

Foreva[®] Shotcrete

- Excellent bond strength
- High mechanical properties at young age
- No risk of void behind reinforcing bars
- Strong compatibility with concretes in place
- Large thickness layer in one shot
- Standard design rules for concrete structure is applicable to the reinforced structure

REPAIR AND STRENGTHENING SOLUTION BY SHOTCRETING - DRY PROCESS

Foreva[®] Shotcrete is the Freyssinet solution for repair and strengthening by dry shotcreting of concrete structures. **Foreva[®] Shotcrete** enables to obtain a perfectly bonded strengthening and to consider in the calculations that the strengthened structure has a monolithic behaviour.

ADVANTAGES

- **High performance strengthening:** enable to reach C60/75 concrete strength;
- **High modulus of elasticity:** between 30 and 44 GPa;
- **Reduced the effects of shrinkage:** low water content;
- **Low porosity:** high compacity concrete;
- **High adhesion to rebars:** as good as standard concrete;
- **A uniform surface with a « regular » aspect:** in « grains »
- **Enables long transfer distance:** up to several hundreds of meters;
- **User friendly:** reduce cleaning operations in case of stop and restart.

FIELDS OF APPLICATION

The **Foreva[®] Shotcrete** solution enables to repair damaged facings and to strengthen elements of concrete structure.

- Appropriate for bridges, buildings and any concrete structures;
- Appropriate for underground structures, in particular tunnels : local repair, strengthening by a concrete liner connected to the ground or by an unbounded liner (support and protection of watertightness membrane) ;
- Suits masonry structures : strengthening of counter-vout;
- Allow to calculate the strengthened element in compliance with BAEL 91 requirements;
- Must be applied on non brittle facings with a minimum clearance of 1.5m.



FREYSSINET
SUSTAINABLE TECHNOLOGY

PRINCIPLE

The **Foreva[®] Shotcrete** solution is based on the transfer of dry concrete and its spraying with introduction of water at the lance.

The transfer of the concrete as a dry mix between the inlet and the outlet of the pipe enables to transport it over long distances.

Dry shotcreting is characterized by:

- a high cement content in the vicinity of the interface with the facing due to the rebond of the biggest aggregates;
- a compacting effect in the thickness of the layer applied by the aggregates which are sprayed against the facing at very high speed.

Consequently the shotcrete has an excellent bond strength to the substrate and high mechanical properties, without risk of void behind rebars.

EXPERTISE

Freyssinet technical department determines the concrete mix formula, the equipment (capacity, flow rate, etc.) and the procedure of application (thickness to be sprayed, number of layers, delays between layers, etc.) in relation to the specificities of the works (distance of transfer, concrete strength, etc.).

PRODUCTS

Concrete mix formula is designed by Freyssinet technical department who determine the type and fraction of components: cement, sand, aggregates, admixtures, fibres and additions, so as to reach the required performances.

Admixtures:

- maintain fluidity (stabilize the setting);
- initial cohesion (activators);
- stiffening (accelerate the start of setting).

Fibres:

- better cohesion of fresh concrete;
- reduce the effects of shrinkage;
- increase mechanical properties.

Additions:

- higher bonding properties (fumée de silice).

The concrete is either a ready for use concrete or a premixed concrete (in bags, in big bags or in a tank), or fabricated on site.



SPECIALIZED TEAMS

The **Foreva[®] Shotcrete** solution is implemented exclusively by Freyssinet teams who defines in particular the substrate preparation procedure, the spraying equipment, the arrangement at the working areas and the provisions for noise, vibrations, dust and pollution.

Freyssinet specialists in shotcreting are certified by ASQUAPRO.