CLAIMS

1. A method for supporting and reinforcing an excavation, comprising the steps of:
- installing a first rib (1) for supporting and reinforcing an excavation, said first rib (1) comprising at least a first structural element (5A) wherein that said first structural element (5A) comprises a tubular body (C) provided with an inner cavity (9A) and vent means, said first structural element (5A) comprising a filling device (7) operatively couplable to means for injecting concrete into said cavity (9A);
- injecting concrete at a pressure above atmospheric pressure so as to fill the inner cavities of the structural elements (5A,5B,5C) of said first rib (1) at least until complete filling thereof,
- prolonging the injection of concrete with the vent means closed so as to increase the internal pressure of the concrete.

2. The method according to claim 1, wherein said method comprises the steps of:
- installing a second rib (1A) in a position adjacent to said first rib (1), said second rib (1A) comprising at least a first structural element (5A) wherein that said first structural element (5A) comprises a tubular body (C) provided with an inner cavity (9A) and vent means, said first structural element (5A) comprising a filling device (7) operatively couplable to means for injecting concrete into said cavity (9A);
- connecting said first rib (1) to said second rib (1A) through one or more connection chains (45A,45B)
- filling the cavities of the structural elements of said second rib (1A) with concrete at least until complete filling of these cavities.

3. The method according to claim 1 or 2, wherein said filling device (7) comprises an opening (7A) defined on said body (C) of said structural element (5A) and a closing element (7B) of said opening (7A), said closing element (7B) being movable between a closed position and an open position.

4. The method according to claim 1 or 2 or 3, wherein said tubular body (C) of said structural element (5A) has a substantially circular cross section

5. The method according to any one of claims 1 to 4, characterized in that it comprises a second structural element (5B) comprising a first terminal portion (81) connected to a first end portion (51) of said first structural element (5A).

6. The method according to claim 5, wherein said second structural element (5B) comprises a tubular body (C2) provided with an inner cavity (9B) adapted to be filled with concrete after installation of said rib (1), and wherein said inner cavity (9A) of said first structural element (5A) is communicating with the inner cavity (9B) of said second structural element (5B).

7. The method according to claim 1, wherein said rib (1) comprises a bearing element (90) connected to an end portion (52) of said first structural element (5A).

8. The method according to claim 7, further comprising the step of increasing internal pressure of the concrete into said inner cavity of said first structural element (5A), causing a relative movement between said bearing element (90) and the first structural element (5A).

9. The method according to claim 5, wherein said rib comprises a third structural element (5C) comprising a tubular body provided with an inner cavity (9C) adapted to be filled with concrete after installation of said rib (1), and wherein said third structural element (5C) comprises an end portion (71) connected to a second terminal portion (82) of said second element (5B).

10. The method according to claim 9, wherein said inner cavity (9B) of said second structural element (5B) is communicating with the inner cavity (9C) of said third structural element (5C).

11. The method according to claim 9, wherein said third structural element (5C) comprises an end portion (72) connected to a bearing element (90) of said rib (1).

12. The method according to claim 11 further comprising the step of increasing internal pressure of the concrete into said inner cavity of said third structural element (5C), causing a relative movement between said bearing element (90) and the third structural element (5C).

13. The method according to claim 2, wherein each rib comprises a plurality of connection rings (48A,48B) arranged at predetermined intervals along the relative structural elements, each connection chain (45A,45B) being coupled with the ends to connection rings arranged on different ribs at a corresponding height (H).

14. The method according to claim 13, wherein each connection ring (48A,48B) is configured so as to allow coupling of at least two connection chains (45A,45B).