# Application Methodology

# for

# RELinforce™ FRP STRENGTHENING SYSTEMS

## Strengthening of Beams and Slabs using RELinforce™ Carbon Laminate

The procedure for strengthening of columns with RELinforce™ Carbon Fiber Laminate system is as follows:

1. Surface Preparation.
2. Application of RELinforce™ Fab S as Primer.
3. Application of RELinforce™ Lam A.
4. Fixing of RELinforce™ C Lam.

**1) Surface Preparation**:

- **Removal of Damaged and Unsound Concrete:**

  The effectiveness, integrity and performance of the RELinforce™ FRP System critically depend on the preparation and soundness of the substrate. Therefore, preparing a clean and sound substrate is the most important part of the entire application process. Environmental effects and corrosion of the reinforcing bars can cause damage to concrete or masonry. Any such concrete or masonry area that is determined by the engineer of record or other properly trained personnel to be damaged and unsound must be removed and repaired before application of the RELinforce™ FRP system. Defects in concrete substrate can compromise the strength of the system. Covering of carbonated or chloride-contaminated concrete with RELinforce™ FRP system without addressing the source of contamination will be detrimental to the effectiveness of the repair system.

- **Surface Preparation:**

  All sharp fins, protrusions, surface irregularities and unevenness shall be ground to a smooth surface with less than 1/32 inch in deviation. Surface preparation shall promote continuous intimate contact between the RELinforce™ material and concrete by providing a clean and smooth flat or convex surface. Disk grinders or similar equipment may be used to remove paint, stains and other surface substances that may affect the bond. Any surface protrusions caused by crack injection must be removed before application of the RELinforce™ EP putty. For severe undulations and defects use RELinforce™ EP Mortar. The surface must be completely cleaned of any dust, grease, oil, curing compounds, wax, stains, paint, surface lubricants, foreign particles, weathered layers or any other bond inhibiting materials.

**2) Application of RELinforce™ Fab S Primer:**

All resin systems supplied by RELinforce™ are two-component systems, containing a Part A (**Resin**) and Part B (**Hardener**). We will be using saturant RELinforce™ Fab S having mixing ratio of **100 Parts** Resin to **50 parts** Hardener (by weight). It is very important that the two parts are thoroughly mixed in proper recommended proportion for proper development of the adhesives properties. Saturant Fab S Part A & Part B must be mixed for a minimum of 3 minutes or until a uniform color and consistency is achieved. No organic solvents or thinners

should be used to thin the epoxies. If mixed resin begins to generate heat or display increased viscosity should not be used and discarded properly.

Prepared marked surface where **RELinforce™** C Lam Carbon Laminates has to be applied shall then be primed with a low viscous two component primer, manually using brush or roller to improve the bonding capacity of the concrete surface and fill the capillaries. Impregnate all the corners and edges properly. If any dry patches are found the same needs to be primed. Allow the Primer to become tacky.

**3) Application of RELinforce™ Lam A:**

The **RELinforce™** Lam A Laminate adhesive shall be mechanically mixed as per the mixing ratio of **100 Parts** Resin to **50 parts** Hardener (by weight). Apply the mixed Laminate adhesive as per the provided consumption with the help of steel trowel on the primed surface as well as on the Carbon Laminate also for better performance properties. Press the carbon Laminates against the concrete surface with the hard roller and hold it temporarily till the adhesive becomes tacky to hold the laminates to avoid voids generations and sagging under its own weight. Mix as much adhesive material as can be applied within its pot life. Mixed material exceeding its pot life shall be discarded and not used for application.

**4) Fixing of RELinforce™ C Lam:**

The carbon fiber laminates to be used shall be **RELinforce™** C Lam laminate as per the design provided. It shall be precision cut using a mechanical cutter in lengths required as per the design drawing. Clean the laminates of all the dust and loose suspended particles. Fix the adhesive applied **RELinforce™** Laminates against the concrete substrate by gently pressing the same. Roll the laminates with a medium nap roller, pressing along the longitudinal direction to avoid air entrapment and proper embedding of the laminates into the laminate adhesive. Level the excess adhesive that oozes out at the edges of the laminates in a tapered form. Any deviation in alignment of the laminate shall be corrected by straightening the same immediately. Laminates should be suitably anchored as per the design and recommendation.

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