Warszawa, 06.12.2023

Author: mgr inż. arch. Aleksandra Przywózka

Doctoral dissertation topic: Opportunities to improve the circularity of construction and to determine and analyze the factors influencing the results of the embedded environmental footprint on the example of selected office buildings in Poland.

Abstract

Defining construction as a sustainable, ecological activity seems to be a challenge that is almost impossible to achieve given the way this sector of the economy currently operates. This process will always be accompanied by environmental degradation, associated with both the construction space and the production space of building materials. The construction of buildings, especially commercial ones, is inevitably burdened with some environmental cost. It is worth considering whether, in order to radically change the direction of construction that would slow down negative environmental changes, the way we think about building and design should be changed. These changes should be related not only to the individual buildings, but above all, on a larger scale, to the planning of entire cities.

The current trend is to build new buildings to last somewhere between- 20 and 50 years, usually on previously undeveloped areas. Moreover, adaptation of the existing buildings, rarely seems economically beneficial. Therefore, it is necessary to verify the possibility of optimizing newly constructed buildings in a way to reduce their negative impact on the environment, and to improve already existing design and decision-making processes.

Energy optimization of buildings has already been discussed in many studies concerning passive building technology. The challenge for the coming years is to develop an approach that would equally reduce the energy demand of the processes of the material production, construction, renovation and repair, and demolition. Analysis of the lifecycle of the building from the phase of materials manufacturing to the demolition makes it possible to determine the impact of the various phases on the building's environmental footprint, as well as to define the determinants that would reduce it.

The fundamental aspect of the work will be the analysis of the processes of the closed-loop economy, through which it is possible to reduce the environmental footprint of buildings throughout their lifecycle. The possibilities of implementing this idea in the construction sector on the polish market will be examined. Office buildings that are (or were) under construction

Aleksandra Przywózka

in the current decade will be analyzed. The analysis will focus on aspects of sustainable management of materials used in construction. The research will be carried out in 2020-2023.

Keywords: circular economy, sustainable construction, recycling, building life cycle, environmental footprint, efficient use of material

Aleksandra Przyczka