

The present invention relates to a new method of laterally propping or holding up the vertical walls of deep excavations so as to permit digging without causing the destruction of these walls.

5 It is known, in order to produce structures in the ground which may have considerable depths, to construct the vertical retaining walls of the said structures by digging trenches with a bentonite mud which holds up the walls of the trenches, then by replacing the
10 mud with slurry or concrete which, on hardening, forms the vertical walls of the structure, before carrying out the digging of its inner volume.

According to the technique currently employed, the lateral propping or holding up of the vertical walls
15 is ensured during the excavation by constructing, between various stages of the excavation, at least one floor which is thus able to withstand horizontal forces exerted by the ground on the outside of the vertical walls.

This mode of working requires the construction, in advance, of the supports which are necessary for
20 supporting the intermediate floors.

These supports are obtained by sinking shafts which go down to the base of the building and into which prefounded posts are introduced and which permit the
25 support of the intermediate floors.

The method according to the invention permits production of the excavation in a simpler, quicker and more economical way.

The present invention relates to a method of
30 propping or holding up the vertical retaining walls of deep excavations, characterised in that after producing the excavation freely to a depth compatible with the resistance of the retaining walls, an annular slab is constructed on the bottom of the excavation, which slab
35 bears via its periphery against the vertical retaining walls and rests on the bottom of the excavation; in that after the solidification of this annular slab it is joined, so as to support it, to the upper part of the retaining walls by means of stays; and in that the

excavation is then continued via the interior of the annular slab down to the lower end of the structure.

5 In accordance with the invention, it is advantageous for the annular slab, which makes it possible, during the excavation, to ensure the absorption of the horizontal forces exerted by the ground on the retaining walls, to be used to form part of an intermediate floor.

10 This can be achieved easily by positioning the annular slab at a suitable height and by giving it a form corresponding to that of the floor concerned.

15 When the excavation is finished, it is sufficient to support the annular slab by means of the supports provided for supporting the floor and to close the open central part of the annular slab, whereupon it is sufficient to take off the stays which were holding the annular slab during the excavation in order to obtain the final floor.

20 In the case of excavations of great depth which require the absorption at several levels of the horizontal forces exerted by the ground on the retaining walls, it is possible according to the invention to construct a plurality of annular slabs successively, which may each serve advantageously as an intermediate floor.

25 In order to make the invention more readily comprehensible, an embodiment thereof which is taken as an example and shown in the accompanying drawing will now be described by way of illustration and without implied limitation.

30 In this drawing, Figure 1 is a diagrammatic view in vertical cross-section of an underground structure in which the annular slab according to the invention has just been constructed.

35 Figure 2 is a plan view corresponding to Figure 1.

Figure 3 is a view corresponding to Figure 1 after fitting the stays.

Figure 4 is a plan view corresponding to Figure 3.

Figure 5 is a cross-sectional view corresponding to Figure 3 after completion of the excavation.

Figure 6 is a plan view of Figure 5.

5 Figure 1 shows a cross-sectional view of a structure in the process of being excavated in accordance with the invention.

Using a customary technique, the retaining walls 1 have been constructed on the periphery of the structure before starting the excavation.

10 When the retaining walls have set, the excavation has reached a certain depth as shown in Figure 1.

In accordance with the invention, an annular slab 3 which rests on the bottom of the excavation and bears via its periphery against the retaining walls 1 is then
15 constructed, leaving a large opening 4 in its centre, as can be seen in Figure 2 ...[sic] when the annular slab 3 has set, it is joined by means of stays 5, preferably articulated at each of their ends, to the top part of the retaining walls.

20 In the embodiment shown in the drawings, the lower ends of the stays 5 are fixed to the annular slab 3 in the vicinity of the opening 4, but it is obvious that the stays could be fixed at different points of the annular slab 3.

25 Once this operation is completed in this way, it is sufficient, in accordance with the invention, thereafter to carry out the excavation of the lower part of the structure to reach its lower level 6.

30 The execution of this second part of the excavation is greatly facilitated by the existence of the opening 4 of large dimensions, which permits easy removal of the spoil.

When the excavation is completed, as shown in Figures 5 and 6, it is then possible to carry out the
35 construction of the intermediate floors and to construct the supporting points which underpin the annular slab 3, thereby making it possible to take off the stays 5.

The annular slab 3, of which it only remains to close the central part using a conventional technique,

thus serves as a floor element.

It can be seen that the method according to the invention permits, in a simple and economical way, the production of excavations in deep structures, without the need to construct at the beginning of the excavation deep supporting points for underpinning the floor, which is constructed first, to withstand the horizontal forces exerted by the ground on the retaining walls, in order to permit the continuation of the excavation.

It is understood that the embodiment which has been described above does not imply any limitation and that it may undergo any desired modifications without thereby departing from the scope of the invention, which is defined by the terms of the claims.

Firstly, it is obvious that although the structure shown is of parallelepipedic shape, the invention applies to structures of any shape.

Similarly, it would not be a departure from the scope of the invention to support the annular slab during the continuation of the excavation by means of differently located stays.



Claims

1. Method of propping or holding up the vertical retaining walls of deep excavations, characterised in that after producing the excavation freely to a depth compatible with the resistance of the retaining walls (1), an annular slab (3) is constructed on the bottom of the excavation, which slab bears via its periphery against the vertical retaining walls (1) and rests on the bottom of the excavation; in that after the solidification of this annular slab (3), it is joined, so as to support it, to the upper part of the retaining walls (1) by means of stays (5); and in that the excavation is then continued via the orifice (4) in the annular slab (3) down to the bottom (6) of the structure.
2. Method according to Claim 1, characterised in that the annular slab (3) is used to form part of an intermediate floor and in that, for this, it is rested on supports constructed for this purpose, whereupon the stays (5) are removed.