

3.4 CarbonArmor® Wall Reinforcing System

3.4.1 Summary Description

Foundation Supportworks offers high-strength fiber-reinforced polymer (FRP) composite materials to reinforce concrete block and poured concrete foundation walls. These systems effectively combine the benefits of epoxies and carbon fibers to provide high strength, low strain tensile reinforcement. When properly installed and bonded to concrete substrates, like basement walls, significant improvements to both structural integrity and load capacity can be achieved (*Figure 3.33*).

The design strength of the CarbonArmor system is supported by extensive application and durability testing. The CarbonArmor Wall Reinforcing System is a proven method to laterally support bowing foundation walls. Technical specifications and spacing recommendations are included in *Appendix 3C*.



Figure 3.33 Rendering of CarbonArmor installation with optional ArmorLock connection to rim joist and sill plate

3.4.1.1 Advantages

- Ideal to reinforce the inside face of block walls to prevent further bowing
- Optional ArmorLock® system resists movement at the top of the wall
- Flexible carbon fiber fabric contours tight against the wall
- May be installed around obstructions on the wall; such as piping, electric conduit, and HVAC ductwork
- Completed and cured installations are suitable for painting
- Low profile system can be concealed by wall framing

3.4.2 Installation Steps

Step 1

Prepare the wall surface about eight inches wide for each CarbonArmor strap. Concrete surfaces must be structurally sound and free from contaminants such as dust, dirt, or oil. Use the vertical mortar joints of block walls as guides. Surfaces must be mechanically abraded to remove paint, expose a fresh, roughened surface of the block or concrete, and to remove protrusions from the wall that may trap air behind the installed CarbonArmor strap (*Figure 3.34*). At locations that will receive an ArmorLock installation, grind the top edge of the wall to create a smooth, rounded corner (*Figure 3.35*). After abrading, thoroughly clean the wall with a vacuum and place confinement tape along edges of the prepared areas.



Figure 3.34



Figure 3.35

Step 2

To establish a continuous, flat bond of fabric to the wall, thoroughly mix the two-part epoxy paste and fill all mortar joints and cracks at the strap locations. All mortar joints and cracks located behind the fabric should be filled flush with the face of the wall (*Figure 3.36*).



Figure 3.36

Step 3

Thorough and complete mixing of the liquid epoxy is critical for the performance of the product. Pour small container of epoxy saturating resin into the large container and mix on low speed with a drill and the supplied paddle mixer for at least five minutes. (*Figure 3.37*).



Figure 3.37

Step 4

Pour mixed liquid epoxy into tray and saturate the prepared wall surface using the provided roller. Repeat this step with a second coat after allowing epoxy to soak into the wall for five minutes (*Figure 3.38*).



Figure 3.38

Step 5

Cut CarbonArmor strap to match the wall height. Place strap on a horizontal surface and use roller to saturate one side of the fabric (*Figure 3.39*).



Figure 3.39

Step 6

Place the wet side of the fabric against the wet wall. Use the roller to saturate the fabric with a generously applied final coat of epoxy (*Figure 3.40*).



Figure 3.40

3.4.2.1 ArmorLock® System

The optional ArmorLock bracket and FRP system essentially splices with CarbonArmor straps to extend reinforcement to the building's rim joist and sill plate framing. ArmorLock provides supplemental support for the foundation wall's top connection to the sill plate. If the top of wall connection to the sill plate has shown signs of movement, then other options should be considered, such as the PowerBrace system. CarbonArmor and ArmorLock systems are again best suited for bowing block walls showing initial signs of distress.

Step 1

Evenly drape dry ArmorLock straps around bracket (*Figure 3.41*) and attach bracket to the sill plate and rim joist with eight #9 x 1-½-inch long wood screws (*Figure 3.42*).



Figure 3.41

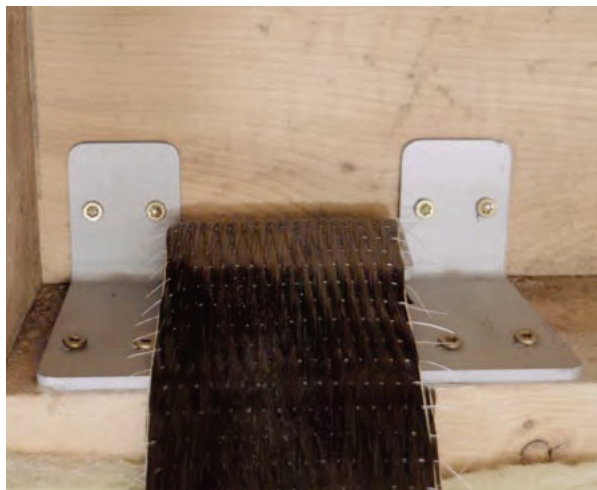


Figure 3.42

Step 2

Temporarily roll up ArmorLock straps, place on top of sill plate, and complete Steps 1 through 4 from *Section 3.4.2* (*Figure 3.43*).



Figure 3.43

Step 3

Unroll ArmorLock straps, wet both sides of each strap with liquid epoxy, pull tight and adhere to wall (*Figure 3.44*).

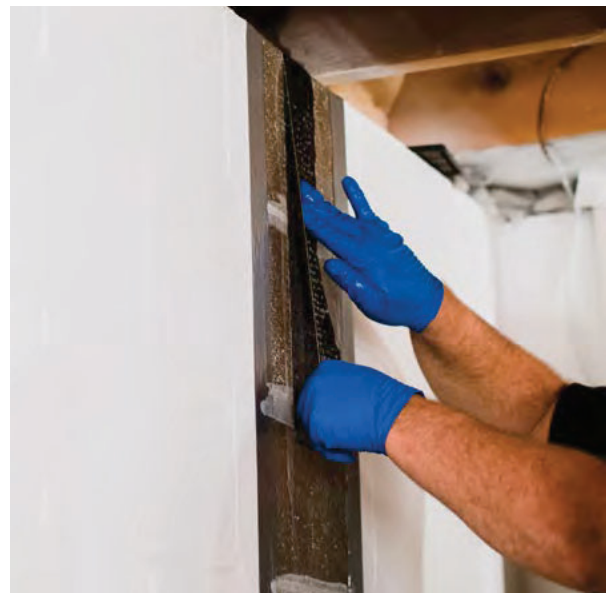


Figure 3.44

Step 4

The wet side of the CarbonArmor strap is installed over and bonded to the ArmorLock straps as described in Step 6 from Section 3.4.2 (Figure 3.45).



Figure 3.45

Step 5

Installation of the CarbonArmor Wall Reinforcing System with optional ArmorLock System complete (Figure 3.46).

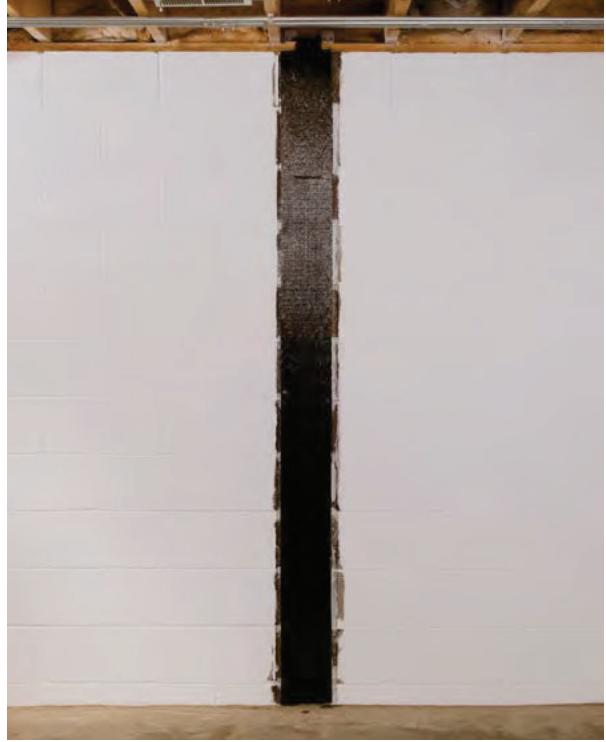


Figure 3.46

3.4.2.2 Special Installation Considerations

- Do not apply to concrete less than 30 days old.
- Do not apply to concrete with curing or sealing membranes.
- The surface of the wall should be visibly dry and dry to the touch.
- Workplace shall be climate controlled.
- Do not apply to concrete with a surface temperature less than 45°F.
- Do not allow epoxy to freeze.
- Store epoxy in an appropriate environment to maintain temperature between 60 and 90 degrees Fahrenheit.
- Do not thin epoxy with solvent.
- Installations with exposure to ultraviolet rays shall be covered or otherwise UV-protected with a proper coating of paint.