TEXAS HISTORICAL COMMISSION
real places telling real stories
### Gordian 2018 Facilities Construction Costs, RS Means, p. 361

<table>
<thead>
<tr>
<th>Material</th>
<th>Labor</th>
<th>Equip.</th>
<th>Subtotal</th>
<th>Total w/OHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud wall, non-load-bearing 25 ga. X 3-5/8” metal studs, with 3.4 lb. metal lath, 3 coat gypsum plaster, 2 sides</td>
<td>2.47</td>
<td>6.70</td>
<td>.42</td>
<td>9.59</td>
</tr>
<tr>
<td>Stud wall, 8’-12’ high with 1/2” interior gypsum board; 1-1/2 hour fire resistive, 2 layers, on non-load-bearing 25 ga. X 3-5/8” metal studs, 16” o.c., tape &amp; finish 2 sides.</td>
<td>1.95</td>
<td>3.24</td>
<td></td>
<td>5.19</td>
</tr>
</tbody>
</table>
Plaster & drywall product sales comparison for 2017

According to Statista.com, approximately

25 Billion sq ft

of wallboard products were sold in the US in 2017.

25,000,000,000 sq ft of drywall would cover a room

25’ x 25’ x 47,348 miles high, or

1/5 of the way to the Moon (238,900 miles).

Comparable information for traditional plaster products has been much harder to isolate, so far.
OBSERVATIONS

2016 - 2018
Navarro County Courthouse, District Courtroom proscenium arch above Judge’s Bench, during restoration.

New panels cast from molds of original panels

Surviving panels from original construction
Navarro County Courthouse, District Courtroom “proscenium arch” above District Judge’s bench.
Navarro County Courthouse, District Courtroom plaster detail.
c. 1911-1915
Navarro County Courthouse
*scagliola*
plaster treatment –
faux marble

Plaster Restoration in Your Historic Building
Colorado County Courthouse, 1891. District Courtroom ceiling in ornamental plaster with stained glass dome, constructed after 1909 Hurricane.
Colorado County Courthouse, 1891
Columbus, Texas –

Before and After the 1909 hurricane that destroyed the original clocktower and roof.
Cooke County Courthouse, 1911
Ornamental plaster.
Cooke County Courthouse, Ornamental plaster reconstruction.
Newton County Courthouse, minor plaster damage.

Milam County Courthouse, plaster damage, more advanced.
Longterm damage, Llano County Courthouse.
Recent ceiling damage from Hurricane Harvey, Lavaca County Courthouse.

Longterm ceiling damage, San Saba County Courthouse.
More longterm damage.

Longterm damage, Harrison County Courthouse.
And more. And when you thought it could get no worse….
It does.

Notice the horizontal grooves in structural clay tile beneath the plaster. More on this later.
INQUIRY

Is there a better way to improve plaster durability on mass walls constantly vulnerable to moisture?

What are the current best practices for plaster repair?
ANSWER, Part A

Inspect and maintain roof drainage, gutters, and downspouts, watertight and flowing freely. This will increase the longevity of old and new building materials, and reduce chances for masonry wall saturation and damage to interior finishes of the exterior wall.

Behold, the hydraulic boom lift. Approx. $1500 for 1-day rental with delivery and pick-up.

Plan for minor irrigation and lawn repair.

Schedule this inspection to coincide with maximum accumulation of leaves & tree debris, depending upon the species of trees near the building – once or twice a year.
Know the plaster basics.

Ingredients: lime, gypsum, sand, fiber + water
Type of Application: 3-coat, 2-coat
Substrates: laths, masonry
PLASTER INGREDIENTS

LIME: Manufactured substance from processed limestone, shells, dolomite…

Originally the principal binder of plaster mix.

Limitation: Very slow setting means paint must wait. This is an intolerable condition in a deadline-driven construction environment.

GYPSUM: Mineral mined from the Earth. Late 19th century, gradually became principal binder of the plaster mix – faster setting.

Limitation: Vulnerable to water damage.

Lime and Gypsum are still used together in plaster for their combined benefits.

AGGREGATES: Act as filler, increases dimensional stability, reduces shrinkage and cracking as plaster cures, provides texture and color

FIBER: Prevents excess plaster loss as “keys” form behind lath. Synthetic or natural – cellulose or animal hair

WATER: The right amount to form a hand-tool applied surface finish
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Fayette County Courthouse, La Grange, 1891

Lavaca County Courthouse, Hallettsville, 1899
Traditional multi-coat plaster

**SCRATCH COAT**
- LIME: none
- **GYPSUM PLASTER**: 100 lbs
- SAND: 18 shovels-full
- FIBER: One big handful

**BROWN COAT**
- LIME: none
- **GYPSUM PLASTER**: 100 lbs
- SAND: 25-30 shovels-full
- FIBER: none

**FINISH COAT**
- LIME: Type S, 100 lbs
- **GAUGING PLASTER**: 50 lbs
- SAND: none
- FIBER: none

From the Old House Journal. Illustration by Rob Leanna, based on Kathy Bray.
Plaster Restoration in Your Historic Building

Photo by Old Town Home
Plaster Restoration in Your Historic Building

Photo by ProTradeCraft
Expanded metal lath for 3-coat plaster application over existing brick wall.

“Scratch coat” forms the first base coat.

Hardeman County Courthouse
Wall damage reveals horizontal rib pattern of structural clay tile designed to function like a scratch coat, allowing only a 2-coat plaster wall finish, consisting of ‘brown coat’ and finish coat.
Types of Lath

Original wood lath for plaster underside of wooden stair.

Expanded metal lath for 3-coat plaster application in new wall construction.
San Saba Co. Courthouse. Original wood lath for plaster underside of wooden stair to balcony.

Fulton Mansion, Rockport, TX. Original wood lath for plaster ceiling.
Traditional wood lath for plaster wall of stairwell.

Notice the ooze of plaster base coat, forming a strong “key” with the lath.
Expanded metal lath and integral vent for plaster soffit replacement by Burt.
CURRENT PROJECTS

Lynn County Courthouse, Tahoka, TX

San Saba County Courthouse
CURRENT PROJECTS

Lynn County Courthouse, 1916
Main hallway
Non-original lay-in ceiling conceals original plaster ceiling and stenciling above, to be restored.
District Courtroom Balcony, concealed above dropped ceiling, before restoration.
Close-up of original plaster ceiling, crown mold, stenciling, and some moisture damage.
Temporary work platform for District Court ceiling access supported on scaffolding below in courtroom.
General repair of damaged plaster, and ‘trenching’ to conceal new electrical wiring in conduit.
Lime + molding plaster + fiber, sets faster, for repairs in place.
Lime + molding plaster, crown mold repair.
“Pushing the Mule”
Damaged and missing ornamental plaster dentil molding.

Terra Cotta
Dentil molding removed for casting replacement piece.
Dentil molding replacement installed January 10, 2019.
Plaster Restoration in Your Historic Building
Damaged and missing ‘egg and dart’ plaster molding.
New cast of ‘egg and dart’ plaster molding.
Pure molding plaster, with fiber.
Plaster Restoration in Your Historic Building
Lime + gauging plaster, sets slower.

Scored plaster to simulate tile.
San Saba County Courthouse
1st Floor Conditions before plaster restoration
1st Floor Conditions before plaster restoration
1st Floor Conditions before plaster restoration
San Saba County Courthouse Plaster Analysis

<table>
<thead>
<tr>
<th></th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
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<tbody>
<tr>
<td>Total thickness</td>
<td>3/8”</td>
<td>1”</td>
<td>7/8”</td>
</tr>
<tr>
<td>Number of coats</td>
<td>TWO</td>
<td>ONE</td>
<td>TWO</td>
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</table>

**FINISH COAT**

<table>
<thead>
<tr>
<th></th>
<th>Thickness</th>
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</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>1/8”</td>
<td>1”</td>
<td>5/32”</td>
</tr>
<tr>
<td>Paste composition</td>
<td>Gypsum &amp;</td>
<td>Gypsum</td>
<td>Gypsum and hydrated lime, partially carbonated</td>
</tr>
<tr>
<td></td>
<td>crushed stone fines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber</td>
<td>None</td>
<td>Animal hair</td>
<td>Animal hair, trace</td>
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</table>

**BASE COAT**

<table>
<thead>
<tr>
<th></th>
<th>Thickness</th>
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</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>1/4”</td>
<td>No base coat</td>
<td>11/16”</td>
</tr>
<tr>
<td>Paste composition</td>
<td>Portland cement with Minor hydrated lime</td>
<td>Gypsum &amp; crushed stone fines</td>
<td></td>
</tr>
<tr>
<td>Fiber</td>
<td>Animal hair</td>
<td></td>
<td>Animal hair</td>
</tr>
</tbody>
</table>

From Plaster Analysis by Derek Cong, Ph.D. Wiss, Janney, Elstner Associates, Inc. 2018.
Solid plaster partition, with metal lath embedded between plaster coats. Total thickness = 2-1/4”.

New stud wall construction.

Wood ‘ground’ for trim attachment.

Scored gauging plaster on metal lath.

Veneer plaster on drywall.
Lime + gauging plaster.
Tools of the Trade

Plaster Restoration in Your Historic Building