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Influence in Connection of a Vapor Barrier in Critical Detail of Composite Structures

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Abstract

Influence of connection vapor barrier in a critical detail of composite structures is directed to the humidity temperature evaluation of a design detail, focusing on the risk of mold growth. Detail corner of the building is elected with a variation of the connection of vapor barrier on the concrete skeleton. The thesis describes the course of moisture in those points of structure describing the possibility of the occurrence and growth of fungus.

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1. Introduction

The composite structure, respectively. Composite structures, the trend in the construction of houses, civil and industrial buildings. It applies where there is an object used a combination of two (or more) different technologies or methods of construction. One technology ensures the stability of the building, while the other is applied to the wall structure. A typical example, which is already anchored in our several years, monolithic reinforced concrete skeleton construction filled brick blocks. In contrast, the atypical example of timber in which the supporting function is performed by a reinforced concrete frame. This type of composite construction is widespread in the Nordic countries.

Combining design, wood-based panels and assembled or monolithic reinforced concrete frame is achieved the benefits of both technologies simultaneously. The wood used for façade construction provides insulating properties, determines its appearance and fully exercises its lightness and functionality. Subtle concrete skeleton eliminates the limited lifespan of wood in stressed areas of construction and construction also gives the maximum flexibility in the design of the facade and interior layout. The big advantage compared to traditional composite construction Wooden buildings are fire resistant.

Today's trend in construction is determined by the passive and low-energy standards, which determine high requirements for buildings and their construction. In a particular the thermal technical requirements for circuit design, object orientation to the world side, assessment of environmental construction, airtightness of the building and more. For composite structures it is risky especially the connection of different structural systems due to the different physical properties of the materials used.

For proper functionality of the thermal envelope of buildings with composite structures it is important to ensure the proper realization of vapor layer and its connection to the concrete skeleton. When correctly performed at critical contact structures in the details of construction, there is an increased flow of water vapor diffusion, which are produced in the internal environment of the building. Increased flow and change of seasons has resulted in condensation of water vapor in the structure. Increasing humidity in the structure has resulted in the formation of thermal bridges (areas with an increased heat flow), volume changes of wooden structures, decrease the effect of an airtight envelope of buildings and ultimately creates the risk of mold growth.

2. The risk of mold grow

In porous materials, which also include wood and materials made of wood-based, it is contained always certain amount of water. Depending on temperature, relative humidity and ambient air pressure. The water is physically bound. If the timber, respectively. wood element for some time located in an environment with a temperature and humidity, then the moisture is stabilized at the so-called. the equilibrium moisture. In building practice can have equilibrium moisture wide range (from about 6% of the room up to 25% or more in the external environment in the winter). [2]

The equilibrium moisture of wood embedded in the envelope of a timber frame affects some basic physical properties:

- With the increasing wood humidity reduces its compressive strength in the fiber direction and modulus of elasticity.
- With increasing humidity increases the risk of attacks by biological pest wood (wood decaying fungi, wood-destroying insects, rot and mold).
- Changing the humidity makes changes in the shape of the cross section of wood. It's very unpleasant property and the use of wood is necessary to take it into account.
- When unregulated or more multiple drying can create cracks in the wood, which reduce the resistance of the relevant timber member, thereby restricting its use.

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