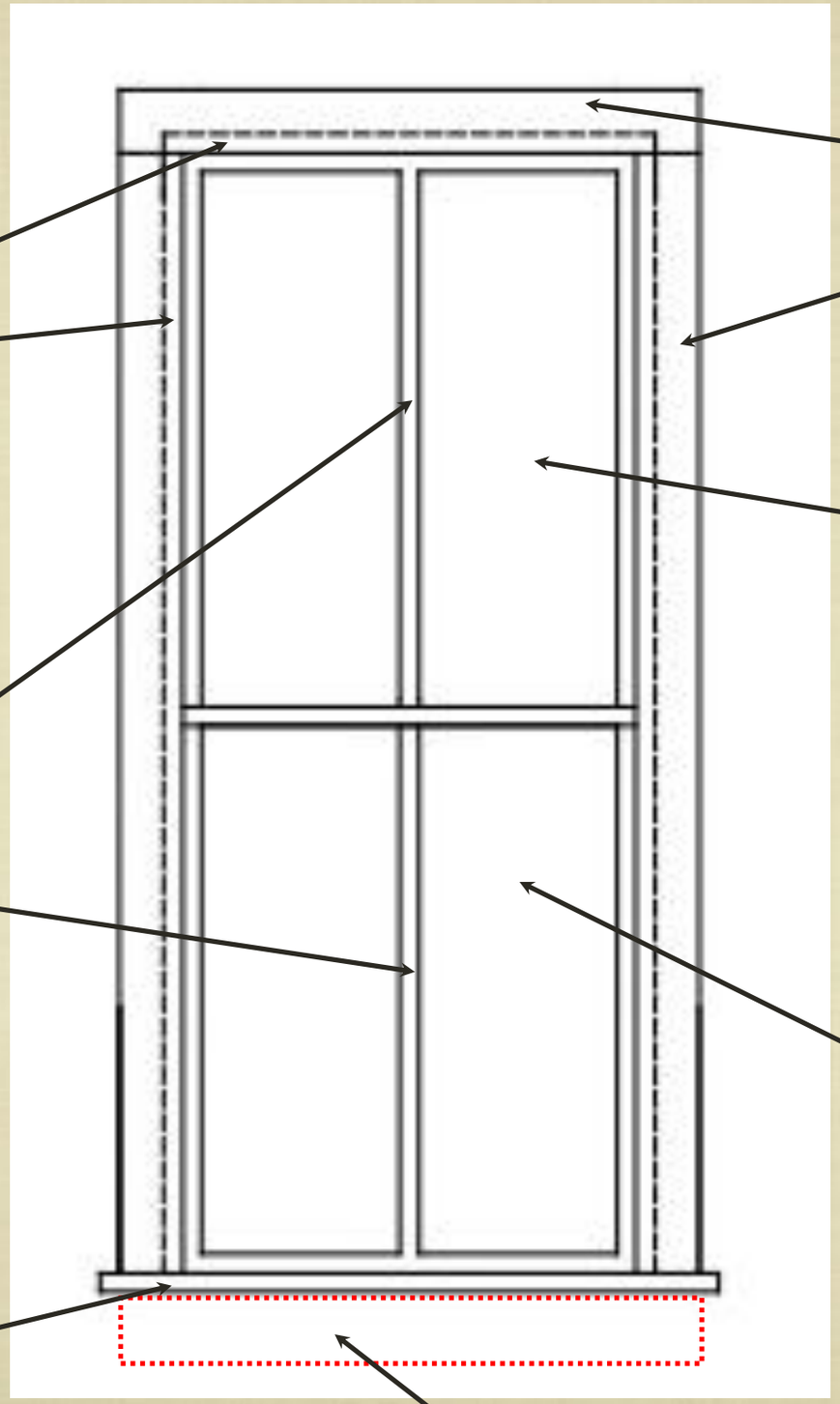
Bill of Lumber.

Bill of Millwork.

Bill of Hardware and Iron.

Bill of Brick Masonry for Chimneys.

Double Hung Windows



Frame
.030x.100

Trim
.030x.100

Muntins
.030x.030

Upper sash
.030x.030

Lower sash
.030x.030

Sill
.030x.156

No apron on my windows

General Approach

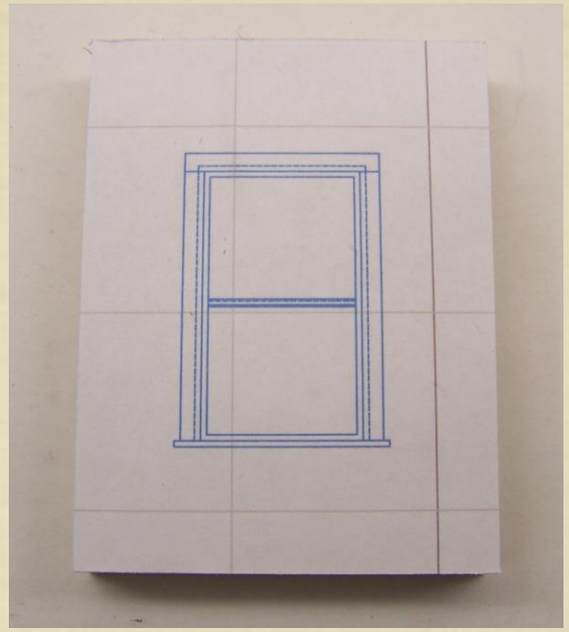
- Wanted to duplicate prototype appearance, not construction (similarly to commercial castings)
- Essential gimmick is styrene construction with wooden jig
- Techniques work well in 1/4” scale
- Should be fine in larger scale
- More compromise probably required in smaller scales

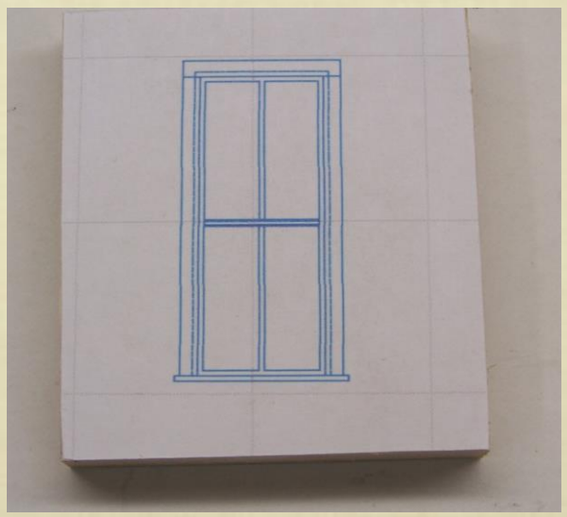
Basic Steps

- Make actual-size drawing and mount on assembly block
- Build jig
- Cut and assemble window frame and sashes
- Paint
- Install glazing
- Finish sashes and muntins

Drawing

- Used Turbo-Cad on Mac
- Paper and pencil would work
- Glue to scrap of plywood
- Rubber cement better than white glue



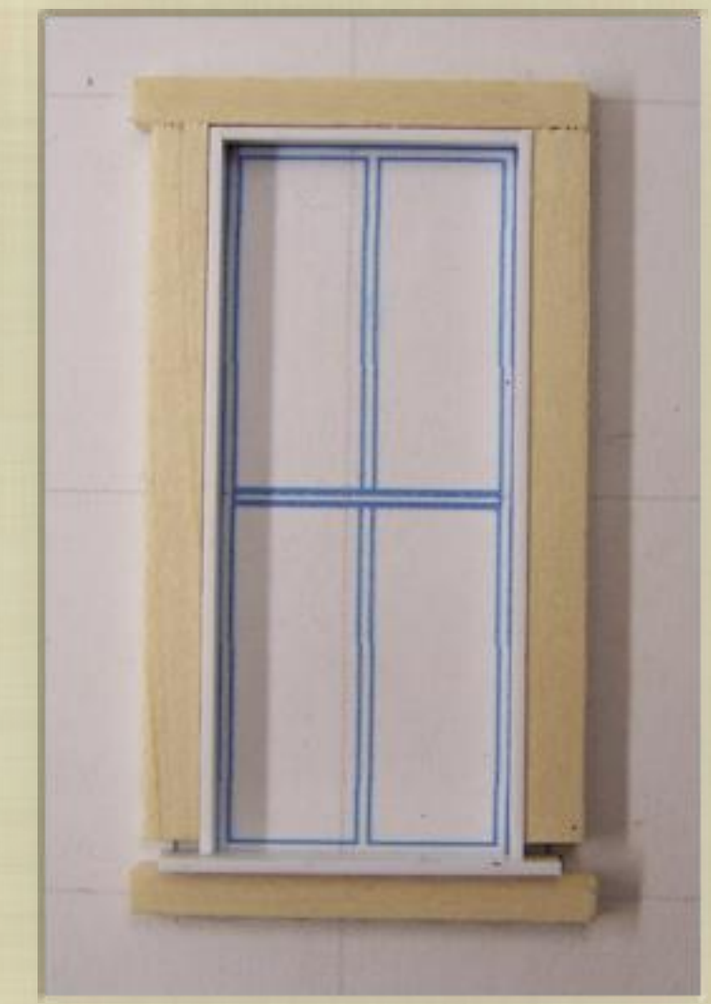


Finish jig

- Glue strip-wood jig around perimeter of drawing
- Use thickness just slightly less than .100 window frame material
- Leave gap at bottom for sill

Cut and assemble Frame

- Cut Sill from .030 x .156 styrene and place in jig
- Cut Sides of Frame from .030 x .100 styrene
- fit top of frame between sides
- Apply liquid adhesive to corners

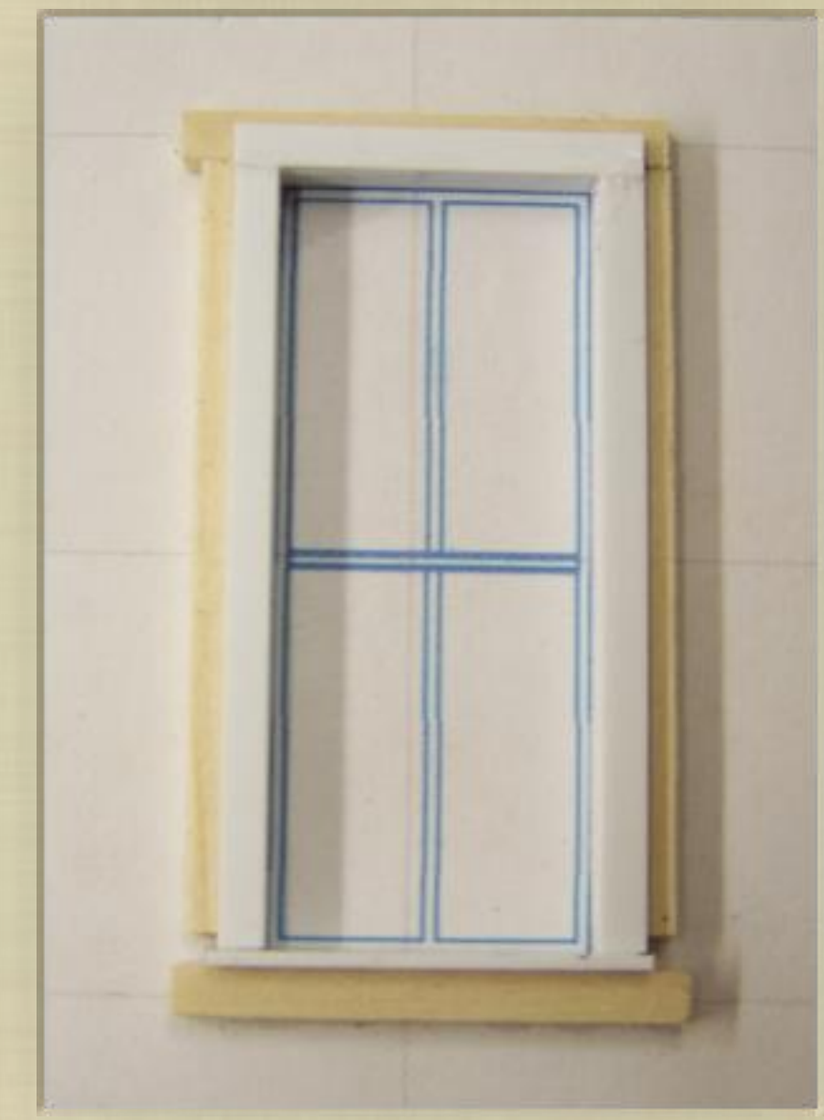


Fit and Apply Trim

- Cut trim from .030 x .100 styrene

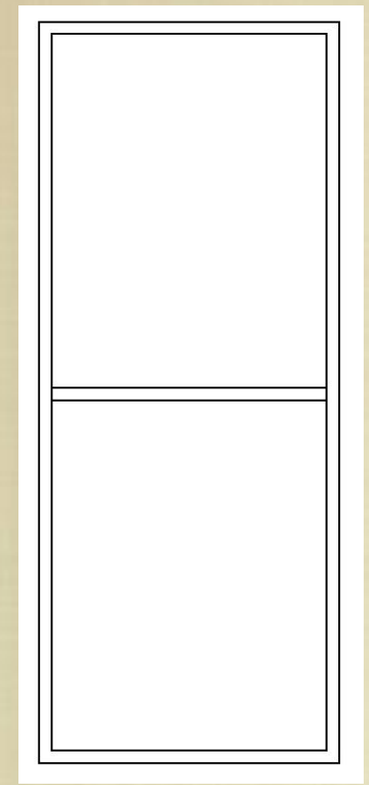
- Top trim piece overlaps joint of frame sides with frame top

- Result is strong frame



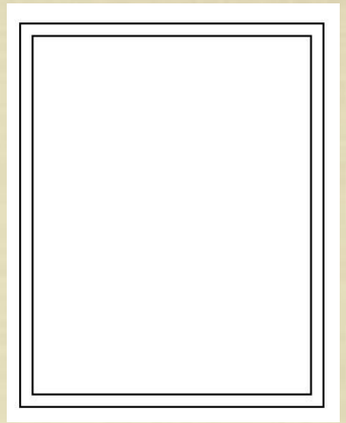
Sash Assembly
(.030x.030 and glass)

Layer 1



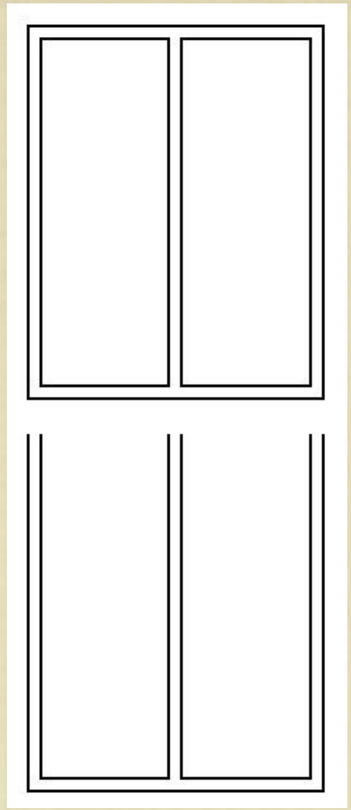
\+

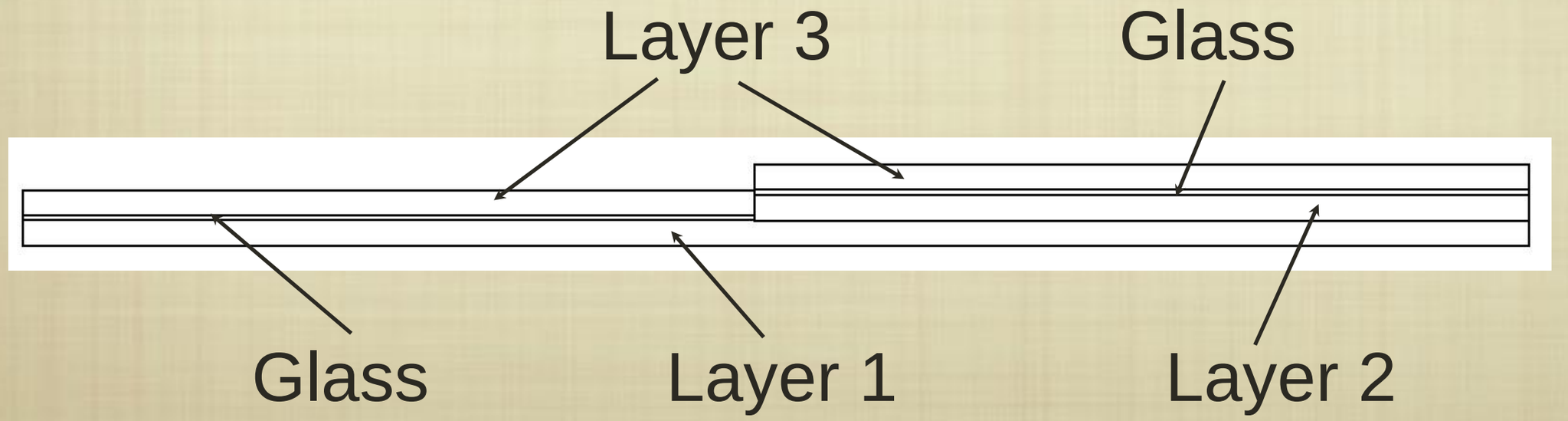
Layer 2



\+ Glazing +

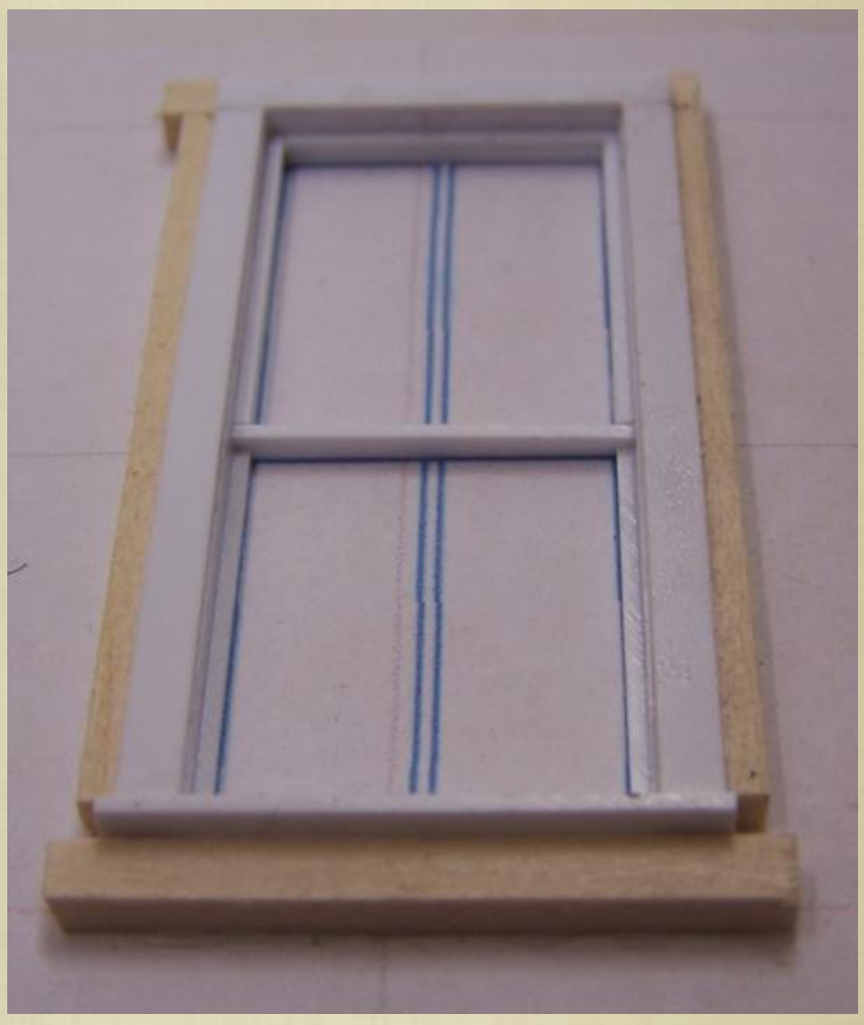
Layer 3





Begin sashes

- Leave frame in jig
- Fit and glue Layer 1 of sash using .030 x .030 styrene
- Fit and glue Layer 2
- Provides base for installing glazing



Paint

- Paint everything, including material for sash layer 3
- At most, leaves minor touchup after glazing
- Completing window now requires only installing glazing and sash layer 3

Glass

- Slide covers make great glazing
- Clover House: 2.3x0.9 inches, 10 for $6.50, 25 for $13.00
- College book store or online: 7/8 x 7/8 inches, 1oz (100?) for approximately $6.oo
- Note the latter allows panes up to about 3.5 feet square in 1/4” scale

Cutting Glass

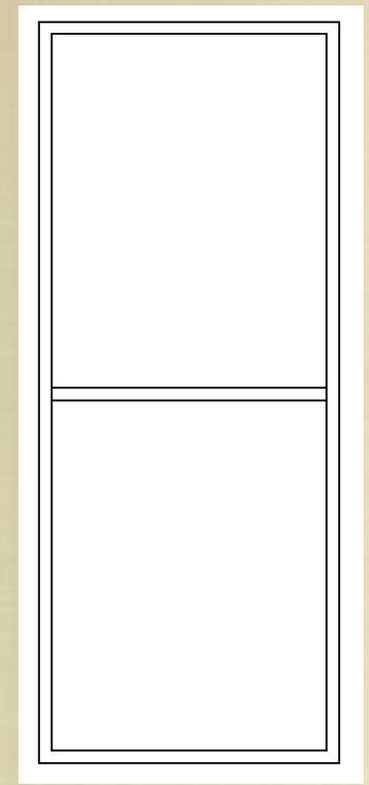
- Measure with calipers
- Mark with straight edge and diamond scribe (Clover House)
- Scribe once each direction -- lightly but firmly
- Snap with hobby pliers

Install Glass

- Really like Micro-Mark's Pressure Sensitive Adhesive (PSA)
- Dries clear but tacky
- Apply lightly with .020 piano wire in pin vise
- When PSA clears, lay down glass and press Lightly

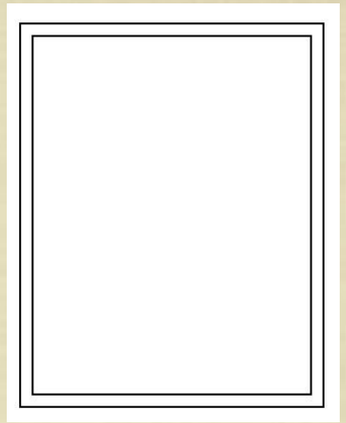
Sash Assembly
(.030x.030 and glass)

Layer 1



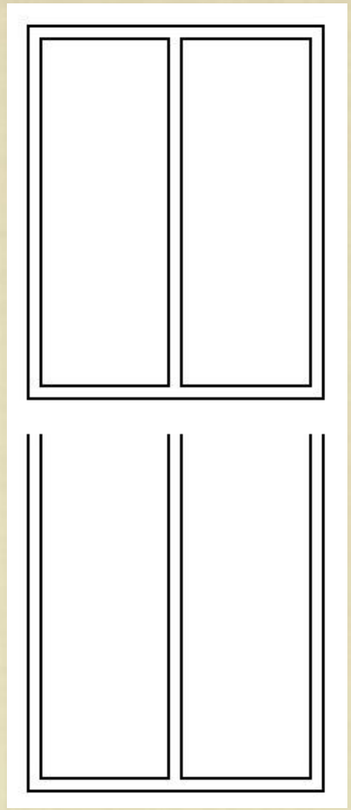
\+

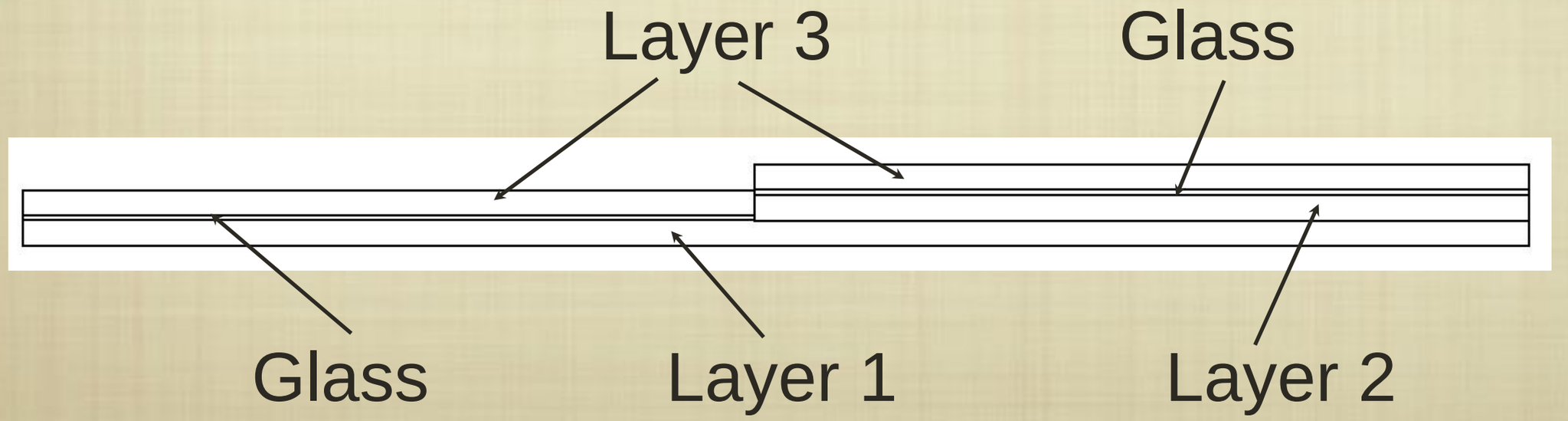
Layer 2



\+ Glazing +

Layer 3

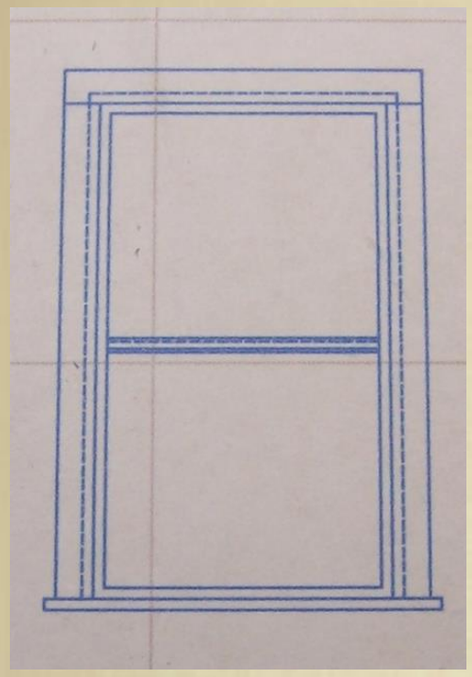




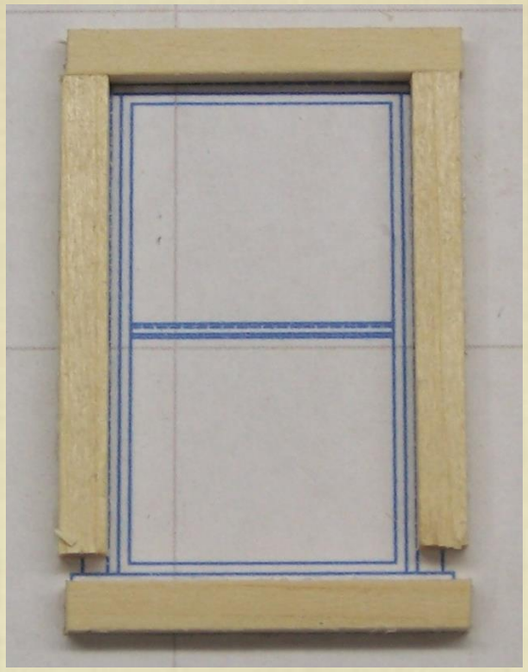
Finish

- Cut and fit .030 x .030 pre-painted styrene for sash layer 3 (including muntins if applicable)
- Apply light coat of PSA around sash perimeter
- After PSA dries clear, press on pre-painted top sash layers
- Apply light coat of PSA to back side of muntins
- After PSA dries clear, press muntins gently in position on glass panes

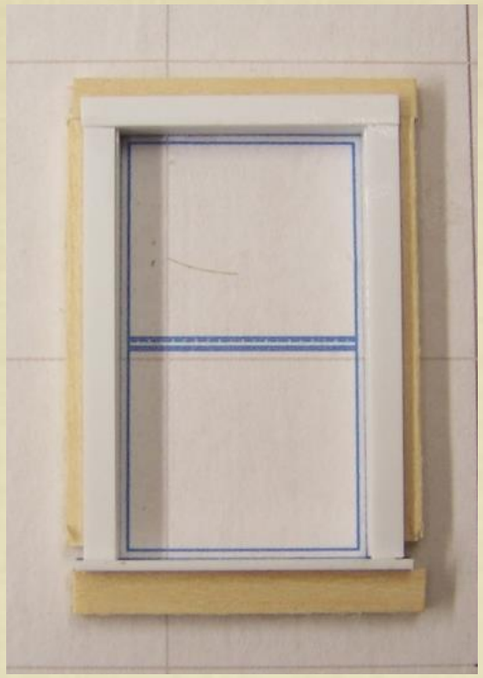
Second Window



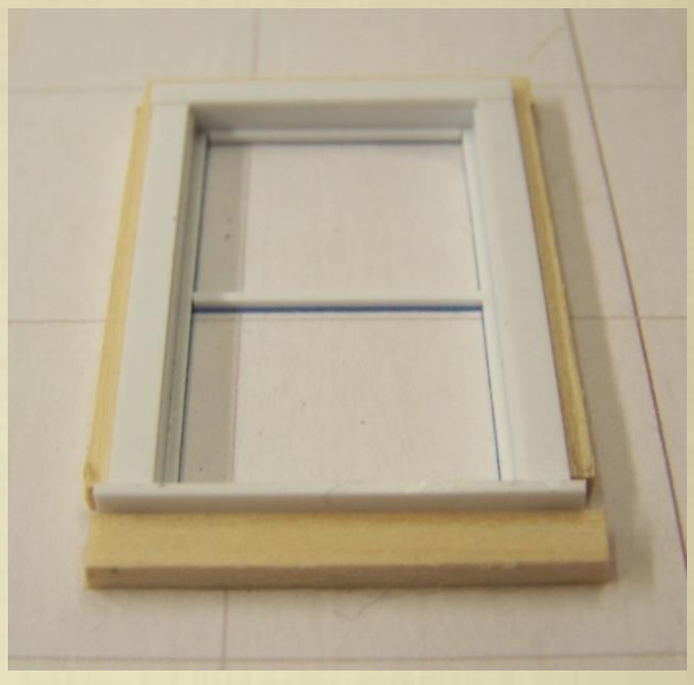
1. Drawing



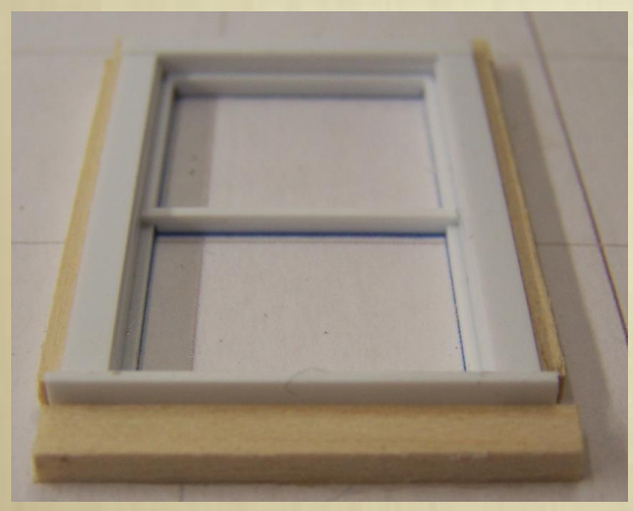
2. Jig



3. Frame/Sill/Trim



4. First Sash Layer



5. Second Sash Layer

6. Paint

7. Install Glass

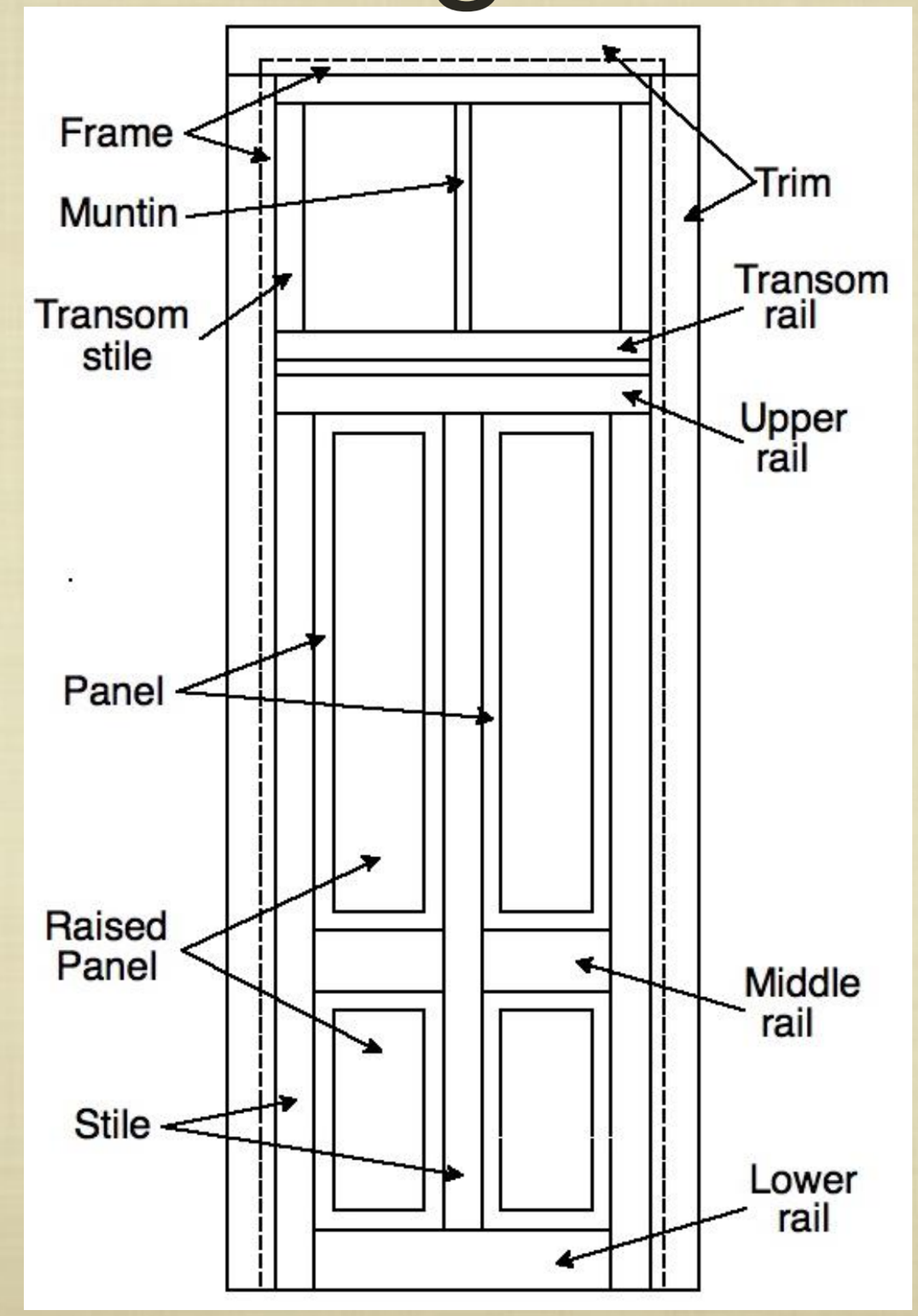
8. Third Sash Layer

Recent Example

Styrene Doors

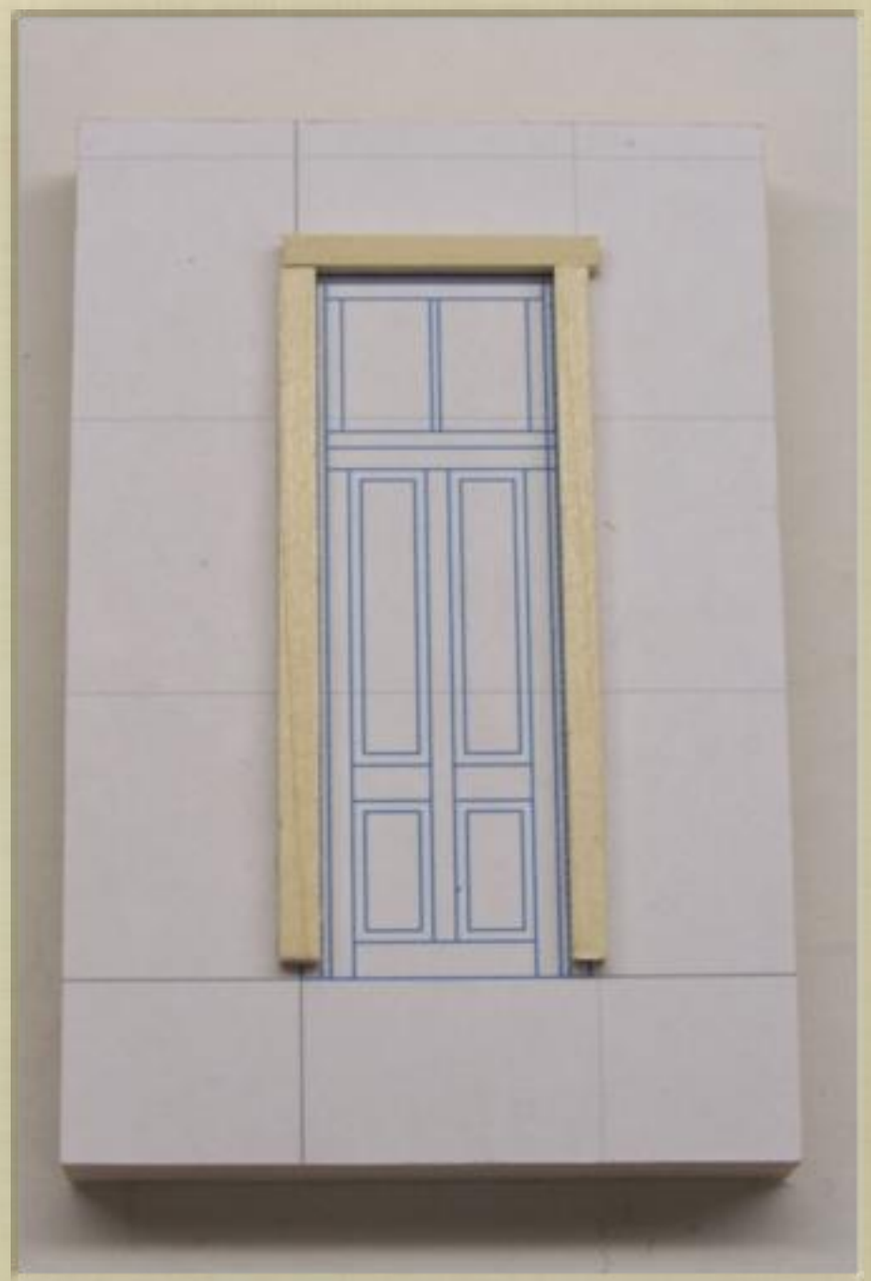
- Similar concepts, but more straight-forward than windows
- Built over drawing and jig
- Where relevant (Frames, trim, and transom muntins), used same dimension materials as for windows
- Transoms optional

Passenger Door



Passenger Door Jig

- Glue full-size drawing to block
- Glue stripwood along sides and top
- Same thickness as for windows



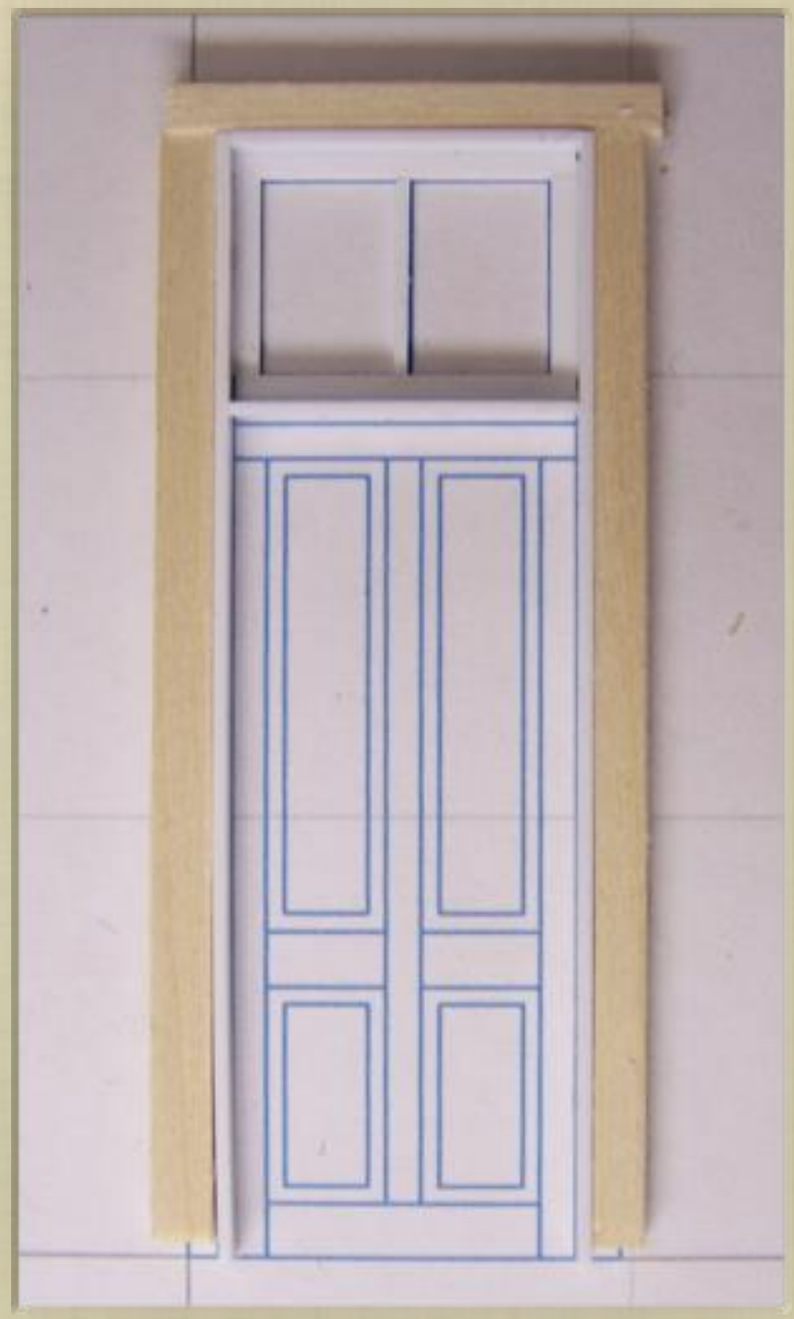
Door Frame

- Fit and glue together sides and top of frame (.030 x .100)

- Fit and glue frame material at top of door opening

- Fit transom rails and stiles inside transom opening (.030 x .060)

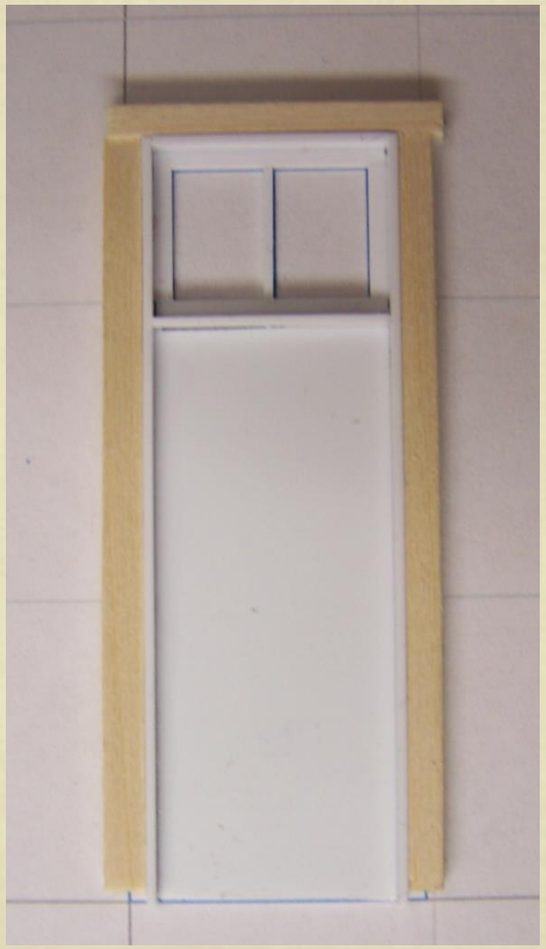
- Add muntin (.030 x .030)



Door Body

- Fit and glue sheet styrene door body in opening

- Used .040” styrene because that’s what I had



Trim

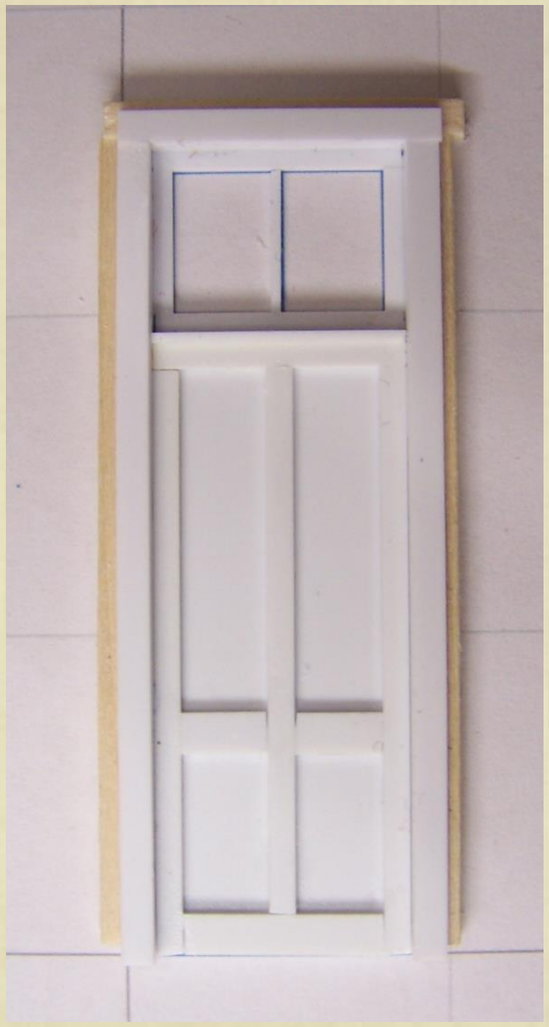
- Glue trim (.030 x .100) around frame (none on cross-member between door and transom)

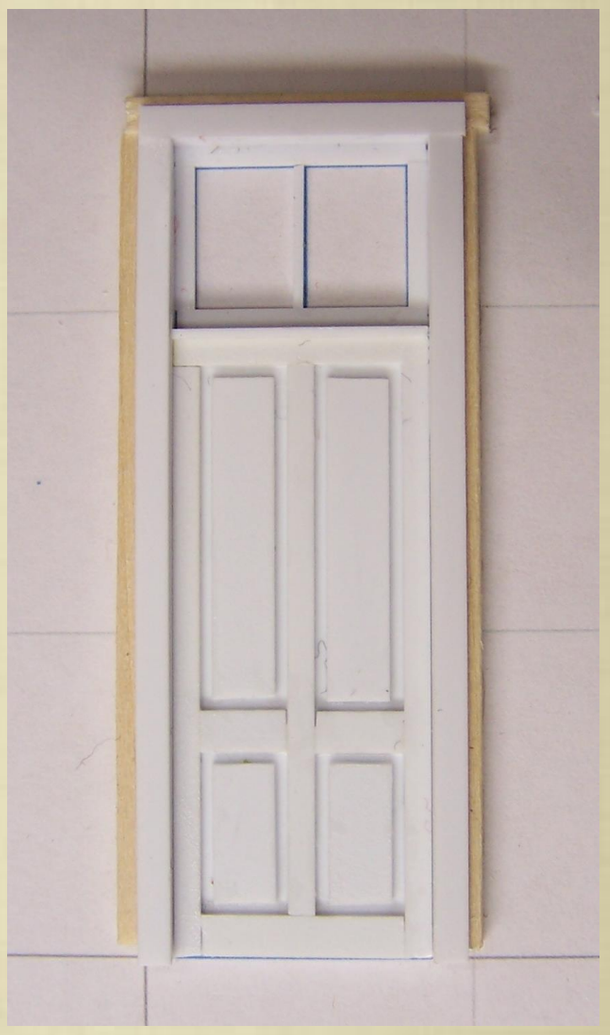
- Begin buildup of door with .030 x .080 upper rail and stiles

Complete Door Face

- Fit and glue .030 x .125 middle and lower rails

- Fit and glue lengths of .030 x .188 styrene to simulate raised door panels

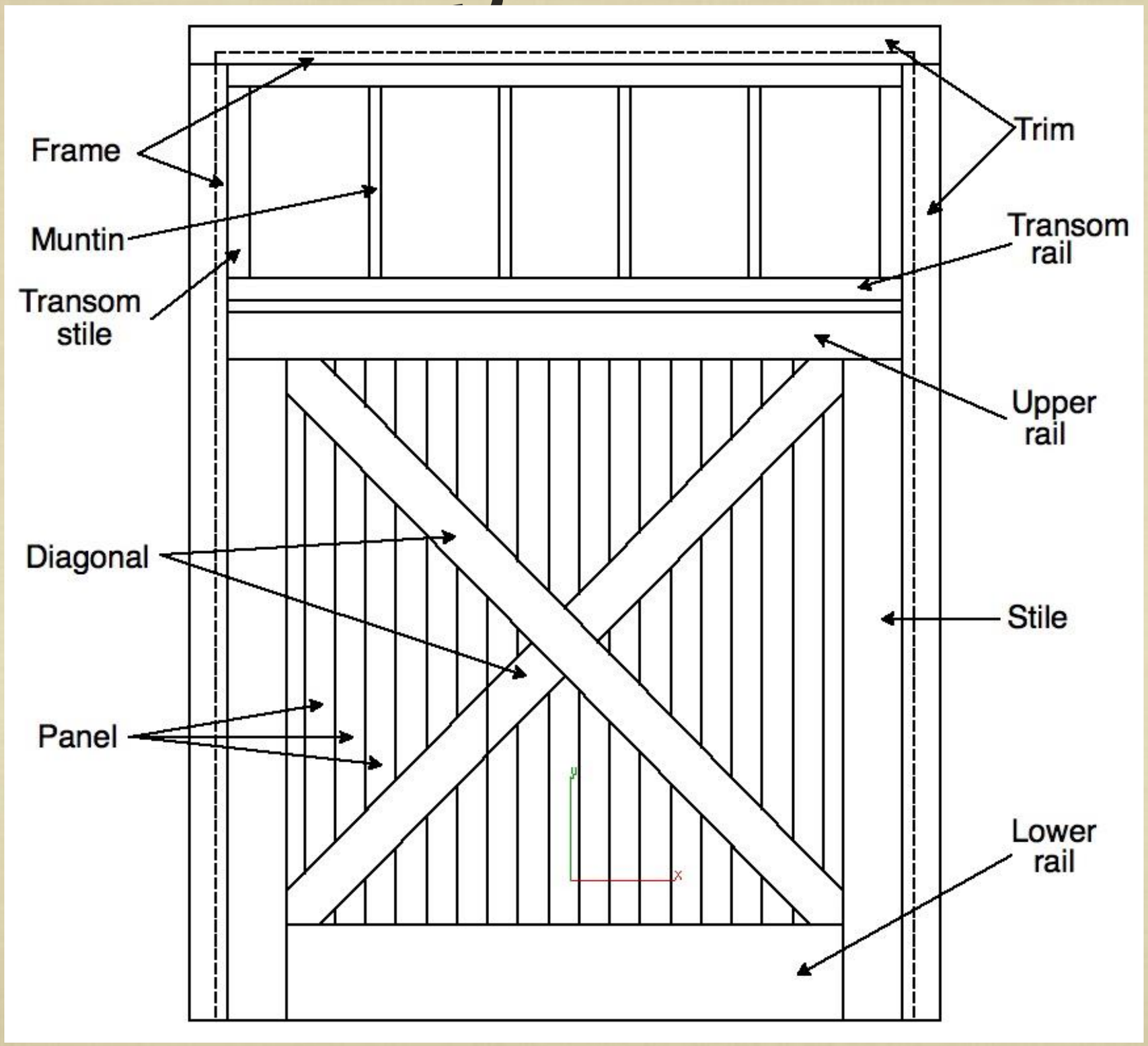




Finish Door

- Paint
- Install glass -- simply glue to rear of transom opening with PSA
- Add plate of .010 styrene and knob (tiny nail with head ground down to .050” diameter) -- both painted brass color

Freight Door



Freight Door Jig

- Glue full-size drawing to block
- Glue stripwood along sides and top
- Same thickness as for windows

Door Frame

- Fit and glue together sides and top of Frame (.030 x .100)

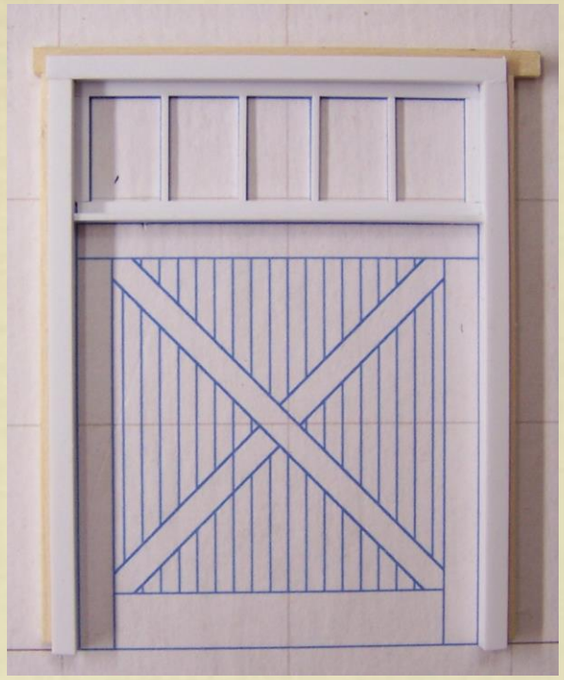
- Fit and glue frame material at top of door opening

- Fit transom rails and stiles inside transom opening (.030 x .060)

- Add .030 x .030 muntins

Trim

- Glue trim around frame (none on cross-member between door and transom)

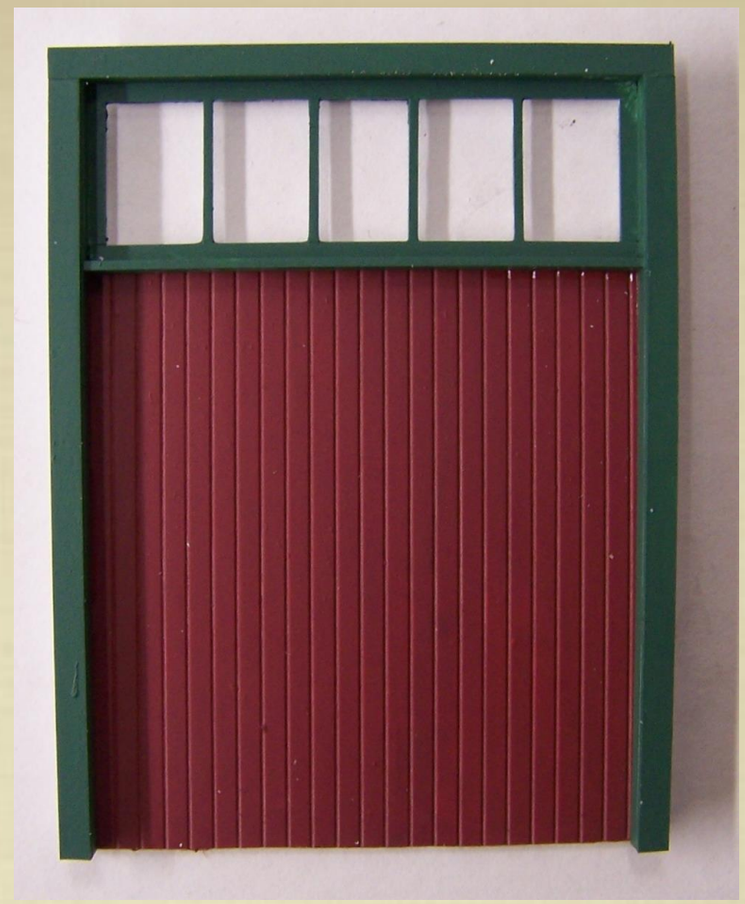


- Paint at this stage if want door itself to be different color

Finish

- Glue prepainted, scribed door body to back of frame with super glue

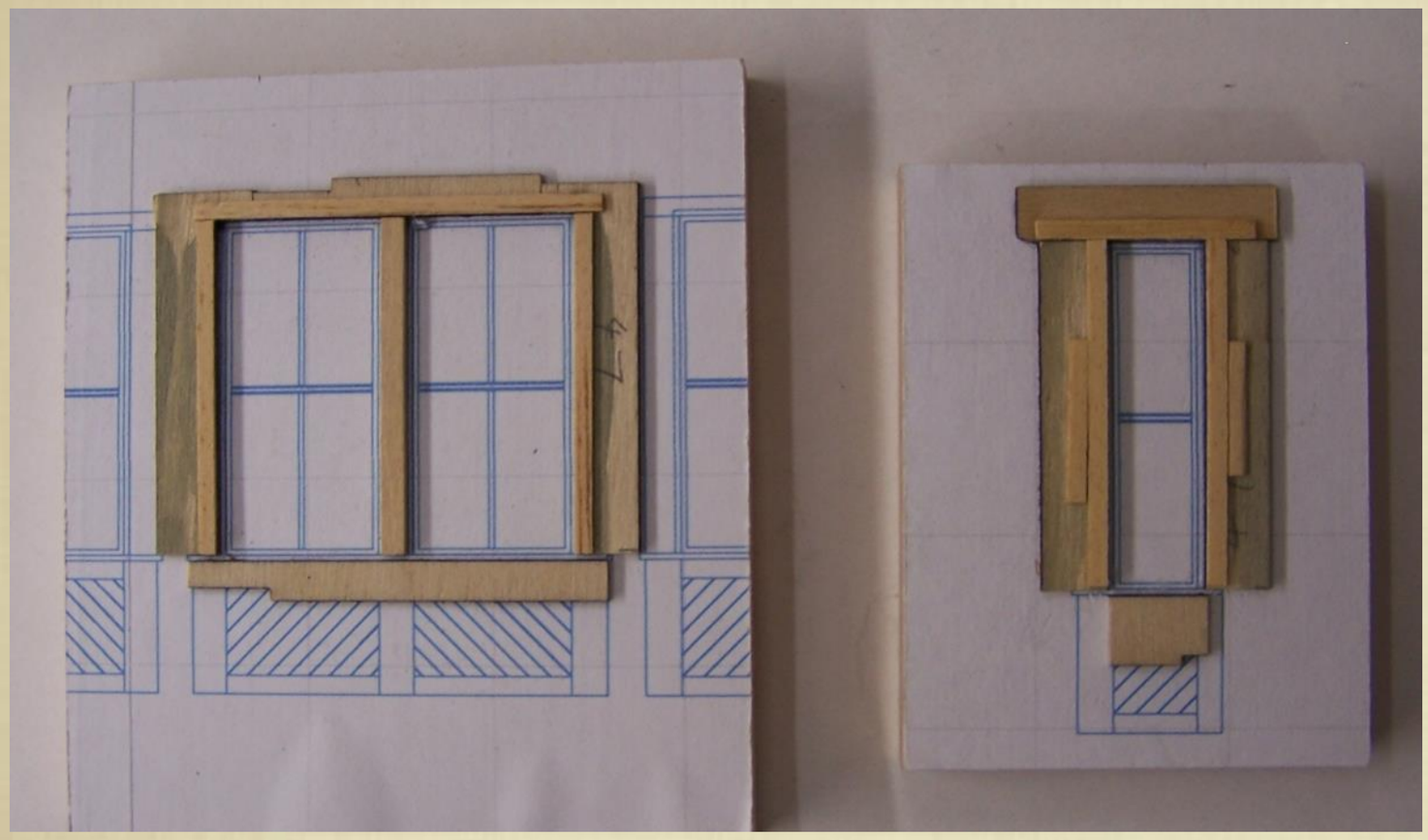
- Fit and glue door trim (see below)



- Install glass on rear of transom with PSA (align any necessary joints with muntins)

Top Rail/Stiles	.030 x .156
Bottom Rail	.030 x .250
Diagonals	.030 x.125

Bay Window Used Same Techniques



Windows and Doors on Model

Styrene Stack Chimneys

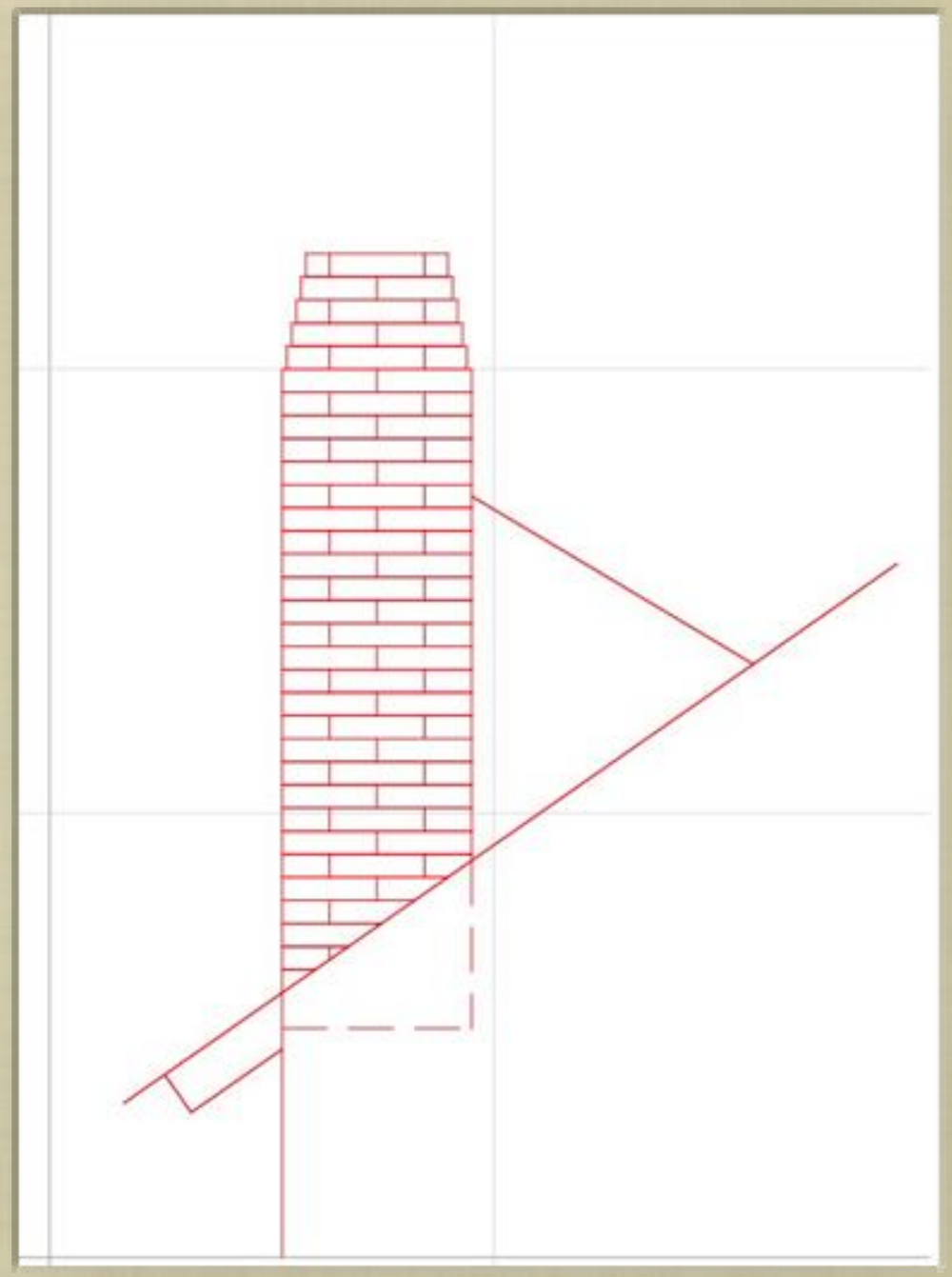
- Moclips station chimneys not unusual
- But different from commercial castings
- No success with carving
- Didn’t try individual bricks
- Came up with idea of styrene stack: chips for brick courses alternating with chips for mortar lines

Moclips dimensions

- 27 Courses of brick -- .427” squares of .040 styrene, scribed vertically

- Made mortar layers approx .050” smaller squares of .010 styrene

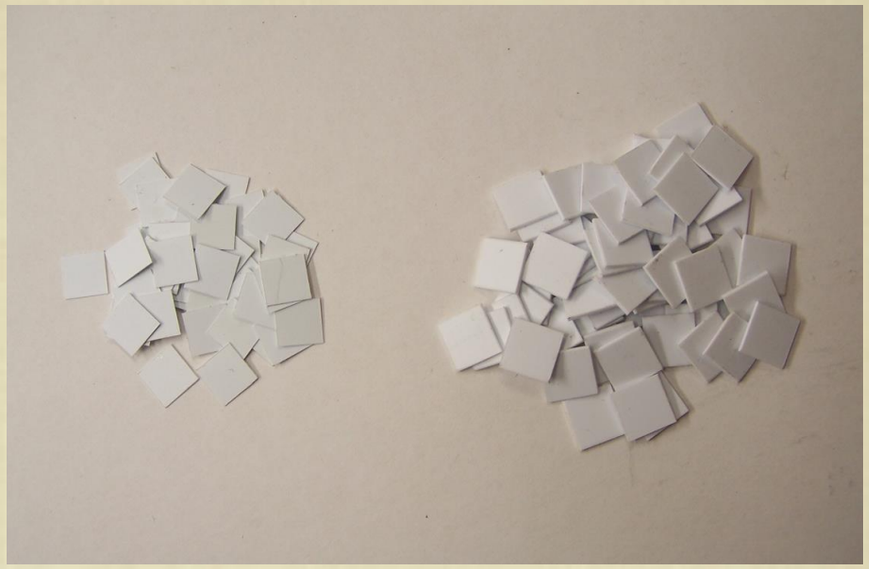
- Additional 5 Top brick courses progressively decreased to .320” sq

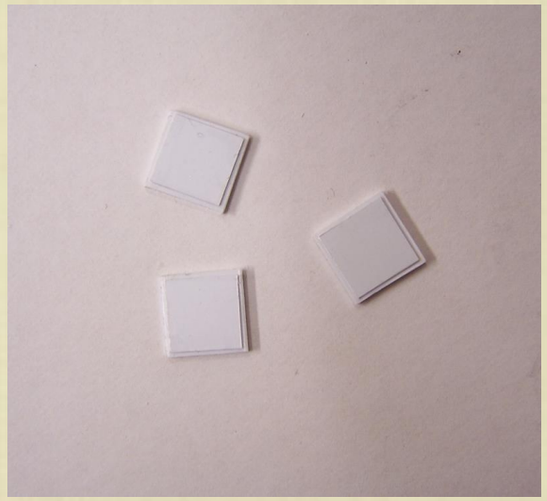


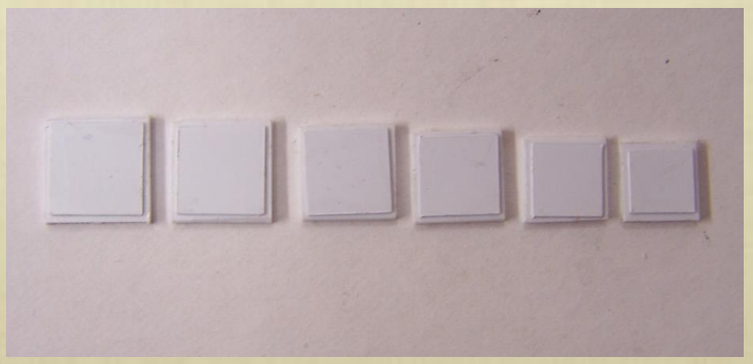
Brick and Mortar Chips

- Cut chips from sheet styrene using calipers, knife, and straight edge

- Adhere mortar chip to each brick chip -- eyeball into position, then brush cement around joint



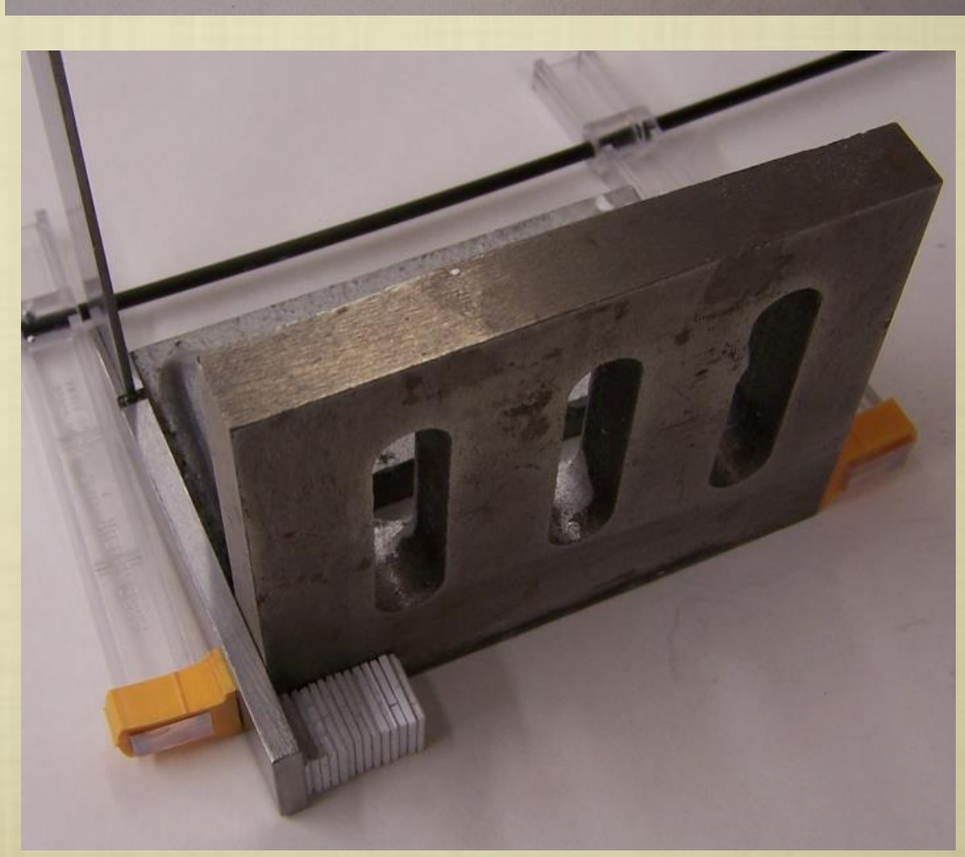




Scribe Verticals and Build Stack

- Hold chips with pliers and cut mortar lines by pressing with #11 blade, 2 lines one opposing pair of sides and 1 line on other sides

- Fashion arrangement to help with alignment



- Brush one chip with cement and press new one on top

- Be certain 1- and 2-scribe sides alternate

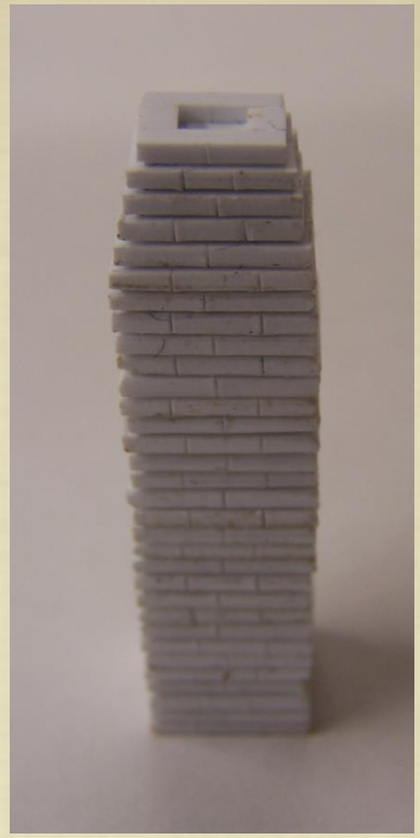
Finish

- Continue to top, using tapered chips for last courses

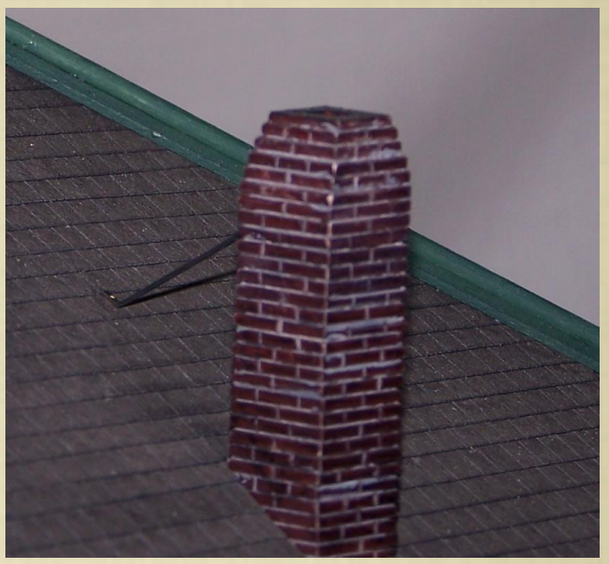
- Top course actually made with bits of .040x.080 strip

- A little crude in these pictures but actual samples better

- Didn’t get samples painted, but very satisfied with finished result on earlier model (see next slide)

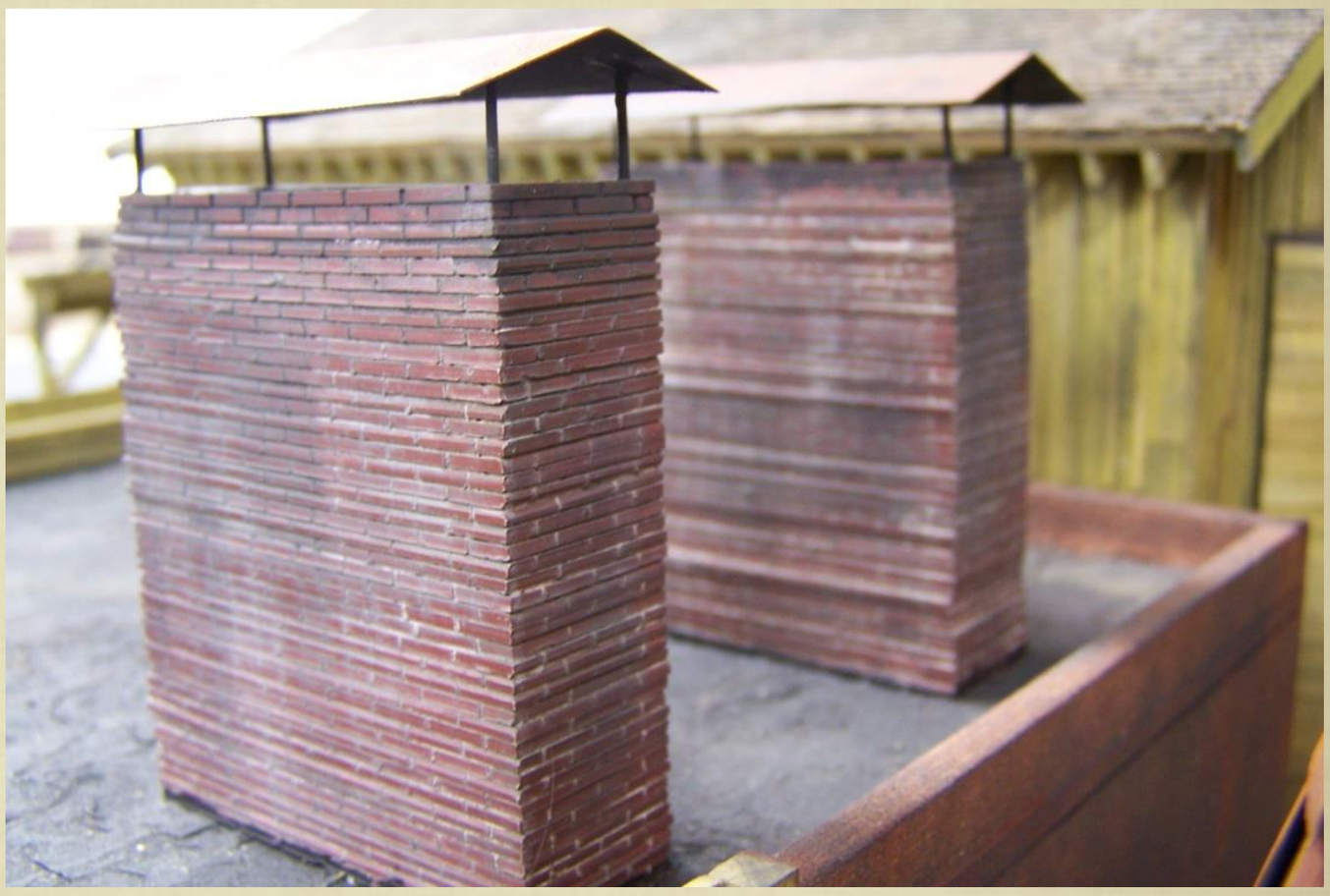


Installed Chimneys



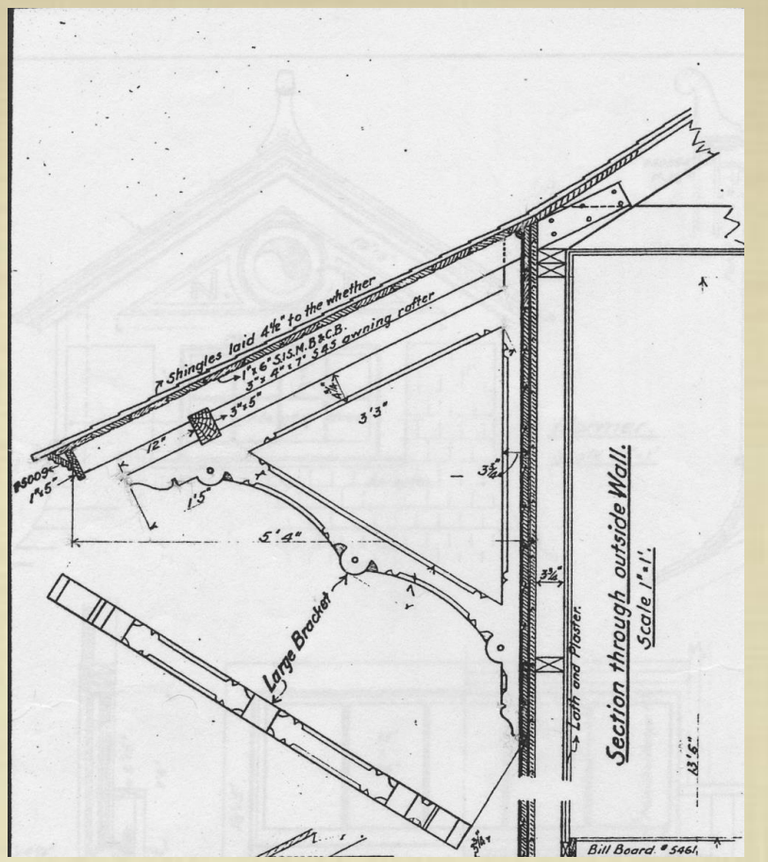
Another Example

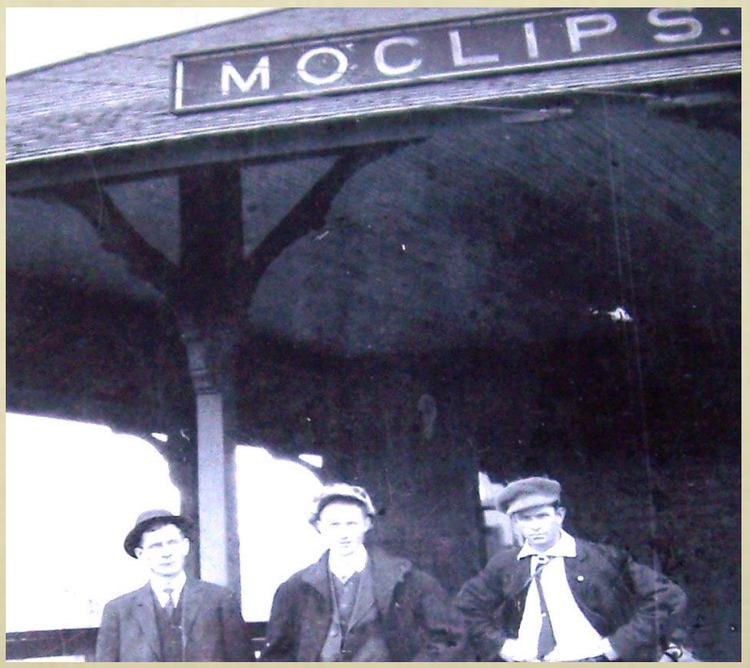
- Stacks on Shingle-Mill Drying Kiln



Corbels

- Prototypes were ornate
- Prominent feature, especially in exposed waiting area
- No intent to replicate
- But needed to duplicate angle and general form



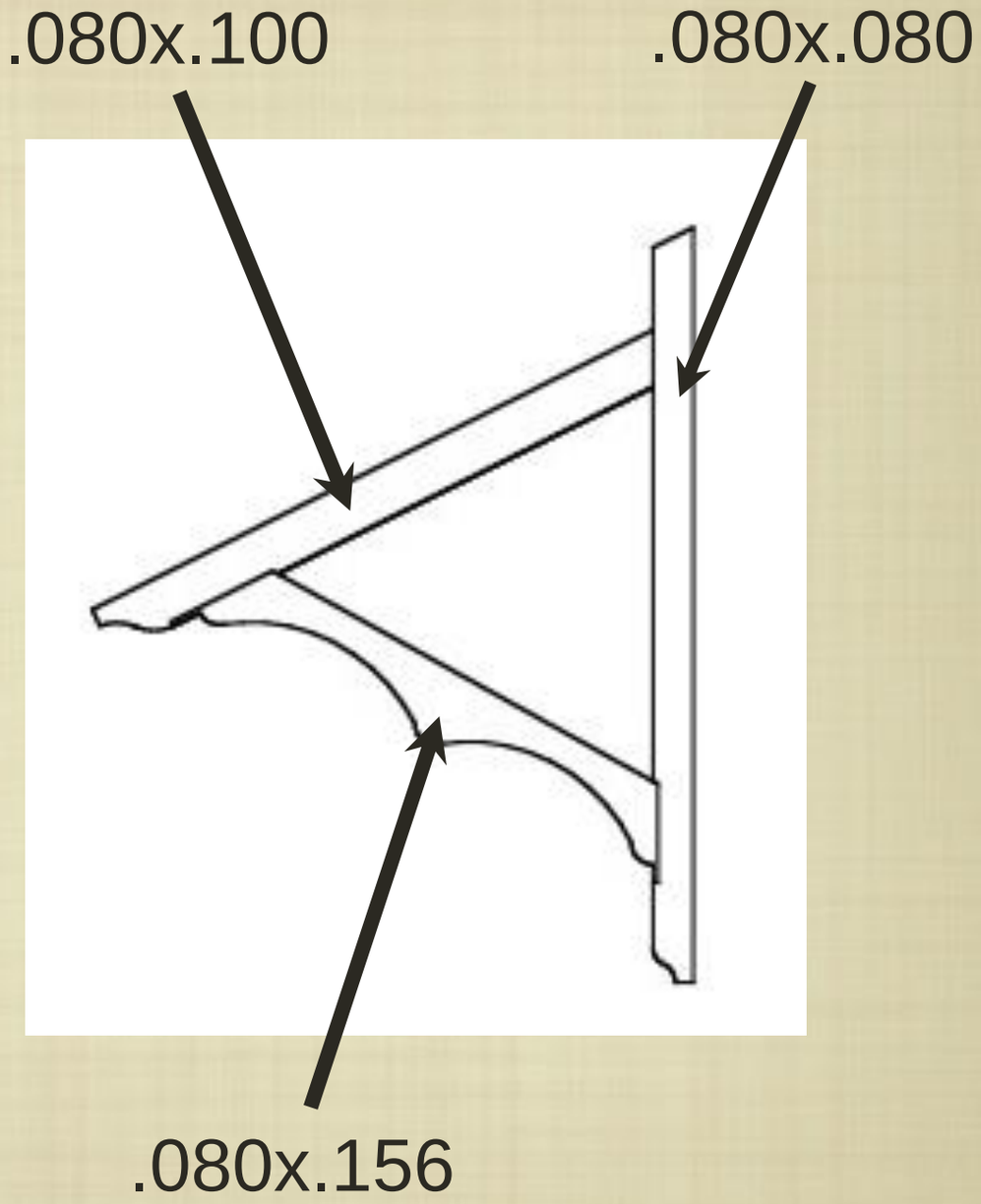


Situation

- Needed 25
- Nothing close available
- Real modelers would make castings
- No casting experience and didn’t want to start with this project

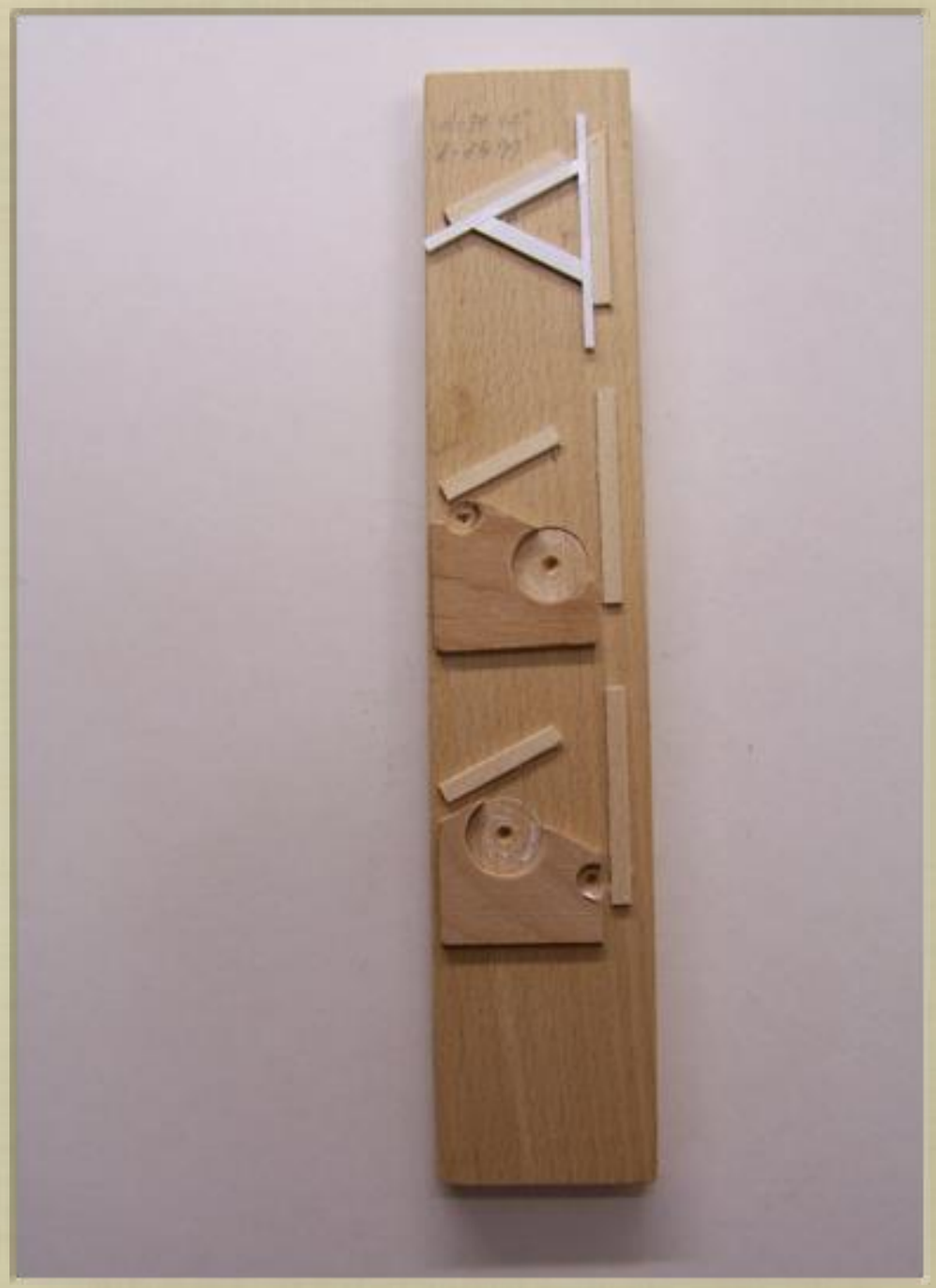
Approach

- Other successes suggested fabricating from strip styrene
- Worked well enough to be interesting
- Settled on this design
- Indicated dimensions correspond to prototype



Construction

- Used three-part jig
- Cut and glue oversize Triangle, using jig for fit



Construction

- Use second jig to secure during first shaping

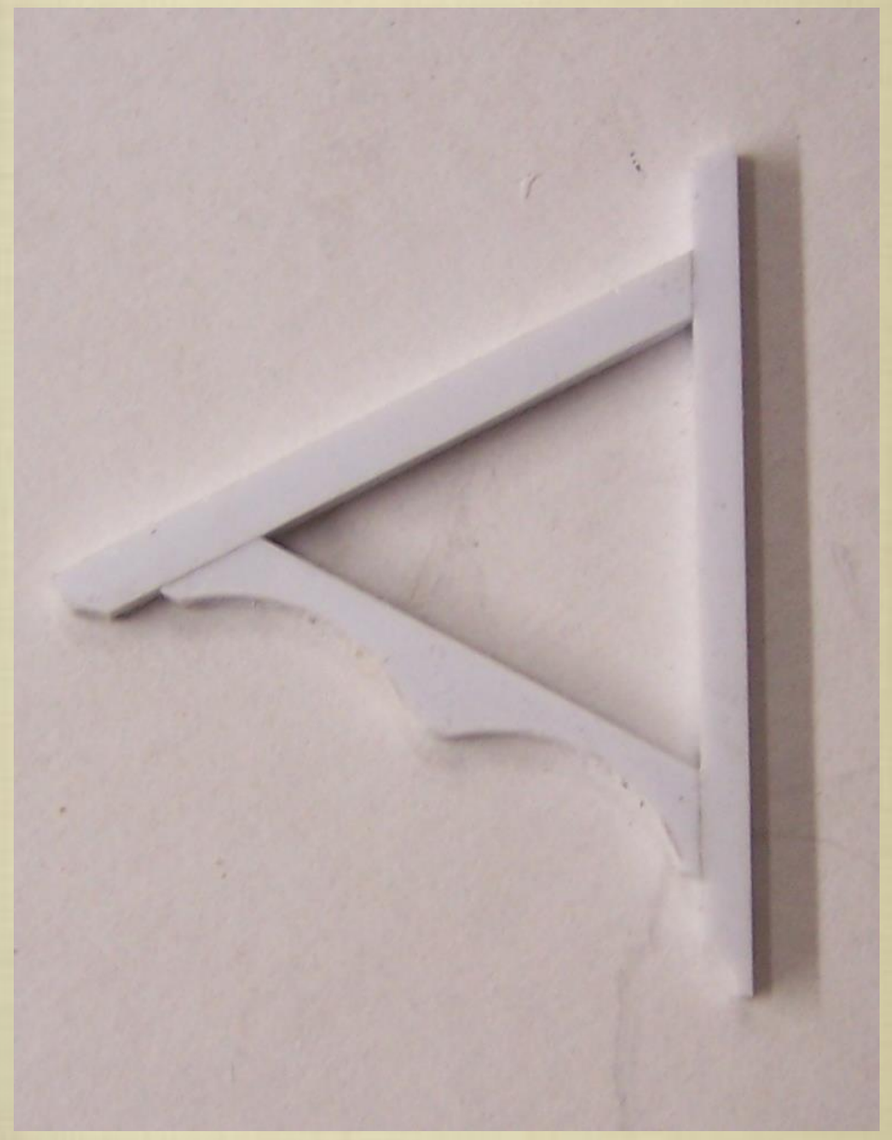
- Bits of scrap plywood from lazer kits help control shaping

- use 1/4” and 5/8” Forstner bits to make curves

Construction

- Move to third jig to cut last curves

- Trim ends and smooth edges



Final Effect of corbels

Overall Result