Lauredan Le Guen, Int J Waste Resour 2018, Volume 8
DOI: 10.4172/2252-5211-C1-011

8th World Congress and Expo on Recycling

June 25-26, 2018 | Berlin, Germany

Treatment process of CDW: Promising link to complete circular economy in the civil engineering

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Among the many environmental interactions with human activities, the construction and building materials (bricks, plaster, asphalt or cement concrete, clay materials and slurry) are recognized as a no negligible source of pressure on the environment. It is defined as the product of the linear economy, that is, an economy that digs resources out of the ground (e.g. rock materials), transforms them into products and buries in the ground, that is, in landfill sites, at the end of the life cycle of the product. Such an approach is wasteful, for both money and resources. An alternative, the circular economy ("cradle to cradle"), consists in remanufactured and/or reused materials such as today's goods become tomorrow's goods. The French energy transition law claims that by 2020, 60% of the building and construction materials will come from recycling also called construction and demolition waste (CDW). The process evolution of the construction waste management can be considered as one of the large challenge for the civil engineering community leading to several scientific issues to overcome. Currently, the plant used for the CDW treatment manufactures products for a "low cost" valorization because of the standards and the customers' consideration and the economical concurrency. The adaptation and the modification of these plants are necessary in order to target the manufacturing of product to a high value valorization. Based on some recent studies, the perspectives of this new strategy seems to be promising.

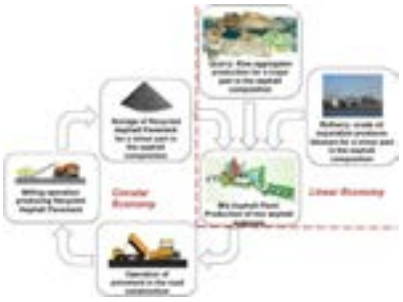

Figure 1: The circular economy applied to the road pavement fabrication

Recent Publications

1. Huchet F, Le Guen L, Richard P, Piton M, Cazacliu B, Semelle P, Matheus J, Riche H and Tamagny P (2018) Influence of the asphalt composition upon the thermodynamics performance of a mixing plant. Road Materials and Pavement Design 19:104-119.
2. Neto R O, Gastineau P, Cazacliu B G, Le Guen L, Sebben Paranhos R and Petter C O (2017) An economic analysis of the processing technologies in CDW recycling platforms. Waste Management 60:277–289.
3. Sampaio C H, Cazacliu B, Miltzarek G L, Huchet F, Le Guen L, Petter C O, Paranhos R, Ambrós W M and Oliveira M L S (2016) Stratification in air jigs of concrete/brick/gypsum particles. Construction and Building Materials 109:63-72.
4. Le Guen L, Huchet F and Dumoulin J (2014) Wall heat transfer correlation for rotary kilns with secondary air flow and recycled materials inlet. Experimental Thermal and Fluid Science 54:110-116.

Biography

Lauredan Le Guen received his PhD in Civil Engineering (2012) from Ecole Centrale of Nantes, France. He works as permanent Researcher at the French Institute of Science and Technology for Transport, Development and Networks (IFSTTAR) from 2012. He participated at one French national research program and one international research program with the University Federal of Rio Grande do Sul (UFRGS) of Brazil. He supervised several Batchelor's degree and Master's students. His scientific production reaches 9 scientific publications, 1 book chapter and around 10 communications in national and international conferences.

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