Energy saving construction technology analysis of building engineering

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Abstract. The wide application of energy-saving technology in the construction of building engineering can effectively deal with the problem of energy consumption in the construction process. The application of various energy-saving construction technologies in construction engineering can reasonably reduce the construction cost of construction engineering, is conducive to improving the thermal insulation efficiency of construction engineering, and then improve the construction quality of construction engineering, and greatly improve the economic and social benefits of construction. In this paper, the energy-saving construction technology in building engineering is analyzed for reference.

1. Introduction
Energy-saving construction problem of housing construction project as reflects one aspect of national energy resources saving is important, comprehensive housing construction project in the construction of the necessity of the construction technology of energy conservation, the energy saving technology in constant research and exploration, new insights, and puts forward a summary of the old methods, continuously improve the level of housing construction project energy saving construction technology, to promote housing construction project in China towards the direction of low energy consumption and high quality [1].

2. The principle of energy saving construction of housing construction engineering
In the process of energy saving construction of building engineering, two principles should be strictly observed. First, energy-efficient raw materials will be used as far as possible. Second, the strict implementation and supervision of energy-saving standards. For housing construction engineering, the selection of building materials is very important, should do a good job in material selection, as far as possible to choose energy-saving materials for construction, such as in the construction of doors and Windows, should choose energy-saving doors and Windows sealing strips for doors and Windows airtight; Adopt advanced energy-saving technology for wall and roof insulation and energy-saving design; Reduce building energy consumption materials, select new energy-saving materials for building construction. Secondly, the relevant specifications are the prerequisite to ensure the smooth construction of energy conservation. In the process of construction, construction rules should be strictly observed [2-3].

3. The application of energy saving technology in building engineering
In order to better study the application of energy saving construction technology in housing construction engineering, after discussing the necessity and application principles of energy saving
technology in housing construction engineering, this paper analyzes its application strategies, mainly from the following aspects:

3.1. Application of roof energy-saving construction technology

In the construction of energy conservation, the reasonable use of the corresponding energy conservation treatment technology in the top of the building can play a good role in heat preservation and heat insulation, forming the utility of "warm in winter and cool in summer". Energy-saving technology is mainly applied in the construction mode of dome and spire in the construction process of building roof, which can effectively reduce part of the sunlight radiation bearing area, reduce the temperature penetration of sunlight, and at the same time achieve indoor thermal insulation. This shows that the application of energy-saving construction technology is extensive. Along with the social economic development, increasing people's life demand, therefore, people in the value of roof construction quality at the same time also started to pay attention to the function of roof of beautiful shape, so only simple application in spires and domes cover the top of the construction of the energy saving technology can't meet the demand of the current people's living, in order to solve this problem, have gradually started to application and innovation of new thermal insulation material, and to put it into the top floor laid is usually should be adopted in the construction of the strong ability of refraction and high temperature fidelity ability building energy-saving materials, the applications of these materials to building the top floor waterproof layer below, with good insulation effect. Such as expanded perlite, glass wool and other small thermal conductivity of light materials. At the same time, in order to sublimate the thermal insulation effect, polystyrene foam, polyurethane foam and other materials should be laid above the waterproof layer on the top of the building, so as to make the building roof really achieve thermal insulation effect [4].

3.2. Application of energy-saving doors and Windows

In the application of energy saving technology in construction engineering, doors and Windows are the most used building materials. Because doors and Windows are the most energy-consuming building materials in all building components of traditional buildings, it is very necessary to apply energy saving technology in the construction of doors and Windows. Therefore, the energy saving process of doors and Windows has become an important link in the whole construction process of energy saving. In the construction process of traditional doors and Windows, transparent mineral materials such as glass not only occupy the space of doors and Windows, but also cause a large amount of loss of the ability to enter the room through the doors and Windows, causing a serious waste of energy. And energy saving construction technology is applied to the process of construction of doors and Windows, can save material, make full use of energy resources to achieve maximum energy saving doors and Windows construction, should choose high quality doors and Windows, such as terminal T3B project roof lights adopts the unique waterproof structure, the use of imported from abroad advanced aluminum and sealing strip, as well as the development, the various forms of daylighting skylight system developed science, has a long durability, can save resources. In addition, the priority to choose the door and window material with small coefficient of thermal conductivity, can greatly increase the tightness of the door and window, and maintain the corresponding energy initial state of stability, making the indoor temperature normal operation.

Energy saving window data is shown in Table 1.

| Window type       | Air layer thickness | Window area ratio (%) | Heat transfer resistance (m².K/W) |
|-------------------|---------------------|-----------------------|----------------------------------|
| Single window     | —                   | 20~30                 | 0.16                             |
| Single frame      | 12                  | 20~30                 | 0.26                             |
| Double glass      | —                   | 20~30                 | 0.33                             |
| Double window     | 100~140             | 20~30                 |                                  |
3.3. Energy saving wall construction technology of building engineering

In the traditional building construction materials selection, clay type solid brick in the traditional building wall and other structural construction is widely used in the building materials, however, this material has been prohibited by the country to use. In its place are slag bricks and fly ash construction materials. It has good thermal insulation, high strength, large load capacity and abundant construction resources. Moreover, the recycling of what is waste is both economical and state-supported. In addition, in the wall structure design, due to energy saving and high quality of the two points of view, the best choice of shear wall structure, especially for high-rise building wall design. In the construction of shear wall structure, sliding form technology and formwork technology are generally used for wall structure construction, which can greatly improve the efficiency and quality of building wall construction, and can greatly save the resources of building materials. Finally, when carrying out the construction drawing wall construction, we should strictly manage the use of wall building materials, and carry out the construction in strict accordance with the relevant provisions according to the requirements, especially when carrying out the concrete daub and wall painting, pay attention to avoid waste. Table 2 shows the basic structure diagram of external wall insulation system of rock wool board.

| Number | System composition | Material composition                      |
|--------|--------------------|------------------------------------------|
| 1      | Basic level        | Exterior wall painting wall, etc          |
| 2      | Level blanket      | M7.5 mortar level (thickness not less than 12mm) |
| 3      | Tack coat          | Special adhesive for rock wool board      |
| 4      | Insulating layer   | 45mm hydrophobic rock wool board          |

3.4. Application of external wall insulation technology

Wall is the most core component of the surface of architectural engineering, and also serves as the largest category in the field of architecture. The application of thermal insulation technology in the building exterior wall mainly achieves the thermal insulation function effect through the use of thermal insulation wall, which is mainly because the correctness of the thermal conductivity method and thermal conductivity coefficient of the building wall can directly affect the energy saving effect of the building engineering. At present, the external insulation of the exterior wall is the most widely used thermal insulation method in construction engineering. At the same time, from the perspective of the thermal conduction link of the wall, the thermal insulation of the exterior wall has a certain close relationship with the implementation of building energy conservation. The application of thermal insulation technology in the building exterior wall is mainly combined with the thermal insulation materials in a fixed way to achieve the thermal insulation effect, just like the thermal insulation materials for the preservation process of the temperature of the construction project. In order to improve the thermal insulation function of external walls, reasonable and appropriate thermal insulation materials should be analyzed and selected according to the building external temperature and environmental conditions. The traditional method of thermal insulation and energy saving is mainly through the application of aerated concrete block to the exterior wall thermal insulation of building engineering, to achieve high quality thermal insulation effect, and has the characteristics of economic price and environmental protection, but the appearance is not elegant. Therefore, new thermal insulation materials should be actively applied to achieve energy conservation and environmental protection, beautiful appearance, thermal insulation and other effects such as made of sepiolite and aluminum silicate fiber and other materials made of silicate composite thermal insulation mortar, can make up for the existence of cracks in the polystyrene plate, and has the advantages of simple construction, good thermal insulation performance and so on [5].
3.5. Energy-saving construction technology for roof insulation

In the thermal insulation roofing construction scheme design, should be first choice stupid vinyl materials of building materials and get together ammoniac vinegar related waterproof thermal insulation material as roof insulation construction material, these materials have strengthened heat preservation effect and long service life, small density, small coefficient of thermal conductivity, and good sound insulation effect, especially its heat preservation effect is more significant, and wet resistance is strong, even in wet conditions, its heat preservation and heat insulation effect also will not be cut. In the roofing construction, it is necessary to pay attention to the pouring of reinforced concrete construction, first of all to ensure that the pouring is uninterrupted, so ensure the stability of temperature, avoid because of the pouring process of discontinuous and caused by temperature reduction, resulting in the overall emergence of reinforced concrete gap and crack problems. Secondly, we should pay attention to the vibration and compaction work in the whole process of pouring, to avoid the occurrence of honeycomb due to the insufficient density of the overall reinforced concrete, and the vibration and compaction can effectively avoid the occurrence of slurry reinforced concrete and reinforcement leakage potential problem. In addition, to do a good job in the flat construction task, first of all, to choose a higher integrity and strength of the flat material, and the flat need to have a certain slope to achieve the natural flow of rain water, in order to avoid the occurrence of water and rain leakage phenomenon. And the flat layer should have a certain distance of separation. Finally, the roof insulation and energy saving construction need to do the preparation work and data collection before the construction, and also need to have professionals on the site of the building investigation. During construction, the construction shall be carried out in accordance with relevant regulations and codes of practice. The roof structure is shown in Figure 1.

![Figure 1. The roof structure](image)

3.6. Application of surface lighting technology

The surface lighting technology is a typical technology in construction engineering. Surface lighting technology is mainly used in most of the natural light existing in nature. It can be divided into direct use and indirect use according to the different area and distribution state of the natural light on the building surface. In the past, direct use was the main way of construction technology, and side lighting was the most commonly used way of lighting use. However, it was affected by the Angle of light irradiation and the position of the building to some extent, so there was a large spatial limitation in the process of using light. The surface lighting technology, which is mainly based on energy-saving
construction technology, mainly uses indirect utilization, which can effectively solve the problem of light limitation and fully reflect the role of energy saving [6].

4. Appendices
The wide application of energy-saving technology in the construction of building engineering can effectively deal with the problem of energy consumption in the construction process. Building energy saving design can guide people to live in harmony with nature and develop together with nature. Therefore, in the actual construction and production of buildings, we should strengthen the importance of building energy saving design, and constantly improve the position and proportion of energy saving design in architectural design.

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