

# Difficulty analysis and countermeasure discussion of building HVAC construction

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**Abstract:** HVAC is a part of building equipment. The quality of HVAC engineering in buildings is directly related to whether buildings can be directly put into operation. Based on the importance of HVAC construction, we must master the relevant construction technology and analyze the difficulties in the construction, and ensure the overall level of the HVAC construction as far as possible. This article analyzes the difficult points of construction HVAC construction, focuses on the key countermeasures to deal with these problems, and provides a quality assurance for the construction of HVAC projects in China's construction projects.

**Keywords:** HVAC construction; difficult analysis; improvement technology; solutions

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## 1. An overview of HVAC engineering

HVAC engineering is the abbreviation of professional heating, gas supply, ventilation and air conditioning engineering. Specifically, the HVAC engineering mainly includes three aspects: heating, ventilation and air conditioning.

Heating is heat supply, which is to ensure that the indoor temperature can meet the needs of human normal life as much as possible when the weather is cold<sup>[1]</sup>. In practice, radiators are usually used to achieve this. Ventilation replaces outdoor fresh air with indoor air and is usually divided into natural ventilation and mechanical ventilation. Air conditioning is the air conditioner we often say. Air conditioning is not only for indoor temperature, but also for humidity, cleanliness and so on. Specifically, it can be divided into two categories: central air conditioning and household unit air conditioning.

HVAC engineering is a complex project in construction engineering, and its construction quality has a very important impact on the use of buildings. Therefore, we must attach importance to the role of HVAC engineering and ensure its effectiveness as far as possible. With the improvement of the people's living standard, the quality of the HVAC project is also higher and higher. In the construction project, the construction of the HVAC project is often faced with many key difficulties. Once the operation is inadvertently, it will easily affect the quality of the project. Therefore, it is necessary for the construction personnel to be as careful as possible in carrying out this part of the operation, and to deal with emergencies in a timely manner and handle it carefully.

## 2. The important significance of improving the HVAC construction technology

### 2.1 Save resources and protect the environment

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To improve the installation and construction technology of HVAC facilities, the most important role is to effectively save energy and achieve environmental protection. If the HVAC is installed and put into use, all the functions of the building will be brought into play effectively. On the one hand, the energy consumption can be reduced and the comfort of the residents is also improved on the other hand.

## **2.2 The quality of HVAC engineering is related to the quality of the whole project**

HVAC engineering design to multiple jobs, usually need to cooperate with other professional construction. From the initial pipe laying to the installation of later equipment, HVAC engineering is closely related not only to civil engineering<sup>[2]</sup>, but also to hydropower construction. If the quality of HVAC construction is guaranteed, the whole construction project will also have high quality. On the other hand, there are quality problems in HVAC construction, and the quality of civil and hydroelectric parts, such as the close cooperation, can not be guaranteed, and the overall quality of the construction project will naturally decrease. In the final analysis, the quality of HVAC projects is closely related to the quality of construction projects.

## **2.3 Constantly update and improve technology**

In recent years, China's domestic HVAC construction technology has achieved significant improvement, but there are still large differences compared with developed countries. In other words, under the current circumstances, there are still some defects in the construction of domestic HVAC projects. If we do not solve these problems, we will not only delay the construction period, but also will have an impact on the quality of HVAC construction. Therefore, we must constantly improve the construction technology of the HVAC project, ensure the efficiency of the project, improve the efficiency of the project, and strictly control the quality of the HVAC construction.

# **3. Difficult problems in the construction of HVAC engineering**

Nowadays, people's requirements for housing have changed from the former "have housing" to the current "live well", and the HVAC project has become increasingly important in the construction and installation project. During the construction of the project, the HVAC project involves a wide range of projects, and the various projects are interlinked. Only when each project is completed can construction quality of the HVAC project be guaranteed. This paper analyzes some common problems and key difficulties in the process of HVAC construction, and finds out the key reasons for these problems, and the solutions are made to ensure the quality of the construction as much as possible.

## **3.1 Problem of drawing design**

As we all know, no matter what kind of construction projects are carried out, the drawings of the project must be designed in advance in accordance with the needs of the project and the conditions of the construction site. The subsequent construction of the project is strictly carried out in accordance with the design drawings. The HVAC project is also the same. The blueprint design of HVAC engineering is the premise to ensure the smooth progress of the project. However, there are many problems in the design of HVAC engineering. In many cases, there is a lack of communication between the designers and the builders. It is difficult for the builders to grasp the intentions of the designers. The designers can not meet the requirements of the construction personnel. Both sides can only rely on their own speculation to complete the work. In addition, the design of many designers only has a rough outline, but there is no clear label for the design instructions. Such drawings are actually applied to the construction process and many factors cannot be determined, which will cause serious obstacles to the construction. In addition, there are some more serious problems, for example, the design calculation in the design drawings is not complete, and the error is likely to occur in the selection of equipment because of the lack of effective basis. If there are problems in equipment, the impact on building engineering can be imagined.

## **3.2 The problem of the allocation of funds**

In recent years, China's economic level has been significantly improved, and the construction industry has a larger

proportion in the process of economic development. The fundamental purpose of building units in building engineering is to seek profits for themselves. In the process of building construction, in order to gain more benefits in the project, the builder reduces the capital expenditure for the construction enterprise. The construction enterprise lacks fund support in the process of construction. The selection of materials, the supporting facilities and the support of the personnel can not reach the standard. In addition, there are some construction units that focus on the quality of the building itself and ignore the importance of the HVAC project. In order to meet the demand for HVAC project construction, construction companies can only reduce the funds for building construction to maintain HVAC project construction. In such cases, problems such as poor material quality, cutting corners and other problems occur from time to time.

### **3.3 Project progress problem**

Although the HVAC project is not the main body of the entire construction project, it is indeed a key auxiliary project. When construction operations have been carried out, strict control must be exercised for each construction step. As mentioned before, for every aspect of HVAC construction, every link is interlinked. Therefore, the construction schedule of HVAC project affects the overall construction progress to a certain extent. Therefore, during the construction process of HVAC engineering, we should not only ensure the quality of the project, but also ensure the efficiency of the construction. In the process of concrete construction, it is impossible for every step to be the same as ours. The emergence of these unexpected problems will slow down the efficiency of construction. In many cases, some construction companies are required to complete the project on time in order to ensure that the project can be completed on time. Despite the slow construction of the project, the construction speed will be accelerated at the later stage of construction to ensure construction efficiency. Blindly accelerating construction often affects the quality of the project. In addition, it may increase project costs. Therefore, in order to ensure the construction efficiency, in addition to the influence of external factors, it is also necessary to ensure the timely supply of materials, the quality level of personnel, and the construction technology of the project.

## **4. The improvement solutions of HAVC construction**

### **4.1 Solutions of system operation difficulties**

#### **4.1.1 In view of the pipe blockage problem**

Pipeline installation is usually inseparable from the welding process, in order to ensure the robustness of the welding, the dirt attached to the pipe must be clean up in advance, pipe mouth closed to be installed can only be carried out after removing rust on the inner wall of the pipe. In the process of specific construction, first of all, a large drain valve can be installed in the lowest part of the pipe inverse pie network, the reason why choose large drain is that the small one has a poor effect. The drain valve id installed in the lowest place, because sewage effect will be significantly reduced if installed elsewhere. In addition, if necessary, you can also add several temporary filter in the installation of the pine network. Before formally connecting equipment, it should be prompt to clean up the equipment, and then in strict accordance with the relevant specification requirements, systematic cleaning steps will be made, fundamentally solve the problem of pipe blockage.

#### **4.1.2 For pipeline leakage problem**

When the HVAC project is partially completed, there will usually be professional personnel who will debug the HVAC project and test the stability of the project. During the commissioning process of HVAC, leakage is one of the most common problems. Once pipeline leakage is discovered, it must be solved at the first time. First of all, the location of the leakage must be determined. Then, combined with the construction drawings, take corresponding corrective measures. Specifically, combined with the design drawings, find the difference between the specific construction and design drawings, and determine the leakage location of the pipeline based on this. After confirming the location of the leak, a single-loop pressure test experiment is then performed to confirm that the leakage point can be connected by using copper pieces. But the accuracy of this method is difficult to determine, so if necessary, even if it will cause

greater losses, we must dig the ground.

## **4.2 Improvement measures for technical difficulties in installation**

### **4.2.1 Selection of thermal insulation materials**

The choice of insulation material is usually performed during the preparatory phase of the project. The choice of insulation material determines what HVAC project needs to rely on to protect the indoor temperature. Therefore, the importance of selection of thermal insulation materials should not be ignored. Keeping good quality is the first link. In the selection of thermal insulation materials, the quality of the material must be inspected by professional personnel<sup>[4]</sup>, and the thermal insulation materials without relevant quality inspection certificate are not allowed to enter the construction site. The second point is the rational selection of thermal insulation materials, the needs of each project are different, in addition to the quality of insulation materials, the rationality of the selection is a problem worthy of our consideration. In recent years, rubber foam insulation materials have been widely applied. This insulation material has longer service life and stronger corrosion resistance. Therefore, in the construction process of HVAC, we must strictly control material installation and ensure the quality of material installation as far as possible.

### **4.2.2 Reasonable control of HVAC pipeline construction**

The HVAC can not be separated from the installation of the pipe, and the pipe is one of the most important building materials in the HVAC project, so the quality of the whole HVAC project is directly determined by the quality of the pipe. In the process of pipeline installation, we must ensure the reliability of pipeline engineering and strictly control the construction process of pipeline engineering. In the process of pipeline installation, we must ensure the reliability of pipeline engineering and strictly control the construction process of pipeline engineering. When installing a ventilation system for a HVAC project, it can be installed in a clear manner. The advantage of this type of installation is that, once a problem arises, it can be repaired with less damage to other parts. Finally, in the installation process of thermal insulation materials, after the installation is finished, the construction surface must be dealt with later. This is because if the compactness of the construction surface is insufficient, cracks are likely to occur, affecting the construction quality of the project.

## **5. Conclusion**

To sum up, under the current situation, the construction of HVAC works has directly affected the comfort of residents' lives. Therefore, some common problems in the process of HVAC construction must be checked and processed in time, find the root of the problem, take scientific and reasonable measures, and make the corresponding solutions in the first time in order to ensure the quality of the construction of the HVAC project. Building HVAC engineering has broad development prospects in the future development process, which requires relevant technical personnel to continuously study the construction technology of HVAC engineering. While ensuring the construction efficiency of the project, it can also improve the construction quality of the HVAC project and play a role in promoting the development of China's construction projects. Create a healthy and comfortable working environment or living environment for people as much as possible.

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