

Industrial Structures



FREYSSINET

THE PROBLEMS

All industrial structures age and undergo changes over time that may make them unsuitable for use. Freyssinet offers its clients proven solutions for the repair, the protection and the strengthening of these structures.

■ FIELD OF APPLICATION

- Silos,
- Hangars,
- Storage warehouses,
- Factories,
- Testing and research centers,
- Dams.

■ IDENTIFIED PROBLEMS

- Corrosion of reinforcing steel,
- Concrete spalling and flaking,
- Concrete cracking,
- Concrete delamination,
- Partial destruction or failure of elements,
- Excessive deformation,
- Water infiltration.

■ NATURAL CAUSES

- Ageing of materials (steel, wood, concrete),
- Concrete cracking or spalling due to alkaline reaction,
- Concrete carbonation,
- Chlorides penetration in concrete cover,
- External chemical aggressions (polluted air, acid rain),
- Chemical aggressions due to stored products,
- Freezing/thawing cycles.

■ STRUCTURAL CAUSES

- Change in stored materials,
- Change of standards (wind, earthquake, safety),
- Design error, poor design or implementation,
- Material fatigue (moving wheel loads effects).

■ ACCIDENTAL CAUSES

- Fire,
- Explosion,
- Excessive loading (offset draining),
- Ground movements.



Waterproof repair in a cement plant



Cathodic protection with titanium mesh



Patch repair and re-profiling



Strengthening with FRP (Foreva® TFC) anchored by carbon braids

Freyssinet, with more than sixty years of experience, as a main contractor in specialized works, has developed the Foreva® offer, a turnkey service guarantee for the long-term enhancement of your structures.

Strengthening by additional prestressing monostrands



OUR SOLUTIONS

The Foreva® solutions enable Freyssinet to carry out repair and retrofit works in line with industry standards and good engineering practice while respecting the environment.

■ ASSISTANCE WITH THE STRUCTURAL DIAGNOSIS

■ ASSISTANCE WITH THE DESIGN

■ CONCRETE REPAIR

- Treatment of cracks
 - Resin and grout injection (**Foreva® TF Inject**)
 - Injection of cracks with water infiltration
- Concrete re-profiling
 - Patch repair (**Foreva® REP**)
 - Shotcrete (**Foreva® Shotcrete**)

■ PROTECTION OF REINFORCING STEELS

- Cathodic protection with galvanic anode:
 - Use of discrete anodes (**Foreva® GP Guard**)
 - Use of zinc coating (**Foreva® GP Zinc**)
- Cathodic protection with impressed current:
 - Use of discrete anodes (**Foreva® CP Tube**)
 - Use of anodic ribbons (**Foreva® CP Ribbon**)
 - Use of anodic meshes (**Foreva® CP Mesh**)
 - Use of conductive anodic coating (**Foreva® CP Coat**)
- Electro-chemical treatment of concrete
 - Realkalinization (**Foreva® PH+**)
 - Chlorides extraction (**Foreva® CL-**)
- Surface Treatment
 - Use of Inhibitors of corrosion (**Foreva® Inhib**)
 - Protective coatings (**Foreva® Relastic 310**)
 - Water repellent impregnation (**Foreva® Fuge**)

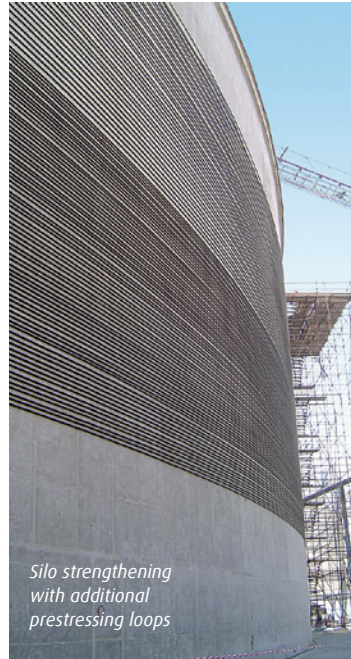
■ STRENGTHENING WORKS

- Additional prestressing (Freyssinet products)
- Shotcrete (**Foreva® Shotcrete**)
- Carbon fiber bonded composite
 - Bidirectional and unidirectional fabrics (**Foreva® TFC**)
 - Pultruded laminate (**Foreva® LFC**)
 - Pultruded rod (**Foreva® RFC**)
- Metal and wood reinforcements
- Underpinning with micro-piles
- Load transfer using flat jacks (Freyssinet process)

■ PROTECTIVE COATINGS AND WATERPROOFING LININGS

- Polyurea spray coatings (**Foreva® Polyurea**)
- Application of laminated epoxy coating (**Foreva® Reva**)
- Application of a hydraulic coating
- Placing of shells and membranes (Polyolefin, PVC)

Columns repair by shotcreting



Silo strengthening with additional prestressing loops

Strengthening by Foreva® TFC



Our specialist teams are on hand to help you identify the Foreva® solution that meets your requirements.



Americas

Argentina
Brazil
Canada
Chile
Colombia
French Guyana
Mexico
Panama
Peru
El Salvador
United States of America
Venezuela

Europe

Belgium
Bulgaria
Cyprus
Czech Republic
Denmark
Estonia
France
Hungary
Iceland
Ireland
Italy
Latvia
Lithuania
Luxembourg
Macedonia
Netherlands
Norway
Poland
Portugal
Romania
Russia
Serbia
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom

Africa and Middle East

Algeria
Egypt
Jordan
Kuwait
Morocco
Oman
Qatar
Saudi Arabia
South Africa
Tunisia
United Arab Emirates

Asia

Hong Kong
India
Indonesia
Japan
Macau
Malaysia
Myanmar
Pakistan
Philippines
Singapore
South Korea
Taiwan
Thailand
Vietnam

Oceania

Australia
New Zealand

www.freyssinet.com

