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NOTE

From:	Presidency
To:	Delegations
Subject:	Re-use of Construction Products today and in the future in Member States

Delegations will find in Annex a Presidency note on re-use of Construction Products today and in the future in Member States, in view of the Technical Harmonisation meeting on 3 July 2019.

ANNEX

Circular Economy and Construction Products Regulation (EU) No. 305/2011

We spend nearly 90% of our life inside buildings. A large amount of national assets are stored in building stock. In the EU, residents use an average of 48 m² of floor area. Housing costs consume as much as 22% of disposable income. Creating and maintaining building stock is a major economic sector that employs 18 million people and accounts for 8.6% of the EU's GDP.

Currently, 50% of the Earth's raw materials are used for construction, 40% of primary energy is used in buildings and 35% of greenhouse gasses (GHG) and 30% of all waste are created in the construction sector. The construction sector consumes nearly all of the cement, half of the steel, one quarter of the aluminium and one fifth of the plastics. In order to fight climate change, it is necessary to do more within the construction sector. It is crucial to increase awareness of the link between resource use within the construction sector and climate change, and to invent more possibilities for reusing existing construction products and finding ways to recirculate products that cannot be used as such, but could be turned into materials for manufacturing new products.

We Need to Fight the Climate Change

According to the United Nation's Intergovernmental Panel on Climate Change (IPPC), the remaining 'carbon budget' for this century is approximately 800 billion tonnes (Gt) of CO₂. Such a figure would mean that we have a chance of keeping global warming below 2 °C, which is less than the target set by the Paris Agreement. The carbon budget would be 550 GtCO₂, if we hope to prevent the globe from warming more than 1.5 °C. A recent report by Material Economics claims that our consumption of cement, steel, aluminium and plastics prevents us from reaching our goals of fighting climate change. The production of these four materials alone according to current trends would result in 920 GtCO₂ emissions by the end of this century. If we do not change current practices and production volumes, we are likely to double the CO₂ budget, which will result in permanent changes to our living conditions.

There is no evidence that the demand for construction materials will be maintained at the current rate. Rather, it appears that because the world economy is growing, consumption of steel and cement could roughly double, aluminium triple, and plastics quadruple by the end of the century. If nothing changes, demand for primary materials is likely to rise rapidly and continue to do so for many decades to come.

The EU building sector uses 1.6 Gt of materials per year. This amount is likely to grow because the majority of building stock in Europe is post-war and needs substantial renovation or replacement in the next few decades. The total CO₂ footprint of producing building materials in the EU is 250 Mt per year. Cement, steel, aluminium and plastics account for almost 80% of these emissions. The construction phase of a building accounts for as much as half of its lifetime CO₂ footprint and its use phase for the other half. Construction and demolition generate 25–30% of total waste volumes, which is a lot of more than for any other sector.

Existing building stock forms a resource bank of useful materials – as well as a repository of harmful substances. By utilising the materials and products that we already have within our building stock, we could meet the needs of the modern economy with significantly lower levels of production of new primary materials. More than 60% of EU steel production is based on primary production, i.e. produced from iron ore. The largest potential lies with plastics where the recycling rates rarely exceed 10%. Actually, more than 40% of the plastics collected for recycling in the EU are never turned into secondary materials. It is predicted that by 2050 post-consumer aluminium scrap could amount to 75% of the production required to meet European demand. It is not possible to recycle cement as such, but structural elements can be re-used. Furthermore, unreacted cement can be recovered from concrete, which can be recycled into new concrete production. Crushed concrete can be downcycled into aggregate for ground works or similar uses, although this may not be technically feasible or economically profitable in all contexts. To put it frankly, during the next 50 years we will be running short of many of the elements in our periodic table that we use every day. The question is how can we convert existing material into new products? In resolving this question lies huge potential.

The need for building materials could be reduced, for example, by changing designs to increase a building's longevity and adaptability, influencing the disassembly at the end of its life and reusing intact structural components on-site or within local markets.

How to Tackle the Challenges of the Construction Sector

The construction sector faces structural challenges. The construction industry is fragmented and comprises numerous small companies. Many of the companies are still recovering from the financial crisis. Profit margins are lower than in many other sectors. Materials efficiency is not included in mandatory regulation in a manner that, for example, fire, safety and energy performance are.

In many cases, a building company can only improve profit by reducing labour costs, which is not likely to inspire the desire to pay attention to the circular economy. Contracts are often structured so that the people making the decisions concerning the materials to be used do not bear the cost of dealing with waste. Instead, they bear the cost of possible delays and that is why builders are likely to order more than enough building materials as a buffer. Therefore, not all the materials at a construction site get used. Surpluses usually cannot be sold or returned. Because of that, approximately 15% of building materials are wasted in construction. This material inefficiency further undermines the poor profitability of the sector.

When a building is replaced because of functional, economic, normative or stylistic obsolescence, the building is often demolished wholesale, even though structural elements, which account for 85% of the GHG footprint of materials, may still have a long remaining technical lifetime. Nowadays, the technical lifetime of a new building is in many cases designed to be only 50 years.

When the building itself reaches its end-of-life, quite a few of its component are still fully functional. Especially steel and concrete components offer potential for re-use. However, at the moment, only 5% of end-of-life steel from buildings is actually re-used.

Even though reusable parts would in fact be available, in most cases there are no local markets to connect those who dismantle buildings with those who could use the parts, or store the parts until someone else could use them. It is also difficult to certify or to trace the performance of re-used construction products.

In many cases, buildings are designed using building information modelling (BIM). BIM has the potential to enable advanced control over scheduling, cost, and operations, and maintenance, during the use phase, as well as store detailed 3D object data. BIM provides a tool to help reduce surplus waste, and create shared platforms for exchanging end-of-life components for re-use. This together with smart CE marking offers major opportunities for the future re-use of construction products. At best building information modelling (BIM) can be designed as an operational tool (“House Book /House Library”), which will be monitored using everyday, functional guidelines for maintenance and renovations during the whole lifetime of a building (“Maintenance and Renovations Book/Library). Thus, the building itself would have an updated memory of materials available for re-use in the possession of the real-estate owner.

Recycling building materials as raw materials for manufacturing new construction products links to the Waste Directive and the ‘end-of waste’ policy which creates obstacles to the trade of secondary materials. According to the Waste Directive, 70% of the materials should be utilised where the primary objective would be re-use, the secondary option recycling, and the third option recovery.

In the majority of cases, circulating existing materials consumes less energy than manufacturing everything through new production. However, current practice is not yet set up to facilitate high recycling rates. Year after year, the consumption of raw materials is exceeding our planet’s reproductive capacity. In addition to that, we are creating a lot more waste than our Planet Earth has the ability to neutralise.

The 2018 Special Report by the IPCC on the impacts of global warming of 1.5 °C does not really leave room for hesitation. It is certain that there is an urgent need to implement actions on a massive scale. The report only gives as little time as 12 years to cut back GHG emissions in order to maintain global warming at 1.5 °C. It is about time to pay attention to the sustainable use of building materials. Nobody wants to face a disaster.

Possibilities that Construction Products Regulation May Offer

The Construction Products Regulation (CPR) is the most important piece of EU legislation regarding construction materials. Sustainable use of natural resources is included in Annex I, but the articles themselves do not mention the re-use of construction products. Annex I is used as a basis for mandates for standardisation, but at the moment the recycling or re-use of construction products is not included in harmonised product standards. In fact, the question of re-use and recycling of construction products was not an issue at the time the CPR was drafted more than a decade ago.

We have discussed the concept of re-used construction products in an Advisory Group meeting two years ago, on 22 June 2017. According to the views of Member States, it was evident that the market of re-used construction products was marginal. The question is what can we do to create more business opportunities for the circular economy in the construction sector? How should we amend EU legislation in a manner that makes the re-use of construction products appealing?

To start with, we need to make a distinction between recycled and re-used construction products from a CPR point of view. Recycled and re-used construction products can be divided into four categories: 1) new re-used construction products, 2) old re-used construction products, 3) surplus building materials and 4) recycled construction products.

New re-used construction products are products that have been CE marked and DoPs exists. It can be presumed that in future, due to digitalisation and the use of BIM, it will be possible to digitally document all buildings in a manner that all the information about a construction product will be accessible when demolishing components. If the re-used construction product was CE marked when manufactured there is no problem since the declaration of performance (DoP) exists and the performance is known. In these cases, re-used construction products have both DoPs and CE marking, and the products can be used as such.

In order to help create new market opportunities for old re-used construction products, we need to decide what to do with the obligation of CE marking. Should we exclude re-used construction products that have been manufactured prior to CE marking from the harmonised sphere? It is not possible to begin to CE mark products that have been manufactured prior to having a hEN and mandatory CE marking. The manufacturer might not exist anymore and it is not possible to create factory production control (FPC) afterwards. However, the information concerning the performance of the product is still needed. How can we get that? If every tile is tested, there are not going to be any tiles left for re-use. Would it be possible to amend article 5 of the CPR in such a manner that a construction product that has been installed in a construction work for a certain period of time can be used for the same purpose without mandatory CE marking, for example? If CE marking was not mandatory for these products, the problem would cease to exist.

The surplus building material (unnecessary extras on a construction site) is new and CE marked so there should not be problems of creating a market for the use of that material.

Whenever a manufacturer uses recycled material to make a brand new construction product, it is understandable to use hENs and to CE mark the newly produced construction product. The most important aspect that will increase the attractiveness of using existing material for production of new construction products is to consider demolished material as raw material rather than waste. Therefore, it is necessary to discuss overlapping legislation in regard to the Waste Directive, and take this issue into consideration in case the Waste Directive is also about to be revised.

The following questions could be discussed during the first meeting of the Working Party on Technical Harmonisation (CPR):

- 1) *What is the situation in Member States regarding the circulation and re-use of construction products?*
- 2) *Are there best practices and examples to share?*
- 3) *What is the procedure for approving re-used construction products that are not CE marked?*

- 4) *How could EU legislation help to create business opportunities for re-use of construction products?*
- 5) *Is there a possibility of defining “secondary uses” for used construction materials that cannot for some reason be tested?*
- 6) *Which measures (e.g. labelling and other information requirements) should be introduced into the CPR to increase re-use and recycling rates?*
- 7) *Would Member States be ready to accept marginal losses in terms of safety when there are big wins in terms of the environment?*

Albert Einstein said: "We can't solve problems by using the same kind of thinking we used when we created them". I believe that the time to change our thinking has arrived.

Kirsi Martinkauppi

Chair of the Working Party on Technical Harmonisation (CPR)
