

## **SUMMARY**

### **EXAMINATION OF GREEN ROOFS IN FAVOUR OF SAVING ENERGY AND DECREASING ENVIRONMENTAL STRESS**

**PhD thesis**

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Importance of energy efficiency has increased over the last decades, as the cost of energy resources has an increasing tendency. Designing and constructing a new building the profession has to take this issue into consideration with outstanding significance. The green roof can be a solution of the ecological approach. Advantage of the green roof is that this layer can be an additional top structure of an existing flat-roof building, just as thermal insulation.

Today, there is real opportunity by greening the top of the buildings, to compensate the lost natural surfaces in cities. Furthermore, green roof can be install not only on newly built roofs, but even on existing buildings. It only requires a structural calculation considering the additional weight.

Several researches has been proceeded about energetic properties of green roofs in the last decades. A few examples are mentioned in the literature. There were steps in order to standardize green roof structure with publishing guidelines. First guideline was compiled by the German Landscape Research, Development and Construction Society (FLL) in the late 1970's.

Our aim was to prove the experimental theory that green roof has a positive energetic effect to the building. We intended to reach this result on two different ways: measurement and calculation.

There had been chosen a nursery school building, which was built in the 1970's, and an experimental green roof was installed on the top in the early 1990's. This layer lies only on the half of the roof, while the rest is covered with concrete pavement. This situation provided the opportunity to examine both types of roof, and to make a comparison between them.

Detailed analysis of temperature field of the roof structure has been performed both with measurements and calculation. Aspects of the examination of this temperature field was the periodicity and the usefulness of average values of longer periods for energetic calculations.

I used the measurements to validate the mathematical model of the calculation, and as a result I got a useful method to have the values of the temperature field of the structure.

Finally, I was able to define the thermal conductivity coefficient of the green roof layers for several different cases, as winter, summer, day and night conditions.

It can be declared, that positive energetic effect of green roof can be calculated. Effect is more emphatic in summer situation and its vegetation has an additional cooling influence by evaporation.

