

Construction



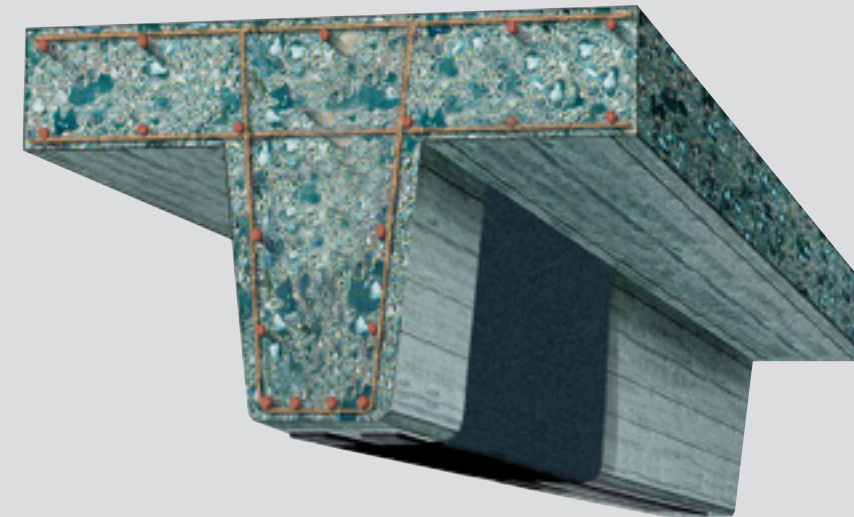
Sika[®] CarboDur[®] Structural Strengthening Systems



Structural Strengthening with Sika® CarboDur® Composite Systems

Reasons for Strengthening

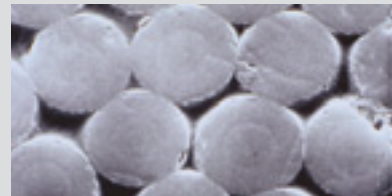
- **Durability problems** due to poor or inappropriate construction materials
- **Inadequate** design or construction
- **Aggressive** environments not properly understood during the design stages
- **Increased** loading requirements due to changes of policy or use of structures
- **Increased life-span** requirements made on ageing infrastructure
- **Exceptional** or accidental loading



Materials used



CFRP Plates
Carbon fiber reinforced plates produced by pultrusion process with precise material properties. Mostly used for flexural strengthening of dynamic and static loaded structures such as bridges, beams, ceilings or walls.



Carbon Fibres in CFRP Plates
Magnification 1:2000
Fiber volume content > 70 %



Sika CarboShear L
L-shaped carbon fiber link used as externally bonded shear reinforcement, mostly used for shear reinforcement of T-beams as an anchoring tool for CFRP plates.

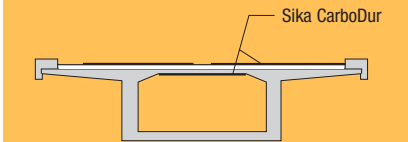


FRP Fabrics
Uni- and bidirectional fabrics with carbon, glass and aramid fibers. Mostly used for seismic retrofitting and shear strengthening.

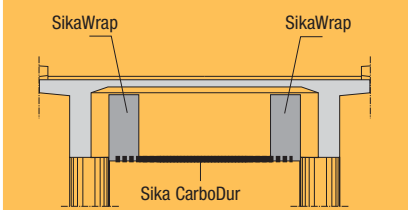


Sika® Systems

- Flexural Strengthening with**
- **Sika® CarboDur®** CFRP plates
 - **Sika® CarboHeater**, heating device for rapid application
 - **Sika® CarboDur®** prestressed CFRP plates
 - **SikaWrap®** FRP fabrics



- Shear Strengthening with**
- **Sika® CarboShear® L** CFRP plates
 - **SikaWrap®** FRP fabrics



- Seismic Retrofitting with**
- **SikaWrap®** FRP fabrics



Upgrading of existing Civil Engineering Infrastructure

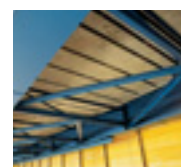
Columns/Poles



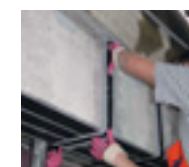
Silos/Chimneys/Towers



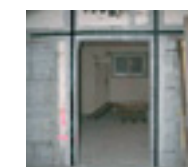
Bridge Decks



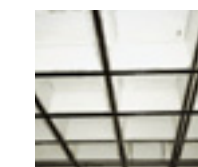
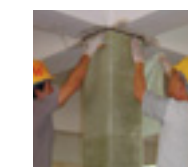
Beams/Girders



Buildings



Parking Structures



Sika® CarboDur® Structural Strengthening Systems

CFRP Plates System Components

Sika® CarboDur® CFRP plates	Elastic modulus Tensile strength	Type S 165 000 N/mm ² 2800 N/mm ²	Type M 210 000 N/mm ² 2800 N/mm ²	Type UH 400 000 N/mm ² 1800 N/mm ²
Sika® Prestressing Systems	Prestressing of Sika® CarboDur® plates over 200 kN (20 tons) with Sika® StressHead or Sika® LEOBA CarboDur® prestressing system			
Sika® CarboHeater Heating device	Fast application (2 – 3 hrs) of Sika® CarboDur® plates			
Sika® CarboShear® L L-shaped CFRP plates	Min. tensile load Elastic modulus	126 kN/40 mm width 120 000 N/mm ²		
Sikadur® Epoxy adhesives and mortars	Application temperature Elastic modulus Bond strength Use	Sikadur®-30 10 – 35 °C 12 800 N/mm ² > 4 N/mm ² (concrete failure) Plate adhesive	Sikadur®-30 LP 25 – 55 °C 10 000 N/mm ² > 4 N/mm ² (concrete failure) Plate adhesive	Sikadur®-41 10 – 35 °C 9000 N/mm ² > 4 N/mm ² (concrete failure) Repair mortar

FRP Fabrics System Components

SikaWrap® FRP Fabrics	Several types of SikaWrap® FRP fabrics are available to meet the requirement of specifier and contractor. Unidirectional woven and non-woven fabrics made of glass, aramid and different types of carbon fibers are available. Bi-directional types can be offered with carbon and glass fibers. The range of areal weight is between 200 and 600 g/m ² for carbon, 400 to 1000 g/m ² for glass and 300 to 600 g/m ² for aramid fiber fabrics. Further possibilities and fiber combinations are available on request.
Sikadur® Epoxy impregnating resins	All SikaWrap® fabrics can be impregnated with the system tested Sikadur® impregnating resins that are all suited for the most common substrate types.

For additional information see corresponding Product Data Sheets.

Also available from Sika



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Your local Sika Company

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