Summary of the following thesis:" **Architecture and Thermal Comfort in The Chosen Categories of Non-domestic Buildings**".

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Key words:

thermal comfort, the non-mechanical measures, non-mechanical thermal comfort's shaping, passive thermal comfort shaping, indoor environment, sick building syndrome (SBS), environmental factor, energy efficiency, adoptive thermal comfort model, energy issues connected with the thermal comfort, energy standards, local climate, outdoor environment, building's form compactness, thermal mass, intermediate spaces, building's zoning, building's envelope, thermal insulation, gaining solar energy, avoiding overheating, natural ventilation and **cooling.**

The subjects of this dissertation are **the non-mechanical measures** for the **thermal comfort**'s shaping in non-domestic buildings. These are the following measures: **spatial, structural,** connected with the **building's zoning** and the used **materials**. The research was conducted for the buildings situated in the temperate climate zone.

The dissertation's thesis was that the thermal comfort in non-domestic buildings, located in the temperate climate zone, could be shaped by the **non-mechanical** methods. There has been also **hypothesised** that:

- the non-mechanical thermal comfort's shaping strategies consist of the resolving of the **energy tasks** (like: heating, cooling, ventilation and lighting) by the architectural, structural and connected with the building zoning and the used materials methods,
- the non-mechanical thermal-comfort shaping could diminish the reliance on the mechanical systems and therefore could improve the energy efficiency of buildings.

In this work the non-domestic buildings of the varied use have been researched to verify the above thesis and to prove the above hypothesis. In the researched buildings the thermal comfort has been shaped by the **spatial, structural,** connected with the **building's zoning** and the used **materials** methods. The passive shaping of the thermal comfort has been conducted counterfactually or complemented to the mechanical methods. Despite of the analysing the buildings, also the single, contemporary and historical, passive measures have been researched. The result of the study is the list of the non-mechanical methods, that could be used to shape the thermal comfort in the buildings.

The thermal comfort is together with the visual, acoustical and olfactory comfort, the indicator of the buildings' indoor environment quality. Till the mid of the 20th century the thermal comfort had been created almost exclusively by the passive methods. At that time the architects had been responsible for the issues connected with the indoor environment. It had been also obvious, that the architects planning the buildings had to consider their external environment. Only around the 1950s the availability of cheap energy and the widespread use of air-conditioning, had created the possibility for the mechanical thermal comfort shaping. As the result, the very similar buildings in different geographical locations had offered the very similar indoor environment. However, these buildings had been not only very energy inefficient but had provided a poor indoor environment quality as well. In effect, users started to relate the mechanically ventilated buildings with the "**sick building syndrome**" (SBS). At that time the thermal comfort issues had belonged almost exclusively to the mechanical engineers' responsibility.

Recently, mostly because of the so called "**environmental factor**", investors and designers have started to rediscover the passive strategies for the thermal comfort shaping. It has been noticed, that these methods could cause the improvement both of the buildings' energy efficiency and of their indoor environment quality. In this approach, thermal comfort issues are no longer the task of the mechanical engineers only, but they are now the subject of the integrated planning, which involves the many planners and consultants.

This dissertation consists of three parts. It the first part, have been described the theoretical issues connected with the thermal comfort, among the other things the "**adoptive thermal comfort model**". The introducing of the adoptive thermal comfort model has made possible again to naturally ventilate the non-domestic buildings and therefore caused the rediscovering of the importance of the architectural measures for the indoor environment shaping. In introduction also have been discussed the inherited strategies, which could be an inspiration for the contemporary ones, energy issues connected with the thermal comfort and the varied energy standards.

In the second, main part of this thesis have been analysed the specific passive strategies, used to shape the indoor environment. These measures have been divided as follow:

- **outdoor environment** (to fit the building to the local climate and built conditions, topography, sun and prevailing wind directions),
- building's **form** (form compactness),
- building's structure (**thermal mass, intermediate spaces**),

- building's **zoning,**
- **building's envelope (thermal insulation, gaining solar energy, avoiding overheating),**
- **natural ventilation** and **cooling.**

The main part concludes also the research of 20 buildings of varied use. In these buildings have been developed passive strategies for the thermal comfort shaping. All of the analyzed buildings are, at least in same extend, naturally ventilated.

The last part contains the conclusions from the above research and the list of the non-mechanical strategies for the thermal comfort's shaping. The third part concludes also the list of advantages and restrictions of the adopting of the passive strategies.

In none of the analysed in this thesis case studies, had been adopted **exclusively non-mechanical strategies** to maintain the thermal comfort. Because of the indoor environment quality issues and of the energy efficiency, investors and designers had always taken advantage of both the non-mechanical and the mechanical measures. However, using the passive strategies for thermal comfort's shaping, in the investigated cases, always resulted in the energy savings, what has been showed in this work. In the building where occupants' satisfaction surveys and the control of the thermal comfort's parameters have been conducted, the tests and surveys have showed, that the energy savings have not been achieved on the indoor comfort's quality expanses. One exception is the acoustic comfort, which has been a reason of concern in some cases.

The conclusion from the conducted research is, that it is possible to ventilate naturally, and so to influence the thermal comfort by the non-mechanical measures, even the buildings or their parts, which have been usually ventilated mechanically (high-rise buildings, rooms without the access to the external walls, the buildings located in the dense built environment, the buildings and rooms where occur the high internal heat gains). The restriction, which made the natural ventilation impossible is the poor quality of the outdoor air.

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