- Subsoil type and its characteristics
- shape of the building
- loads and stresses imposed
- Number of storeys

UNIT IV

A. EXCAVATION - FOUNDATION

EXCAVATION

Excavation consists of removing the topsoil from the area of the proposed building and then forming the trenches for the foundation.
The type of the excavation needed for the foundation depends on the category chosen according to subsoil type and characteristics.
The following description will give an outline of some of the various considerations, activities and processes which result in the erection of a simple building.

FOUNDATION

a. Function

The resulted dead, imposed and wind loads may be transferred through the building by continuous walls or through isolated piers, by columns or piers or by combinations of these techniques. Because each of these structural systems results in foundation types which transfer the loads to the

supporting soil in different manners, the selection of a foundation category should reflect the optimum relationship between building structure and the characteristics of the soil used as support (fig. 4.1).

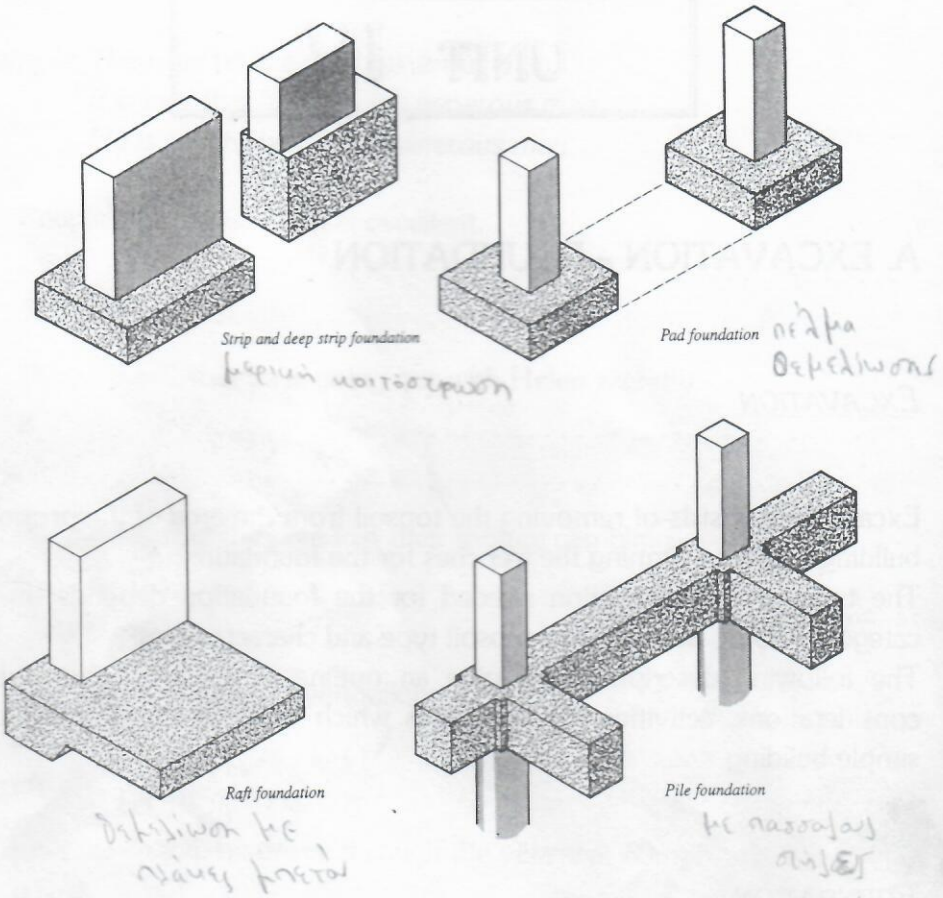

Figure 4.1: Different types of foundation are used according to subsoil conditions and the form of building to be supported.

ii. Design

There are some steps which must be followed to arrive at a correctly designed foundation, which takes into account the relationship between soil conditions and building loads.

1. Assess soil conditions by suitable investigation.
2. From investigations decide the permissible soil loading.
3. Determine the combined building loads (dead, imposed and wind) and allow for the self-weight of the foundation. Typical loads for a single- and two-storey house are indicated in Fig. 4.2.

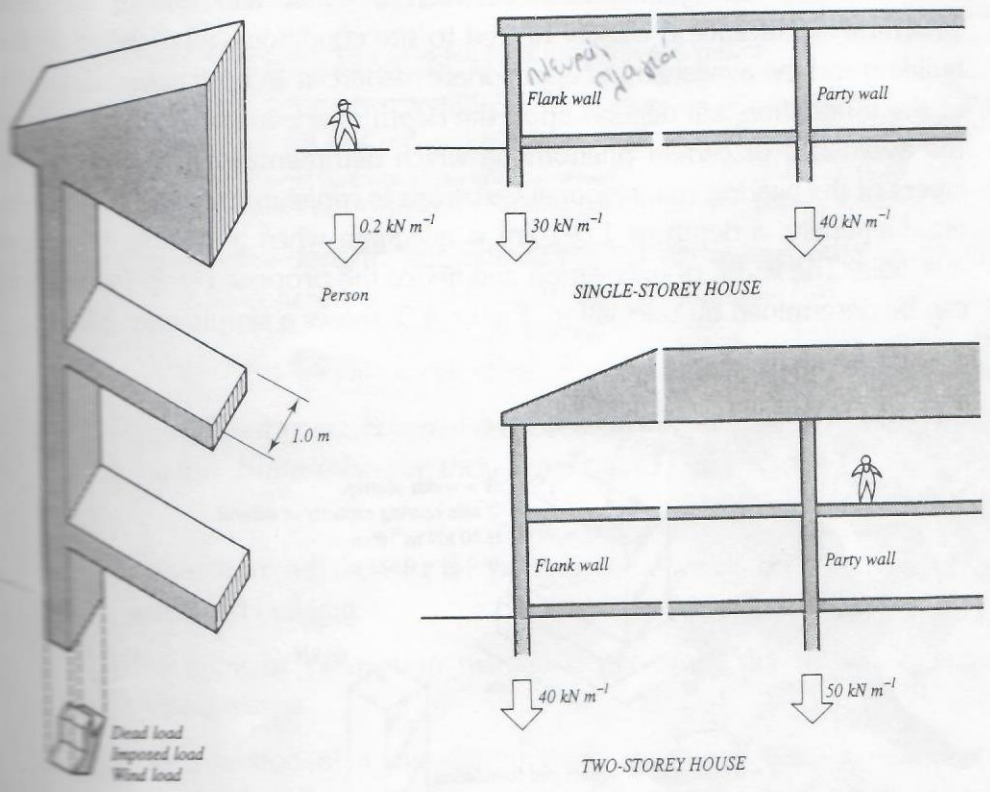

Figure 4.2: Typical loads on a two-storey house.

4. Establish the form and size of the foundation to suit loadings and correct for the self-weight allowances.
5. Check soil resistances against permitted stresses and estimate permissible movements.
6. Allow for necessary movement joints for differentially loaded parts of the building or other structural effects on the foundation.

iii. Foundation Construction

For a two-storey house using continuous load-bearing masonry walls (brick, block or stone), a form of strip foundation will probably be most appropriate, and can consist of a horizontal strip *or* a vertical strip of mass concrete located beneath ground level. The choice between these two forms can be made during discussion between designer and builder as their structural significance is closely related to site conditions, plan shape of the building and the availability of appropriate resources. In both cases the depth of the foundation will depend upon the depth of adequate bearing soil, and the avoidance of certain phenomena which detrimentally affect the upper layers of the bearing soil: seasonal variations in moisture content, tree roots, etc. Generally, a depth of 1.0–1.2m is adequate when a suitable subsoil is available. The width of excavation and hence the proposed strip foundation can be determined by calculation. Figure 4.3. shows a simple example.

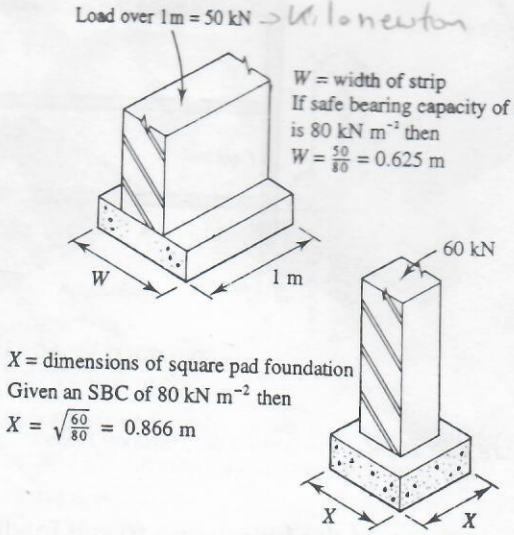

Figure 4.3: *Calculations for foundation design.*