POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 1
Degree in Architecture
Honors theses

HVAC&R system: positioning, accessibility, cleaning and connection with the building

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Work general aim

The work general aim is the analysis of the connection existing among the features and the working way of the HVAC&R system and the fulfilment of qualitative and quantitative requisites of the air standing and from it diffused into the building rooms.

Work structure and contents

The work is articulated in the following thematic points:

1. *Indoor air quality*

In the first point has been defined the air quality concept. It has been suggested a classification of the main pollution sources existing in the internal spaces; there is an analysis of their pollution forms and a prevision of the effects given rise from their contaminants to the air quality perception, to the health of the exposed people and to the materials. Finally have been suggested some measures that can reduce the contaminants emission from the renowned sources and has been explained the incidence of ventilation, defined like letting in, diffusion and drawing of air from the rooms, in the environmental quality management.

2. *Contamination from HVAC&R system*

The aim of the second thematic point is the definition of the contamination forms that typically can be attributed to the HVAC&R system. A detailed thorough examination is dedicate to the contamination by direct letting in of fungi and bacteria, including bacteria of legionella pneumophila genus, from the moist sections of the HVAC&R system and from its units for hygrometric treatment of the air.

In the example the HVAC&R system is liable for a direct contamination form because of dispersion of fibrous matter from a degraded insulating coating

3. *Precautionary measures and control of the contamination from HVAC&R system*

In the third point have been suggested some strategies, for projecting, managing and maintenancing the HVAC&R system, that can control or restrain its typical contamination forms. Among the planning strategies, a special attention has been dedicate to the analysis of the technics for the precautionary and indirect cleaning of the aeraulic sections. Afterwards has been analysed the theme of air filtering and of its decontamination by diffusion of ultra-violet radiation, essential oil, small negative ions or ozone. Among the maintenance strategies, have been analysed the technics of direct cleaning that let sediments and contaminants taken away by sucking or blowing, by mechanical action of brushes or by treatment with compressed air or chemical substances.

The picture illustrates a mechanical tool used for carrying out activities of brushing with articulated equipment

4. *Project of the HVAC&R maintenance disposition.*

This section defines some criteria, for the building-plant system planning, that aid the carrying out of the cleaning activities on the HVAC&R sections. According as the different planning philosophies has been analysed the possible integration levels among technological and plantal systems of the building and have been also introduced some guidelines for planning the service spaces. According as the HVAC&R sections, that will be settled into them, have been delineate in detail the morphological and structural qualification of the service spaces and has been faced the theme of their accessibility according as their position into the building. At the end have been introduced some guidelines, for planning aeraulic sections, that answer for their inspection requisite and for the right course of the adequate maintenance activities, included, above all, the direct cleaning operations.

The picture illustrates an example of dissembling
and emphasis on pressure pipes

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