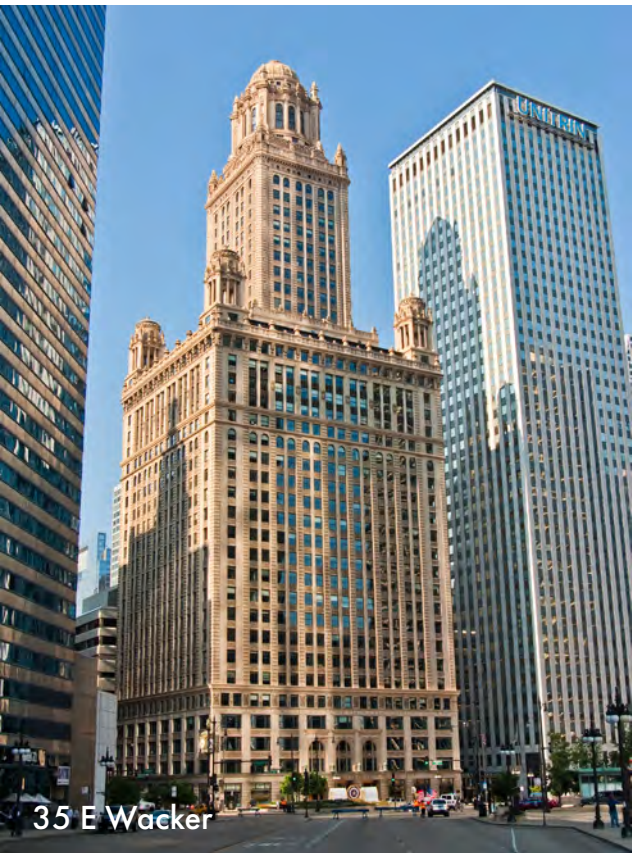
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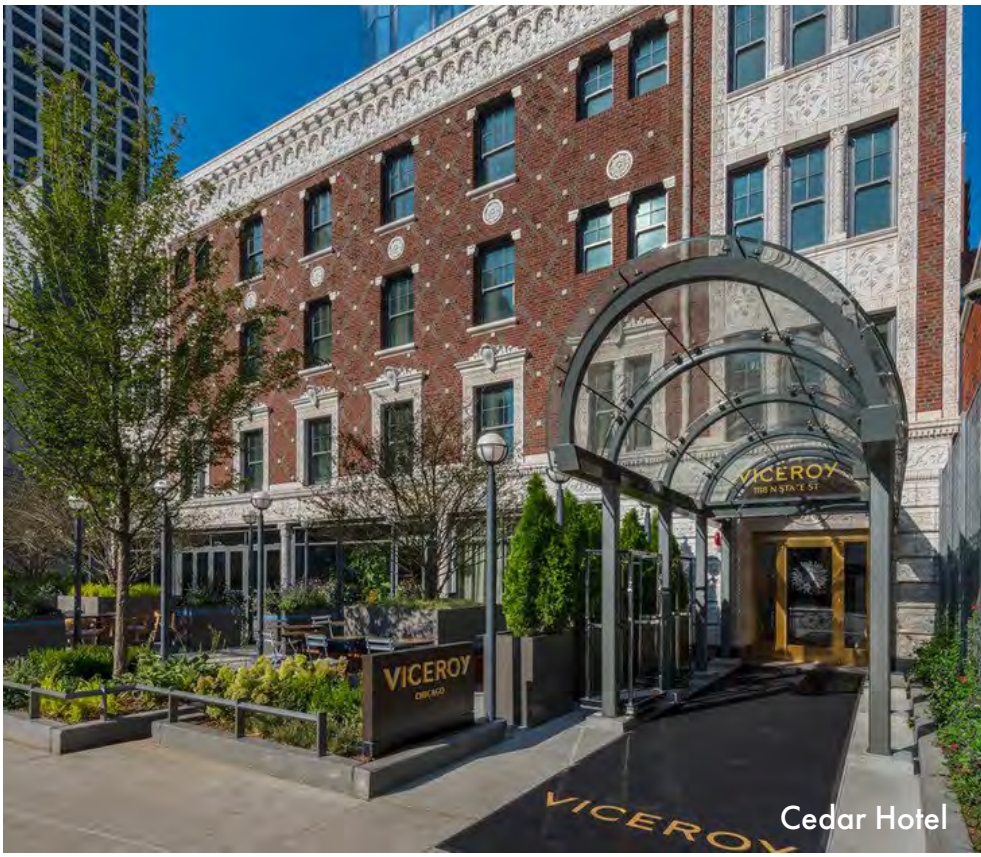

Cedar Hotel

Glass Fiber Reinforced Concrete

For Restoration of Unitized Masonry

Glass Fiber Reinforced Concrete (GFRC) is a masonry replacement material widely used in the restoration industry to replicate historic terra cotta and natural stone. Made of Portland cement, sand, aggregate and alkali resistant glass fiber, GFRC units have excellent flexural strength and impact resistance and are available in a wide variety of shapes, patterns, textures, and colors.

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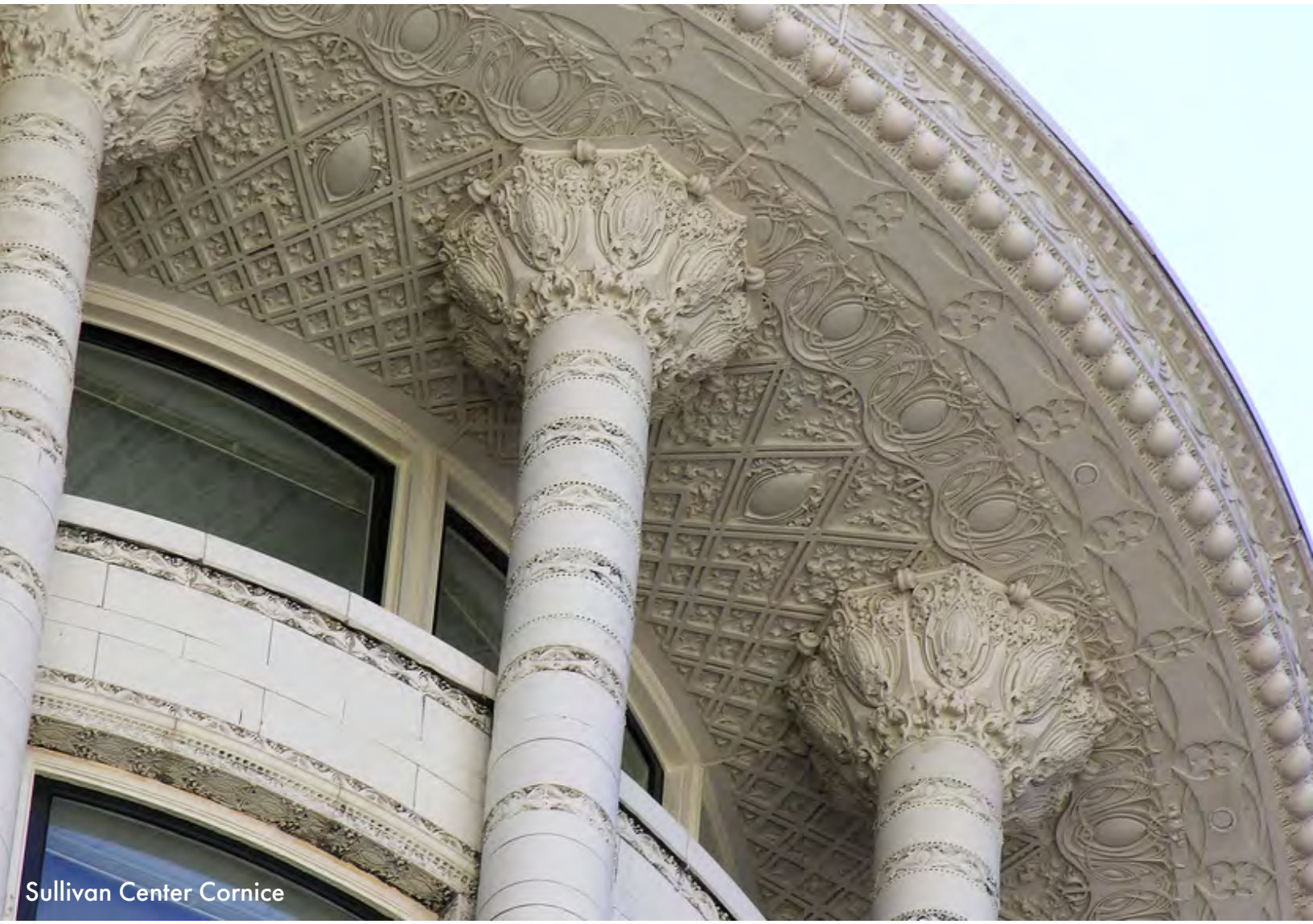
Description

GFRC is an impact resistant exterior masonry cladding. It is ideal for the replacement of deteriorated historic terra cotta or natural stone. GFRC skin is composed of two parts. The outer ⅛" is the face mix. It is a cement-rich concrete. The face is backed by a concrete mix that incorporates alkali resistant glass fibers. This backup mix delivers superior compressive and flexural strength to the material. The total skin has a minimum ¾" thickness that can be increased for added impact resistance or structural loads.

GFRC skin is sprayed in thin, cummulative layers into a mold. The face mix is sprayed first, followed by the backup mix. Since GFRC is produced in a spray-up process, rather than being poured like traditional concrete, it is particularly successful at capturing complex geometries and heavy ornamentation. Intricate molds are often produced with 5-axis CNC technology to maintain tight fabrication tolerances and efficiencies. After a GFRC unit has cured, it is demolded and then finished to match the historic source material.



Sullivan Center Cornice

Finishes

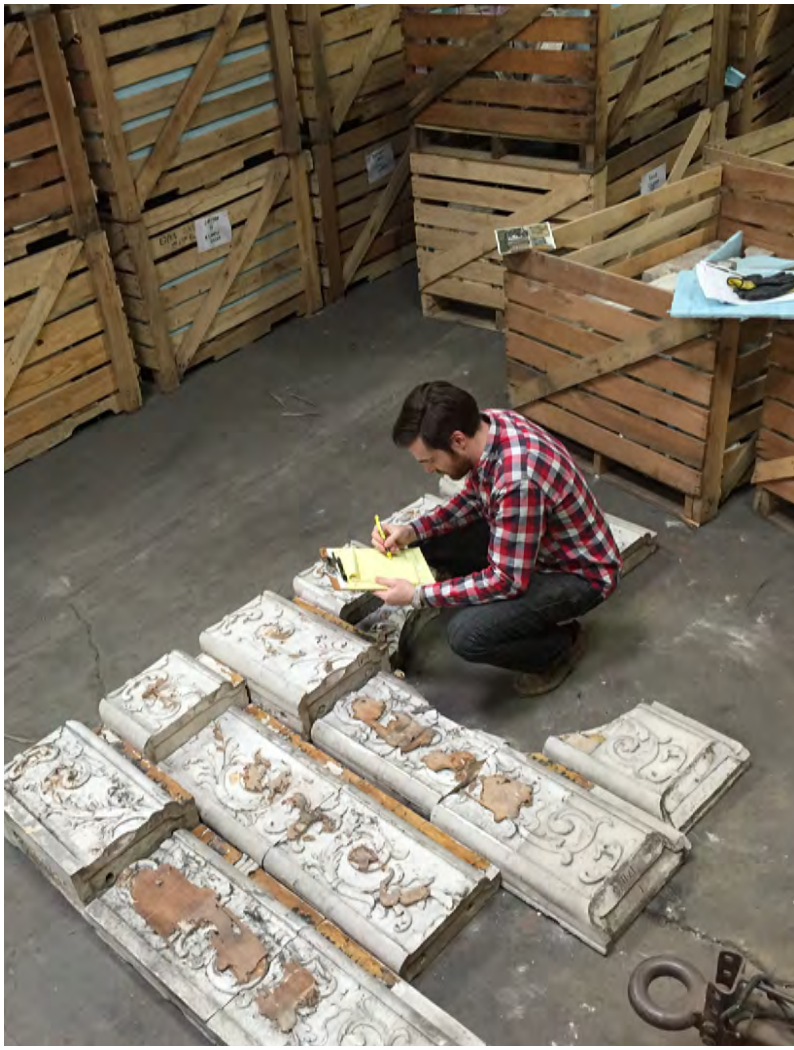
GFRC can be finished in a wide variety of colors, textures, and patterns to match historic designs. Colors are achieved from a combination of through-body pigmentation, aggregates, surface stains, and coatings.

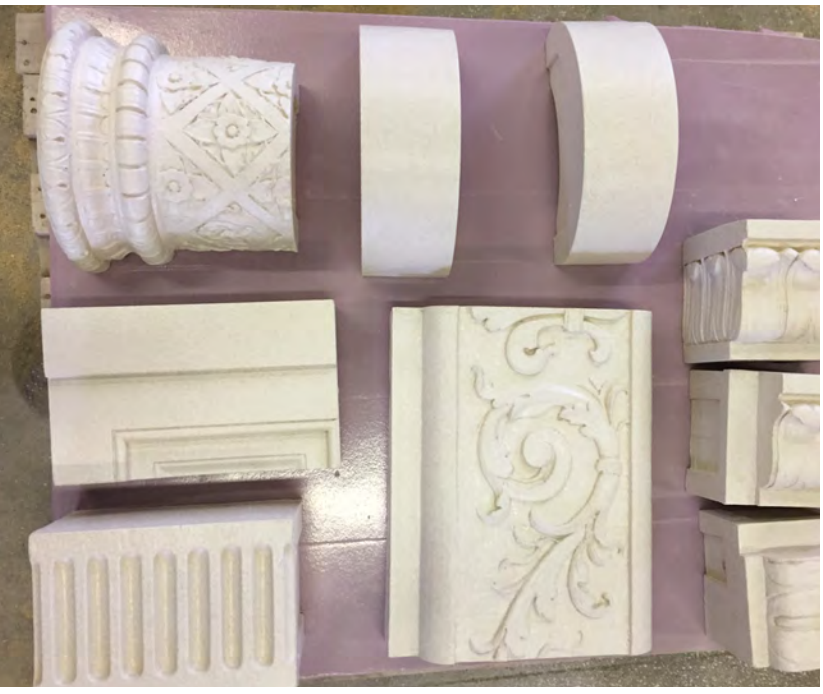
Most colors that are incorporated into the body of GFRC are synthetic iron-oxide pigments. Naturally colored aggregates are used separately or in combination with pigments to arrive at a desired color.

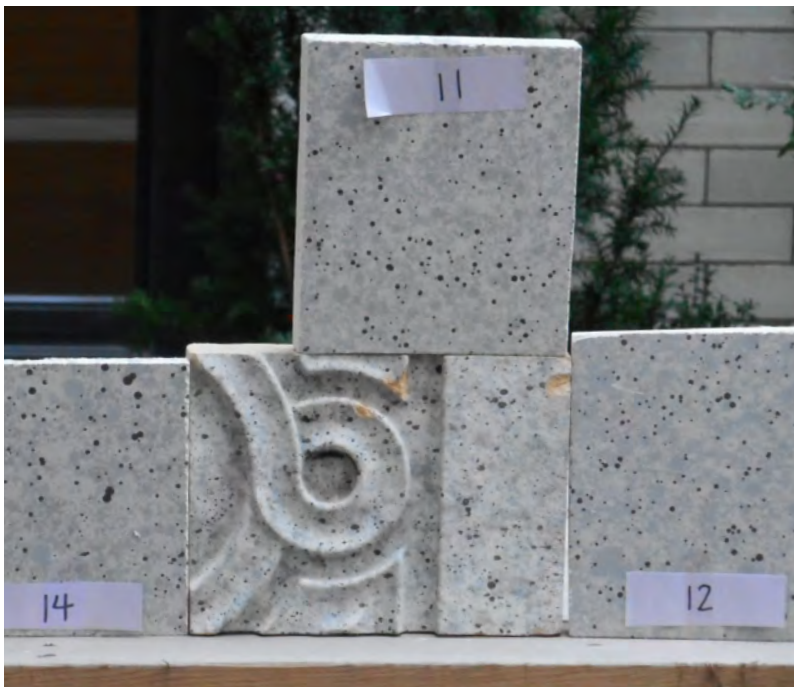
Glazed, bright, and highly saturated surfaces are replicated by masonry coatings, stains, and sealers. These finishes can be made to have a matte, shiny, metallic, or shimmer effect to match any historic masonry.

Texture is achieved by sandblasting the GFRC surface. Light sandblasting provides a smooth finish. Progressively heavier sandblasting delivers a coarse finish similar to aged granite.

Patterns and intricate designs are made by using a formliner set into the mold. The cement-rich face mix of GFRC captures and retains crisp details like the cornice on the Sullivan Center.

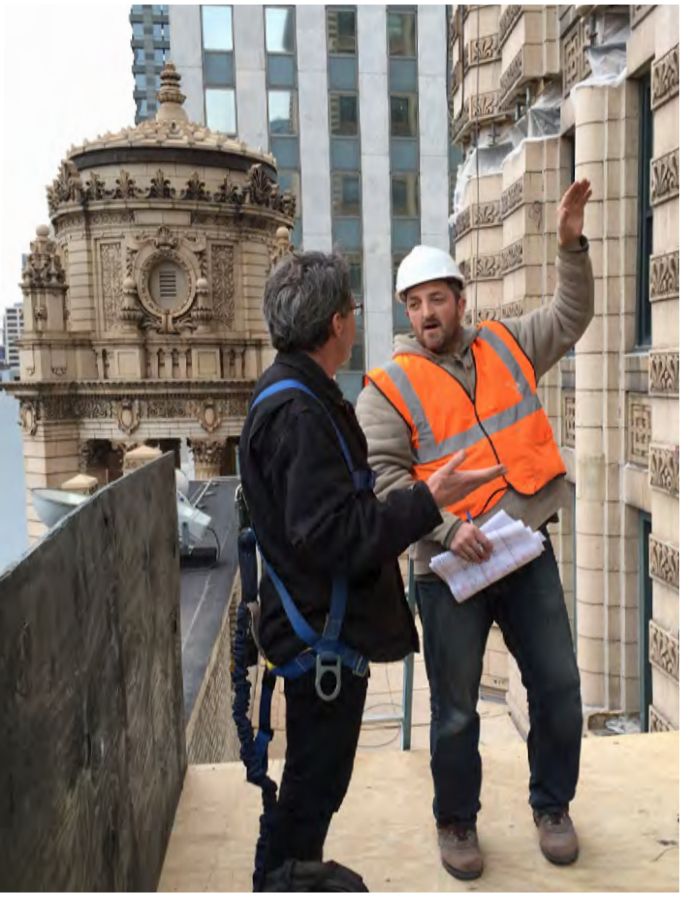






Technical Data

Property	Test	Result
Glass Fiber Content	ASTM C1229	Glass Fiber 5% by weight
Flexural Strength	ASTM C947	1,200 PSI
Compressive Strength	ASTM C39	10,000 PSI
Surface Burn Characteristics	ASTM E84	0 Flame Spread 5 Smoke Development



Reviewed by the U.S. Department of the Interior for masonry restoration.

Quality Assurance

Building Blocks carefully manages projects from start to finish. From survey and design through fabrication and delivery, working with us ensures the knowledge and experience necessary to realize quality restoration within budget. We have a successful track record of both terra cotta and GFRC replacement projects since our foundation in 1983.

Additional Resources

Further information about the use of GFRC in historic masonry restoration:

Department of the Interior's Preservation Brief 16

Department of the Interior's Preservation Brief 42

Secretary of the Interior's Standards and Guidelines for Preservation, Rehabilitation, Restoration, and Reconstruction Projects