

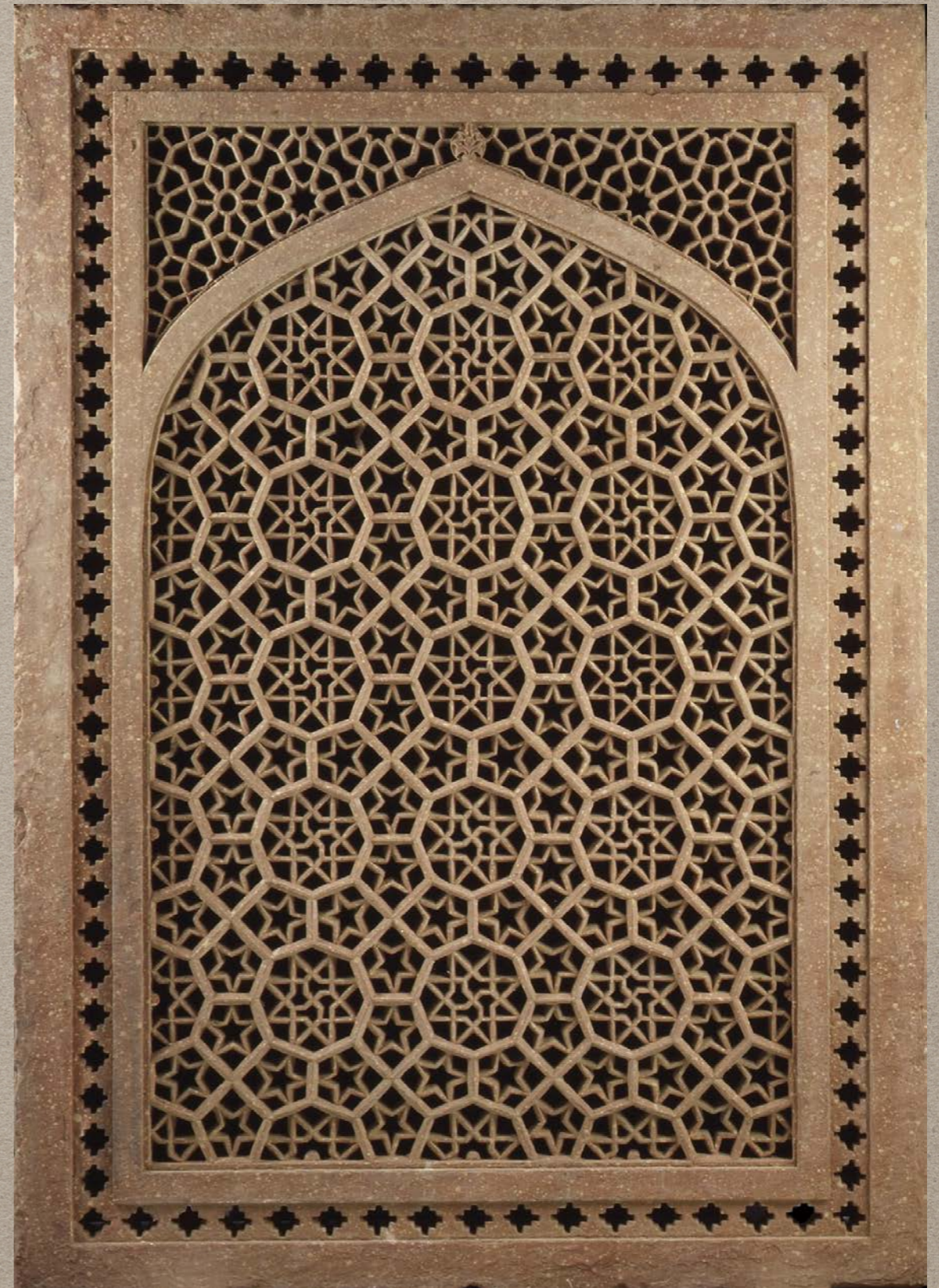
**UPDATING AND REUSING AN EXISTING MOUNT  
IN THE REPAIR AND RE-INSTALLATION OF A 16TH C.  
MUGHAL INDIA JALI**

In November of 2017, I received an email from Conservator Linda Roundhill asking if I would be interested in collaborating with her on the repair and re-installation of a broken object. Specifically, a sandstone Jali from 16<sup>th</sup> Century Mughal India.

# JALI ARE PERFORATED STONE LATTICE SCREENS

JALI PROVIDE  
PRIVACY WHILE  
LOWERING AIR  
TEMPERATURE BY  
COMPRESSING IT AS  
IT FLOWS THROUGH  
THE LATTICE.

COURTESY METROPOLITAN MUSEUM OF  
ART



# OUR FIRST MEETING WITH THE CLIENT INFORMED US OF THE ORIGINS OF THE OBJECT AND THE IMPORTANCE OF OUR TASK.

- This Jali is purported to be from a palace of Third Mughal Emperor Akbar the Great, near Fatehpur Sikri India. Akbar joined the disparate kingdoms of South Asia into the golden age of the Mughal Empire in India. His rule extended from modern Afghanistan through almost the entire Indian sub-continent.

- Photo Courtesy Boston Museum of Fine Arts



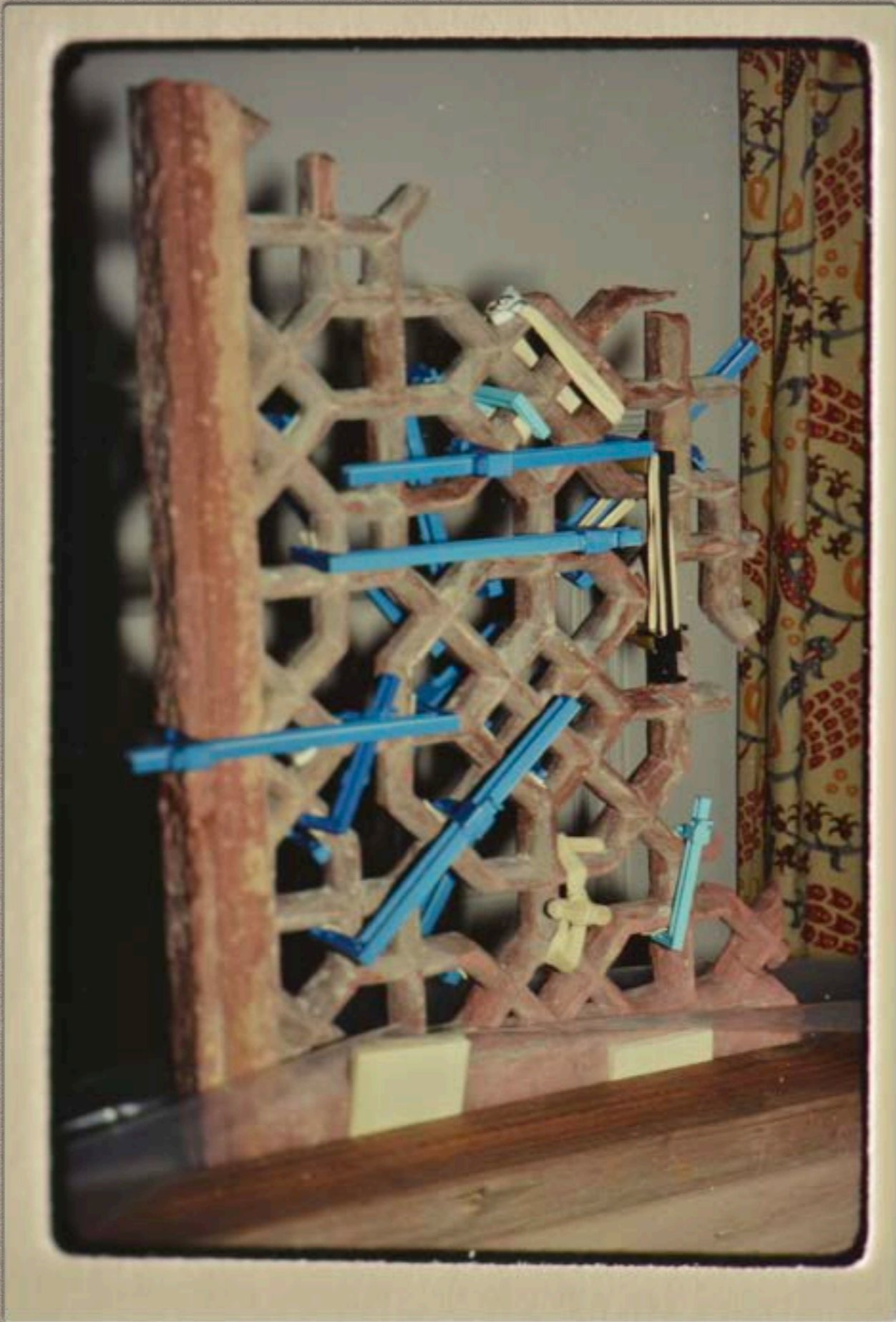
# THE JOURNEY OF THE JALI: SO THE TALE GOES...

- In the 1570's Akbar built a palace near Fatehpur Sikri for and maintained his capital there for many years. The city was later abandoned, likely for lack of water and political reasons.
- The palace was later pillaged by the Jat rulers of Bharatpur, and the jali placed in storage.
- At some point before 1970, the jali was moved to London.
- In the 1980's, the current owner purchased the jali and it was moved to San Francisco.

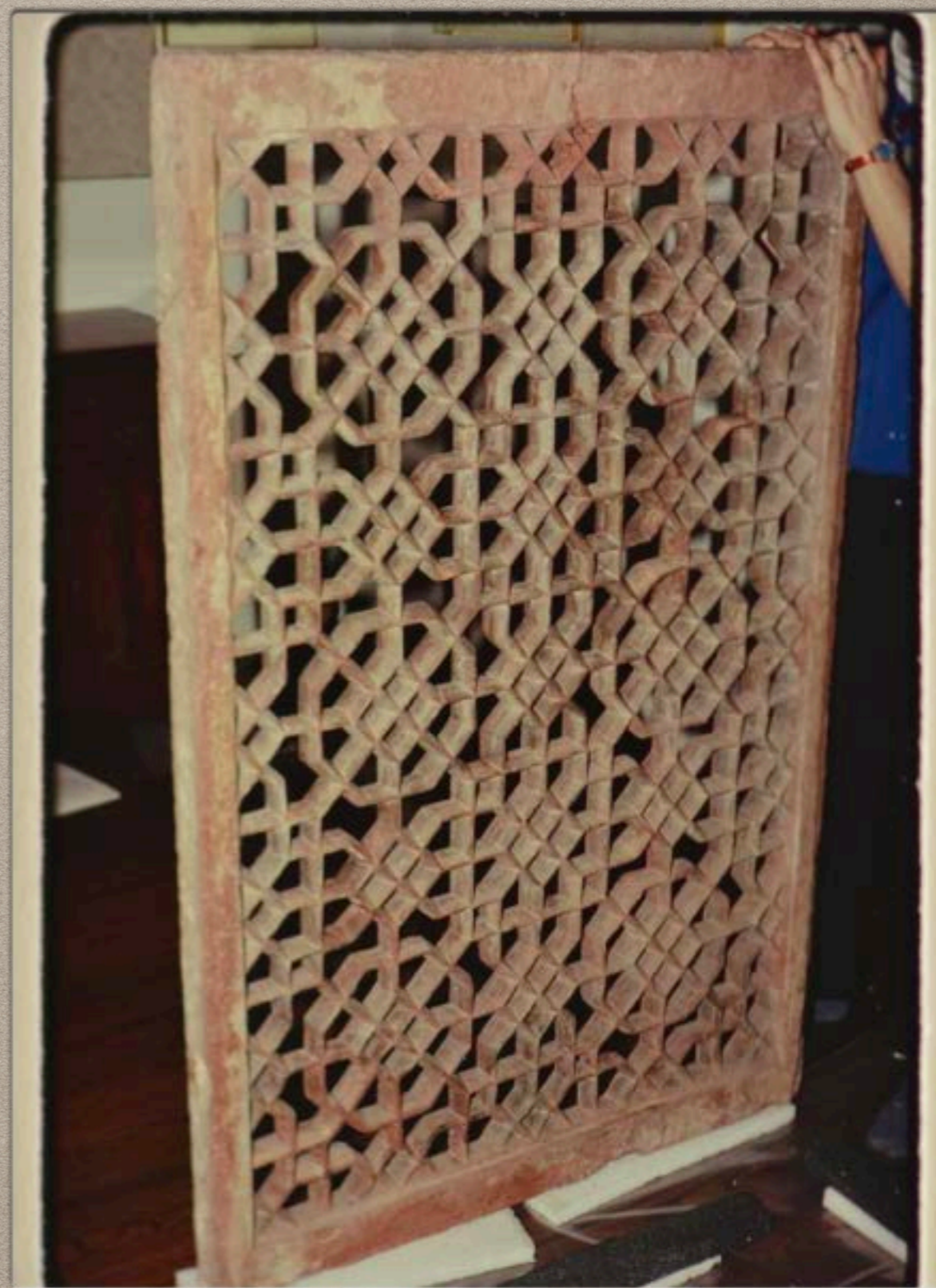


## **1989: THE LOMA PRIETA EARTHQUAKE**

A SEISMIC STABILIZATION MOUNT WAS BEING PREPARED FOR THE JALI, BUT IT WAS NOT FINISHED IN TIME TO PROTECT IT FROM DAMAGE.



**THE JALI WAS  
PIECED BACK  
TOGETHER BY  
CONSERVATORS  
JANE AND  
DENNIS  
PIECHOTA AND  
RESTORED TO  
ITS FORMER  
BEAUTY AND  
INTEGRITY**





**AFTER REPAIRS WERE COMPLETED, A MOUNT OF 1 1/2" (38X38 MM) SQUARE STEEL TUBING WAS FABRICATED BY EXPERTS FROM THE SAN FRANCISCO ASIAN ART MUSEUM.**

**THE JALI WAS SECURELY INSTALLED WITH THE MOUNT TO PREVENT ANY FURTHER SEISMIC DAMAGE.**

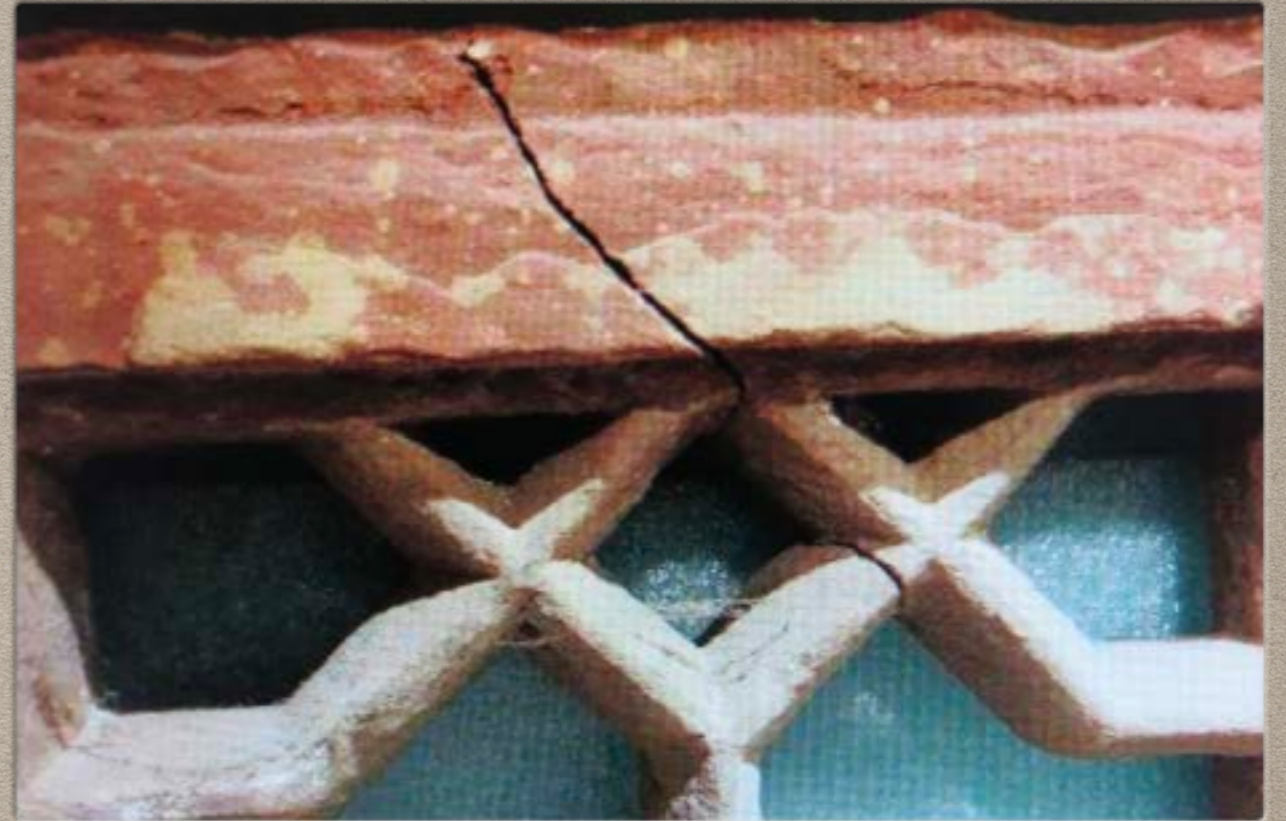


**IN 2009, THE JALI WAS MOVED TO ITS CURRENT LOCATION IN SEATTLE**

THERE IT WAITED, CRATED, FOR EIGHT YEARS UNTIL THE INSTALLATION SITE WAS READY.



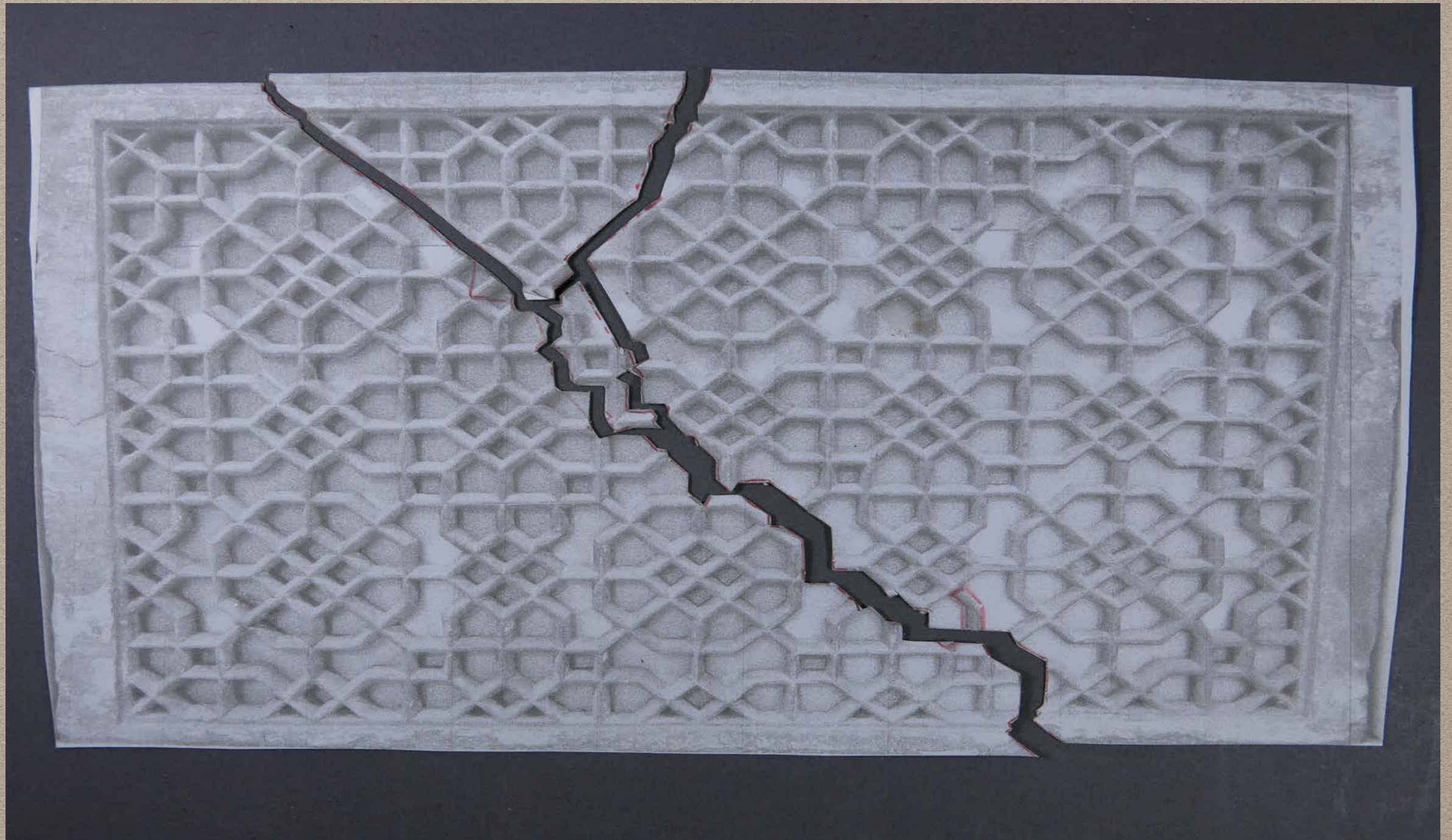
**WHEN ARTECH FINE ART SERVICES OPENED THE CRATE TO INSTALL THE JALI, IT WAS FOUND TO BE DAMAGED. CONSERVATOR LINDA ROUNDHILL WAS CALLED AND THUS BEGAN OUR COLLABORATION.**



# **AFTER EXAMINATION, A PLAN OF ACTION WAS FORMULATED TO SUPPORT THE JALI DURING RESTORATION.**

- We needed to:
  - Chart the actual breaks and weak areas.
  - Estimate the likely weight of the object.
  - Design modifications to the present mount.
  - Devise practical methods for controlled movement of the large fragments.
  - Plan for final installation with minimal handling.

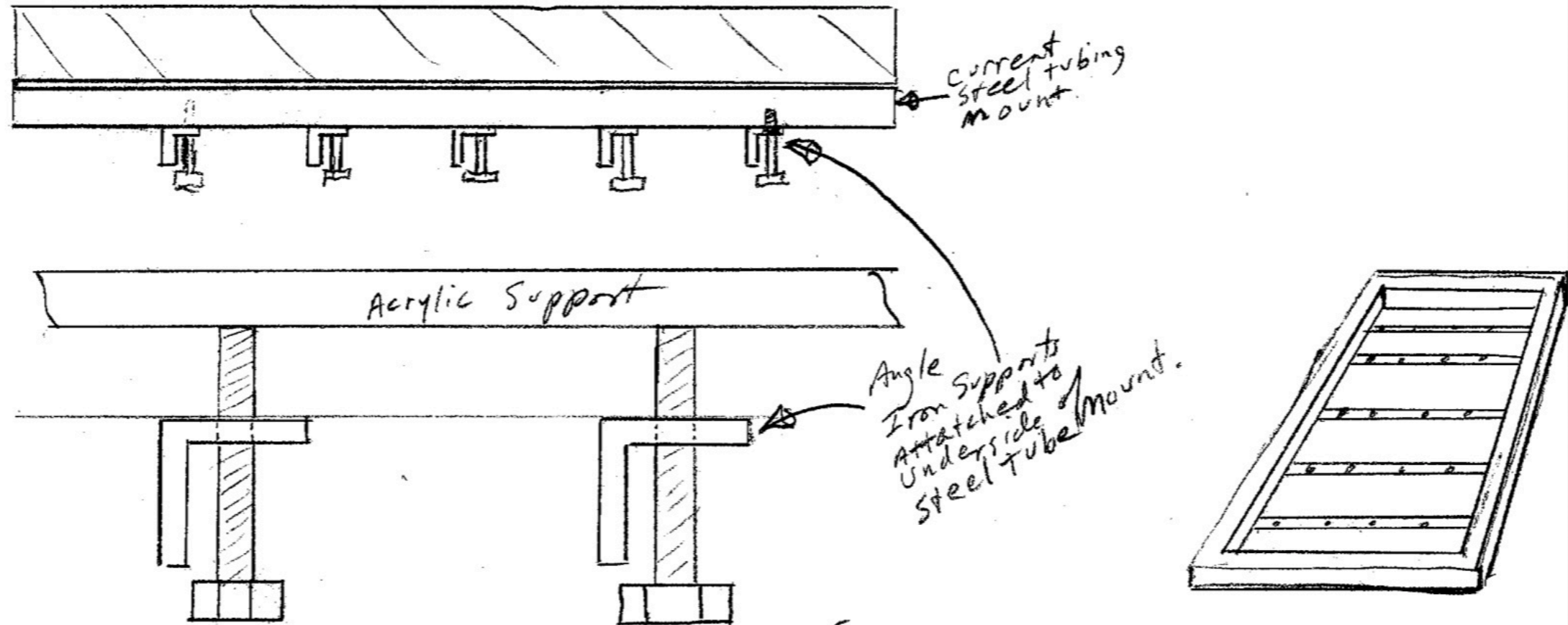
# LINDA CAREFULLY CHARTED THE PATTERN OF THE DAMAGE



# CALCULATING OBJECT WEIGHT

- Object Size 34.5"x54.5"x 3" (92 X 142 X 7cm)
- Frame cross section 3"x 3" (7.5 X 7.5 cm)
- Interior Lattice 30"x48"x 2" (75 X 122 X 5 cm)
- Estimated percentage stone/air in lattice: 35%
- Estimated total volume 1.51 Ft.<sup>3</sup> (.043 m<sup>3</sup>)
- Weight of Sandstone=145 Lbs./ ft.<sup>3</sup> (2327 kg/m<sup>3</sup>)
- Estimated weight: 218 Lbs. (100 kg)

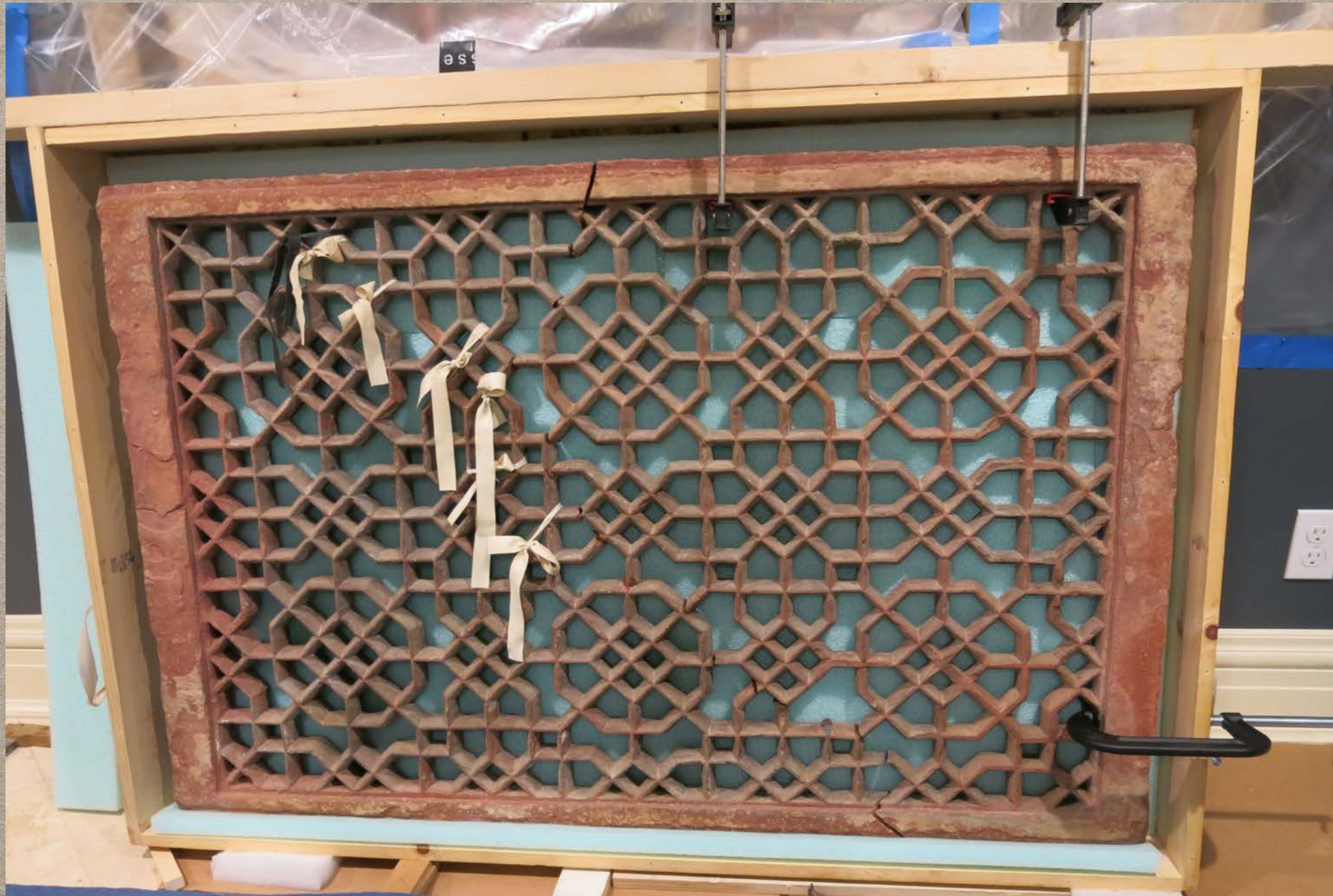
# Initial Mount Modification Design

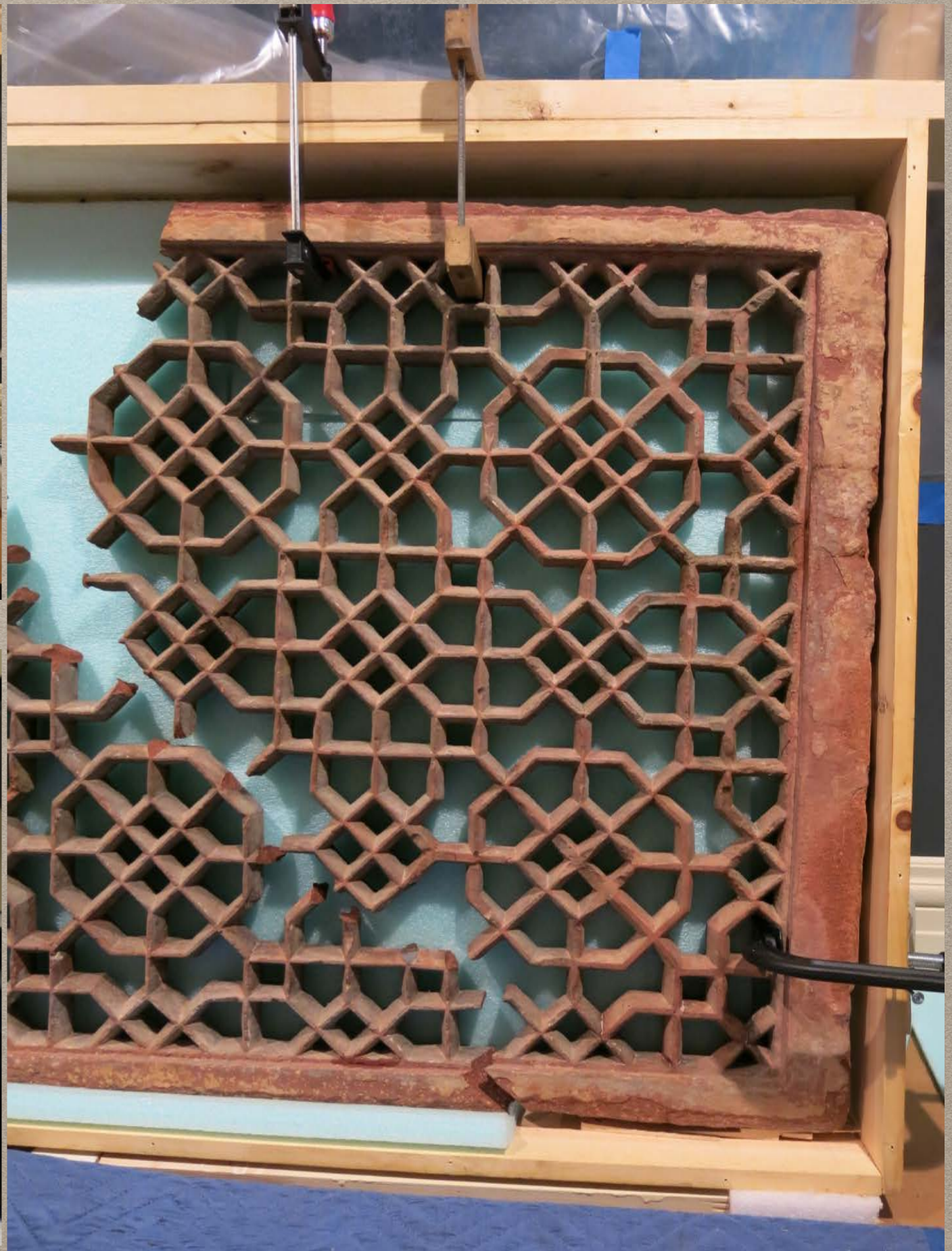
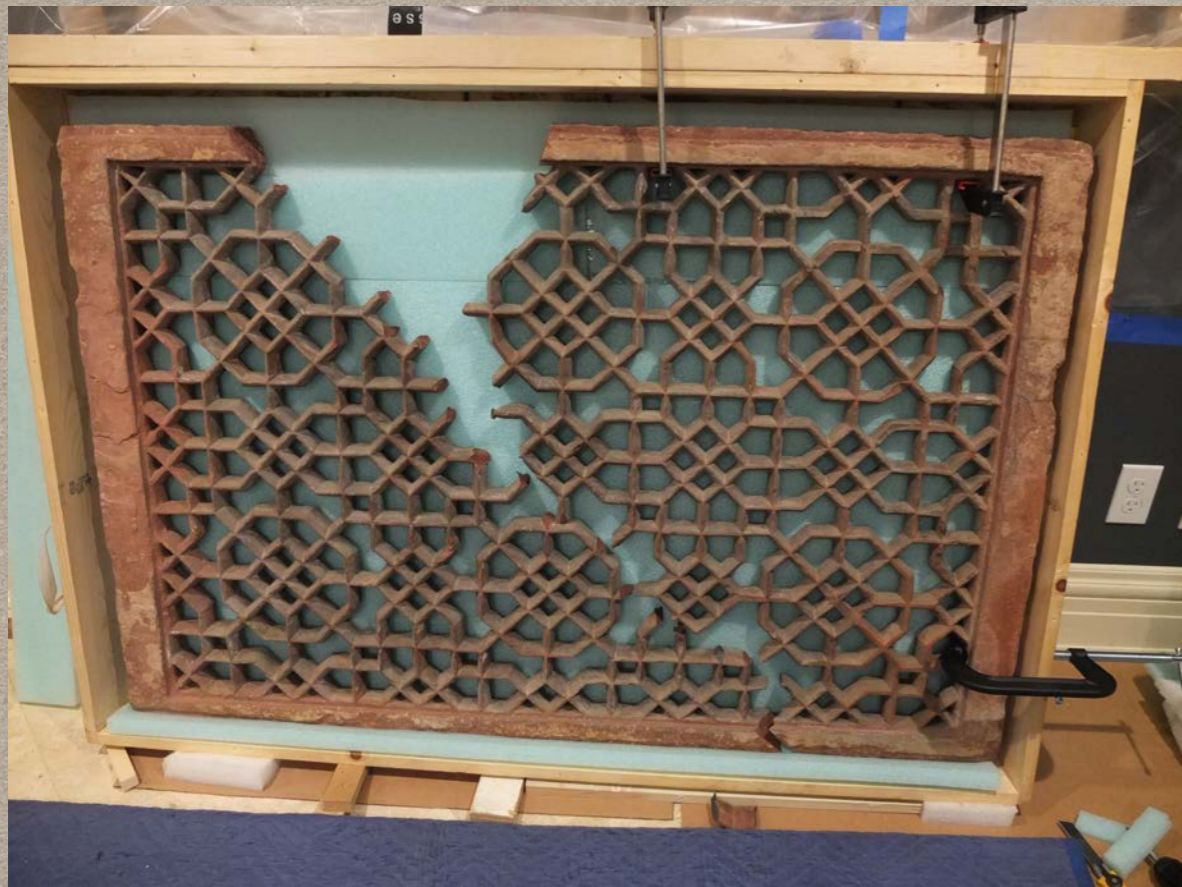


The "Frame" of the object  
Rests on the Square Tube Mount.  
The lattice is supported on a  
sheet of thick Acrylic, supported  
At many points by bolt adjusters.

Materials Costs  
Steel \$25.00  
Fasteners \$25.00  
Acrylic Sheet \$125.00?  
Labor to Prepare System  
4-5 hours

**THE CRATE TOP WAS REINFORCED  
AND CLAMPS USED TO GENTLY  
MOVE THE LARGE FRAGMENTS**





# THE BREAKS WERE OFTEN CONTAMINATED WITH OLD BUTVAR ADHESIVE AND SALTS

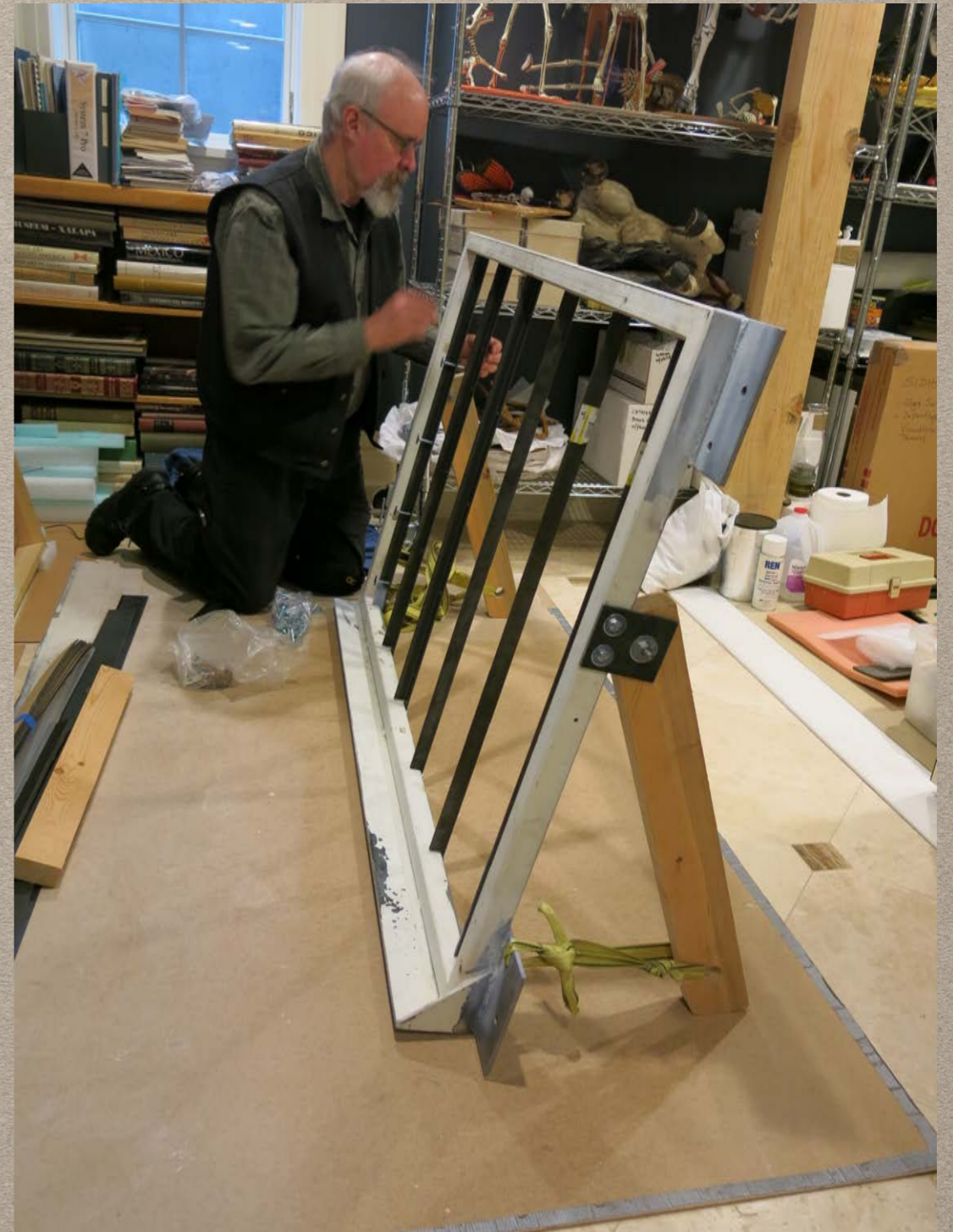




**LINDA USED SCALPELS AND  
POULTICES TO REMOVE GLUE AND  
SALTS FROM THE JOINT SURFACES**

# WHILE I WORKED TO MODIFY THE CURRENT MOUNT

- Added legs for support at shallow back angle
- Added temporary steel supports and adjusting bolts to align breaks
- Modify lower supporting ledge



# DETAILS OF ALIGNMENT SYSTEM OF STEEL ANGLE, ELEVATOR BOLTS, AND ACRYLIC PLASTIC



# A STEEL GUSSET WAS CUT AWAY TO ALLOW HORIZONTAL MOVEMENT OF LARGE FRAGMENTS

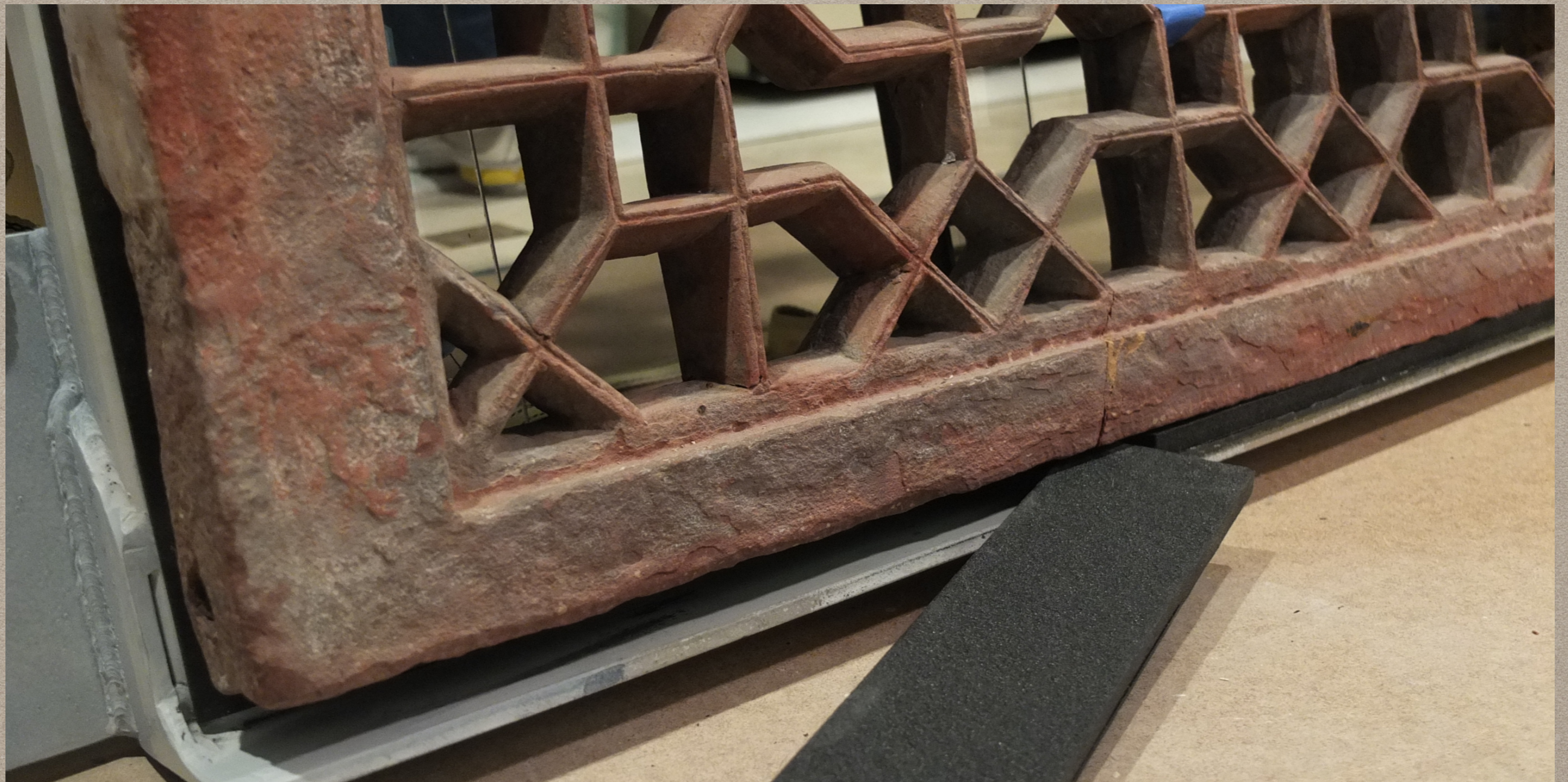


# THE FINISHED MOUNT READY TO RECEIVE THE JALI





**THE LARGEST FRAGMENT WAS  
LIFTED FROM THE CRATE ONTO A  
FOAM SLAB AND SLID ACROSS THE  
FLOOR TO THE MOUNT**

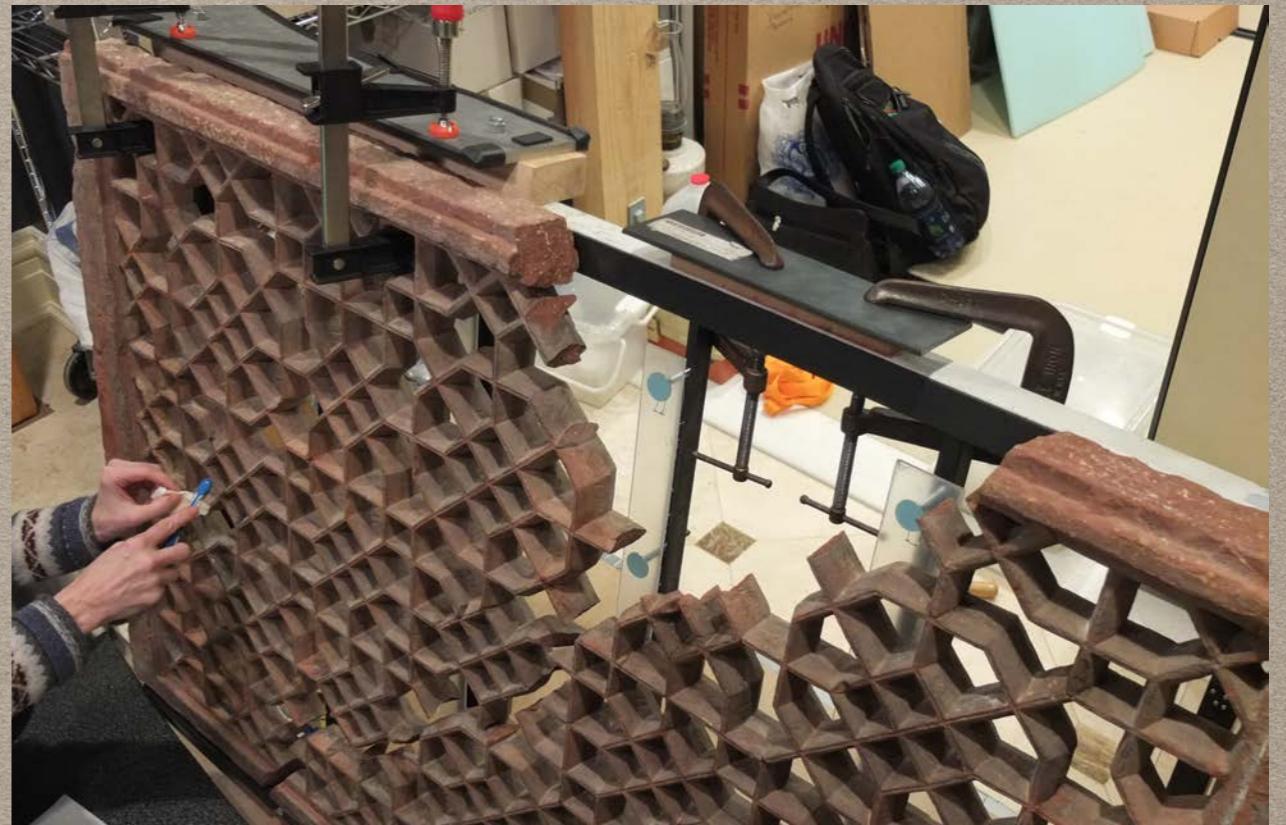
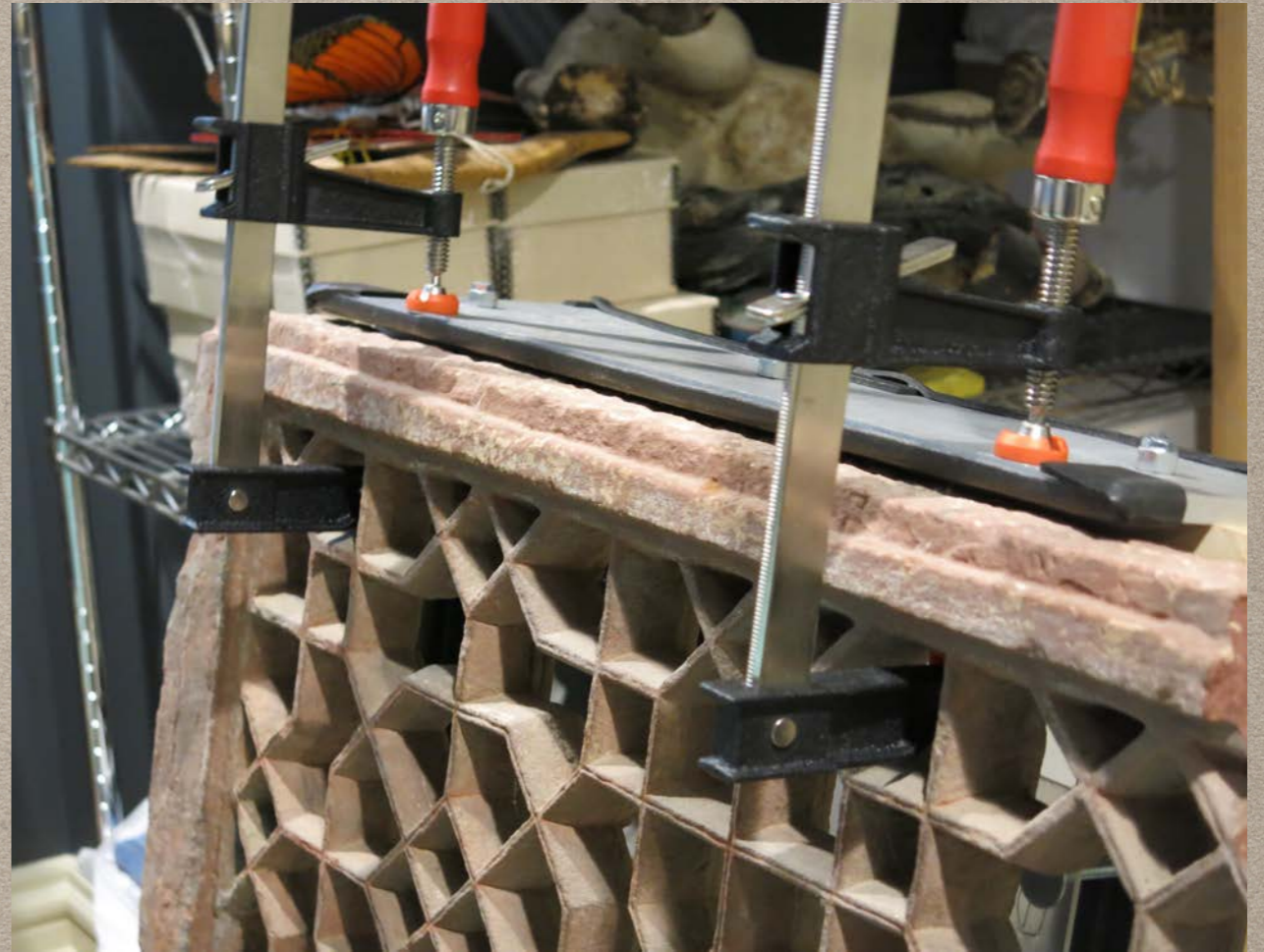


**MOVING THE FRAGMENTS TO THE MOUNT REVEALED THE TRUE FRONT OF THE JALI. THE GROOVES INDICATE IMPERIAL ORIGINS.**

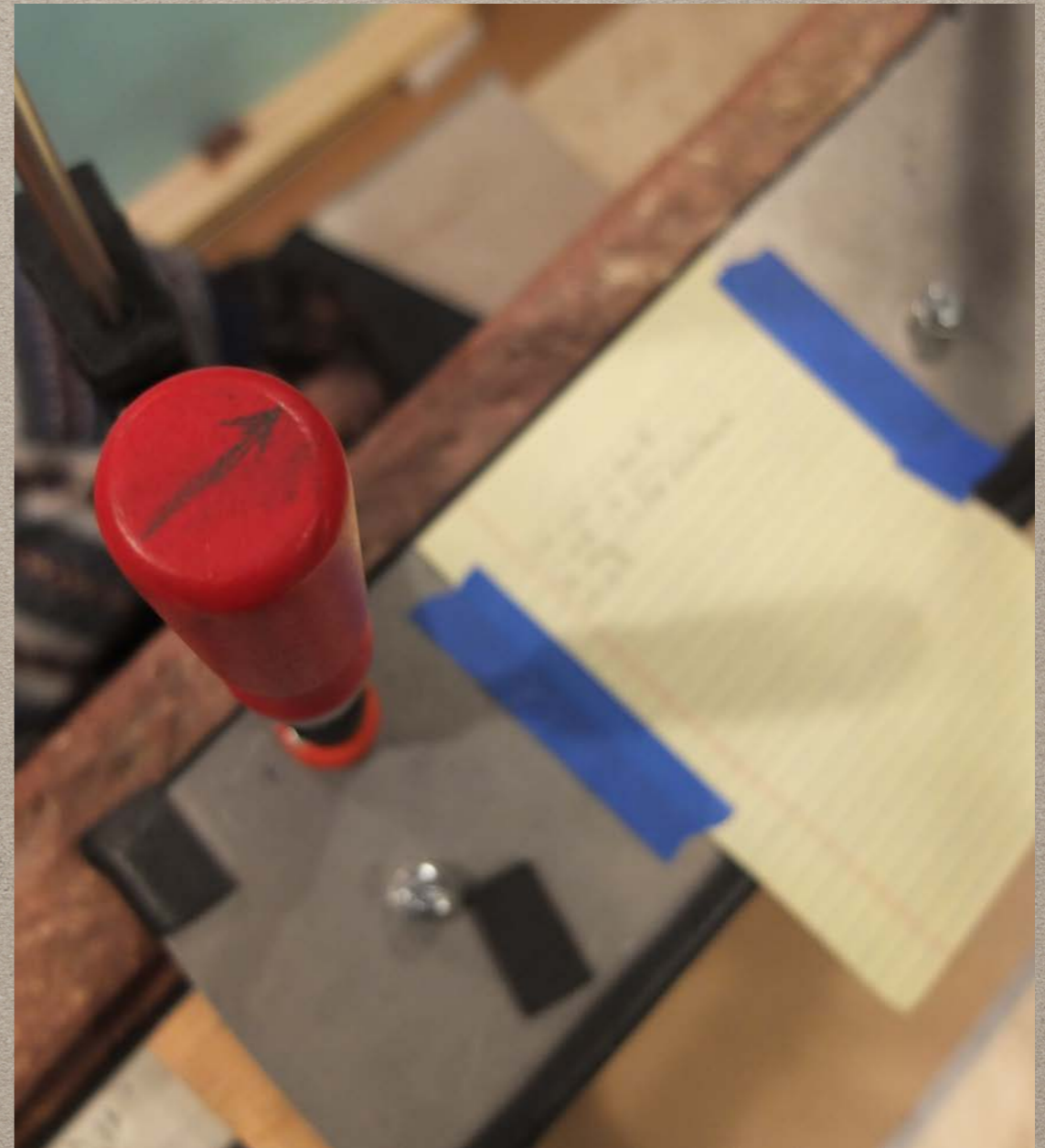
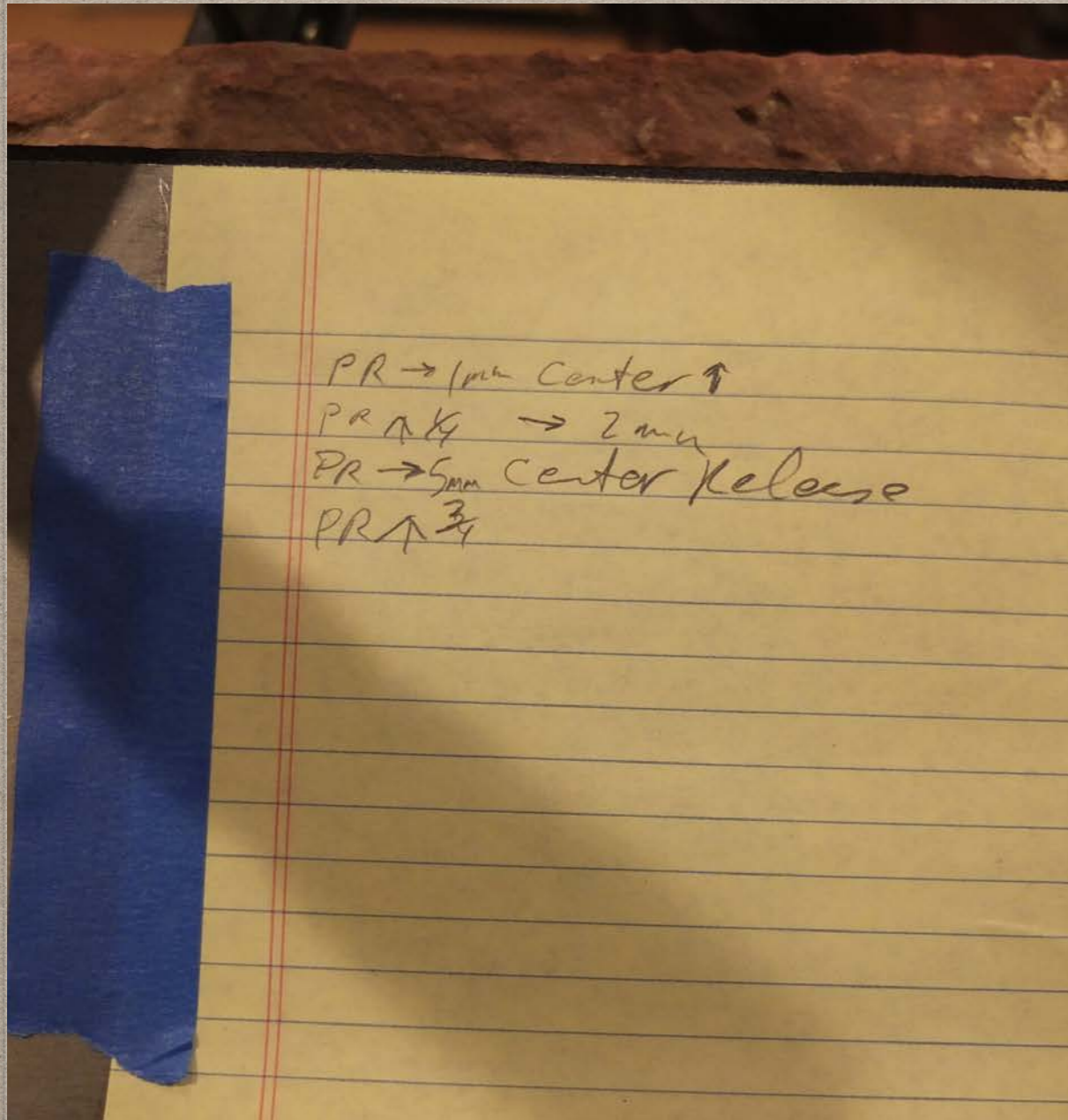


# **THE SECOND LARGE FRAGMENT**

**THE FRAGMENT WAS SUPPORTED BY CLAMPS  
TO FACILITATE FINE MOVEMENT FOR GLUING**



# A DRY RUN ASSEMBLY ALLOWED US TO CHART THE MOVEMENTS OF THE FRAGMENTS FOR SAFETY



# FINAL PREPARATIONS WERE MADE BEFORE GLUING

- Linda mixed a custom formulation of Aquazol 500 50% solids with 1:9 ethanol:distilled water.
- The adhesive had to have sufficient open time to bring all 29 joins together, yet be reversible by reasonable and safe methods.
- Final adjustments were made to align the fragments
- Silicone release paper was placed between the joins and the steel mount frame.

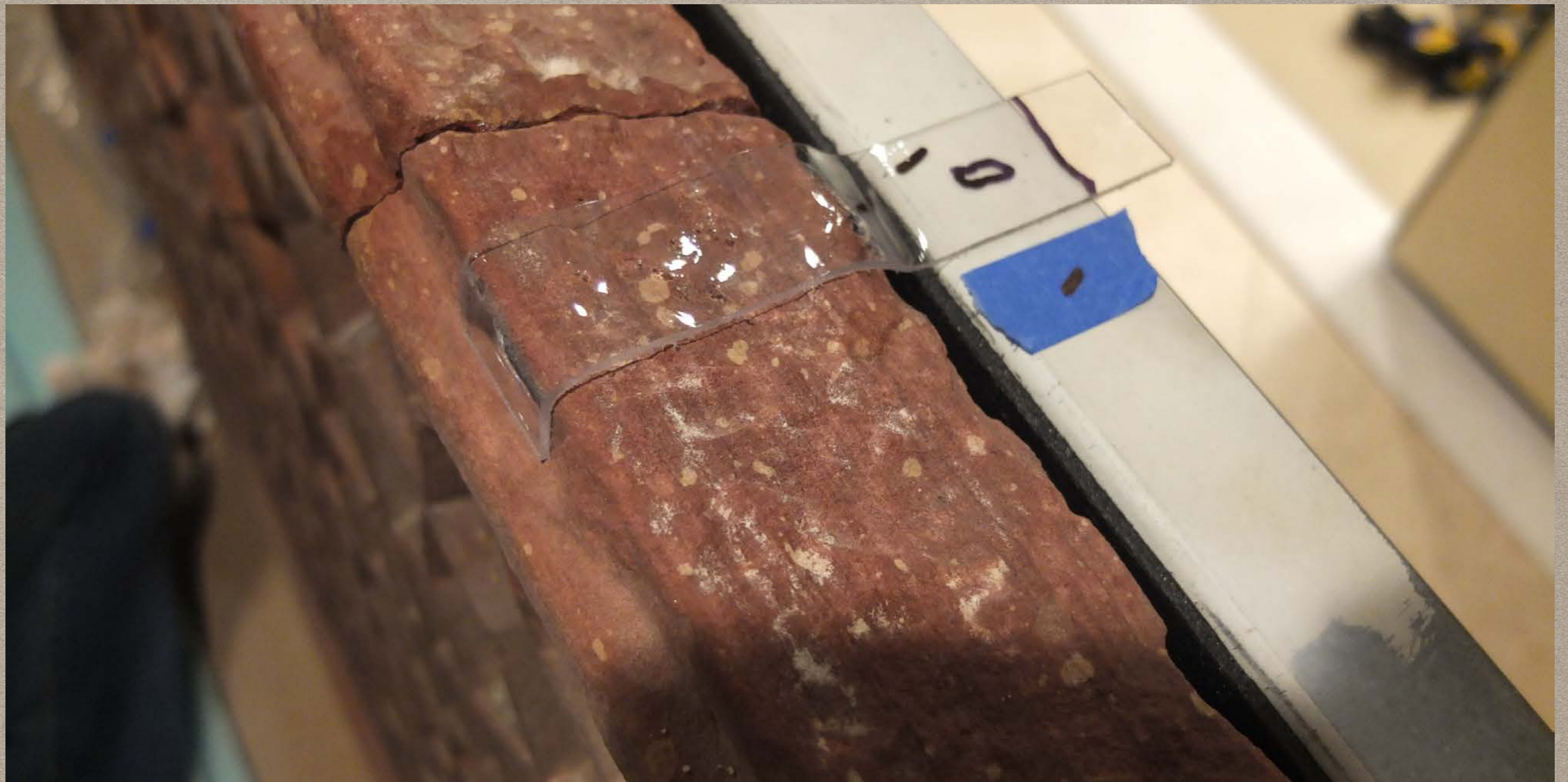






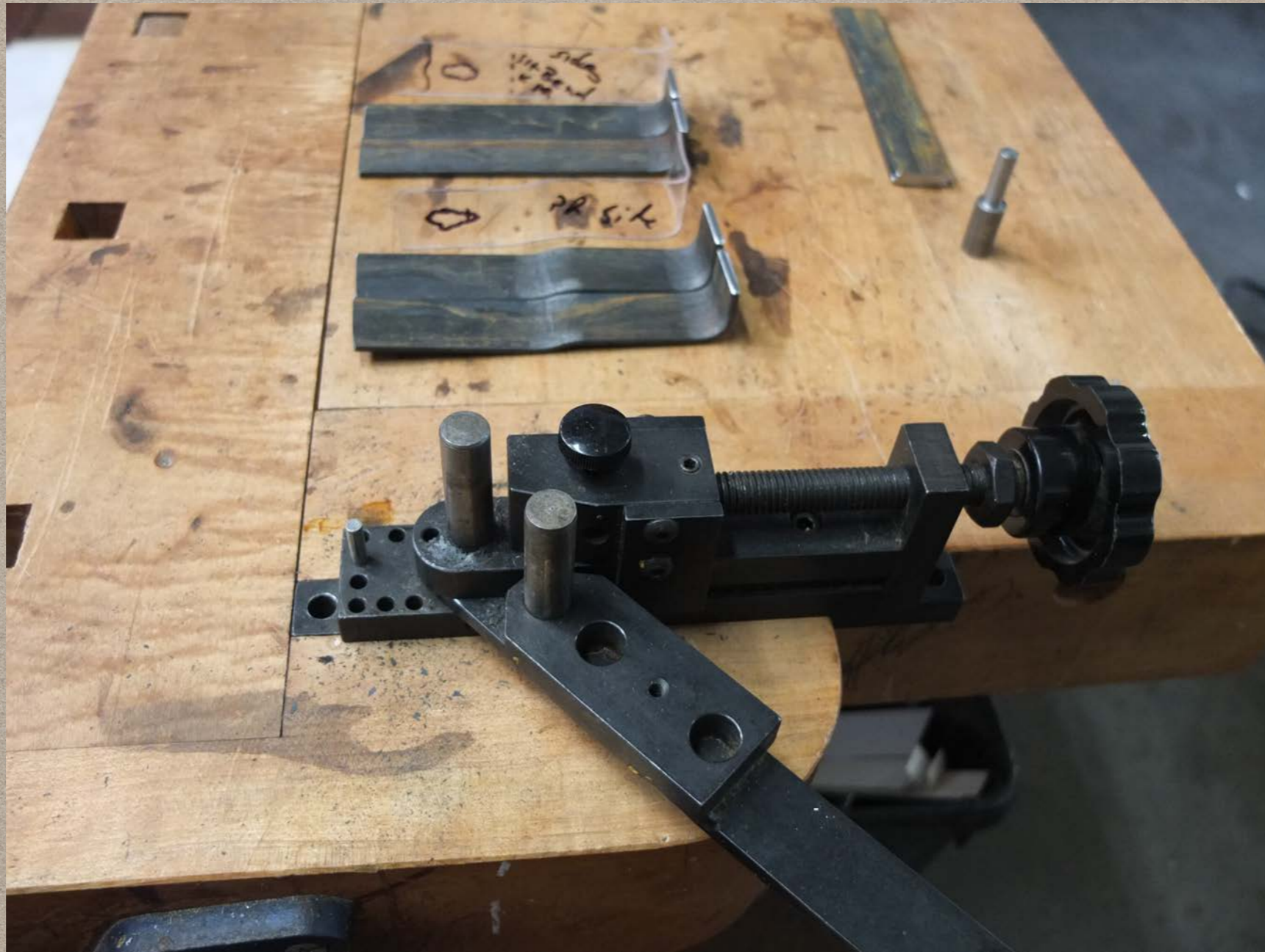
## **EPOXY PUTTY BASE SHIM**

THE REPAIRED JALI WAS RAISED WITH CLAMPS AND LOWERED ONTO A PLASTIC WRAPPED SLAB OF FRESH EPOXY PUTTY TO ELIMINATE POINT LOADS AND REGISTER THE LOWER SURFACE TO THE SUPPORTING LEDGE.



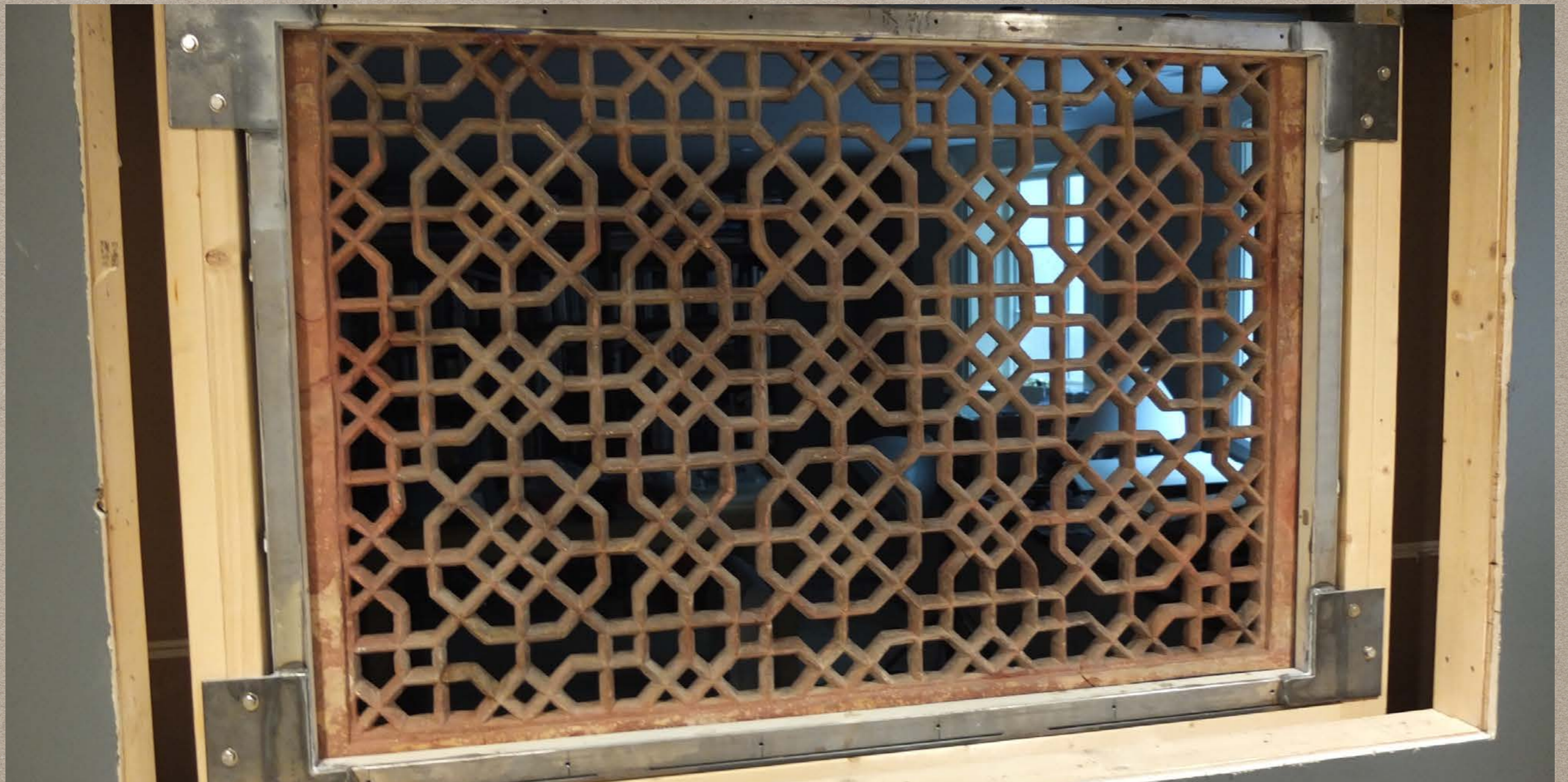
## **TEMPLATES FOR RETAINERS**

0.080" (2MM) VIVAK SHEET PLASTIC (PETG) WAS HEAT BENT TO CREATE TEMPLATES FOR FABRICATING STEEL RETAINING HOOKS.



**1" X 1/8" (25 X 3MM) STEEL  
COLD BENT TO TEMPLATE CONTOURS  
USING A DUO-MITE BENCH BENDER**





## **FINAL INSTALLATION VERSO**

**THE MOUNT AND OBJECT WERE LIFTED AND  
FASTENED INTO PLACE BY ARTWORKS FINE  
ART SERVICES OF SEATTLE.**



**FINAL INSTALLATION FRONT VIEW  
OPENING TO BE TRIMMED WITH DECORATIVE  
MOLDING AND THE JALI BACKED WITH A  
BLACK ULTRASUEDE COVERED PANEL.**

# I'D LIKE TO THANK:

- Linda Roundhill of Art and Antiquities Conservation LLC, Woodinville, WA USA
- Our clients who shepherd this object and others in their care as true world treasures
- Helen Walker and all the organizers of the Sixth International Mountmaking Forum
- The Natural History Museum London
- Betsy Brown, my dear wife and friend, whose support and encouragement allows me to do this level of work