Appropriate Building Materials for Facades and Interiors of Railway Stations

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ABSTRACT

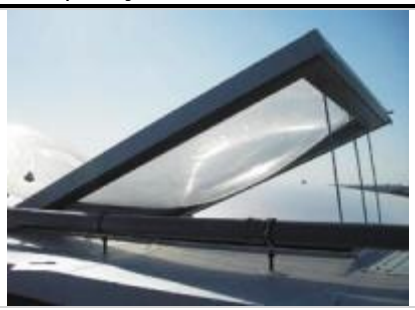
All trips by rail, as a rule, begin and end in the station building. Following the psychology of the passenger, it is easy to understand his desire as quickly as possible, entrusts himself to the care of the railway service, to get to his destination. At the dawn of the railways, efforts were required to attract passengers. Concerts and various celebrations were held in the buildings of the railway stations. This left a peculiar imprint on the stylistic features of the railway stations being built at that time, which more resembled palaces than office buildings.

Keywords: Railway station, facade, interior, building materials, exterior

The facade of the building. The cladding of the building is AluCoPan (aluminum composite panels), glass. ETFE is a polymer material of a new generation, a copolymer of ethylene and tetrafluoroethylene. These structural units in the polymer chain give it the best properties. The materials closest to ETFE that have firmly entered our lives are polyethylene and Teflon (polytetrafluoroethylene).

This story of ETFE began in 1972. It was invented by Dupont and used in aviation and astronautics. It was in these areas of human activity that the unique insulating and mechanical properties of the polymer were needed, as well as their stability in a wide range of temperatures, including ultra-low ones. The material is used to insulate electrical wires in cars, aircraft and robotics, as well as a coating for containers in which aggressive liquids are transported: ETFE has high resistance to chemical aggressors and UV radiation. ETFE began to be perceived as a building material after the construction of the British center for the study of ecology Eden Project, when ETFE and everything connected with it became a fashionable architectural "chip". The openwork roof of two giant buildings, similar to honeycombs, has become the hallmark of the center. Each cell of these cells is a multilayer ETFE lens.

Characteristics of ETFE. The main advantage of the polymer is lightness. It weighs ten times less than glass! At the same time - high speed of installation and spectacular appearance. A feature of ETFE films is high light transmission in a wide range of wavelengths, ranging from visible radiation to ultraviolet. This property makes ETFE especially valuable material for the construction of greenhouses, scientific botanical centers, winter gardens, sports facilities.



The building structures implemented with the help of ETFE can be single-layer and multi-layer. In addition to roofs and facades of buildings, with the help of single-layer film structures, it can be organized any non-standard objects, all kinds of canopies, umbrellas. Multilayer systems consist of pneumatic membrane cushions enclosed in aluminum profiles and supported by a lightweight load-bearing structure. To ensure the proper level of thermal insulation and resistance to external loads, air periodically enters the pneumatic lenses under low pressure. This technology is ideal for use in areas with increased seismic activity, as well as high wind and snow loads.



ETFE is transparent to solar radiation, however, by partially darkening the various layers of the pillow, the effect of blinds can be achieved. An intelligent solar energy utility system was used to install the roof of the FESTO headquarters. The system contained three layers of pneumatic lens, two of which (outer and middle) were darkened with a half-period shift. When the pressure in the chambers of the pillow changes, the middle layer moves relative to the outer one, approaching it or moving away from it. In the extreme positions of the middle layer, the lighting changes from maximum to minimum.

Appearance. The polymer can be printed, appliqued, sun hatching, as well as any pattern, such as a logo or inscription. The surface of the multilayer elements can serve as a screen for displaying images or videos. The thermal insulation properties of the structure are comparable with similar parameters of the best 3-chamber double-glazed windows, they depend on the number of layers, that is, on the volume of air cavities. Due to the absence of pores, the surface of the ETFE is practically not subject to contamination, any liquid rolls off it like dew from flowers. Thanks to this material very good conditions are provided to the winter garden, which can be applied in the interior of railway stations.

Winter garden. Many people who are tired of traveling or on the contrary, waiting for a train, need fresh air, a more cozy atmosphere, a winter garden will be a very popular place for passengers. Unlike a greenhouse, there is a recreation area in the greenhouse where you can relax and admire the plants, as well as decorative techniques are used. But still, the greenhouse is created for the convenience of plants, not a person. The winter garden is a part of the building. The winter garden is designed for the convenience and recreation of a person, plants serve only as a cozy background. Therefore, the winter garden is also called a half-house-half-garden. This is the most perfect and most complex form of interior landscaping in architectural, engineering and artistic terms.

Lighting. There should be enough light in the winter garden. The meager light of a cloudy December day is not enough, even if the glass is on all sides. It can be also picked up shade-tolerant plants that are accustomed to such conditions in nature. But it is better to take care of artificial lighting. Many indoor plants grow perfectly with the illumination of ordinary economical bulbs.

Humidity of the air. Almost all indoor plants are inhabitants of forests, except for desert cacti, of course, they do not tolerate dry air well. Fan heaters, many types of electric heaters dry the air, it is better not to use them for heating the winter garden. A large number of plants in one room will increase the humidity of the air naturally. They evaporate moisture through the leaves. But humidifiers can be also used, or put an aquarium to artificially increase humidity.

Temperature. Almost all tropical indoor plants do not tolerate sudden changes in air temperature, subtropical plants respond gratefully to a slight difference in daytime and nighttime temperatures. There should be no cold drafts in the winter garden. But regular airing is necessary. Plants for the garden are selected according to their requirements for air temperature. The winter garden can be cool, with an air temperature of 15-18, up to a maximum of 20 degrees Celsius.

In addition to observing all these conditions, it is also necessary to place the plants correctly. The most light–loving–closer to light sources, shade-tolerant-in shaded corners. But the most important thing is to arrange the plants beautifully, harmoniously, so that each of them looks good from different sides. It should not be forgotten to place the accents correctly to the harmony of the fuchsia tree, the beautiful painted leaves of alokasia and paid attention to the small flowering saintpaulia. How to plant plants is also not an unimportant question. There are two options: the first is to plant everything together in large boxes or specially made recesses in the floor, the second is that each should grow in its own pot. In the first case, there is more space for the roots, moisture is better preserved when

planting together, but it is necessary to select plants by type of soil, taking into account its acidity, nutritional value and other parameters. In addition, it is very difficult to transplant a diseased flower without damaging others.

Planting plants in separate containers is more convenient. They can be moved, choosing the best location option, watered and fertilized as recommended for each specific plant. At the onset of severe frosts, the most thermophilic species can be moved to a residential area. The disadvantage of this method is that a large number of pots of different sizes does not always look beautiful.

Most often, a compromise option is chosen: plants are grown in separate containers, put together and the gaps between them are covered with expanded clay or pebbles. Often at the same time, climbing or creeping species are planted, using them as groundcover.

Solar panels. Currently, alternative power sources are rapidly developing. If earlier receiving energy from the Sun was considered a phenomenon from the field of fiction, now solar panels are used in various industries from cosmonautics to individual construction. The development of solar energy began in Europe. Many enterprises install solar energy sources on roofs. The installation of solar panels on the roof of railway stations has a number of advantages.

Advantages of using solar panels on the roof:

- a free and virtually inexhaustible source of energy;
- the work does not harm the environment;
- maintenance consists in periodic cleaning of panels from dust;
- the possibility of obtaining electricity in places where there are no centralized electricity networks;
- the possibility of combining different power sources, that is, in clear weather, you can turn on solar panels, and in inclement weather, use a conventional power source.

The roof of solar panels also has disadvantages:

- relatively high prices for equipment for energy production;
- low efficiency;
- dependence on the activity of sunlight under different climatic conditions of use.

However, it is worth noting that these shortcomings are constantly being reduced and eliminated, due to the development of high-tech technologies. The more consumers there are of solar energy, the cheaper the equipment and solar panels will become.

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