

R2C2, Roads Resisting Climate Change

The times when Climate Change (CC) existed as a fairy-tale are gone and now is the moment to face up to it.

Despite the main human contribution to CC being the increase in carbon dioxide (CO₂) levels, actions to fight it should not only focus on cutting CO₂ emissions, but also on attenuating their consequences, such as global warming and extreme rainfall events. Cities are particularly vulnerable to these impacts due to their scarce regeneration capacity.

Roads constitute a notable percentage of the skin of urban areas, playing a crucial role when talking about CC in cities. Nowadays, city roads are basically regarded as a means for goods and people to go from A to B; nevertheless, they could also be seen as a weapon to mitigate CC. Under this premise, a new pavement

structure solution based both on preventive and corrective actions against CC is proposed. Its design, called R2C2 (Roads Resisting Climate Change), consists of two concrete layers. The one on the top is composed of pervious concrete with high Albedo and voids percentage, including alkali-activated by-products, which enables mitigating Urban Heat Island effects and air pollution, draining flood-related high runoff rates and reducing CO₂ emissions during concrete manufacturing, respectively.

The bottom layer is a concrete mixture, in which part of the cement is replaced by biochar, a carbon-rich product obtained by heating biomass that also contributes to carbon sequestration and purifies runoff pollution exacerbated by the first flush effect. Therefore, R2C2 provides a holistic solution to the main impacts of CC on cities •

