

# Art of restoration... ...Reinforcement engineering

**SINERT**



## CERTIFIED APPLICATION CYCLE

- ◆ Demolition of the ruined concrete or demolition using water jets at a pressure of up to 3000 bar;
- ◆ creation of denticulated surfaces that favour the grip of future reconstruction mortars;
- ◆ sand blasting of all uncovered irons - grade SA2½;
- ◆ sand blasting of the entire concrete surface to create a clean, stable base with open pores and subsequent deep blowing to remove all deposited sand;
- ◆ high-pressure washing to produce surfaces devoid of any dust and polluting agents;
- ◆ treatment of exposed irons with passivating cement grout to which have been added additives with "multiple anticorrosive action migrating inhibitors";
- ◆ integration and replacement of excessively ruined irons;
- ◆ reconstruction of edges, iron coverings and missing parts with thixotropic mortars with high mechanical resistance to compression and bending, strong adherence to the concrete, elastic module and heat expansion coefficient similar to that of concrete;
- ◆ restoration of original profile;
- ◆ injection of ground floor loose stone foundations;
- ◆ installation of any necessary reinforcements;
- ◆ high resistance anticarbonation shaving;
- ◆ final protective coating .



## REINFORCED CONCRETE IMPROVEMENT AND RESTORATION

*Long live concrete*



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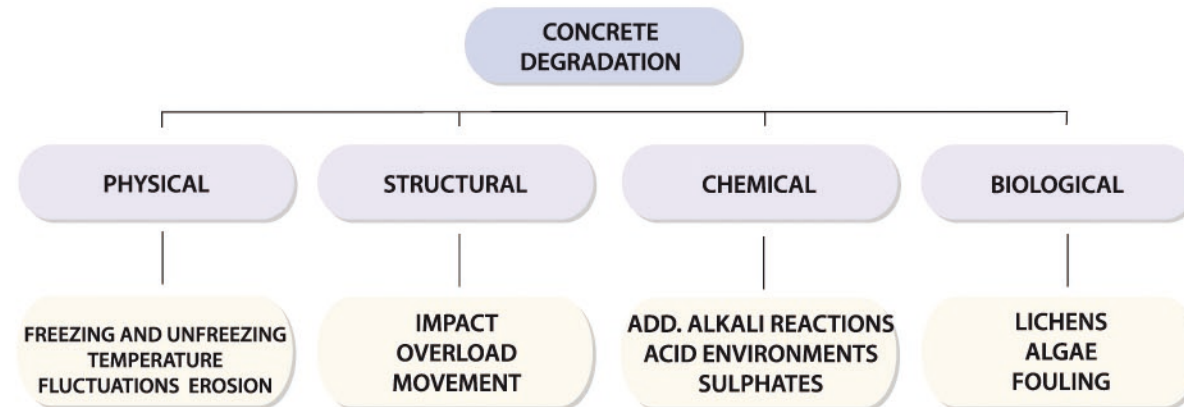
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## Through targheted choices and careful planning ...

The processes that can cause the degradation of concrete works are numerous and of various kinds.



This mainly involves concrete and these are physical, mechanical, chemical, biological and obviously structural processes.

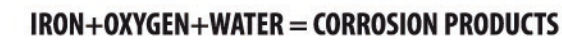
Only one process – corrosion – directly affects reinforcements, and indirectly affects concrete, due to the consequences which reinforcement corrosion has on the concrete itself.

Corrosion occurs not only because of a lack of protecting concrete but also because of damage and therefore indirectly because of one of the listed processes, as well as loss of alkalinity caused by the reaction of the carbon dioxide in the air with the alkaline components of the concrete (carbonation).



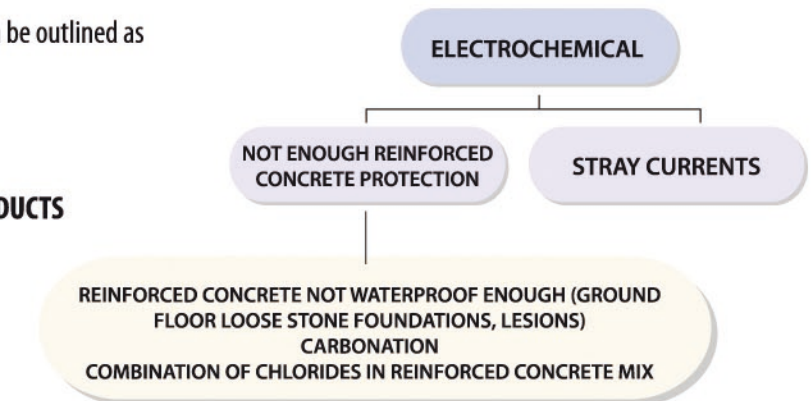
### Degradation of reinforcements

The reaction pattern of a reinforced-concrete structure can be outlined as follows:



This reaction of an electrochemical nature consists of four partial processes and more specifically:

- ◆ by iron oxidation reaction that makes available electrons in metal phase and causes the formation of corrosion products (anodic process);
- ◆ by oxygen reduction reaction which on the other hand consumes such electrons (cathodic process). dal trasporto degli stessi
- ◆ the conveyance of these electrons inside the metal from the anodic regions where they are made available to the cathodic regions where, instead, they are consumed;
- ◆ and finally, electrolyte, which is the means that allows the circuit to close and convey the electrons and is made up of concrete and water.

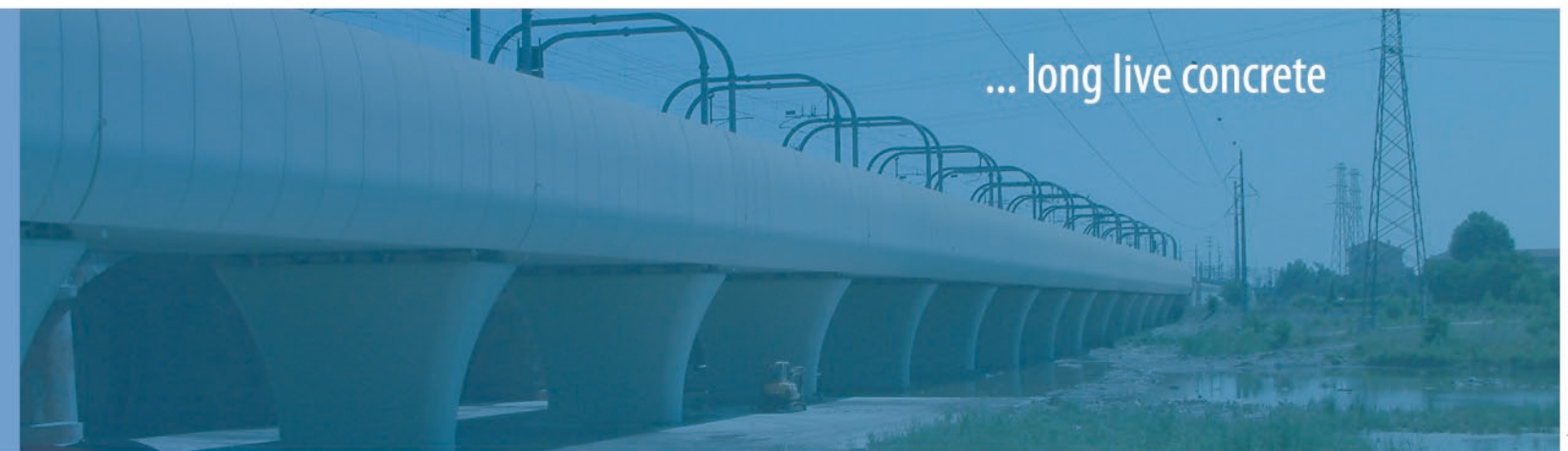


The circulation of current in the concrete must be stopped by reducing the amount of water and preventing it from permeating deep down. Membranes or coverings must therefore be used to protect the concrete against water



### CARBONATION AND AGGRESSION BY CHLORIDES

Each job must stop the corrosion under way and maintain protective conditions for the rest of the building's life.



... long live concrete