METHOD STATEMENT

Sika® CarboDur® Grid C

Concrete Strengthening

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BUILDING TRUST

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1 SCOPE

This Method Statement is written as a guide for the use and application of Sika® CarboDur® Grid C, a Structural Strengthening Reinforcement System consisting of Sika® Carbodur®-300 Grid embedded in a Sika® MonoTop®-3200 Grid cement-based mortar matrix (Fibre Reinforced Cementitious Mortar).

This System is designed for the flexural and shear strengthening of concrete structures.

2 SYSTEM DESCRIPTION

The Sika® CarboDur® Grid C System is used for the structural strengthening of concrete structures.

2.1 LIMITATIONS

- The Products must only be used in accordance with their intended applications. The System configuration as described in the Product Data Sheets (PDS) must be fully complied with and may not be changed.
- Strengthening Products and Systems should only be used by suitably trained and experienced professionals. All strengthening works must be carried out as directed by a suitably qualified Structural Engineer as the Supervising Officer.
- For any other specific construction / build information please refer to the relevant Engineer's specifications, details, drawings, and risk assessments.
- Local / regional differences in Product formulations may result in performance variations. The most recent and relevant local Product Data Sheets (PDS) and Material Safety Data Sheets (MSDS) must be referred to and can be obtained from your local Sika® Technical Department.
- This Method Statement is intended as a guide and must be adapted to suit the local Products, Standards, Legislation and any other specific local or specified requirements.

3 PRODUCTS

The FRCM (Fibre-reinforced Cementitious Matrix) System consists of the structural mortar Sika® MonoTop®-3200 Grid and the carbon fibre grid Sika® CarboDur®-300 Grid.

For further information on materials and application, please refer to the relevant Product Data Sheets.

Sika® Brand	Description
Sika® CarboDur®-300 Grid	Impregnated carbon grid packaged in plastic film
Sika® MonoTop®-3200 Grid	One-component mortar for the embedding of the Sika® CarboDur®-300 Grid

3.1 MATERIALS STORAGE

All materials must be stored properly in undamaged, original sealed packaging, in dry and cool conditions at temperatures between +5°C and +35°C. Protect all the Products from direct sunlight. Please refer to the specific information contained in the respective Product Data Sheets regarding the minimum and maximum storage temperatures and times. Sika® MonoTop®-3200 Grid can be stored for up to 12 months from the date of production.

4 EQUIPMENT

Tools necessary for the preparation and application of the System:

Mixing Tools

Drill and Mixing Paddle: Small Quantities

Double Mixing Paddle: Small Quantities

Forced Action Pan Mixer: Medium Quantities

Forced Action Pan Mixer: Large Quantities

Hand Tools

Trowel

Mixing Bowl

Measuring Cylinder

Sponge

Scissors

Notched Stainless Steel Trowel (typ. 9mm)

Stainless Steel Trowel

Spraying Tools

Hopper Gun

Spraying Equipment

Air Compressor

4.1 CLEANING

Clean all tools and application equipment with water immediately after use. Hardened material can only be removed mechanically.

Spray equipment shall be thoroughly cleaned at appropriate intervals during the application process to prevent accumulation of residual deposits using adequate pressure water.

5 HEALTH AND SAFETY

5.1 RISK ASSESSMENT

The risks to health and safety from everything, including any defects in the structure, working procedures and all of the materials used during the installation must be properly assessed and safely accommodated.

Any working areas on platforms and temporary structures must also provide a stable and safe area to work. All work and working procedures must be carried out fully in accordance with the relevant local health and safety legislation.

5.2 PERSONAL PROTECTION

Work Safely!

Safety boots, gloves and other appropriate skin protection should be worn at all times. The use of disposable or new / clean protective clothing during the materials preparation and application is strongly advised.

Appropriate eye protection should be worn at all times whilst handling, mixing and installing the Products. Carrying an eye wash with you at all times is recommended.

Always wash hands with suitable soap and clean water after handling the Products and before food consumption, smoking, visiting the toilet and after finishing work.

The work area needs to be well ventilated, and operatives should take frequent breaks in fresh air to avoid any other health issues.

For more detailed health and safety information, please refer to the latest Material Safety Data Sheet (MSDS) for each Product.

5.3 FIRST AID

Seek immediate medical attention in the event of excessive inhalation, ingestion or eye contact causing irritation. Do not induce vomiting unless directed by medical personnel.

For eye contact, flush the eyes immediately with plenty of clean water, occasionally lifting the upper and lower eyelids. Remove contact lenses immediately. Continue to rinse the eye(s) for 10 minutes and seek medical attention.

Rinse contaminated areas of skin with plenty of water. Remove contaminated clothing and continue to rinse the skin for 10 minutes and seek medical attention.

For more detailed health and safety information, please refer to the latest Material Safety Data Sheet (MSDS) for the Product(s).

5.4 WASTE DISPOSAL

Do not empty any surplus material into drainage or water systems; dispose of all waste materials and packaging responsibly through licensed waste disposal facilities or Contractors, fully in accordance with local legislation and the relevant authorities' requirements.

6 PREPARATION

6.1 PRE-APPLICATION PREPARATION

Review the project specifications in detail, inspect the site conditions and report immediately in writing to the responsible Engineer if anything is, or appears to be, unsuitable for the proper execution of the works required.

The Contractor is responsible for the preparation of the work to ensure the proper functioning and quality of the application of the Sika® CarboDur® Grid C System.

Prior to commencement of work, the Contractor's representative must have visited the site and inspected all aspects of the application requirements. The Contractor shall provide a Method Statement detailing the application procedure of the System for approval by the Engineer.

6.2 SUBSTRATE PREPARATION

The concrete substrate must be in good condition and free of dust, dirt, loose materials, surface contamination and all materials that reduce adhesion.

In relation with FIB Bulletin No. 14, in situ substrate tensile strength shall be more than, or equal to, 1.5 MPa. If the values are lower, after consultation with a Structural Engineer, the surface preparation / repair shall continue until the minimum requirement is achieved.

The substrate should be thoroughly wetted down 24 hours before application of the Sika® CarboDur® Grid C System.

The concrete shall be saturated surface dry (SSD conditions) prior placing the mortar.

Remove excess water before application, e.g., by using a clean sponge. Ensure that there is no standing water on the surface. The surface should have a dark matt appearance without shine and the pores and hollows in the surface should be free from water.

When Sika® CarboDur® Grid C is to be applied over sharp edges, such as beam arrises, the edges must be rounded to a radius of at least 20 mm by an appropriate method, e.g., grinding with a diamond disc.

Note: If concrete repair work is necessary to achieve a suitable surface to install the Sika® CarboDur® Grid C System, a suitable Sika® Repair Mortar should be used. For guidance, please contact your local Sika® Technical Department.

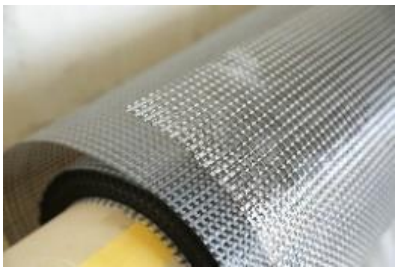
The waiting time before the application of the reinforcement System for the repair with mortars from the Sika® range is 72 hours under the following ambient conditions: 20°C and at least 80% RH (relative humidity).

6.3 SIKA® CARBODUR® 300 GRID PREPARATION

Organise a material preparation area so that there is no risk of contamination to the Grid. It is recommended that the Grid be rolled out onto a clean plastic sheet on the floor / work surface.

According to the design drawings and / or instructions from the Overseeing Engineer, cut the reinforcement to the relevant dimensions, using a suitable pair of scissors.

Store the remaining Sika® Carbodur® 300 Grid away from any risk of contamination or soiling, until it is ready to be used.



6.4 PREPARING SIKA® MONOTOP®-3200 GRID MORTAR

6.4.1 MIXING

Pour the **minimum** recommended clean water quantity into a suitable mixing container. While stirring slowly, add the powder to the water and mix thoroughly for at least 3 minutes. Add additional water, if necessary, up to the maximum specified amount to achieve the required consistency and a smooth consistent mix.



7 APPLICATION

7.1 HAND APPLICATION

When manually applying by hand, first make a scratch coat by firmly scraping the Sika® Monotop®-3200 Grid mortar over the substrate to form a thin layer and fill any pores or cavities in the surface. Ensure the whole surface that needs to be strengthened is well covered by the scratch coat.

A further layer of Sika® Monotop®-3200 Grid mortar must then be applied immediately onto the wet scratch coat using the smooth face of the notched trowel to level it on the surface.

Then use the notched side of the trowel to create a profiled surface whilst controlling the thickness of the application.


7.2 SPRAYED APPPLICATION (WET SPRAY)

The pre-mixed quantity of mortar is fed into the hopper. The mortar is conveyed onto the substrate with the help of compressed air.

Usually, a small valve on the air connector is used to regulate the air flow rate.

With too little air, the material will “splutter” and not be sprayed adequately; too much air will produce turbulence in the sprayed material, causing too much loss.

As a general rule, set the nozzle opening to two or three times larger than the maximum mortar grain size. Hold the nozzle at 90 degrees and approximately ~100 mm to 300 mm away from the substrate. It is advisable to carry out a small spray trial before starting the main application.

The spray distance from the substrate is dependent on the air pressure, nozzle opening size and type of hopper gun. Refer to the machine manufacturer’s instructions before use.

Once the mortar is evenly sprayed on the surface, use the notched trowel to level and then create a profiled surface whilst controlling the application thickness.

7.3 INSTALLATION OF THE GRID

On the layer of the freshly applied Sika® MonoTop®-3200 Grid, immediately place the Sika® CarboDur®-300 Grid. If the grid is freshly unrolled, it may have a concaved shape. Apply the grid to the substrate so that the central portion of its length is raised, and the ends meet the substrate first. Press the grid with the smooth side of the trowel to fully embed it into the fresh mortar.

Spread the excess Sika® MonoTop®-3200 Grid that is pressed through the grid over its surface until a smooth surface is obtained and the grid is fully covered.

Apply a second coat of Sika® MonoTop®-3200 Grid, either by hand or spray application and trowel to a smooth finish.

Finishing must be carried out to the required surface texture using suitable finishing tools as soon as the mortar has started to harden.

As each roll of Sika® Carbodur®-300 Grid is 50 m long, overlapping in the longitudinal direction is generally not required. However, where overlapping is required to facilitate easier installation, to ensure continuity of reinforcement the overlap length of Sika® CarboDur®-300 Grid is to be 200 mm. There is generally no need to overlap with neighbouring, parallel strips of Sika® Carbodur®-300 Grid.

For shear reinforcement, overlapping is not necessary unless requested by the designer of the strengthening solution.

At this stage in the development of the Sika® CarboDur® Grid System, the application of several reinforcement grid layers (2 or more) has not been evaluated.

7.4 ASSOCIATED COATINGS

Once installed, no UV protection is required for the Sika® CarboDur® Grid C System; therefore, the finished surface can be left uncoated.

Where protective coatings are required for functional or aesthetic reasons, protective coatings such as Sikagard®-550 W Elastic, Sikagard®-675 W GB Elastocolor or Sikagard® 63 N can be applied onto the dried System.

8 LEGAL NOTE

The information, and in particular the recommendations relating to the application and end-use of Sika® products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the products suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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