

## Plaster, Stucco & Wallpaper

### Introduction

The conservation of plaster, stucco and wallpaper requires a highly trained professional or a knowledgeable and practiced homeowner. Although routine maintenance may seem straightforward, damage can occur to the unique materials in your heritage home as a result of inappropriate conservation efforts. This guide includes general information on plaster, stucco and wallpaper and briefly mentions guidelines for conservation to aid you in selecting the proper professional for the task at hand.

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### Plaster

Plaster consists of a mixture of powdered lime or gypsum with water, applied to the interior surfaces of a building. The mixture was traditionally applied on walls and ceilings over a lath made of wooden bands secured to wall studs or ceiling joists, but has more recently been applied to heavy-duty metal mesh. The application of plaster traditionally included three coats. The first, or base coat, was strengthened to best adhere to the lath, with binders of animal hair and aggregates of sand, for example. The second coat consisted of a similar composition and texture, but aimed at ridding the surface of irregularities. The final application often saw

the addition of lime to whiten and create a smooth surface free of imperfections. Paint and wall paper would be applied directly on this top coat.

Contemporary wet plaster has typically replaced lime with gypsum, a hydrated calcium sulfate or sulfate of lime that hardens more quickly. Modern-gypsum plaster does bond to the traditional plaster well, aided by lime's softer and more porous character. If the combination of plaster does not remain dry, dampness will cause stress and lead to hairline cracks due to their

differences in porosity. If the situation is left to worsen, both materials will deteriorate.

Drywall, also known as plasterboard, gypsum board or Gyproc, is comprised of gypsum plaster pressed between two thick sheets of paper. Due to the skill and amount of time required for traditional plaster application, drywall is most commonly used today. It is used as the surface for direct painting or as the primary coat and lath for wet plaster. As drywall is much thinner and harder than the sum of traditional plaster coats applied onto the lath, it does not possess the same insulation against noise. Also, drywall does not provide the same depth of character and craftsmanship.

### **Decorative Plaster**

Ornamental plaster displays great craft and skill. It was commonly used for cornices, ceiling medallions and coffered ceilings, ranging from simple cornices to elaborate architectural sculpture. Decorative plaster work can be produced by a trained professional on site (in place or on a plasterer's workbench,) or cast off site. Any required repair greater than a crack or pit should be addressed by a professional.

### **Stucco**

Stucco, one of the most common traditional building materials, can be used as a decorative coating for walls and ceilings and as a sculptural and artistic material in architecture. It may be used to cover less visually appealing construction materials such as metal, concrete, cinder block, or clay brick. The application of stucco is a historic technique that consists of applying a lime mortar onto a lath. Many regional variations of stucco exist, including mixtures of lime, mud, clay, cement, chalk, straw or gravel.

Characteristic of the Region of Waterloo, traditional stucco applied to a wooden lath consisted of a lime, sand and water mixture that was bonded with straw, animal hair or other binders for sturdiness. This mixture would be applied to a wooden lath in two or three coats for optimal performance and durability. The first layer was a rough coat, known as the "scratch" coat, which provided adhesion between the lath and consecutive coats applied. The texture finish would be created with the final coat, and often mixed with pigments for colour. Stucco's composition shifted to include an increasing percentage of Portland cement mixed with lime. Today lime is often replaced with gypsum, but it may still be used for the finish coat. Traditionally, stucco was, and should still be, left unpainted.

## Wallpaper

Wallpaper, in combination with paint, plaster moldings and molded woodwork, is characteristic of the interior décor of heritage homes. Wallpaper was typically applied directly onto plaster walls and ceilings, unless the wall had been previously prepared with canvas. Today, wallpaper is most often added to restore an interior room in a heritage building to a pre-determined period. It is recommended to keep samples of existing layers of wallpaper as a record of the modifications made to the room throughout its existence (see [Samples and Documentation](#) below).

When trying to date your wallpaper, consult heritage wallpaper catalogues and a qualified professional. As well, consider the following questions provided by the organization, [Historic New England](#):

- Type of paper  
Is the wallpaper machine or handmade?
- Printing process  
A paper can be hand painted or block, machine, or screen printed.
- The style and pattern  
These can be characteristic of a certain period.
- Colour  
Although certain time periods can be characterized by common wallpaper colour, paper is harder to date according to its colour.
- Date of your home's construction  
The date your home was built can give you a good starting point, but be cautious of additions.

## Samples and Documentation

Before starting your conservation project, document the existing form, material, and condition of the surface.

If you want to identify previous installations of wallpaper, collect samples from each interior surface. On surfaces with many layers, samples should be taken in the form of chips of peeled paint and paper, and can be feathered to show underlying tones. These should be analyzed and saved for future reference, along with any documentation provided (photographs, drawings, and notes). Use a high-powered magnifier or microscope at 30x to 100x magnification to exam-

ine the layers and help distinguish between paint, primer, finish colours and wallpaper. If you would like to install a reproduction of your old wallpaper in a similar colour and pattern, uncover as much of the heritage wallpaper's pattern as possible without damaging it. You can reference heritage wallpaper catalogues or speak with a knowledgeable professional to find a match to your wallpaper. Although this sampling technique is not 100% accurate, it can help inspire and guide your conservation project.

As stucco is typically left unpainted, it will not require the sampling technique mentioned above. Care should be taken to document any texture or decoration pattern, as well as the top layer's pigmented colour before doing any work. When undertaking repairs, note and maintain the width of all combined coats of stucco relative to the wood trim. Colour samples (the pigmented top coat) should be taken from weathered and freshly broken areas, and preserved for future colour matching purposes.

## Maintenance and Repair

Heritage features, such as your home's original plaster, stucco and wallpaper, should be maintained wherever possible, with minimal intervention. Cleaning methods should be selected based on the materials and chemical composition of the surfaces to limit potential damage. Repairs or replacement may be required if the material has deteriorated due to environmental conditions or extensive structural damage to the building. A heritage professional should be contacted for historical assessment, repair advice and guidance, and removal or replacement of plaster, stucco and wallpaper.

### Plaster

#### Causes of Failure

Plaster failure can result from a number of problems, as identified by Gordon Bock in the Old House Journal's, "Plaster Repair Option:"

- i. Plaster dating from the 1850s and earlier may be affected by weakness of materials if the mixture contained lime of uneven quality or sand with impurities
- ii. Poor application condition resulting in the plaster being unable to settle or freezing prematurely (i.e. the plaster was applied in less than ideal weather, too hot or humid, as well as too cold)
- iii. Structural shifts (i.e. movements induced by balloon framing)
- iv. Moisture
- v. Gravity (i.e. plaster naturally pulling away from ceiling lath – this is worsened with water damage)



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### Prevention against Deterioration

Ensure that there are no building conditions that would cause moisture related damage, such as high humidity or leaks. Ideally, there should be minimal differences in humidity between the rooms of the home. Moisture conditions should be resolved before completing any plaster work.

### Repair of Hairline Cracks

Small hairline cracks in random directions do not typically imply plaster failure. They can be fixed before repainting by being opened slightly with the point of a can opener or tool specifically for this function, and filled with a mixture of gypsum and lime, or spackling compound. Certain cracks will reoccur with contraction and expansion of the material. They will need to be remedied either by removing all debris to open the crack in the shape of a “V” before damping and filling the void with patching plaster, or covering the crack with a drywall or fiberglass tape before covering with a drywall joint compound. It is important to use a non-shrinking compound and to give newly applied plaster sufficient curing and drying time prior to sealing. After repairs are finished, apply a coat of white shellac to protect and inhibit moisture from paints to seep into the plaster.

If the hairline cracks are too numerous, but the plaster is fundamentally sound, you can apply canvas to the wall. This is a historic technique used in the 1920s. First prepare the wall by filling in any voids in the plaster and removing any paint. Apply a traditional canvas material, or a contemporary fiber product for wall canvassing, using an adhesive applied to the full surface of the wall. Canvassing a wall will also smooth its appearance after years of wear and imperfections caused by repairs, repainting, and wall paper removal. It should be noted that this technique can be difficult to undertake. It is advised that you consult with an expert. Sourcing canvas can be difficult these days, but some sailing shops will sell pure canvas. Most home renovation stores will sell synthetic alternatives. Fiberglass is a sound alternative if undertaking work on your own. [Specification Chemical](#) sells a product called [Nu-wall](#) that has received good reviews from industry experts.

## Stucco

### Prevention against Deterioration

If properly mixed and applied, stucco can be as durable as a brick and lime mortar wall. Stucco can protect the building envelope from rain and wind, and can provide a certain degree of fire protection. However, this material is very fragile and prone to cracking and crumbling if not regularly maintained. If hairline cracks are permitted to develop, water can penetrate through the voids to create moisture issues and rot of the structural elements. Regular maintenance is very important.



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### Routine Maintenance

Traditionally, property owners annually applied a coat of whitewash to conserve stucco. The lime within the whitewash acted as a hardening agent, filling the hairline cracks to prevent them from developing. Paraffin or oil mastics were also often applied to improve stucco's impermeability. Today whitewash is still being applied to preserve stucco, although its composition and texture has changed slightly. It most often consists of a mixture of cement, lime, sand and water with a binding agent, applied with a brush. It is vital to know your base before applying whitewash.

Before stucco work is undertaken, an evaluation should be made of all elevations of the building and the composition of the existing stucco must be identified in order to match the new stucco to the old in strength, texture, colour and material. All materials should be repaired and replaced in kind.

### Repair of Hairline Cracks

These small cracks can often be attributed to settlement, self-restorative control joints or poor construction. To repair a small hairline crack, clean the crack of its loose materials and debris with the aid of a trowel or putty knife. Gently brush all dust away with a damp paintbrush and let it dry. Remove a piece of the original stucco top coat that has failed, and place on a heavy piece of plastic, cardboard or cloth outdoors and grind it to a powder. Fill the crack with a tri-polymer sealant before holding the crushed stucco adjacent to the sealant-filled crack and gently blowing it into the void. If the sealant should accidentally get onto the surface of the stucco, it can be cleaned off with a soft rag dipped in mineral spirit; a petroleum derived clear liquid also known as mineral turpentine. This repair may require some practise, as to not waste all the powdered stucco.

Extensive repair of stucco is not as easily mendable as it may appear, and should not be carried out by an untrained professional.

### Removal of Stucco

Stucco should not be removed unless deteriorated, with the guidance and help of a professional. This includes stucco that has been directly applied to masonry without lath. The stucco was most likely applied to protect the underlying masonry that was never meant to be exposed.

## Wallpaper

Wallpaper deterioration will most often reflect the deterioration of the plaster beneath. An inspection should be done by a professional before undertaking any repairs. Repairs of wallpaper will vary based on the intent of the conservation project, and the remaining amount



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and condition of paper still adhering to the plaster. Heritage conservationists recommend that property owners consult a trained professional before cleaning, repairing or removing your heritage wallpaper. Conservation of wallpaper in place is preferred to its removal to preserve the authenticity of application, seams and wrinkles.

### **Safety Precautions: Lead-based paints**

If your home was built before 1960, it most likely contains one or more layers of lead-based paint. As wallpaper will help contain lead dust from deteriorating lead-based paint, caution should be taken if cleaning or removing the wallpaper to expose underlying paint. For more information on lead-based paint and safety precautions, please refer to the Region of Waterloo's Practical Guide: Asbestos, Mold & Lead Abatement.

### **Summary**

Care should be taken to conserve the features of your home, since the craftsmanship and authenticity of your heritage plaster, stucco and wallpaper cannot be matched by contemporary products. Although the repair and removal of these materials require specialized labour, their superior quality and longevity are worthwhile to maintain. This is not a complete guide. The untrained should seek professional help before attempting repairs, removal or any other work to their historic plaster, stucco and wallpaper.

### **References**

If you would like to learn more about conserving your plaster, stucco or wallpaper, please refer to the following primary sources:

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