



6.8 Wiring

6.8.1 General

Libraries have ever increasing equipment dependent on a wiring system. This technical equipment is sufficiently numerous and complex to have a significant impact on the architectural concept. Moreover, the rapid evolution of information technology forces us to design installations that can be easily adapted.

It is essential that the architectural project should have the design of the ducting fully integrated into the building. This ductwork should allow the wiring to pass from the central point to every connection point of the library, with adequate dimensions and accessibility, and with connecting systems adaptable to possible changes occurring over time.

The ductwork should cater for the following installations:

- a) Electricity.
- b) Telecommunication systems:
 - a) computing network (voice and data, etc.);
 - b) audiovisual;
 - c) building security systems;
 - d) management system of installations.

This chapter gives details and recommendations about the ductwork for library projects.

6.8.2 General recommendations

The following issues should be considered:

- a) Adaptation of the ductwork to the architecture of the building.
- b) Specification of the connections, distribution boxes, fuse boxes and ductworks taking account of:
 - a) Accessibility for monitoring.
 - b) Capacity for extension and adjustment.
 - c) Physical space suitable for the installation.

- c) Location of distribution boxes:
 - a) Inaccessible to public.
 - b) Strategic location to avoid loss of reception due to excessively long wiring routes.
- d) It is important to consult specialized technicians.
- e) Both dimension and features of ductworks will be determined by requirements of the different types of wiring.
- f) It will be useful to know both the distribution and the features of the furniture placed close to connection points.

6.8.3 Ductworks

There are two different types of ductworks:

- a) vertical ductworks;
- b) horizontal ductworks.

6.8.3.1 Vertical ductworks

Their main function is to connect distribution boxes with the horizontal ductwork, distributed through the different levels of the building.

The most important issue is to find the best place for avoiding unnecessary routes. Moreover, the ductworks should be practicable and permit extension in the future.

6.8.3.2 Horizontal ductworks

Horizontal ductworks need a more comprehensive planning. The chosen solution will have a direct influence on the architecture and the cost of the building.

Depending on the location, there are the following types:

- a) Ductworks over the floor structure (between the floor structure and the flooring).
- b) Ductworks beneath the floor structure.
- c) Exposed ductworks.

6.8.3.2.1 Ductworks over the floor structure (between floor structure and flooring)

These ductworks have the following basic elements:

- a) Ductworks through which the wiring goes.
- b) Connection boxes.
- c) Access hatches.

Ductworks can be installed in two ways:

- a) Fitted in a filling layer between floor structure and flooring.

This solution is not completely flexible, because the location of the equipment is subordinated to the organisation of the grid. In these cases, it is convenient to design an extensive pre-installation able to guarantee both mobility and growth of the equipment.

When the flooring placed on the ductwork is not resistant, both the ductworks and the access hatches should be able to support the weight of shelving and other pieces of furniture without being damaged.

- b) Fixed directly to the floor structure in cases where there is raised floor.

With raised floor we refer to a system of adjustable feet placed on the floor structure supporting some plates on which the flooring is placed. (See Chapter 12 - Floor construction and covering).

This is the most flexible solution, since accessibility of this system allows increasing or modifying installations freely.

There are several systems of access to wiring:

- a) Exposed network of access hatches.

Hatches should be completely level with the rest of the flooring to avoid accidents. Although they can initially be covered by furniture, changes in distribution can make them coincide with circulation spaces.

The opening mechanism of covers has to be compatible with the type of cleaning of the flooring. When it is cleaned with liquid products, hatches should have watertight covers in order not to damage the ductworks and connections beneath.

- b) Occasional access hatches.

In every connection point a hole in the flooring should be made in order to access installation.

This solution is compatible with raised floors but it has disadvantages when ductworks are fitted into a filling layer between floor structure and flooring. In these cases, for every new connection a hole must be made exactly through the route of the ductwork, with danger of damaging existing wiring.

In all cases mentioned above, connection mechanisms between wiring and equipment can be installed in the same access hatch on the flooring or in the piece of furniture where the equipment is located.

6.8.3.2.2 Ductworks beneath the floor structure

These ductworks can be exposed or hidden by a false ceiling. In both cases wiring goes through trays fixed to floor structure. When there is a false ceiling, it is necessary to install access hatches. This option permits greater flexibility of locating the equipment and of possibly extending the system.

This system allows the supply of power both to equipment placed in the floor above and equipment placed in the floor below.

- In the first case the connections with the equipment are carried out by a hole in the floor structure through which the wiring passes. The connection mechanism can be located on the flooring or within the piece of furniture where the equipment is placed.

The hole on the floor structure should be sealed with waterproof materials so as not to damage ductworks and connections beneath.

- In the second case some kind of vertical ductwork is needed in order to reach the equipment on the lower floors. This ductwork can run down through walls or pillars, either exposed or hidden, or it can be an isolated column (See chapter 13-3-2-3).

This type of ductwork is not possible neither in floor structures in direct contact with the ground or in those with an impracticable false ceiling.

There can also be difficulties with grid floor structures when the connection point requires making holes in solid elements of the floor structure, and also in other specific types of floor structure.

6.8.3.2.3 Exposed ductworks

Exposed ductworks are very suitable when refurbishing existing buildings or converting them for library purposes, where it is difficult to hide wiring.

Advantages:

- a) Flexibility.
- b) Accessibility to the whole installation.
- c) Wide supply with different types of finish: perimeter ductworks, electric skirting boards, isolated columns that can be anchored to flooring and to the superior floor structure and allow incorporating connection mechanisms, etc.

Disadvantages:

- a) Visual impression of the exposed ductworks can affect the aesthetic image of the whole.
- b) Influence on the placing of furniture. Perimeter ductworks prevent placing furniture in direct contact with walls.