

## HENRI CAMBEFORT AND SOILS GROUTING

By **Thibault Badinier** and **Youssef Abboud**, young members of the French Society for Soil Mechanics and Geotechnical Engineering (CFMS Jeunes), April 2022

### Soil Grouting: techniques and cases used

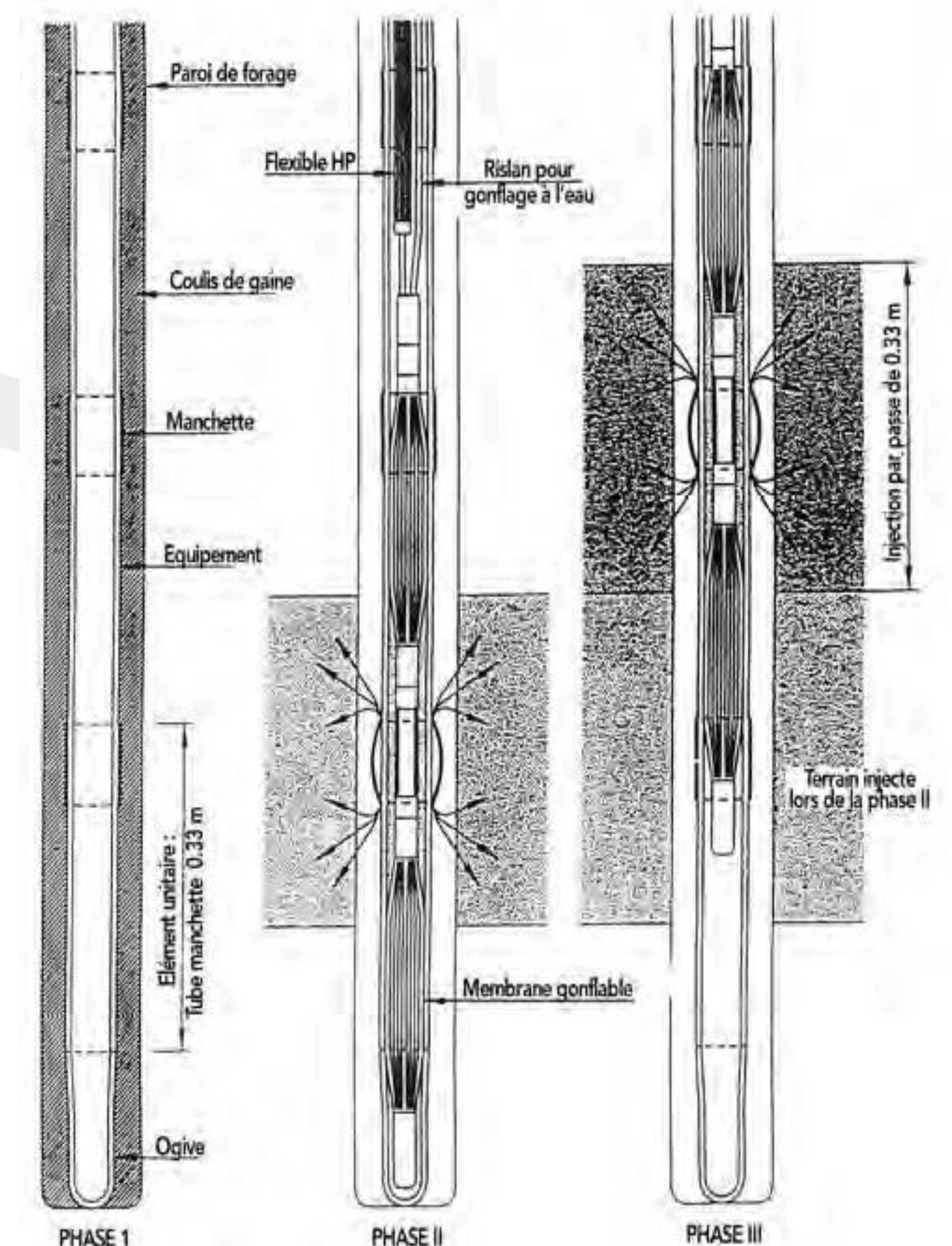
Grouting is a group of methods aiming to **modify the soils and rocks by replacing their porosities with binder that eventually forms an impermeable and more resistant matrix**. Soil grouting was firstly used in 1802 by Charles Berigny, who injected mortar grout to reinforce the lock of port of Dieppe. Later grouting was decisive in the 1920s and 1930s for many large dam projects carried out throughout the world.

Nowadays, grouting methods have progressed with the evolution of binder products. Mortar binder has been replaced with ultra-fine cement mix, clay mix and chemical products such as silicate gel and resin. Today, grouting is used in diverse cases. It allows soil and rock waterproofing, reinforcement, masonry refitting and settlement compensation. **Guidelines on soil grouting methods** have been published in 2006 by the **AFTES** (French association for tunnels and underground space), a revised version will be published in 2022.



### Henri Cambefort (1912-1995)

Despite not being the inventor of the soil grouting methods, Henri Cambefort is **one of the most important figures** in this field. Graduated as an engineer of the *Ecole Nationale des Ponts et Chaussées* in 1936, he became the technical director of Soletanche ten years later. **He is considered as the initiator of many inventions** from this period such as diaphragm walls, bar and mud drilling, triple-shell corers and the use of silicate gels and sleeved grouting pipes in grouting methods. He is also the author of **“Injection des Sols”** (Editions EYROLLES, 1964), a reference book on grouting techniques.



### Serre-Ponçon Dam

The Serre-Ponçon dam is considered as **the largest earth dam in Europe**. It was built on the Durance river in a 600 m wide pass. The dam base width is 650 m and its height is 124 m. This dam is remarkable for the importance of the soil grouting work. It prolonged the impermeable clay core up to a depth of 100 m in the alluvial valley. It is also known for being the first project in which sleeved grouting pipes were used. The construction started in 1952 with the beginning of the grouting and lasted till 1960 with the final infill of the lake.

Photos credits:

« La conception et la réalisation des travaux d'injection des sols et des roches » AFTES 2006; « *Mécanique des sols et des roches* » Magnan 2017; sireggeotech.it; EDF and « *Serre-Ponçon* », Les Films du Soleil, 1958

