



ROCKY MOUNTAIN MASONRY INSTITUTE

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ROCKY MOUNTAIN MASONRY INSTITUTE

**MAINTENANCE AND
REPAIR OF OLDER
MASONRY BUILDINGS**



**SO YOU BOUGHT AN OLD
MASONRY BUILDING...NOW WHAT**

- **Cleaning**
- **Tuckpointing**
- **Repair & Maintenance**

**FOR MORE INFORMATION OR TECHNICAL ADVICE CALL
303-893-3838 OR EMAIL DIANET@RMMI.ORG**



TESTING AGENCIES

Hauser Laboratories
720-406-4800
www.hauserlabs.com

Testing of paint substrates

CTC-Geotek
303-698-1050
www.ctcgeotek.com

Engineering testing & inspection of
concrete, masonry, soils

Atkinson-Noland & Associates
303-444-3620
www.ana-usa.com

Consulting engineering, inspection
services, and materials testing.
Specializing in non-destructive, on-
site testing of masonry buildings.

CTL-Thompson
303-825-0777
www.ctlthompson.com

Consulting engineering, inspection
services, and materials testing

Wiss Janney Elstner Associates, Inc.
303-914-4300
www.wje.com

Consulting engineering, inspection
services, and materials testing

**FOR MORE INFORMATION OR TECHNICAL ADVICE CALL
SPECIALTY MASONRY CONTRACTORS
(INCLUDING TUCKPOINTERS)**

Olde English Masonry
303-469-6750
www.oldeenglishmasonry.com

Historic restoration, matching expert
with brick and mortar

King Masonry, Inc.
719-591-0353
kingmasonry@mailsvc.com

Masonry restoration, specializing in
commercial, industrial, institutional
and governmental projects of any
size.

Denver Masonry LLC
720-329-4610
www.5280masonry.com

Historic restoration

Rock and Company
303-637-9230
www.rockandco.com

Stone restoration

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MAINTENANCE

Water is the natural enemy of masonry. Water infiltration is the number one cause of premature failure of brick or stone. Masonry walls are designed to shed water from a vertical surface. Any horizontal ledges allow rain and snow to slowly seep into the brick or stone.

Saturated masonry can fracture during Colorado's many freeze-thaw cycles. Regular maintenance of copings, flashings, window sills, gutters and downspouts is the most important step you can take to extend the life of your brick or stone structure. Do not attempt to repair a deteriorating masonry wall until you have first corrected the drainage problem which caused the deterioration. Look at the building after a rainstorm. Wet patches of wall and puddles of standing water will lead you to the problem.

Specifically check:

- Parapets
- Chimneys
- Flashings
- Roofing Membranes
- Window Sills
- Gutters & Downspouts
- Sidewalks which slope towards (instead of away from) the base of the building
- Landscape sprinklers which soak the base of the building
- Porches without scuppers to drain away rainwater



Once you have ensured that the wall is dry and sound, you can perform repairs.

Masonry repair is rarely a job for amateurs. Your repair is supposed to look good and weather well. A botched repair job can ruin the integrity and appearance of your building. Take the time to search out good craftsmen. Ask for references and check them out. If done properly, masonry repairs will last for decades.

SPECIALTY MASONRY CONTRACTORS (INCLUDING TUCKPOINTERS)

Cornerstone Restoration
303-830-2223
www.cornerstonebrick.com

Residential tuckpointing; expert in mortar matching; rebuilding chimneys; structure repair

A.P. Eberlein Company
970-535-9380

Commercial Masonry Restoration; stonework.

Brick Art Restoration
303-722-2690

Masonry repair & restoration, including tuckpointing, brick replacement

Building Restoration Specialties
303-297-2004
www.brsrestores.com

Commercial historic preservation

ANCHORS & TIES (MANUFACTURERS)

<p>Hilti 800-879-8000 www.hilti.com</p>	<p>Epoxy anchors, expansion anchors</p>
<p>Cintec 800-363-6066 www.cintec.com</p>	<p>Grouted anchors & reinforcement</p>
<p>Helifix North America Corp. 330-562-2647 www.helifix.com</p>	<p>Helifix Retrofit Ties</p>
<p>Hohmann and Bernard 800-645-0616 www.h-b.com</p>	<p>Masonry ties available at Rio Grande and Three-wit Cooper.</p>
<p>Heckmann 800-621-4140 www.heckmannbuildingprods.com</p>	<p>Masonry ties available at Rio Grande and Three-wit Cooper.</p>
<p>Halfen 303-596-9556 www.halfenusa.com</p>	<p>Anchoring systems</p>

TUCKPOINTING / REPOINTING

Tuckpointing is the process of removing and repairing damaged sections of mortar. It is important to repair cracked mortar joints. A gap in the integrity of the surface of the wall allows windblown rain to enter the joints during a storm. If the water freezes, it expands and enlarges the crack. Water entering the wall can eventually fracture the masonry. Do not repoint an entire wall. The damage is usually limited to a specific area which was exposed to severe weathering or water infiltration.

Replacement mortar should match the original mortar in color, texture, joint profile and strength. Although buildings built before 1900 typically did not use Portland cement, up to 10% of the lime content of the mortar can be Portland cement without damaging the wall. This small amount of Portland cement makes the mortar more workable. A higher amount of Portland cement will produce a stiff, inflexible mortar which will deteriorate the surrounding bricks. The National Trust for Historic Preservation recommends Type O mortar for face brick with exterior exposure. Type O mortar is very soft but has great bond strength.

Before attempting a tuckpointing job, you should try our several different colors of mortar to find the perfect match. These test lines are usually applied to the existing wall in the vertical joints. Mortar should match when wet as well as when fully dried. This color matching is an artform. Much of the success of your repointing project depends upon the artistry and craftsmanship of your mason. Not all masons are qualified tuckpointers. It is a specialty. Ask for references and check them out.

Remove the lines of damaged mortar with a small hand-held rotary grinder or a hammer and chisel. Do not use a large saw which is hard to control and can damage the brick. The cut-out joints should be twice as deep as they are wide. Wash the wall with water to remove dust and to promote proper bond between the new mortar and the brick. Pack the joint with new mortar. If it is a deep joint, pack the mortar in several layers. When the mortar has set up to a "thumb print stiffness" use a metal tooling sled to finish the joint so the profile of the mortar matches the surrounding joints. Clean away excess mortar and lightly wash the wall with water.

After the mortar has fully cured (24 hours), lightly scrub the wall with a mild acid solution and a natural bristle brush to remove the haze. Wash the wall with water to neutralize the acid bath.

CLEANERS, PAINTS, SEALERS AND CONSOLIDANTS

CLEANING



All types of cleaning are hard on masonry walls. Cleaning should only be attempted if the layer of dirt is actually harming the wall. Acid rain trapped at the face of the wall by encrusted dirt can eat away at the face of the brick. If cleaning is necessary, do several tests to determine which cleaning procedure and solution will be most effective.

Choose the gentlest method which

will do the job economically.

Harsh abrasive cleaning removes the tough weather-resistant surface of the masonry along with the dirt. Under no circumstances should you ever sandblast a wall which will be exposed to the weather. Sandblasting can significantly shorten the expected lifespan of a masonry building.

Acid based solutions are typically used to clean granite, slate, sandstone and unglazed brick. Alkaline solutions work on acid-sensitive materials like marble, limestone, glazed brick and terra cotta. A poultice of anhydrous clay and cleaner is sometimes used to draw out stains which have soaked deeply into the stone.

Most cleaners should be applied with water and a low pressure (400 p.s.i.) wash. It often helps to pre-treat the wall by soaking it with a fine spray of water for 24 hours before attempting cleaning. This loosens the encrusted dirt.

You should not clean a building if there is a danger of frost before the wall can thoroughly dry out. Moisture trapped in the wall during a cold snap can cause the brick or stone to fracture. Be sure wash the wall thoroughly after cleaning to neutralize the harsh cleaning chemicals. Protect windows, wood trim and landscaping from the cleaning solutions.



ProSoCo
720-490-5922
www.prosoco.com

Full range of masonry cleaners, sealers, coatings, and consolidants, including special restoration products. Good technical advice, too. Products can be purchased locally through Rio Grande Co..

Peel-Away Stripper
www.diamondchemicals.com

“Peel Away” Paint Stripper with evaporation-retarding film. Available locally through: Diamond-Vogel, Glidden, and Sherwin-Williams distributors.

Rio Grande Company
303-825-2211
www.riograndeco.com

Full line of masonry construction products, including tools, paint strippers, restoration cleaners, sealants, mortar colorants, sand, construction grouts, anchors & ties, etc. Also carry Thoro-Sheen masonry paint (75% transmission rate) and ProSoCo BMC (90% transmission rate).

Smalley & Company
303-744-7289
www.smalleyandcompany.com

Sells Dow All-Guard (92.3% transmission rate; 12.3 perms) and Sikagard Elastocolor (90% transmission rate; 12 perms). Masonry coatings can be ordered. They are not stocked.

MORTAR MATCHING

U.S. Mix
303-778-7227
www.usmix.com

Masonry mortars; custom mortar adjusted for color and material matching.

Quikrete of Colorado
303-429-2111
www.quikrete.com
www.specmix.com

Masonry mortars; custom mortar adjusted for color and material matching. Minimum custom batch is one pallet (35 bags).

BrickImaging
303-255-2130
www.brickimaging.com

Resurfacing and/or staining of masonry for graffiti removal and for matching of old work to new work. Stain is a permanent, breathable way to change the color of brick, block, stone and mortar.

Rio Grande Company
303-825-2211
www.riograndeco.com

Custom mortar batching. Call Chuck Foote for information.

Threewit-Cooper Cement Co.
303-246-1666
www.threewitcooper.com

Full line of masonry construction products, including tools, mortar colorants, sand, grout, anchors, ties, etc.

PAINTING

One of the joys of owning a masonry building is that it doesn't need painting. If possible, leave a masonry building naked. If you must paint, use a product which has a high water vapor transmission rate so moisture will not be trapped in the wall behind the paint. Look for a paint with a high Permeability Factor. Most latex paints have a perm rating of 5 or 6. Oil-based paints have even lower perm ratings. BASF's ThoroSheen, Dow Corning's All Guard and ProSoCo's Breathable Masonry Coating are paints specifically designed for



use on masonry. They have perm ratings of 9 or 10. A high perm factor indicates a paint with a high capacity to transmit water vapor.

It is important that the surface you intend to paint is sound. For best results, the new layer of paint should be the same type paint as the top layer of existing paint. Multiple layers of paint increase the likelihood that your new paint job will fail prematurely. Testing the stability of the base layers of paint is expensive, but it is cheaper than repainting the whole building in a year or two.

Chemical strippers are the best way to remove old paint. If there is a possibility of lead paint on the building, use a chemical stripper which is covered with an evaporation-retarding film. The stripper and the loosened layers of paint cling to the film as it is removed. This keeps the dangerous lead particles safely encapsulated. Chemical stripping is usually done by the painting contractor.

REPAIRING SPALLED OR FLAKING STONE

The first choice is to replace the damaged stone with a new piece of stone, cut from the original quarry. Unfortunately, this is almost never possible. Even if matching stone can be found, replacing with original materials is usually too expensive. Sometimes the damaged stone can be removed from the wall and reset with the inside facing out. This exposes new undamaged surfaces to the weather.

If the damaged areas are small, patches of cementitious material can fill in the gaps. If the patch is to be successful, the mason must first cut away any loose and damaged stone around the patch and must score the back of the area to receive infill to make sure the patch will adhere to the old stone. The patch must be softer than the surrounding stone to ensure that the repair does not deteriorate the wall further. If reinforcement is used, it should be non-corrosive. Stainless steel reinforcement is best.

Sometimes entire panels of stone are replaced with substitute materials. The new material should match the color, texture and wearability of the stone as closely as possible. Cast stone and precast concrete are often used to imitate stone. GFRC (Glass Reinforced Fiberglass Concrete) is another replacement possibility. Gray or white stone is usually matched more successfully than colored stone.

Stone consolidation is used to replace the natural binders which time and weather have stripped from the stone. These chemical binders are spray-applied to the damaged stone in several successive layers, penetrating deeply into the material. This process works better on some types of stone than it does on others. Laboratory testing is required to determine the appropriate consolidant as well as the number of coats required for adequate penetration. This process not only prevents further deterioration, it can also raise the compressive and flexural strength of the damaged material.



BRICK & TERRACOTTA

General Shale—Robinson
303-783-3000
www.generalshale.com

More than 80 colors of new brick available to help match old brick; tumbled brick available; custom runs possible.

Summit Brick & Tile Co.
303-592-7080
www.summitbrick.com

Many shapes and sizes of new brick & pavers available.

Acme Brick Company of Denver
303-688-6951
www.brick.com

Many shapes and sizes of new brick & pavers available.

Interstate Brick
303-292-2345
www.interstatebrick.com

Basalite is the Colorado distributor for Interstate Brick products; new terracotta architectural building products; concrete masonry units.

STONE, CAST STONE & PRECAST PRODUCTS

Gallegos Corporation
 303-753-1021
www.gallegoscorp.com

Gallegos Corp. can fabricate & install all types of natural stone, including sandstone, limestone, granite, marble
 RMMI Member

Camp's Rocky Mtn. Cut Stone
 303-429-3357
www.camp-stone.com

Many types of natural stone

Pine's Stone Company
 970-945-2940
www.pinestoneco.com

Many types of natural stone

Telluride Stone Company
 303-388-8863
www.telluridestone.com

Many types of natural stone

Haddonstone
 719-948-4554
www.haddonstone.com

Cast stone building products and architectural ornaments

OTHER RESOURCES

TECHNICAL INFORMATION (INCLUDING CIVIC & PROFESSIONAL ORGANIZATIONS)

Colorado State Historic Fund
 303-866-2825
www.historycolorado.org

Technical & historical library; preservation grants; distributors of National Park Service *Preservation Briefs*; coordinators of National & State Registers of Historic Places; architectural & craftperson referrals

American Institute of Architects
 Colorado & Denver Chapters
 303-446-2266
www.aiacolorado.org

Architectural referral service; design publications; preservation advocacy

Historic Denver
 303-534-5288
www.historicdenver.org

Nonprofit preservation advocacy & educational organization; technical & historical information available to members

Rocky Mountain Masonry Institute
 303-893-3838
www.rmmi.org
 Diane Travis, Technical Director

Masonry trade association; technical information and assistance on masonry design & construction; educational programs; contractor and product referrals

FOR MORE INFORMATION OR TECHNICAL ADVICE CALL

Atkinson-Noland & Associates
303-444-3620
www.ana-usa.com

Consulting engineers, specializing in evaluation and strengthening of masonry buildings.

Building Seismic Safety Council
202-289-7800
www.bssconline.org

How to build buildings to withstand earthquakes

Colorado Preservation, Inc.
303-893-4260
www.coloradopreservation.org

Statewide private non-profit preservation organization; technical information & assistance; education programs; public policy participation

The Masonry Society
303-939-9700
www.masonrysociety.org

Professional masonry engineering society; research & technical information on masonry materials & structural design

National Trust for Historic Preservation Mountains Plains Office
303-623-1504
E-mail: mpro@nthp.org
www.nationaltrust.org

National nonprofit preservation organization; financial assistance and technical support for important historic preservation projects; periodical publications and books; preservation advocacy

Association for Preservation Technology International
www.apti.org

Publishes the Journal of Preservation Technology

ROCKY MOUNTAIN MASONRY INSTITUTE

Brick Industry Association
703-620-0010
www.bia.org

Technical Notes and other publications on all aspects of brick design, construction, maintenance and repair. (BIA Tech Notes are now available online) BIA publications can be ordered directly from their web site.

National Concrete Masonry Association
703-713-1900
www.ncma.org

Technical notes, publications & technical assistance on all aspects of CMU design, construction, maintenance and repair. NCMA publications can be ordered directly from their web site.

Denver Central Library
720-865-1111
www.denverlibrary.org

Access to extensive collections of architecture and preservation materials through Inter-Library Loan Program (available to Denver residents only)

Tattered Cover Bookstore
303-436-1070
www.tatteredcover.com

Extensive collection of architectural books

Building Stone Institute
866-786-6313
www.buildingstoneinstitute.org

Technical information about natural stone