Underpinning:

- The process of placing a new foundation under an existing one or strengthening an existing foundation is called underpinning of foundation.
- **It may required to serve following purposes:**

- To strengthen the shallow foundation of existing building when a building with deep foundation is to be constructed adjoining it.
- To strengthen existing foundation which has settled and caused cracks in the wall
- To deepen the existing foundation (resting on poor strata) so as to rest it on deeper soil strata of higher bearing capacity.
- To construct a basement under an existing building.

There are two underpinning Methods. They are:

- **Pit Method**
- **Pile Method**

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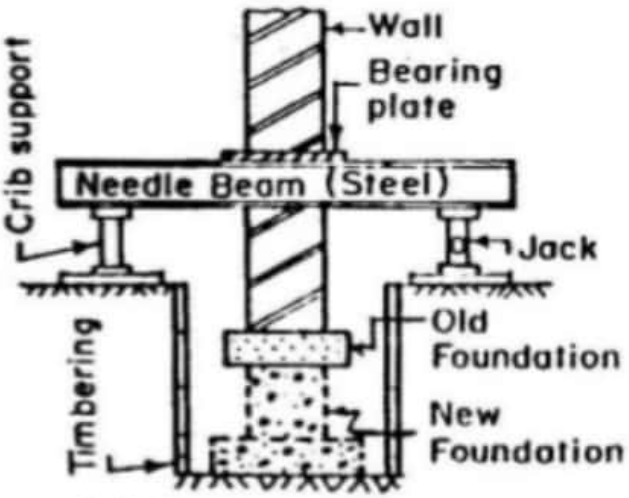
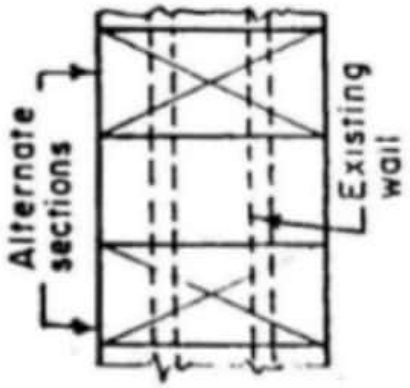
Pit Method:

- In this method the length of the foundation to be underpinned is divided into sections of 1.2 to 1.5 m lengths as shown in Fig. For each section a hole is made on the wall above the plinth level and a needle is inserted in the hole. Bearing plates are placed above the needle to support the masonry above it.
- Needle is supported on either side of the wall on wooden supports and screw jacks. The foundation pit is excavated up to the desired level and new foundation is laid.
- In the round, the work is undertaken in alternate sections. Once the alternate sections are undertaken, the remaining sections are worked out.
- If the wall for which underpinning is to be carried out is weak, raking shores is provided to support them.



(a) Vertical section



(b) Plan

FIG. 18.5 PIT METHOD

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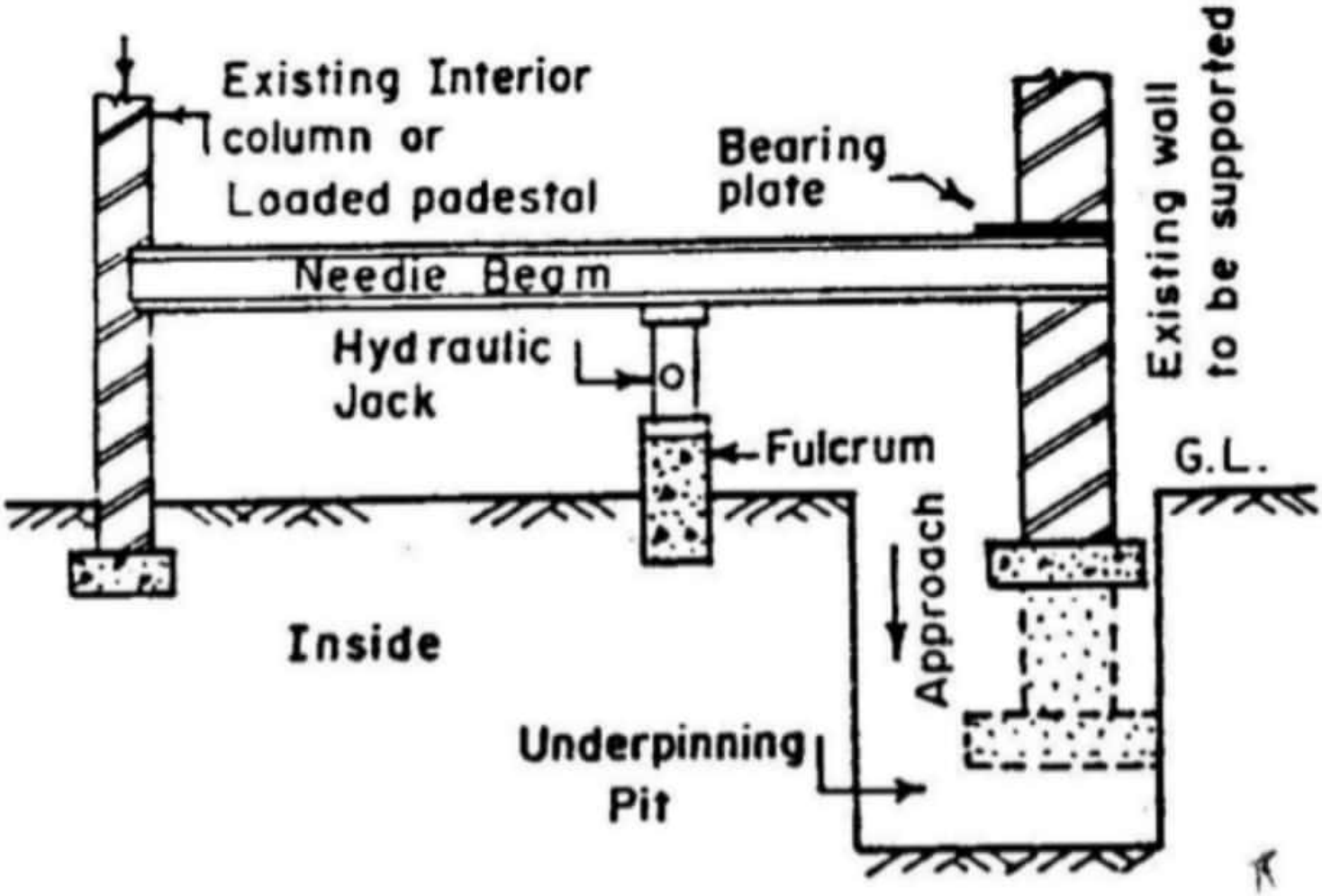

FIG. 18.6. PIT METHOD WITH CANTILEVER NEEDLE.

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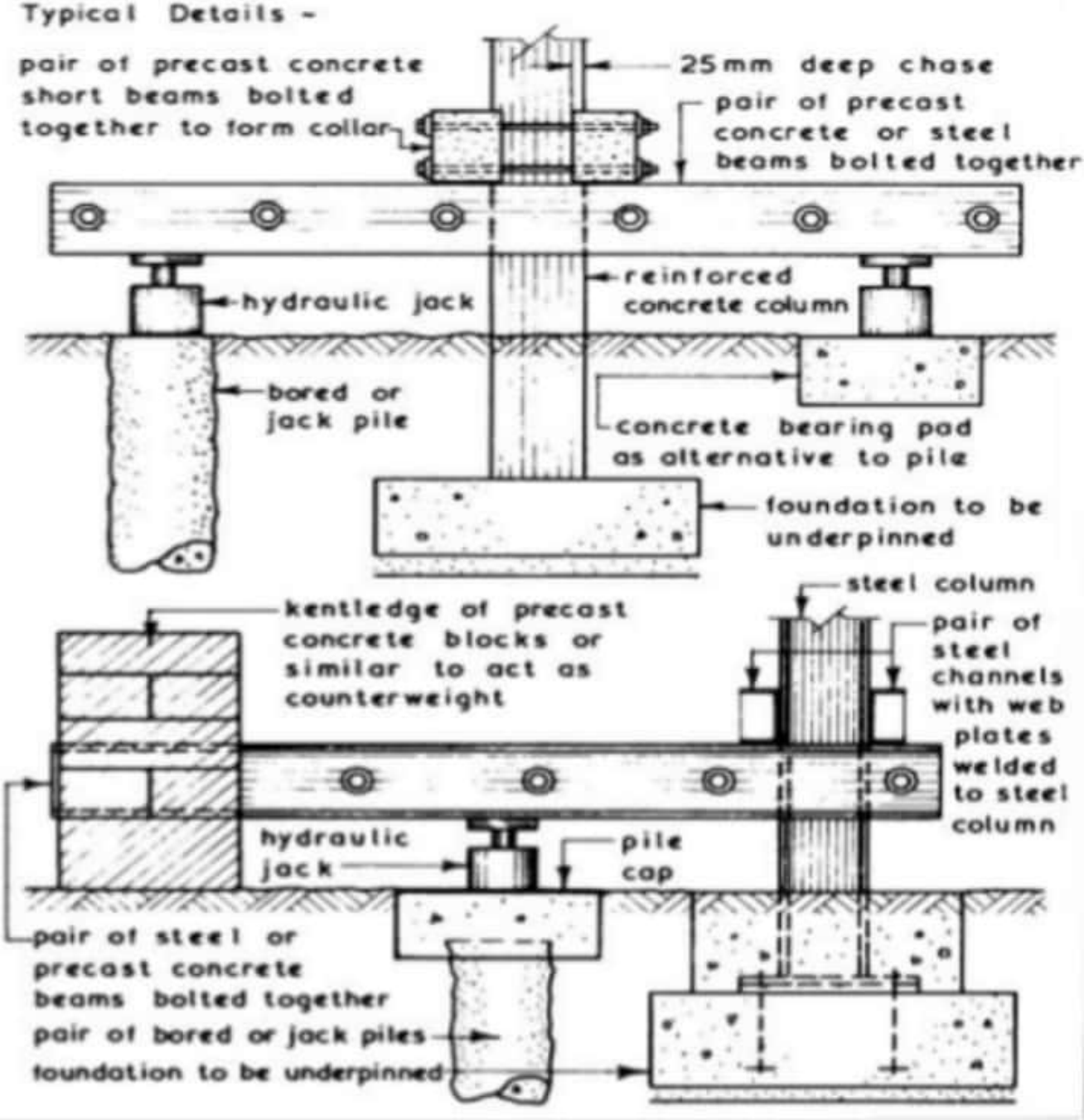
Typical Details -



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- **In pit method of underpinning, the followi noteworthy.**

1. Alternate sections are taken up in the roun sections should be taken next.
2. For long wall the work should be started from and worked outwards.
3. If the foundation is deeper, proper timbering foundation trench may be done.
4. The needle beam should be removed only when th foundation has gained strength.
5. It is desirable to do the new foundation work in concrete
6. The needle should be closed in masonry using cement mort

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Pile Method:

- In this method, piles are driven at regular interval along both sides of the wall. The piles are connected by concrete or steel needles, which penetrate through the walls. These beams also act as pile caps. This method is effective in clayey soil and in waterlogged areas. The existing foundation is very much relieved of the load. Fig 3 illustrates the pile method of underpinning.

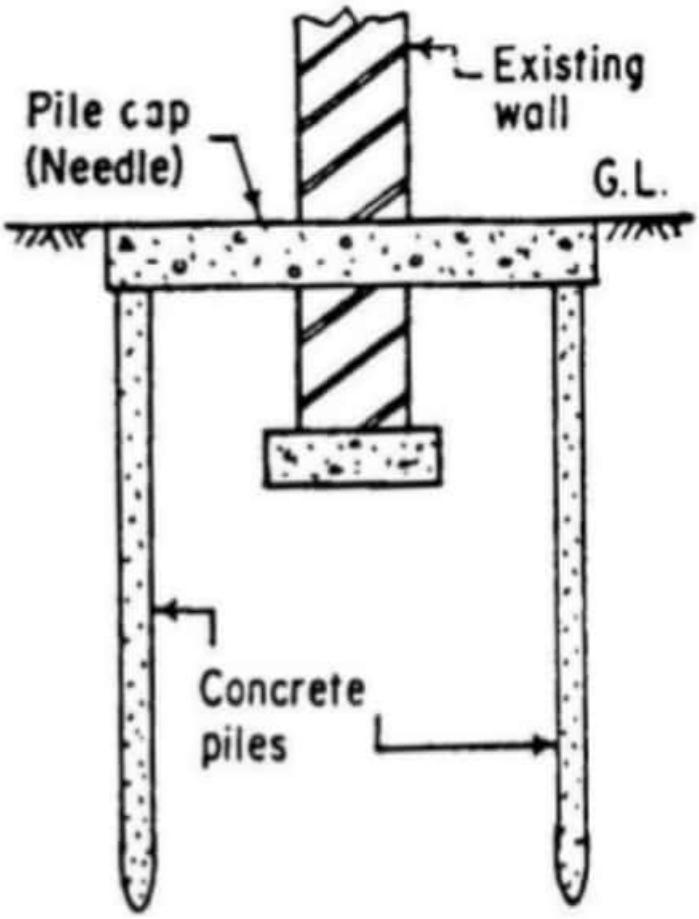

FIG.18.7. PILE METHOD.

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