Construction City

Applying Circular Economy in the Construction Sector

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Introduction

We need to meet the challenge of climate change in all sectors of society. The construction sector represents one of the major contributors to CO2 emission.

The construction sector represents the largest share of total global energy-related CO2 emissions, according to the 2018 Global Status Report prepared by the International Energy Agency (IEA) for the Global Alliance for Buildings and Construction (GlobalABC).

In 2017, building construction and operations accounted for 36 percent of global final energy

Circle Economy [2]

Circular economy is a manifestation of economic models that highlight business opportunities where cycles rather than linear processes, dominate. It is restorative and

there are mature technologies for recycling of metals , such as steel, aluminium and cobber, cardboard, plasterboard and certain plastics. Less commonly building materials being recycled include wood waste, concrete and insulation.

All the materials acquired when pulling down a building have value, and these values need be utilised. But the road to applying the three Rs is long. The problems are many.

Problems with applying the three Rs

Reusing

Planning a new building starts with an architect drawing the building. The architect would like to reuse materials and components from buildings due for demolition or from materials from old buildings, stored somewhere. But information about available materials is scarce. Old buildings are poorly documented with little or no information about the dimensions of components or the quality of the components/materials and are also lacking requirdifrdocw 9 (r)5 (ts)1 (w)4

developing new technologies for “lifting/jacking” entire building floors in existing buildings – and by this avoiding/reducing demolition altogether.

However, materials are getting scarce and prices for new building materials are increasing. This trend might make reusing materials cost effective in the future. Many companies are now registering new buildings, even though it is still a cumbersome process. Registering old buildings is even more time consuming and costly.

Legal issues

There are many legal issues related to selling reusable materials. For example, the owner of the building supplying the materials (the building being torn down) is required to sell the materials under the same conditions as a company selling new materials. The materials have to comply with current industry standards and come with a five-year guarantee.

Recycling

A considerable amount of construction waste is possible to recycle. Both metals and concrete from demolished buildings can and are to a certain extent being recycled. Crushed concrete may for example be used as gravel for new construction projects. The recycling of one tonne of cement could save over 5000 litres of water and 900 kg of CO2.

Maybe walls or columns made of reinforced concrete could be moved and used in new buildings rather than being crushed to gravel.

From 2020, EU has imposed new regulation requiring that 70% of all construction waste either is reused or recycled (hazardous waste exempt). Current status varies across EU-member countries, but in general the 70% requirement is much higher than current reuse and recycle levels.

To sum up; Circular economy is all about retaining value. The better the integrity of the product is preserved, the more is retained.

Stakeholders in a building project

There are many stakeholders when a new building is being planned and built.

The *owners*, who will own the finished building.

The *architects*, who draw the building.

The *finance* sector, who finance the building.

The *authorities*, who control the planning and building.

The *constructors*, who build the building.

The *material producers and recycling companies* that are providing materials and potentially raw materials.

All of these are able to make the building process more sustainable. The architects by planning to reuse materials; the owners by having sustainability as part of their vision for the new building; the finance sector by favouring sustainable buildings with better rates; the authorities by imposing dues and taxes on unsustainable buildings and reviewing regulations on the reuse of materials; the constructors by reducing waste in the building process; material producers by replacing virgin raw material with recycled raw materials.

At the moment building new buildings in the linear economic model is much cheaper than applying the circular model. But this will have to change if we are to curb climate change. The construction industry needs to become more sustainable.