Fabric-Reinforced Cementitious Matrix (FRCM)

Now you can repair and strengthen in one shot.
Introducing the Next Generation of Composite Strengthening Systems™ for Concrete and Masonry Structures

Repair, protect and strengthen aging, damaged or overloaded concrete and masonry structures in one application while significantly reducing your installed cost. The new FRCM externally bonded Composite Strengthening System™ combines a high-performance sprayable cementitious matrix with a carbon-fiber grid to create a thin structural layer that will not add significant weight or volume to the existing structure.

Benefits

• Repair and strengthen structures using only a thin layer of material
• Can be applied in multiple grid layers (four maximum) to achieve desired strengthening — ⅛”–1” (12.7–25.4 mm) thick for one-layer grid applications, adding ⅛” (12.7 mm) for each additional grid layer
• Lightweight system for vertical surfaces and overhead applications
• Suitable for harsh environments or service conditions including marine locations, elevated temperatures, humidity, abrasion and UV
• Works on damp substrates
• Installation process is similar to that for wet shotcrete repair mortars
• Quick installation with less preparation than traditional shotcrete repairs with rebar
• Does not create a vapor barrier
• Matches substrate finish
• 100% solids formulation
• Carbon-fiber grid features excellent chemical and corrosion resistance
• Non-hazardous shipping

System Components

The FRCM system consists of two components: a sprayable, fiber-reinforced cementitious matrix and a carbon-fiber grid.

Cementitious matrix and carbon-fiber grid.

CSS-CM Cementitious Matrix
Bag Size Model No.
55 lb. (24.9 kg) CSS-CM

CSS-BCG Bidirectional Carbon Grid
Roll Size (width x length) Model No.
77 in. (1.95 m) x 164 ft. (50 m) CSS-BCG19550

CSS-HBCG Heavy Bidirectional Carbon Grid
Roll Size (width x length) Model No.
77 in. (1.95 m) x 164 ft. (50 m) CSS-HBCG19550

CSS-UCG Unidirectional Carbon Grid
Roll Size (width x length) Model No.
77 in. (1.95 m) x 164 ft. (50 m) CSS-UCG19550

These products are part of the tested assembly in UL Design No. N859, which achieved a four-hour fire rating when subjected to ASTM E119 / UL 263 full-scale fire testing. Please refer to UL Online Certifications Directory for the UL listing.
Significant flexural, axial or shear strength gains can be realized with an easy-to-apply composite that does not add significant weight or mass to the structure. FRCM provides a low-impact, low-weight alternative to traditional concrete strengthening and retrofit methods. Many times, it’s the most economical strengthening solution available, given its reduced preparation and installation time.

- Projects that also require a surface repair and leveling in addition to strengthening
- Projects with large, overhead, and vertical surface areas where higher production rates are possible with shotcrete material
- Repair applications that cannot afford significant member enlargement
- Composite strengthening applications that require an increased level of abrasion and fire resistance

**Structures**
- Tunnels, pipes and mines
- Tanks, silos and chimneys
- Parking garages
- Bridges, piers and wharfs
- Commercial and industrial buildings

**Seismic Retrofit**
- Shear strengthening
- Displacement/ductility
- Life safety

**Load Rating Upgrade**
- Increased live loads
- Accommodating new equipment
- Change of use

**Damage Repair**
- Deterioration/corrosion
- Blast/vehicle impact

**Defect Remediation**
- Size/layout errors
- Low concrete strengths

**Blast Mitigation**
- Progressive collapse
No-Cost Engineering and Technical Services

We recognize that specifying Simpson Strong-Tie® Composite Strengthening Systems is unlike choosing any other product we offer. Leverage our expertise to help with your strengthening designs. During the Designer’s initial evaluation or preparation of the construction documents, Simpson Strong-Tie can be contacted to help create the most cost-effective customized solution.

Our Complimentary Engineering and Technical Services Include:

Assessment
- Feasibility studies to ensure suitable solutions for your application
- Partnering with trained and licensed contractors to provide rough order-of-magnitude (ROM) budget estimates

Complete Engineering Package
- Specifications prepared to your unique project requirements
- Detailed proposal documentation, including drawings
- Calculations provided for Engineer of Record reference during submittal review
- Calculations for each unique element
- Elevation drawings for each element and component
- Typical detail sheet showing installation details
- General notes to include in the plans
- Signed and sealed documents for all 50 states and throughout Canada

Training
- Online, regional workshops and onsite training

Support
- Our team of licensed professional engineers and technical representatives is available to provide you with no-equal jobsite support

Simpson Strong-Tie Composite Strengthening Systems provide efficient solutions for the structural reinforcement and strengthening of concrete and masonry elements in need of repair or upgrade. Our comprehensive product lineup includes FRCM, code-listed carbon-fiber and E-glass fabrics, North America’s only code-listed precured laminate, FRP anchors, epoxies including an underwater saturant, performance coatings and installation tools.

For complete information regarding specific products suitable to your unique situation or condition, please visit strongtie.com/css or call your local RPS specialist at (800) 999-5099.