CITY OF PATERSON

Downtown Commercial Historic District

Design Guidelines

MASONRY, STUCCO & CONCRETE

This building on Washington Street demonstrates how masonry can be used visually as a structural statement, as well as delicate ornamentation that reinforces the building's character defining features.

PURPOSE OF GUIDELINES

- Identify masonry as a key architectural building feature
- Provide guidance regarding masonry problems
- Encourage retention and maintenance of historic masonry so that it continues to serve as a key architectural feature and protective wall system

These *Guidelines* were developed in conjunction with the City of Paterson's Historic Preservation Commission (HPC) and with input of many diverse stakeholders. Please review this information during the early stages of planning your project. Familiarity with this material can assist you in moving a project quickly through the approval process, saving you both time and money. The HPC staff is available for informal meetings and to provide you with valuable information as you consider making improvements to your property.

Additional *Guidelines* addressing other historic building topics are available at 125 Ellison Street, Suite 408 and on the City's website at www.patersonnj.gov. For more information, to clarify whether your project requires HPC review, or to obtain permit applications, please call the HPC staff at (973) 321-1355.

EXTERIOR MASONRY, STUCCO & CONCRETE

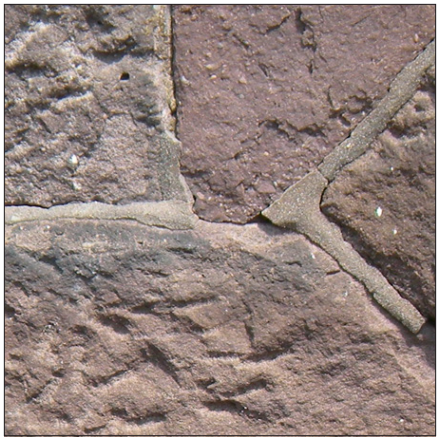
Following the Great Fire of 1902, much of the Downtown Commercial Historic District was reconstructed in masonry, a relatively fireproof material. As such, masonry is considered an important character-defining material in the area. For the purposes of these *Guidelines*, exterior masonry includes stone, brick, and stucco, as well as concrete and concrete block. Historically, a building's exterior masonry surface serves both visual and functional purposes. Visually, it is an important design feature that establishes the rhythm and scale of a building. Historic exterior masonry:

- Acts as an important design feature, helping to define a building's architectural style
- Establishes a building's scale, mass, and proportion
- Adds pattern and casts shadows on wall surfaces

Functionally, historic exterior masonry and concrete typically acts as the principal load bearing system of the building, as well as its "skin," shedding water and deflecting sunlight and wind. Historic exterior masonry:

- Acts as a principal element in the structural system
- Establishes a weather-tight enclosure, providing protection from rain, wind, and sun

20th Century Brick - A hard, dense, fired-clay, regularly shaped building component; sometimes with a glazed surface; used primarily in walls, piers, foundations and exterior pavers.

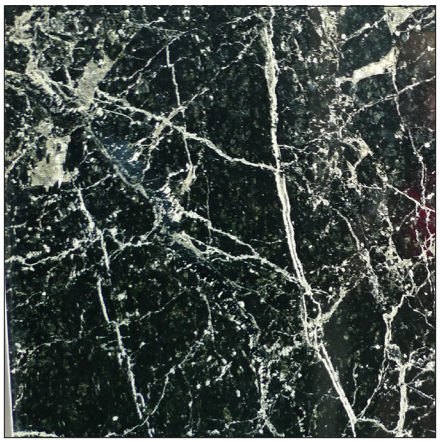


Brownstone - A reddish brown sandstone used as a building material, popular in the late 19th century.

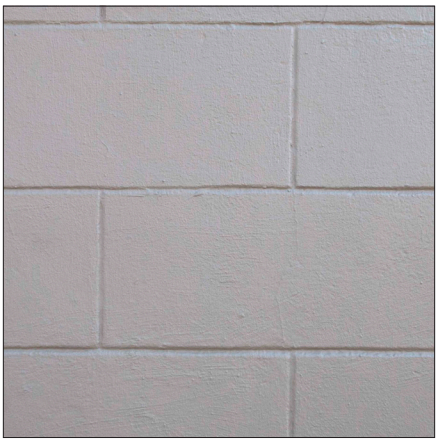
Terra Cotta - A fired-clay, non-structural building component, often with colored glaze, used for decorative, ornate details and wall finishes.

Limestone – A sedimentary rock; used for building walls, window sills and lintels, ornamental stone, sculpture and for producing lime.

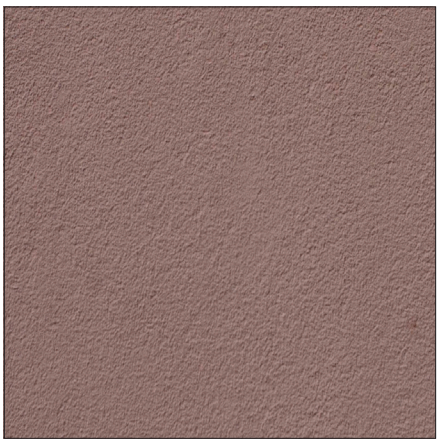
Granite – A hard rock, consisting of small, yet visible, grains of minerals, which can be highly polished or textured; used for walls, piers and street curbs; commonly in gray, black and pink.



Marble – Typically fine grained and able to be highly polished; has a wide range of colors and patterns; used for steps and stoops, statuary and fine masonry.



Scored Stucco - Smooth finish with scoring to simulate stone joints.



Dash Finish Stucco - Textured finish with pronounced aggregate at the surface.

Concrete Block - A structural building material made by mixing water, cement, sand and aggregate, placing the mix in forms and hardening; commonly used for foundations, walls and piers.

COMPONENTS OF MASONRY WALLS

Masonry walls, foundations, and piers were historically constructed of stones, bricks, hollow clay tiles, or concrete blocks stacked on top of each other. The individual units were bonded by mortar, which served to hold the masonry units together and fill the gaps between them. Historically the masonry was load bearing, meaning it carried its own weight to the ground as well as the load of other building elements such as walls, floors, and roofs.

STONE

Stone is a very common exterior wall material in Paterson, particularly for the commercial and institutional buildings constructed after the 1902 fire. The most common types of stone in Paterson are limestone, granite and marble. Limestone detailing is often found at brick buildings. Additionally, some of Paterson's buildings include brownstone. In the mid 20th century, stone veneers became popular, particularly at storefronts. Stone veneers are thin slabs of masonry (typically marble or granite), attached on an underlying structural support system or applied to a wall surface with mortar in various patterns including storefronts.

Rusticated limestone is often found at the base of buildings, particularly by those in the Renaissance Revival style.

BRICK

Bricks are made by inserting clay into a mold and then firing or baking the brick at very high heat. The result is a standardized unit, generally 8" by 4" by 2-1/4" in size. The color of brick can vary, but red is by far the most common. Other colors include yellow, orange and brown. The color is determined by the chemical and mineral content of the clay, and the temperature and conditions of the kiln or oven. Similar to the color, the strength or hardness of brick is determined by the clay ingredients and the firing method, but it is also affected by the way the brick is manufactured.

TERRA COTTA

Similar to brick, terra cotta is made of fired clay, often used for decorative ornamental details and wall finishes. It can have the color of red or yellow brick, or be fired with a clear or colored glaze. Terra cotta became popular in Paterson in the middle of the 20th century, and was often installed as a non load-bearing wall screen material at Mid-Century Modern buildings.

The way terra cotta is manufactured allows for a variety of shapes, forms, and colors. This example celebrates the Art Deco style.

CONCRETE MASONRY UNITS

Concrete masonry units (CMUs), also known as concrete blocks, are similar to bricks in that they manufactured in molds so they all are produced in standard sizes. They are made by mixing water, cement, sand and aggregate (small stones or pebbles), which is placed in forms to harden. The blocks are typically 8" by 8" by 16" in size and typically include voids.

Similar to brick, CMUs are typically stacked and bonded with mortar. They are most often laid in a running-bond pattern (the joints alternate so they are not all lined up.) They can also be formed in decorative molds that create varied patterns when used in construction. In some cases these building elements are structural, weight-bearing elements, and in others they are purely ornamental.

MORTAR

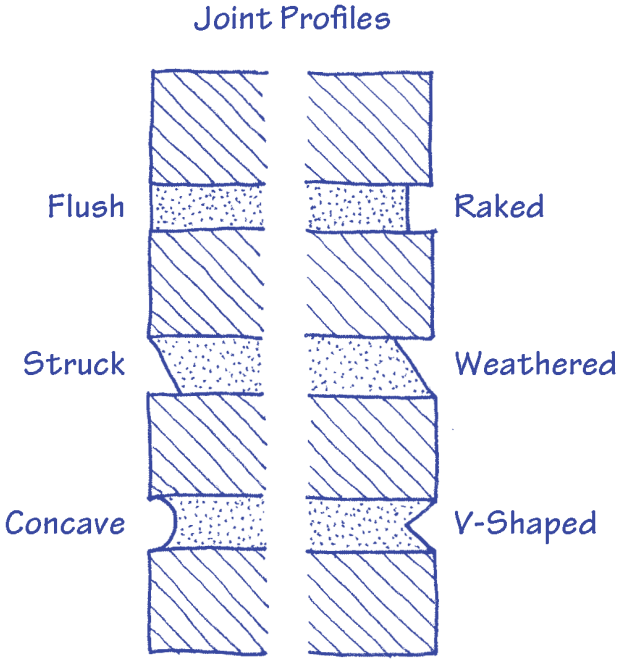
Historically, mortar was generally composed of a few ingredients: sand, lime, and water, and possibly additives such as animal hair or oyster shells. Starting in the mid 19th century, a small amount of Portland cement was added into the mix to improve the workability and hasten the setting time. In the early 20th century, the amount of Portland cement in mortar was increased, resulting in harder mortar corresponding with the manufacturing of harder bricks and concrete block.

Sand is by far the largest component of mortar and defines its color, character, and texture. Since masons would use products that were readily available, sand from historic mortars tended to have weathered, rounded edges and was available in a great variety of grain sizes and shades of white, grey and yellow. Most sand available today has sharper edges from being mechanically crushed and is separated into standard sizes. As a result, mixing several sand colors and sizes might be needed to match historic mortar.

Lime and Portland Cement act as binders for the mortar. High lime mortar is soft, porous, and varies little in volume with seasonal temperature fluctuations. Because lime is slightly water-soluble, high-lime mortars can be self-healing and reseal hairline cracks. By contrast, Portland cement can be extremely hard, is resistant to water movement, shrinks significantly upon setting and undergoes relatively large thermal movements. Portland cement is available in white or grey, and the two colors can be mixed to achieve a desired color. It is possible to add a small percentage of Portland cement to a high lime mixture to improve workability and plasticity. The proportion of Portland cement can generally be increased when repointing 20th century buildings or structures such as most of those found in Paterson.

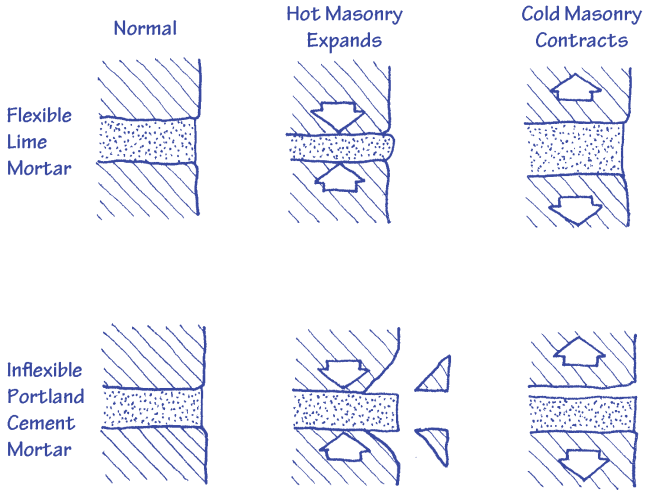
Water used in mortar needs to be clean and free of salts, harmful minerals and acid. If not, it can break down the mortar and adjacent masonry and discolor finished surfaces.

Additives historically included shells, animal hair and clay particles. To duplicate the character of historic mortar, it might be necessary to include additives to match the original. (Refer to *Page 5, Matching Historic Mortar & Stucco*.) It should be noted that there are several types of chemical additives available today including those that increase or reduce the setting time or expand the recommended temperature installation ranges. The use of newer chemical additives is strongly discouraged unless they have been specifically tested over an extended period of time with similar historic materials to the proposed installation conditions.



There are numerous joint profile types, with each producing different shadow lines and highlights. When repointing an area of masonry, it is important to tool mortar to match the existing joint profile for a consistent appearance.

MORTAR HARDNESS & MASONRY



Temperature changes cause masonry units to expand when heated and contract when cold. The expansion and contraction of the masonry units results in compression and flexing of the adjacent mortar joints.

Lime based mortar is pliable and is more likely to compress and flex through temperature cycles. If properly installed, it should also be softer than the adjacent masonry.

Portland cement based mortars are significantly harder than lime based mortars and far less elastic. In addition, cement mortars tend to be substantially harder than historic masonry. When masonry units expand in warm temperatures and when heated by the sun, they press against the harder cement mortar and tend to spall at the edges. During colder temperatures, masonry units tend to pull away from harder mortar, resulting in open cracks that can allow moisture penetration.

The mortar joints between bricks has deteriorated, particularly at the vertical joints, increasing the potential for mortar infiltration. The area at the lower right corner of the photograph has been recently repointed and mortar has been smeared over the surface of the brick rather than tooled. To maintain the historic appearance, it is recommended that the replacement mortar match the historic in appearance, color, texture, hardness, and joint profile.

REPOINTING HISTORIC MASONRY

Repointing work can be time consuming and expensive; however, it can last more than 50 years when completed properly. Repointing requires a great deal of hand labor by skilled craftsmen to remove the existing mortar without damaging adjacent masonry, achieve the appropriate mortar mix and hardness, apply the mortar, and tool it to match the historic joint style and appearance. As a result, it is generally recommended that repointing projects be limited to areas of deterioration rather than an entire building.

To achieve the best results, repointing work should be completed when the temperature ranges between 40˚F and 90˚F for at least two days after the installation of the mortar to help the mortar bond to the masonry. Mortar must be of a similar composition to the historic mortar, including hardness, color, and texture. In repointing projects, it is often recommended or could be required to have a mortar analysis completed by a laboratory to determine the proper mixture proportions for consistency, strength texture and color. It should be placed in joints in layers of no more than 3/8" thick and allowed to harden before additional layers are added. The final layer should be tooled to match the existing joint profile. (Refer to *Page 4, Joint Profiles.*)

MATCHING HISTORIC MORTAR & STUCCO

Most pre-mixed mortar available from hardware stores is generally inappropriate for historic masonry as it contains too much Portland cement and is too hard. The most exact method of matching historic mortar and stucco is to have it analyzed by a professional lab. The HPC Staff is also available to provide guidance based upon the type, location, and condition of the masonry.

TYPICAL CAUSES OF MASONRY PROBLEMS

The principal components of most unit masonry walls are stone, brick and, in Paterson, concrete block and terra cotta. Mortar, which is located between the bricks, stones, blocks, or terra cotta, bonds the individual units together, transfers the load through the masonry and provides a weather-tight seal at the exterior surface. Many problems associated with historic masonry result from the failure to keep masonry mortar joints in good repair. Deteriorated mortar joints can allow water to penetrate the masonry and cause severe interior and exterior damage. There are five principal causes of mortar joint failures:

Weathering of mortar occurs when rain, wind, and pollution eat away at softer historic mortar over time. (Historic mortar was purposely softer to allow the masonry wall to expand and contract with seasonal temperature changes.)

Uneven Settling of masonry walls, hurricanes, and seismic events may result in cracks along masonry joints or within masonry units.

Poor Original Design and Materials can cause ongoing problems if the masonry and mortar are incompatible or inappropriate for their installation location, or if the masonry does not properly shed water.

Temperature Cycles can cause deterioration in Paterson's climate, which is subject to extreme heat in the summer and cooler temperatures in the winter. Temperature cycles can cause masonry and mortar to expand and contract at different rates, breaking the masonry's bond with the mortar. This situation can be much worse if moisture enters an open joint, potentially popping out the surface of the mortar and the masonry, resulting in spalling.

Insufficient Exterior Maintenance refers to potential areas that might cause water to enter a masonry wall and contribute to its accelerated deterioration. Potential areas of concern are: poorly functioning gutters, downspouts, and flashing; rising damp; standing water at foundations; water splashing back off paving and hard surfaces onto walls; or water-entrapping vegetation such as ivy or shrubs on or near masonry walls.

DEFINITIONS

Efflorescence: Water-soluble salts leached out of masonry or concrete by capillary action and deposited on a surface by evaporation, usually as a white, powdery surface

Spalling: Chipping or flaking of masonry, especially concrete.

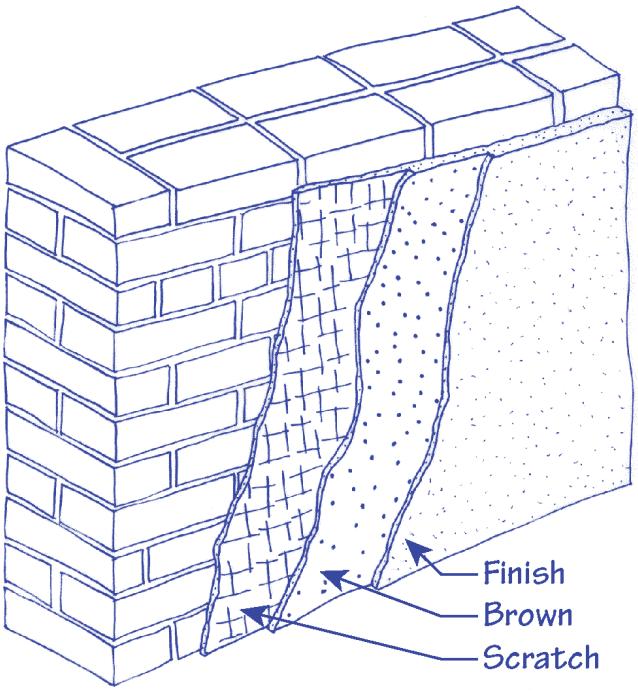
EXTERIOR MASONRY, STUCCO & CONCRETE CHECKLIST

Almost all buildings include some masonry, in some cases such as the Downtown Commercial Historic District it is used as a wall material, but even in wood-framed residential buildings it is typically used as a foundation, pier or chimney, which are masonry elements. Since masonry is often used as part of the structural system for older buildings, it is critical that it is maintained to prevent serious problems. For the best results, it is critical that all masonry and stucco repair and cleaning be conducted when the temperature is consistently between 40 and 90 degrees Fahrenheit. This will minimize potential spalling and problems associated with colder temperatures and shrinkage with warmer temperatures.

Sometimes it is unclear if masonry units or areas are detoriorated enough to be replaced rather than surface repaired. Consultation with a professional is strongly recommended because it usually costs less to fix a small problem now than to delay it into becoming a major expense later.

MATERIAL	INSPECTION REVIEW	RECOMMENDED ACTION
Exterior Walls - General	• Cracks in masonry wall	□ Can indicate differential or uneven foundation settlement or significant structural problems - consultation with an architect or structural engineer is strongly recommended, particularly if condition worsens □ Vertical or diagonal cracks or cracks that split individual bricks or stones tend to represent a more significant problem, such as differential settlement □ Horizontal cracks or hairline cracks limited to mortar joints or individual stones or bricks tend to be less severe □ Monitor and photograph condition after repair during each inspection to see if cracks return
	• Bows or bulges in wall plane • Leaning walls	□ Can indicate differential or uneven foundation settlement or significant structural problems - consultation with an architect or structural engineer is strongly recommended, particularly if condition worsens
	• Water ponding adjacent to foundation • Vegetation, such as shrubs, are located immediately adjacent to foundation • Vines growing on walls • Damp walls • Moss or algae on masonry surface	□ Verify water exiting from downspout is directed away from building foundation - install splash blocks or downspout extensions at base of downspouts □ Vegetation can trap moisture in masonry by blocking sunlight and air circulation - remove or thin vegetation close to a building or conduct regular inspections for algae and mold behind vegetation, remove vines □ Re-grade area adjacent to foundation to direct ground water away from building □ Clean moss or algae from wall surface with low pressure water, with the possible use of detergent and brushing
	• Efflorescence, i.e. water-soluble salts leached out of masonry and deposited on a surface by evaporation, usually as a white, powdery surface	□ Clean efflorescence from wall surface with low pressure water, with the possible use of gentle detergent and a natural bristle brush (not metal) □ Review area for possible additional sources of moisture
Mortar	• Soft and crumbling • Open joints or broken joint bonds	□ Consider patching with compatible mortar if area of deterioration is isolated - mortar should match original in appearance, profile, hardness and composition □ Consider replacement if deterioration is substantial

MATERIAL	INSPECTION REVIEW	RECOMMENDED ACTION
Stones & Bricks	• Spalling, chipping, flaking, cracking or crumbling of surface • Loose or missing stones or bricks	□ Consider patching with compatible materials if area of deterioration is isolated □ Consider replacement if deterioration is substantial
	• Pitted surface from sandblasting or pressure washing	□ Masonry with a damaged surface is more likely to absorb moisture leading to accelerated deterioration - consult a professional □ Monitor and photograph condition to see if it continues to deteriorate □ Review adjacent materials and interior finishes for signs of moisture infiltration and rot
Stucco	• Cracks in surface	□ Consider patching with compatible stucco if area of deterioration is isolated □ Consider replacement if deterioration is substantial □ Substantial cracks might indicate differential or uneven foundation settlement or severe structural problems - consultation with an architect or structural engineer is recommended, particularly if condition worsens
	• Bulges in wall	□ Verify keying of stucco / plaster to lath or underlying substrate - if wall area moves when pushed, stucco/ plaster is not bonded and should be replaced with compatible material to avoid potential surface collapse
Concrete	• Open cracks in concrete surface	□ Surface cracks can increase exposure of reinforcing bars to moisture and corrosion - consultation with an architect or structural engineer is recommended, particularly if condition worsens □ Substantial cracks might indicate differential or uneven foundation settlement or severe structural problems - consultation with an architect or structural engineer is recommended, particularly if condition worsens
	• Pitted surface from sandblasting or pressure wash	□ Concrete with a damaged surface is more likely to absorb moisture leading to accelerated deterioration - consult a professional □ Monitor and photograph condition to see if it continues to deteriorate
Painted Masonry, Stucco or Concrete	• Chalky or dull finish	□ Additional preparation might be required prior to repainting - preparation dependent on surface
	• Peeling, flaking, curling and blistering	□ Possible indication of a moisture problem - review drainage, potential leaks and whether there is a vapor barrier in the wall □ Paint failures near the roof edge, downspouts and porch ceilings and foundations are often the result of drainage problems
	• Paint surface worn	□ Similar to woodwork, painted masonry needs repainting every 5 to 8 years with compatible paint



Stucco was traditionally applied in three layers: the scratch coat; the brown coat; and the finish coat.

STUCCO

Stucco is a relatively inexpensive material that can provide a more finished appearance to brick, stone, or wood framed buildings. In some cases, the surface is scored to look like stone. It acts as a weather repellent coating, protecting the building from rain, sunlight, and wind, and can moderately increase its fire resistance. Stucco can also provide an insulating layer to a wall, reducing the passage of air, and improving a building's fire resistance.

In Paterson, stucco was traditionally applied at the time of construction over concrete and concrete block as a decorative protective coating. Beginning in the 20th century, it was also applied on wood-framed buildings in revival styles of architecture. It was a common exterior finish in Art Deco and Modern structures. Depending on the style of building, the texture of the stucco varies widely, from a smooth finish to textured, troweled, and Spanish-finish stuccoes.

Stucco was also applied on some buildings and structures, years after the original construction, as a remodeling material to vary the original appearance or to conceal deterioration.

The components of stucco are similar to pointing mortar and include sand, lime, Portland cement, water, and possible binders. In some cases, pigments were added to the mix to alter the finished color.

STUCCO APPLICATION

Stucco is essentially a layer of mortar held in position by the bond formed with the underlying material. Historically at masonry walls, one of the best ways to achieve a bond was to "rake-out" the mortar joints about 1/2" to form a groove that holds the stucco in place. (Refer to Raked Joint at *Joint Profiles*, *Page 4*.) When installed on masonry, stucco becomes an integral part of the wall when it sets. When stucco was installed historically on wood framed walls, the stucco was generally "hung" on strips of wood called lath that were nailed to wall studs. By the mid 20th century, metal lath replaced wood lath for stucco application on wood framed buildings.

A stucco wall surface is generally about 1" thick and applied in the following 3 coats:

1. The **Scratch Coat** is approximately 3/8" thick and applied directly to the wall surface. It is forced into the raked joints or pushed into the lath to provide a strong bond. The surface of the scratch coat is deeply scored to allow bonding of the brown coat.
2. The **Brown Coat** is also approximately 3/8" thick and finished with a wood float for a smoother surface.
3. The **Finish Coat** is generally about 1/4" thick with the overall thickness being determined by the finish style

PATCHING STUCCO

Similar to repointing mortar, stucco should be applied in moderate weather conditions, avoiding extreme heat, sun, and freezing temperatures. The final appearance should duplicate the existing as closely as possible in strength, composition, color and texture. Successful patching of stucco surfaces generally requires a skilled craftsman. Similar to stucco application, stucco repairs are applied in three coats. Similar to pointing mortar, if stucco patches are too hard, they could cause additional damage to the adjacent historic stucco surfaces or lead to the formation of cracks that can allow water migration into the wall.

When repairing stucco, hairline cracks can generally be filled with a thin slurry coat of the finish coat ingredients, while larger cracks need to be cut-out and prepared for a more extensive repair. Similarly, bulging wall surfaces need to be cut-out to a sound substrate. For the best appearance, the area to be patched should be squared off and terminated at a building joint or change in materials such as a window or door frame.

Repaired stucco will often need to be repainted for a uniform appearance. When selecting paint, it is important that the new paint is compatible with earlier coats of paint and the stucco material, and applied following the manufacturer's recommendations.

The crack from the window sill might be a sign of building settlement. Review wall for other signs of movement or settlement. Repair crack and apply a lime-based paint for a uniform appearance.

SYNTHETIC STUCCO

The Exterior Insulation and Finish System, or EIFS, is a synthetic stucco system that was popularized in the United States in the late 20th century. It generally consists of 3 layers:

- An inner foam insulation board secured to the exterior wall surface, often with adhesive
- A middle polymer and cement base coat that is reinforced with glass fiber mesh
- An exterior textured finish coat

One of the significant problems with EIFS is that it does not "breathe" and can trap moisture within the wall thickness. This can lead to powdering or melting of softer masonry and rotting of wood sills and framing. If the problem persists, mold and mildew can develop in the building, providing a perfect home for termites.

Although the surface of EIFS can be finished to match many types of stucco, there are some differences. In larger areas of wall surface, EIFS is typically installed with control joints or grooves to allow the surface to expand and contract with temperature changes. These joints are typically not needed with lime based stucco and can result in odd wall patterns. Also, if properly installed, EIFS should not come in contact with roofing, wood trim or porch floors to reduce the possibility of moisture infiltration. Instead, these joints are often filled with sealant that can crack and eventually allow moisture to penetrate.

Because of the differences in the visual characteristics of EIFS from stucco and the potential to harm historic building fabric, the application of synthetic stucco or EIFS at any designated building or structure is not permitted where visible from a public right-of-way.

CONCRETE

Concrete is prepared using a variety of materials, but is generally composed of sand and gravel or crushed stone to which lime and/or cement is added. When water is added, a chemical reaction occurs causing the mixture to harden. This mixture can be poured to form standard and decorative concrete block. To allow poured concrete to be used for structural elements such as floors, walls and columns, metal reinforcing bars are embedded in the concrete to increase its tensile strength, making it less susceptible to cracking.

Concrete deterioration often occurs due to:

- **Corrosion of the metal reinforcing bars:** Reinforcing, when properly installed, is protected by a layer of concrete. When the steel is exposed to water or moisture (including high humidity) it corrodes and expands causing cracking and eventually spalling.
- **Degrading of the concrete material:** Degrading of concrete can occur through weather and wear of a concrete surface, eroding the binder (lime and/or cement) material, exposing the aggregate and possibly the reinforcing bars.
- **Improper construction techniques:** Some aggregates can degrade over time and salts and chemicals within the aggregate can react to the reinforcing or binder material. It is also possible, particularly in concrete from the beginning of the 20th century, that the reinforcing was improperly laid in the form work without sufficient cover or air bubbles were trapped within the pouring of the concrete.
- **Structural problems:** Structural problems can include insufficient or improperly placed reinforcing bars within the concrete, structural settlement, and severe winds or seismic events.

Signs of concrete deterioration often include cracks, spalls (missing chunks of concrete) staining and deflection (bowing) of the concrete. Because of the complex nature of concrete, the variations in chemical properties, and potential for severe structural problems, it is highly recommended that the repair of larger spalls and the repair of deflected concrete be addressed by a preservation architect or engineer.

The expansion due to the corrosion of the reinforcing bars causes spalling of the concrete surface.

MASONRY, STUCCO & CONCRETE CLEANING

Appropriate masonry, stucco, and concrete cleaning improves the character and overall appearance of a building. However, improper cleaning of historic masonry can cause damage to the historic surfaces and cause more harm than good. There are three principal reasons for cleaning historic masonry:

- To improve the appearance by removing dirt, pollen, stains, graffiti, or paint
- To slow deterioration by removing deposits, salts, efflorescence, acids, ivy, algae, moss, mildew, and pollutants that can damage masonry surfaces
- To clean select areas to match historic masonry or mortar or to assess surface condition

Masonry cleaning methods fall within three general categories:

- Low pressure water, with the possible use of gentle detergent and brushing
- Mechanical cleaning including sand blasting, walnut shell blasting, power washing, grinding, sanding, and wire brushing
- Chemical cleaning

Because of the potential damage to historic surfaces, cleaning should be completed using the gentlest means possible. In many cases, soaking the masonry, stucco and concrete with low pressure water can remove much of the surface dirt and deposits. If the soaking method is not successful, it might be necessary to add a non-ionic detergent or brush the wall surface with a natural bristle brush.

The use of mechanical methods, including abrasive blasting, power washing, sanding or grinding, can potentially remove decorative details and the protective surface of the masonry, stucco or concrete, resulting in an eroded surface and permanent damage. Abrasively cleaned masonry, stucco, and concrete usually has a rougher surface that can hold additional dirt and be more difficult to clean in the future. Chemical based cleaners can etch, stain, bleach or erode masonry, stucco and concrete surfaces. Both mechanical and chemical cleaning methods can also make the masonry, stucco, and concrete surfaces more porous and deteriorate mortar joints, allowing for increased moisture penetration.

MASONRY, STUCCO & CONCRETE COATINGS

Water repellent and waterproof coatings are generally applied to prevent water from entering a masonry, stucco or concrete wall, but tend to be unnecessary on weather-tight historic buildings. Water infiltration through masonry and concrete buildings is generally caused by other moisture related problems including open mortar joints, surface cracks or spalls, and poor or deferred maintenance. In instances where the surface of the masonry has been severely compromised, such as for previously sandblasted bricks, the use of water repellent coatings might be appropriate.

Water Repellent Coatings, also referred to as "breathable" coatings, keep liquid from penetrating a surface but allow water vapor to escape. Many water repellent coatings are transparent or clear when applied, but may darken or discolor over time.

Waterproof Coatings seal surfaces and prevent liquid water and water vapor from permeating the surface. Generally, waterproof coatings are opaque or pigmented and include bituminous coatings and some elastomeric coatings and paint. Waterproof coatings can trap moisture inside of a wall and can intensify damage. Trapped moisture can freeze, expand, and spall masonry and concrete surfaces.

Anti-Graffiti Coatings are often installed in an attempt to help remove future graffiti from buildings. Although many of the coatings applied are clear, they can alter the color of historic masonry or become glossy. Similar to waterproof coatings, they can reduce the vapor permeability of the historic masonry. Water-based coatings are available, which can minimize changes to the appearance and permeability of historic masonry. If they are considered, sample test areas should be applied and checked over time for changes in appearance. Pigmented or colored coatings are generally not recommended, since they are rarely the same color as the masonry and can cause problems to the masonry over time.

The rough texture and uneven surface of this brick suggest that an aggressive cleaning method was used. Stucco patches replace bricks and efflorescence, a powdery white substance, can be seen on the surface.

MASONRY, STUCCO & CONCRETE PAINTING

If the exterior of the masonry, stucco, or concrete surface has been compromised through previous sandblasting, moisture infiltration or the use of harsh chemicals, appropriate painting can provide a degree of protection. Proper application of a water repellent paint can prevent water from penetrating while allowing water vapor to escape. Waterproof or inappropriate paint can trap moisture within a wall. Proper preparation is critical to a successful masonry, stucco, or concrete painting project.

Remove loose or flaking paint, mortar, masonry, stucco or concrete as well as ivy, algae, moss and mildew

- Complete items of deferred maintenance including repair of deteriorated gutters and downspouts
- Complete repointing, re-caulking and patching as needed
- Select a paint color appropriate for the building style and seek approval from the HPC; Apply undercoat and paint appropriate for masonry application type; Follow manufacturer's recommendations for application

When painting stucco, it is recommended that a breathable masonry paint be used and that loose or flaking paint be removed prior to repainting.

REMOVING PAINT FROM MASONRY

When considering whether to remove paint from a masonry, stucco, or concrete surface, it is important to assess whether removal is appropriate. In some instances:

- The building might have always been painted; less attractive, softer, or more porous bricks, stones or concrete might have been painted to provide a water repellent protective layer
- Paint can mask later changes or additions

Reason to consider stripping paint:

- To reduce the long term maintenance requirements associated with repainting
- Paint might have been originally applied to mask other problems such as a dirty building
- If existing paint has failed, it might be necessary to strip it before repainting

Signs of failed paint include:

- Paint is badly chalking, flaking, or peeling, possibly due to moisture penetration - it is important to find the cause of moisture and repair before repainting
- If masonry or concrete has been "sealed" by excessive layers of paint or by waterproof coatings, the underlying masonry might not be able to "breathe" and dispel the internal moisture and salts - eventually, pressure from moisture and salts can build up under paint layers and possibly cause the paint to peel and masonry to spall

If paint is stable, complete paint stripping might not be necessary. However, new paint should be compatible with previous paint layers for best adhesion.

Graffiti should be removed quickly to minimize damage to underlying material and discourage additional graffiti.

REMOVING GRAFFITI

Graffiti should be removed as quickly as possible to minimize damage to underlying masonry. To best remove graffiti from masonry, it is necessary to understand the type of masonry and paint used to reduce the potential damage to the surface during cleaning.

In instances where a severe stain or graffiti is present, it might be necessary to use a chemical based cleaner in specific areas. Caution should be taken to test the effects of the proposed cleaner on a discrete area of the building before using it on a principal elevation. It is recommended that the most diluted possible concentration be used to minimize potential damage of the masonry surface. It should be noted that many chemical cleaners are hazardous and require special handling, collecting, and appropriate disposal of the chemicals and rinse water.

PAINT REMOVAL SAFETY

Caution should be used when removing paint since some paints include lead, requiring proper collection and disposal techniques. (Refer to *Guidelines for Windows, Page 5.*)

MASONRY GUIDE

THE HPC ENCOURAGES:

- Replacement masonry, stucco and concrete that matches the historic in material type, color, texture, size, shape, bonding pattern and compressive strength
- Repointing mortar or stucco of the same hardness or softer than the original mortar or stucco and **always** softer than the original masonry - older buildings typically of high lime content with limited Portland cement
- Using mortar, stucco and concrete that matches the appearance, color, texture, pattern, joint size and tooling of the historic mortar, stucco and concrete, as approved by the HPC
- Replacement masonry toothed into existing masonry and continuing the adjacent pattern
- Carefully removing algae, moss, vines and other vegetation from masonry walls
- Completing masonry, stucco and concrete work in fair weather
- Cleaning masonry using the gentlest means possible
- Verifying mortar joints are sound and building is water-tight before water cleaning
- Using clean water without excessive salts, acids or minerals that can deposit on masonry surfaces and traces of iron or copper that can discolor masonry
- Conducting water cleaning a minimum of one month before freezing temperatures to minimize the potential for spalling
- Minimizing water pressure, generally no more than 100 psi, to reduce potential etching of masonry surfaces
- Using non-ionic detergent and natural bristle brushes when water soaking is not successful
- Considering whether paint removal is appropriate
- Removing paint using the gentlest means possible

THE HPC DISCOURAGES:

- × Using power tools to remove existing mortar from joints since they can damage historic masonry
- × Using modern chemical additives
- × Install pointing mortar in a single layer greater than 3/8" deep
- × Installing modern bricks for patching historic masonry
- × Using the taping method of repointing
- × Widening or extending the existing mortar joints or overlapping the new mortar over masonry surfaces
- × Using pre-mixed mortar or stucco that contains a high percentage of Portland cement or does not match the appearance of the historic mortar
- × Using chemical cleaning
- × Applying water repellent or waterproof coatings including paint that can trap moisture and prevent the wall from "breathing"

THE HPC DOES NOT PERMIT:

- × Removing or covering historic masonry
- × Installing stucco over brick, stone or wood framed buildings that were not intended to be stuccoed
- × Painting historic brick, stone, stucco, block, and poured concrete that was previously unpainted because the paint can: damage the historic masonry; alter the visual characteristic of the building and obscure the craftsmanship of the masonry including colors, texture, masonry and joint patterns; and paint on masonry is not easily removed
- × Using mechanical cleaning methods including sand blasting, high pressure power washing, grinding, sanding and wire brushing
- × The use of EIFS in place of historic stucco walls
- × Painting over large areas of graffiti

NEW JERSEY HISTORIC TRUST

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