Stone and Masonry Restoration with Remmers Systems

- Cleaning Equipment
- Cleaning Chemicals
- Consolidation and Strengthening
- Restoration and Pointing
- Preservation and Conservation
Stone and Masonry Restoration and Preservation

The Remmers System Approach

Remmers Technology and Experience
Remmers are undoubtedly the world leader in the development and production of specialist systems for the restoration of stonework and masonry facades, even complex mixed facades of concrete, natural stone, render, timber frameworks, surface masonry and brickwork.

Remmers has gained extensive experience from over 50 years working around the world on prestige and local projects. This includes the restoration of historic and heritage buildings and structures in natural stone and brickwork, public and commercial buildings, period and traditional houses, unique structures, monuments and statues.

As with all types of refurbishment and restoration works, a thorough and in depth knowledge of the materials and the methods used in the original construction is essential – together with a full understanding of their modes of ageing and deterioration. These are normally related to the nature of the building, their environmental exposure over time, and the actions of their owners or occupants.

All of this knowledge and understanding must then be used with full consideration of the building's future use and exposure, the ease of access for maintenance, the desired durability and life expectancy requirements, and of course, the investment budget.

This is why the Remmers system approach is so successful and beneficial to our clients across the UK and Ireland, throughout Europe and increasingly worldwide.

“Remmers has a truly systematic approach and procedure with specialised solutions for each stage of the process.”

Stone Restoration is usually defined as “requiring the accurate replacement and replication of what is missing, or in need of repair” - Stone Conservation is usually defined as “where as much of the original fabric is retained as possible and preserved in its current state”. Most important projects require both of these activities to be undertaken, and again because of the nature of the works, this must only be undertaken by trained and experienced specialist professionals, using a combination of traditional skills and modern technologies.

‘Successful Restoration Starts with the Remmers System Approach’

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The Remmers System Approach

- **Condition Survey**
  To identify the type and visible extent of damage, with Remmers laboratory analysis where required.

- **Cleaning**
  Selection and use of the optimal mechanical and chemical cleaning solutions, followed by re-survey to locate any previously hidden damage.

- **Damage Removal**
  Mechanical breakout and removal of damaged areas where allowed and nothing else can be done to conserve the material.

- **Consolidation and Strengthening**
  Use of penetrating solutions to consolidate or strengthen weakened or weathered surfaces.

- **Restoration of Damage**
  Replacement of the damaged areas beyond practical repair, re-profiling, jointing and pointing.

- **Preservation and Conservation**
  Hydrophobic impregnation to provide breathable protection and waterproofing of the structure to avoid on-going deterioration.

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The Remmers System Approach

To carry out a technically correct, successful stone and masonry restoration project, our Remmers system approach uses many unique and patented Remmers technologies, dependent on the specific nature of the structure and the client and his contractor’s requirements.

**Condition Survey**
Always a pre-requisite as this ensures correct identification of the type and nature of the stone or masonry, the joints and the pointing, the type and extent of surface deposits (dirt and pollution), the direct exposure and use of the building. Additionally a full structural survey is normally undertaken at the same time by a suitably experienced and qualified structural engineer.

From small site samples Remmers can provide a full diagnostic laboratory analysis and restoration specification.

**Cleaning**
Once the condition is known, the most suitable system for cleaning can be determined. The cleaning of natural stone or brickwork also generally enhances appearance by removing surface deposits. However carrying out this work can often reveal additional faults, and these must also be referred to the responsible engineer for assessment prior to the restoration procedure.

Remmers is unique in producing a full range of both mechanical cleaning equipment and chemical cleaning solutions - combining the best techniques of each to produce the right result on site.

**Remmers Mechanical Cleaning Equipment**
The ‘state of the art’ Rotec® system for low pressure, gentle rotary whirljet cleaning of sensitive surfaces. This uses our special range of Rotec® glass powder abrasives in different grain sizes for total control.

This equipment is the most versatile and adaptable on the market. It is suitable for use on all types of stonework including building facades, historic structures and statues. It is especially suitable for sensitive areas where chemicals cannot be used. Due to its cost effectiveness and ease of use, it is now also used for important timber, concrete and other masonry substrates, as well as for graffiti removal.
Cleaning (continued)
Remmers chemical cleaning solutions include Alkutex® and Intachem® products based on advanced formulations of:
- Aqueous alkali – for soiling and dirt removal.
- Solvent – for paint and graffiti removal.
- Aqueous acidic – for pollutant and dirt removal on non-calcareous surfaces.

Remmers Chemical Cleaning Solutions
Alkutex®: Cleaners for sandstone, limestone, brick, concrete and tiles, including fair-faced masonry. This range also includes special solutions for cement laitance and efflorescence, plus oil, grease and traffic film removal.
Intachem®: Water and solvent based cleaners and stripping solutions for cleaning heavily soiled sandstone, granite, brick and terracotta; plus special cleaning solutions for yellow, brown and red sandstone or coloured brickwork and masonry.

Damage Removal
Following thorough cleaning, any damaged areas identified as being beyond practical repair are removed, generally mechanically and as defined by the responsible engineer, before proceeding to the actual restoration stage.

At this time, additional fixings or tie-bars can be installed. All areas to be repaired are cut out according to the type of replacement mortar. Remmers systems may not require costly additional angle cuts, and can often be feather edged.

Consolidation and Strengthening
After cleaning and damage removal, it may be necessary to consolidate or strengthen the remaining exposed and weathered surfaces prior to their restoration. On some historic and heritage structures or monuments this is often a key part of their conservation and preservation.
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Consolidation and Strengthening (continued)

Alternatively the replacement and repair restoration work may be completed before the entire surface is consolidated and preserved.

Remmers consolidation and strengthening solutions penetrate deep into the weathered substrate through the open capillary network, where they react with moisture and deposit silica gel which acts as a reinforcing binder in the same way as the original stone was created. This treatment has absolutely no adverse effect on the stone or brickwork and it allows each way water vapour diffusion and capillary absorption to continue, fully in accordance with good building physics.

Remmers Consolidation and Strengthening Solution

The full Funcosil® range includes silicate, silicic acid ester and silicic acid ethylester based penetrating solutions. These can consolidate and strengthen the surfaces of stonework, historic renders, brick and terracotta surfaces. They have a defined and variable gel deposit rate, adapted to the stone strength, and also have excellent resistance to UV light and weathering of the natural surfaces. Different grades are available dependent on the stone type and whether further treatments are required. This is to ensure there are no detrimental effects on the penetrating or bonding abilities of the subsequent materials, whilst still achieving the desired level of improvement in the substrate. Petrographic analysis and pictures from the electron microscope (see right) illustrate these effects in actual samples.

Restoration of Damage

Remmers provide factory pre-batched colour matched mortars for the partial replacement and repair of stonework, bricks, and their joints and pointing. The range includes cementitious and lime based products with varying strengths, to meet and match that of the original materials, their current condition and the project’s specific requirements. A wide range of 20 standard colours is available together with bespoke colour matching facilities. Remmers own laboratories will analyse and match samples from the actual structure – which can also include assessment for any deleterious salt contents or any other potentially damaging contaminants.
Restoration of Damage (continued)

These unique Remmers materials are easily applied and can even be “feather edged” or tooled to be precisely formed to match the original appearance. This is particularly useful on ornate facade profiles, decorative areas and for fine detailing works in a single layer. Expensive and potentially damaging angle cutting is often not required with Remmers mortar systems.

Remmers Restoration, Re-profiling and Jointing Mortars

Remmers provide the complete range of cementitious and lime based restoration, re-profiling and jointing mortars. The unique colour matching service, even for relatively small quantities, is a particularly valued service for Remmers customers. These innovative Remmers materials are also provided in grades suitable for use on weaker stone substrates, or as specialist renders and pointing mortars, including products for machine application.

Impregnation and Conservation Solutions

These high performance materials should be selected according to the porosity, strength and permeability of the stone, the contractual requirements – such as their method of use (ie, machine application), and of course the structure’s location and environmental situation.

Remmers Impregnation and Conservation Solutions

Remmers Funcosil® range of hydrophobic impregnation solutions are supplied as unique thixotropic creams, and as water or solvent dispersed solutions of silane, siloxane and silicone resins. They are also available in different combinations of these which are designed to suit the specific structure and nature of the actual surfaces to be impregnated and preserved. Remmers Funcosil® impregnation products are available in grades and blends ideal for all types of stonework, brickwork, concrete and render, plus all types of cementitious and lime based facade materials.
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A Selection of Restoration Case Studies

Irish National Museum, Dublin, Ireland

Problem:
Decay of Mount Charles Sandstone through environmental pollution and erosion over time, with the gradual build up of dirt and carbon deposits over the entire sandstone and granite structure.

Remmers Solution:
Cleaning with Intachem® Stone Cleaner and Intachem® Degreaser.
Repair and Re-profiling with Remmers Restoration Mortars.
Protection and Waterproofing with Remmers Funcosil® breathable silane/siloxane combination based hydrophobic impregnation.

The War Memorial Cloisters, Sedbergh Public School, Cumbria, England

Problem:
Stone decay over time and joint deterioration due to water ingress and penetrating damp, with algal growth on the surfaces.

Remmers Solution:
Cleaning and microbial growth removal with Remmers Intachem® solutions.
Below ground Waterproofing with Remmers Sulfiton® bitumen coating.
Stonework Restoration and Repointing with Remmers lime based mortars.
Protective Impregnation with Remmers Funcosil® hydrophobic impregnation.
Conwy Castle,  
Conwy, Wales

Problem:
Weathering and erosion of the natural stone with increased damage from past atmospheric pollution and micro-organism’s metabolic secretions.

Remmers Solution:
Cleaning with Rotec® whirljet equipment and Alkutex® cleaning solutions.
Stone Strengthening with Remmers consolidation and strengthening solutions.
Restoration with Remmers Funcosil® lime based restoration mortars.
Protective Impregnation with Remmers Funcosil® hydrophobic solutions.

Kilcock Church, Co. Dublin, Ireland

Problem:
External: Sandstone erosion over time and deterioration through consequent water penetration.  
Internal: Water damage to lime plaster and deteriorated decorative finishes.

Remmers Solution:
External: Stonework Repairs with Remmers restoration mortar and Waterproofing with Funcosil® hydrophobic impregnation.
Internal: Cleaning with Rotec® equipment to sensitively remove the deteriorated finishes.
Re-profiling with lime based grades of Remmers mortars.
Surface Protection and durable decorative finishes with Funcosil® breathable silicone coatings.
The Worldwide Number One in Stone Restoration and Preservation

A Selection of Prestige Projects Around the World

The Berlin Reichstag
Berlin, Germany

St Basil’s Cathedral
Moscow, Russia

The Brandenburg Gate
Berlin, Germany

The Houses of Parliament
London, England

Cologne Cathedral
Cologne, Germany

Richmond Bridge
Richmond, London

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Stone and Masonry

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The O’Connell Street Monuments
Dublin, Ireland

The Angkor Wat Temple
Cambodia

The Irish National Museum
Dublin, Ireland

The Great Wall of China
China

The British Museum
London, England

The Manhattan Bridge
New York, USA
Stone and Masonry Restoration with Remmers Systems

Complementary Documentation Also Available From Remmers

Concrete Repair and Protection

Flooring and Deck Waterproofing

Basement and Cellar Waterproofing

Extensive Documentation

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