

Double “CE” for Construction Products: “Circular Economy” in “CE Marking”



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Abstract

The EU Circular Economic Action Plan published in 2020, as part of the European Green Deal, highlights the necessity to reduce the energy consumption and emission of greenhouse gases in the field of civil construction. A circular economy (CE) assessment is required starting from the construction products. Engineers and construction companies should have the possibility to select proper products basing on info about the “Circular Economy principles”, such as design for disassembly, recycling, reuse, recovery, and remanufacturing. Unfortunately, the lack of information about circular economy concept in the construction sector and, above all, the lack of harmonized methods for the assessment of construction products performances about sustainable use of natural resources, still hinder the development of a circular economy. This short communication aims to demonstrate that the existing Construction Product Regulation (CPR), i.e. EU Regulation n° 305/2011, about CE marking of construction products, could act as a driver to use products with certified performances about the Circular Economy principles. In fact, the CPR requires common methods, provided in harmonized technical specifications, to evaluate the performance of construction products. Why not also consider Circular Economy performances?

Keywords: Construction Product; Circular Economy; “Construction Products Regulation 305/2011”; CE mark

Short Communication

In the European Union (EU), the building sector is responsible for 40% of total energy consumption and 36% of total CO₂ emissions [1]. Therefore, to reduce the energy consumption and emission of greenhouse gases, strict energy code obliges engineers and construction companies to pay more attention in designing energy efficient buildings [2]. This change of paradigm was also due to the introduction of the concept of zero energy consumption buildings in the Energy Performance of Buildings Directive (EPBD) 2018 [3]. However, the term “Net Zero Energy Building” (NZEB) refers to the zero net energy consumption buildings, i.e. the total sum of energy used annually by the buildings is approximately equal to the total sum of the renewable energy produced on site. Thus, the first step in the design is to aim at passive strategies through the choice of energy efficiency construction products [4]. In the light of the EU Circular Economic Action Plan [5] published in 2020 as part of the European Green Deal [6], it becomes necessary to re-think the building concept, “only” NZEB may no longer be enough, and a circularity “CE” assessment is required starting from the construction products to be used in it. According to [7], the construction industry is responsible for almost a third of total final energy consumption and 15 % of direct CO₂

emissions in the final consumption sector and for nearly 40 % of total energy consumption worldwide. The construction sector is the world’s largest consumer of raw materials, it generates up to 35% of landfill waste [8], and only 20–30% of these resources are recycled or reused at the end of a building’s useful life [9].

Scientific literature in the Circular Economy “CE” related to the building sector has increased in recent years focusing on i) waste management, ii) recycling strategy and iii) innovative “circular economy factors” [10]. In the narrowest field of “resource and waste management for construction products”, the main contributions deal with traceability systems of materials to provide info about the potential environmental impacts of building materials (LCA or LCC), the recycled and recycling material rates, the recycling efficiency and environmental impact (CO₂ footprint) or the potential to be reused in a new project [11]. Despite the new central role in the contemporary scientific debate, Mahpour [12], Liu et al. [13] and Adams et al. [14] stated that the barriers within the management of “circulatory economy of construction product” must be identified in the lack of market mechanisms that promote this products [9], but mainly in the lack of information!

The designers should have the opportunity to select construction products basing on info about the “Circular Economy principles” such as design for disassembly, recycling, reuse, recovery, and remanufacturing. Digital material passports [15], standards concerning the communication of environmental impacts, namely the Environmental Product Declarations (EPD) [16], Product Environmental Footprint (PEF) [17] and so on, are some of the solutions proposed. However, every solution involves different methodologies and, as a result, “non-comparable” information is provided in the market. This lack of clear information discourages designers to use “CE” materials, unless the product company supports the designers, e.g. Tongji University’s top institutes, a high-rise tower has been built from recycle concrete in areas of China that are prone to earthquakes [18]. To address this issue, the revision of “Construction Products Regulation” (CPR) [19] appears to be one of the most viable solutions. The aim of the current CPR [20] is to improve the single market for construction products and to ensure the free movement of these products. It lays down conditions for the marketing of construction products, defining them as products placed on the market for incorporation in buildings and civil engineering works in a permanent manner. The CPR requires a common technical language defining the essential characteristics of construction products in relation to their performance.

This common technical language consists of harmonised technical specifications. Harmonization of technical specifications is a key process to have a proper comparison of the products from a technical perspective. “Harmonised technical specifications” means harmonised standards (hENs) and European Assessment Documents (EAD) which are published in the Official Journal of the European Union (OJEU) and are the references for the “CE” marking of construction products. In this case same acronym “CE” but different meaning. Such standards provide common technical basis to evaluate the performance of construction products and guarantees the availability of reliable information for professionals, public authorities and consumers, allowing them to compare products from different manufacturers and countries [21]. Moreover, this common technical language also enables Member States to define the legal requirements applicable to construction works. The list of harmonised technical specifications can be found on the European Commission website and in the information system “NANDO” [22]. In the case of products covered by the hENs, manufacturers are obliged to CE mark their product and to report the “essential characteristics” in the Declaration of Performance (DoP). The DoP has to be defined according to the construction product regulation (UE) N° 305/2011 (CPR) of the European Parliament and the European Council of 9 March 2011, entered into force on 1st July 2013 [20]. According to the CPR, “the declaration of performance shall express the performance of construction products in relation to the essential characteristics of those products in accordance with

the relevant harmonised technical specifications”. The Regulation 305/2011 defines “essential characteristics” those characteristics of the construction product related to the basic requirements for construction works as reported in Annex I of CPR.

The CPR sets out seven BWRs with regard to: mechanical resistance and stability; safety in case of fire; hygiene, health and the environment; safety and accessibility in use; protection against noise; energy economy and heat retention; sustainable use of natural resources. However, in case of brand-new product or product used in a different way compared to the traditional usage, it could happen that an appropriate harmonised standard is missing. In this case, the manufacturers are not obliged to draw up the DoP and to mark CE their product; moreover, they do not know which are the essential characteristics and how to assess their performance. This gap is filled by developing a European Assessment Document (EAD) by the Technical Assessment Bodies (TABs) to get a voluntary certification. TABs are bodies designated by Member States, are part of the European Organisation of Technical Assessment (EOTA) [23] and act as link between the designers and manufacturers; they must develop the criteria and methods to determine the input data required to carry out the mechanical, energetic and “circular” analysis of buildings. TABs are the competent organisms to develop EADs and issue ETAs (European Technical Assessment), which consist of documents stating the assessed essential characteristics for specific products. The EAD is a document on methods and criteria that are applicable for the assessment of the performance of a new construction product. Once the ETA is issued following the EAD indication, it provides information about the performance of the construction product; therefore, it is the basis for a Declaration of Performance (DoP). Thus, why not take advantage of the well-tested and known CPR to overcome those barriers that prevent the circular economy implementation in the construction sector of EU? Therefore, among the BWR, the BWR n.7 is the requirement for sustainable use of natural resources, and it fits perfectly with the circularity objectives.

To date, no harmonised European standard has taken this requirement into account [24]. An EOTA database [23] query, ‘EAD list’, immediately confirms the statement above. The user can recover all the EAD cited in OJEU by searching for words or scrolling down the EAD list. Using the keyword “recycled”, only n. 8 EADs are selected and no one, in the “Essential characteristics” section, deals with the BWR 7. The situation worsens when the word “recyclable” is used, no EAD is selected. This short communication has a twofold objective: to make critical analyses of the barriers to spread of circular economy in the sector construction, and to demonstrate, as already existing CPR could break down the barriers and act as a driver to use product with certified performance about the Circular Economy principles. Finally, this short communication ends with a question: “Will the new CPR meet the challenge of the double ‘CE’?”

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