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The impact of airports on visual safety of environment

The analysis of airports contribution to the visual pollution of the environment is performed and the major factors of of the visual quality degradation are defined. Recommendations on the mitigation of the negative impact are provided.

The living environment of humans is a system of interacting elements having direct influence on their health status and level of comfort. However, the elements of comfort often get in contradiction with those environment components, which are necessary to provide their environmental safety and normal physiological activity. This is due to pollution and degradation of environment, which is caused by the functioning of the artificial objects and their provision infrastructure. Thus, transport being one of the most important constituents of living standards and municipal services is at the same time the most intensive polluter of urban environment.

It is necessary to note that evaluation of environmental safety of urban settlements often lacks attention to the quality of non-material resources, namely visual environment and visual fields, as a product of constructional human activity with inclusion of natural elements residuals. But the type and parameters of visual environment have profound influence on the perception of the environment condition on the whole and numerous researches note, that it has clear health effects, especially their mental and intellectual activity. Under these conditions the visual fields of aggressive or homogenous character are the most harmful for humans.

A homogenous field is a surface on which either no visible elements are present or their number is minimal. Examples of homogenous fields in urban environment are large panels, solid glass, subterranean passages, asphalt pavement, blind fences and roofs of houses. Inside the buildings, homogeneous fields start with a smooth entrance door, continue with polished walls and cabinets and end with a smooth plastic inside the premises.

An aggressive visible field is a field on which a large number of the same elements is dispersed. Such an environment is created by multi-storey buildings with a large number of windows on the wall, hinged vertical rustles, panels of houses lined with glass, tiled walls, masonry with hidden seam, doors covered with "lining", as well as all kinds of grids, nets, perforated plates, corrugated aluminum, slate, etc. In urban conditions, often one aggressive field is imposed on the other. In an aggressive and homogeneous environment, fundamental vision mechanisms such as saccadic automata, binocular apparatus, convergence, on and off systems and visual centers can not function properly. In particular, in a homogeneous environment, the inverse relationship between the sensory and motor apparatus is violated, since after the next saccade the light drop on the photoreceptors of the eye is insufficient. Accordingly, a minimal impulse is sent to the brain after the saccade and it is insufficient for reliable feedback. In other words, there was an action - a saccade, but there is no confirmation of this action, as a result of which the visual centers and the nervous system as a whole

are in error. This in turn causes a feeling of discomfort. Continuous stay of a person in such environment leads to the violation of the saccades automation. Just as the air must contain enough oxygen, the visible medium must provide sufficient number of elements and their variety.

From the point of videoecology airports are objects with combination of not favorable visual fields of both kinds. Modern airports are built with maximum comfort for passengers. An expanded infrastructure is being created, which includes business rooms, boutiques, cafes and restaurants, etc. from the point of architectural and constructive solutions airports are divided into:

- an airport terminal with an open platform (passengers pass to air transport directly on the platform or by special facilities directly from building of the main air terminal);
- central air terminal with boarding galleries (air terminal with an extension from the field);
- central air terminal with satellites connected with galleries to the main one (satellites provide decentralization of passenger areas close to the boarding area);
- central air terminal with remote satellites (for connection of remote satellites to the central building, there are ground and underground mechanized modes of transport);
- air terminal with a remote passenger apron (aircraft service stations are removed from the terminals to provide great apron flexibility when changing the dimensions and parameters of aircraft maneuvering, buses and mobile lounges are used to deliver passengers);
- independent air terminals (such a system consists of two or more buildings, and each has a connection with land transport);
- central air terminal with remote landing piers (the central building is connected with remote facilities through underground galleries piers).

But even having such a diversity of technological solutions, most modern airports represent almost identical succession of sharp and monotonous elements. It starts from the use of traditional types of structures and constructional materials: reinforced concrete and steel beams, trusses, arches. The lines of the most airport buildings are straight, joined into groups of parallels, finished with cascades of windows. Lack of color is also a problem: the dominant idea is that airport building must be white or any other uniform light color, which reduced the opportunity to decrease the level of aggressiveness and homogeneity.

As for the airport buildings themselves, the premises are divided into large and small-space. To large-scale are the main passenger halls for operations and waiting, luggage handling facilities. Small-space includes office premises, technical and auxiliary. For the covering of large spaces standard blocks and elements of glass, concrete, plastic and metal are used again giving no possibility for visual experience formation. As a result this visual environment aggravates the fatigue and irritation of passengers and staff, prevent normal intellectual activity, contribute to the formation of unpleasant impression from the staying in the airport, especially for a long period of time. Personnel of the airport may undergo deeper psychological effects and suffer from various disorders.

At the same time it should be noted that airports are visual dominants of the landscape, as they are often located outside the city at large open spaces. The even constructional solutions turn the airports into the elements of visual pollution of the environment and thus they lose their advantage of dominants, keeping it only at long distances. This is multiplied by the vast flat territories of airfields and auxiliary structures, which ruin natural landscape without any compensation in the form of visual diversity or unusualness.

Thus, there is need to apply new approaches to mitigate the level of visual environment degradation and prevent negative influence on visitors and personnel. Of course, there is no possibility to apply major changes to the existing facilities, but some arrangements are able to give positive results at low investments, including:

- creation of vertical and roof green plantations, which reduce the level of homogeneity.
- painting facades and internal walls in clear natural colors with minimal level of aggressive lines, but with plot pictures or ornaments;
- creation of open air or indoor green islands, which introduce unusual elements and decrease the alienation of the whole complex.

As for the new objects, their construction must be planned accounting the need to take the homogenous elements and aggressive visual fields to the minimum. New unusual spatial structures made of modern materials are able to make the total picture more attractive. The inclusion of decorative elements, such as portico, columns, and bay windows gives possibility to break big planes into minor visual fields. Instead of straight lines should be substituted with wavy and curved shapes, which produce better effect, as well as colorist solutions, which give possibility to create volume and texture at flat substrate. Any vertical accents are also in favor of visual quality of the environment, but they are not allowed at the territory of the airport due to safety requirements.

Conclusions. The analysis of modern trends in the architectural and technological solutions for airport shows that they create not favorable visual environment with combination of monotonous and aggressive visual fields both in exterior and interior design. This leads to increased fatigue, irritability, reduced workability and life disposition among passengers and personnel. The situation can be improved with introduction of creative decoration, combined colorist solution, development of green islands on open surfaces of buildings.

References

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