

2<sup>nd</sup> World Congress and Expo on

# Recycling

July 25-27, 2016 Berlin, Germany



## Enric Vazquez Ramonich

*Universitat Politecnica de Catalunya, Spain*

### RAC-PP- Recycled aggregates for concrete: Progress and Problems

The reduction of the use of natural resources and the use of a waste material avoiding problematic landfills, have been the principal points to open an important recycling market in most developed countries. Crushed concrete and masonry waste can be suitable for replacing coarse aggregate in concrete. When crushed masonry is used, compressive strength is lower and his high porosity affects durability and shrinkage. With crushed concrete aggregate the compressive strength and durability depend on the quantity of attached mortar. Attached mortar is responsible for higher porosity, weak zones in the aggregate and is related too with the new concrete durability. Smart crushers liberate more adhered mortar and can be a good solution. Methods to guaranty the quality of the production of good quality are developed, but inhomogeneity of the concrete waste of different origins continue to inspire distrust in many consumers, that prefer the use as sub base material in roads. Irregularity of the distribution of chlorides or other contaminants makes complicated the quality control, but combined analysis of durability and sustainability and the use of indicators and models can be a solution. The in situ recycling with only one origin of concrete can assure homogeneity. Many papers reflect the need of more cement to compensate the differences in properties compared with concrete with primary aggregates. When studied with LCA we can see that cement is, by far the most influencing factor in terms of CO<sub>2</sub> emissions. More cement can prevent the sustainability of recycled concrete. Several solutions will be proposed to make the recycled concrete sustainable, from the combined use of mineral additions and chemical admixtures to new mix design methods that can achieve equal performances in fresh state, strength and durability.

### Biography

Enric Vazquez Ramonich is Professor Emeritus in Construction Materials on the ETSIngenieros de Caminos of the Universitat Politecnica de Catalunya and currently in Constructing Cycle SL. His research interest is on eco-efficient materials and wastes for construction, environmental impact by leaching, road pavements, durability of concrete and bituminous mixtures. He has published 80 papers and books from 1967 till today. This publications include: *Progress of Recycling in the Built Environment, Vol 8, RILEM STATE OF ART REPORTS "2013"* y *Guia Española de Áridos Reciclados procedentes de RCD (2012)*, *Ministerio de Medio Ambiente y GEAR*. He has oriented 22 Doctor thesis and 30 Master's. He was invited as Plenary Speaker in Spain, Japan, France, Germany, Austria, Poland, Brazil, Italy, Portugal and China. He has been Chairman from the RILEM TC-217 y TC-198 URM and Member of WG of AENOR, AIPCR and CEN. In 2011, he received the Environment Award from the Catalan Government for his professional career.

[enric.vazquez@upc.edu](mailto:enric.vazquez@upc.edu)

### Notes: