

# **Brick masonry and Basic Work Requirement 7 “Sustainable Use of Natural Resources”**

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## **Executive Summary**

(Problem definition/Research question)

Our built environment has gone through an intensive urbanisation during the last 200 years which resulted in an increasing energy consumption, emission of waste and pollutants. The economical and ecological crisis is the crisis of our technical civilisation model and finding the solution for this situation is an international challenge. Since July, 1st 2014 the new Construction Products Regulation (CPR) has come into force and thereby the new Basic Work Requirement (BWR) No. 7 “Sustainable Use of Natural Resources” which requires recyclability and durability of construction works as well as the use of environmentally compatible raw and secondary materials. These requirements mentioned in BWR 7 still need to be carefully defined considering realistic state on the building market. These three topics imply a new challenge for brick masonry in the future. Until now attention has been paid to the declaration of performance regarding load bearing capacity, thermal properties and noise protection (BWR 1-6). Henceforth, sustainability aspects have to be considered additionally if construction products shall stay competitive.

The international standard EN 15804:2012 provides the core rules for the creation of Environmental Product Declarations (EPD) for building products and materials. Therefore, the questions are how the standards EN 15804 and EN 15897 can support BWR 7 requirements; which is the link between theoretical requirements and the existing situation on a building market and typical construction site and what does it mean for brick masonry. The connections between regulations, standards or declarations related to construction products are occasionally equivocal or they make difficulties in putting another into practice. Although a harmonization process exists already, it still presents ambiguity in adaptability and lucidity. Also, as these instructions are not obligatory, in many cases just ensure opportunities, making parts of the communication optional, which may cause a variety in final results and declarations.

(Methodology, Results)

Dealing with this topic requires the complete understanding of it, along with the opportunities and obstacles it delivers, by establishing the definitions of the terms recyclability, durability and environmentally compatible raw and secondary materials. It is the first step, taking into consideration, to create a sustainable approach before the adaptation itself takes place. Furthermore, the general view that most of the principles of the topic give us must be converted into a specific one, redirected to the audit. On the topic of sustainable construction, brick masonry and hollow bricks got this laureate attention, however, in order to get a thorough impression, other building materials, which can be alternatives, competitors or complements, also took part in the research. During the comparison of the brick walls, some essential aspects were taken into account according to the analysis of the four phases of the Life Cycle Assessment (LCA) and also the “Sustainable use of natural resources” (BWR 7) from CPR. All the examinations, from the very general to the very specific ones, were considered in order to get an organized aggregation of results to reach a critical conclusion at the end.

However, the information derived from the isolated study of building materials cannot be considered

sufficient for making conclusions about their sustainability, but to evaluate their behaviour integrated within a system, releases their actual impact and dependence of the environmental changes. In this case, the four different case studies - of different materials and type of construction, but with similar thermal qualities - affected the final result. The analysis is not the goal but it represents a designing tool that helps to improve edifications with a sustainable approach regarding the future. In case of hollow bricks, the purpose is to acknowledge the mainstays and weaknesses of this kind of construction product, to specifically consider the possibilities and limitations that it performs. Also it contributed significantly to select the fields of intervention which are worth developing.

#### (Conclusion)

A “sustainable” product, material, building component or edification has to fulfil all of the three requirements of recyclability, durability and use of environmentally compatible raw and secondary materials and has to function in a “sustainable” way through all LCA phases - production, construction, use and end of life. Furthermore, it should operate in a harmonized and supplementary manner to correspond with other materials, products or components as well as with the environment. A special focus must be taken in the initial design phase, when the selection of materials and products takes place because it contributes significantly to a more sustainable resource use. However, this point is strongly connected to the last phase by involving possibilities of reuse and recycling and waste management at the end of life.

#### (Recommendations)

It is important to keep in mind that there is a difference between the terms of durability and recyclability and these ideas are not the goals in themselves but the approaches to reach sustainability. The strategical key involves not only to incorporate alternative materials and to make the right use of them but also the right balance between durability, recyclability and use of environmentally compatible raw and secondary materials should be overtaken.