

METHODOLOGY FOR FIBER WRAPPING SYSTEM

1. SURFACE PREPARATION

Basic treatment must be made to the surface prior to strengthening with CFRP system. Surface is very well chipped out to remove all loose concrete up to the hard strata. Major cracks injected & corroded steel treated with anticorrosive treatment.



2. SURFACE AFTER PREPARATION

The surface to be repaired is typically rubbed off to smooth out irregularities, remove contaminants and radius sharp corners. This can be performed by shot or sand blasting, water jet or grinder.

3. APPLYING OF PRIMER

In order to promote adhesion and prevent the surface from drawing resin from the FRP, a low viscosity epoxy primer is applied with a roller until the substrate is locally saturated.



4. PUTTY

As the Primer work over, wherever the surface noticed in uneven condition the surface is well prepared with putty to level-up all irregularities (or) unevenness.



5. CUTTING FABRIC

In a clean area away from the resins, the fabric is carefully measured and cut in accordance with the specifications.

6. SATURATING FABRIC

On large, high volume projects, the fabric can be saturated automatically using **Wet Layup Machine**. For lower volumes and shorter strips, the fabric can be either saturated on a table, or the surface can be coated with resin and the dry fabric applied.



7. APPLYING FABRIC

The pre-wetted or dry fabric is carefully laid onto the surface and smoothed out to remove air bubbles by applying pressure with Fiber Rollers and ensure that the fibers are straight and free of Air pockets.



8. QUALITY CONTROL MONITORING

During the cure, 2 to 6 hours depending on ambient conditions, the fabric is checked to ensure that all air bubbles are removed and that the fabric is not sagging. Edge Structural Composites highly recommends that a trained, qualified inspector monitor applications.

9. Column after Strengthening

After taking care of all perspectives then second coat of Epoxy Saturant is applied and sand sprinkling is done, finally to make the surface rough for over plastering.



Application of Grinding:-



COLUMN UNDER GRINDING



ROUND COLUMNS



SQUARE COLUMNS

For Round Columns: -

As in round column the possibilities of sharp corners is negligible except Junctions, it is necessary to grind & prepare the smooth surface otherwise there is chances of occurring the air bubbles while doing Fiber wrapping.

For Square Columns:-

In square columns apart from the grinding at plain surface areas it is also necessary to remove all the sharp corners with grinder and form at least a minimum of 20mm radius for smooth functioning.

Application of Drilling:-



Marking & Drilling



Inserting Fiber Anchor



Spreading Fibers

Purpose:-

After completing the grinding work the next step is to go for the drilling for which you have to mark at the centre of the column width at specified distances as recommended Or given in the drawing where the overlapping of fiber wrap ends.

The depth of the drilling is as per the size of Fiber anchors which is almost 50mm to 60mm long.

Thereafter the fiber anchors are inserted inside the drilled area and fiber are speeded in such a way that it locks the joint of Overlap.

Primer Coating: - Resin primer-11



Applying Primer on Beam



After Primer Coating

Description:-

Before starting the application of primer we have to be very sure that all water has got evaporated and the moisture on surface should not be more than 4%. As you get confirmation that the moisture meter gives a reading up to the required percentage you can start applying the primer coating on the surface.

Primer is a 2 component based material;

Mixing Proportion: - 1) Base: - 4kg.
2) Hardener:-2kg

These two components has to mix in specified ratio and need to stirrer well with the help of Stirrer machine having speed 200 – 300rpm for at least 2-3 minutes till it gets properly merged because fine mixing will give a better result.

After applying of primer allow the material to cure for at least 24 hrs or overnight before recoating of the second Resin.

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Epoxy Coating: - Matrix -20



Before epoxy coating coat



Applying of Epoxy

Application method:-

Epoxy is a bonding saturate for the fibers and it cannot be applied directly on a rough surface for that it is necessary to apply the first coat of primer due to which the surface becomes smooth and it stops the absorption power of concrete.

Epoxy is a 2 component based material;

Mixing Proportion: - 1) Base: - 3.7kg 2) Hardener:-1.3kg

These 2 components require a proper mixing with the help of Stirrer machine at a minimum speed of 200-300rpm for at least 2-3 mints for accurate merging which gives an output of superior bonding. Immediately after stirring it should be applied on surface without any time gap because it is designed with intension to get set in next 30 – 40 mints after applying on surface for good bonding.

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Fiber Wrapping: - GLASS – Fiber Wrap



Before Fiber Wrapping



After Fiber Wrapping

Method of Applying:-

Fibers designed in different forms as per the requirement of increasing the bearing capacity of Shear and flexural strength of structures. It comes in three different form

Such as;

1) Carbon Fiber (2) Glass Fiber (3) Aramid Fiber.

Before starting the application it is compulsory to check the smoothness of the surface and the sharpness, there should not be any sharpness throughout the periphery of surface and at the junction areas and less undulations which will effect in the functioning of fiber wrapping where there is chances of causing a damage to the fiber which is to be avoided for long lasting.

Immediately after applying the epoxy layer we must start doing fiber wrapping around the surface as per the instruction. While wrapping roller application is must to built a pressure so that the fiber should get properly squeeze with epoxy for superior bonding with concrete which results in developing a better strength.

Most important be careful while wrapping not to allow any kind of air bubbles so roller Application is very must to avoid such kind of inconveniency.

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Anchor Fixing: - Fiber Anchor – GFA 350



Anchor Inserting Fiber Anchor s



Locking with Fiber

How to apply:-

Fiber anchors are made up of Epoxy & Fibers and are design in a light weight

After completing the wrapping work these are normally applied at the ends of the wraps in beams & at the overlapping joints in columns.

It is inserted in the drilled hole as shown in the diagram and then manually it is speeded in the shape of sun so that it should give a locking effect from all 360°.

The purpose of putting fiber anchor is to hold the ends & joints of the wrap so that it should not peel off from the ends in any circumstances which give a long lasting life to the fiber wrapping.

Sand Sprinkling:-



Sprinkling Before



Sprinkling of Sand

Purpose:-

It is done at the final stage after accomplishing the whole wrapping work because to give a Safe and longer life to the system it is further covered by providing a minimum layer of 12mm thickness with polymer modified mortar.

After fiber wrapping and anchor fixing it is given a curing time of minimum 3-4 hrs to get the epoxy hard so that while applying the second coat of epoxy for sand sprinkling, the Wrapped fiber should not slip-down with the additional weight of sand.

For sand sprinkling first second coat of epoxy is applied then immediately the sand is sprinkled manually as shown in the picture.

Sequence of Anchor Fixing



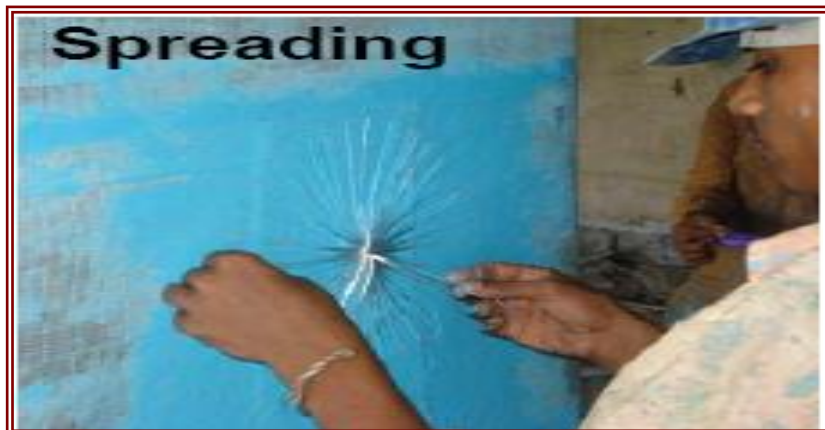
Step no.2



Step no.1



Step no.3



Step no.4

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