Material and Advanced Techniques transforming recovered polymers into bespoke building components: Harvesting local plastic waste for building material

Chris Thurlbourne1

1 Aarhus School of Architecture, Aarhus, Denmark

ABSTRACT

This paper describes examples of the potential of plastic waste as a material for producing bespoke building components focusing on a high level of architectural design articulation and detail with specific attention to the materials sustainable tectonics.

During a seven year period as Head of the Masters study at Aarhus School of Architecture, Denmark (2010-2017) I engaged in a drive from the Danish Ministry of Higher Education for architectural education to engage more with sustainable agendas and practice collaborations nationally and internationally. Research development has therefore been directed towards sustainable tectonics in architecture, coupled with international collaborations.

The paper will present how a partnership with Udaipur Municipality, under the Smart City programs, has produced a plenum of knowledge for:

a. Identification of waste plastic types and sources, together with experiments into processing the material for preparation

b. Development of new building component types using plastic waste, and knowledge transfer for local production

c. Establishment of a knowledge ‘incubator’ and live testing in both India and Denmark to address specific brief requirements

d. How new technology in digital fabrication techniques can be combined to craft specific building parts from recovered plastic waste into architecturally refined building components

e. Demonstration of how sustainable tectonics of waste material can solve complex urban regeneration challenges

The paper will describe how, through project and material development, complex challenges to improving the urban landscape can serve as catalysts for processing and reusing locally discarded plastic wastes and open up new business opportunities and job creation in the construction industry.

Keywords: Circular resource efficiency; Architectural and urban sustainable design; Sustainable tectonics; Recovered Plastics