

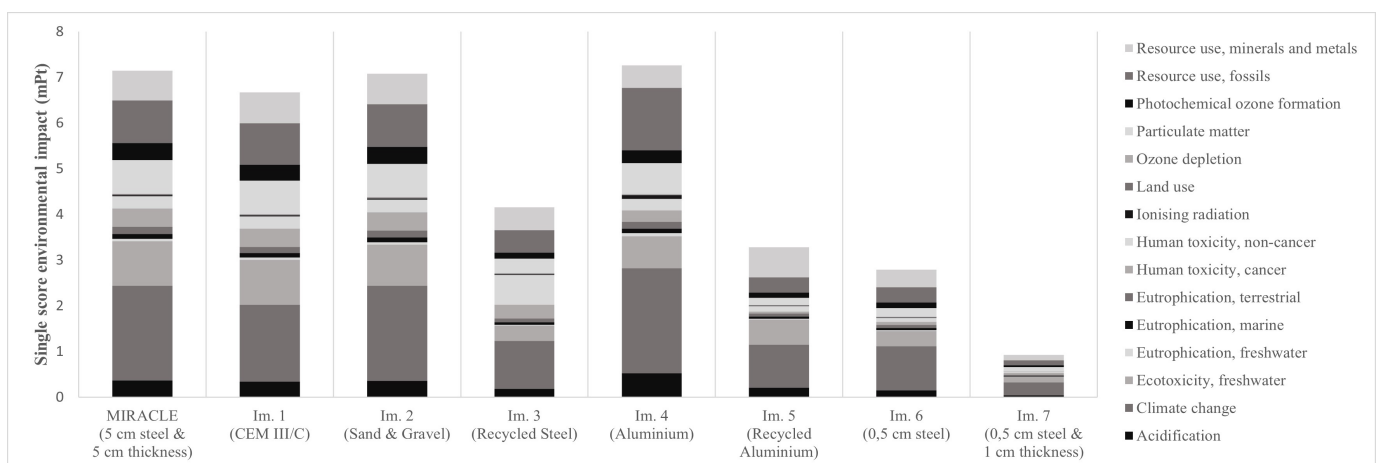
## ENVIRONMENTAL IMPACT ASSESSMENT TO SUPPORT THE DEVELOPMENT OF NEW PHOTONIC META-CONCRETE

The development of the MIRACLE concrete is in a primary phase, but the potential environmental impact (EI) of the first mixture is studied to gain insight in the main environmental drivers and support decision taking in the development process. The aim is to first minimize the impact of the materials and the production processes, in a next step the impact during the use phase and the end of life phase will be assessed.

A recent published conference paper (Adams, N. & Allacker, K. (2022)). *Environmental impact assessment to support the development of a new Photonic Meta-Concrete*. IOP Conf. Ser.: Earth Environ. Sci. DOI: [10.1088/1755-1315/1078/1/012072](https://doi.org/10.1088/1755-1315/1078/1/012072)) investigates the EI of each material and the composition and suggests potential improvements by using alternative

materials. These potential improvements are then integrated into the PMC to quantify the possible reductions of the EI. This assessment clearly shows that the biggest reduction of the EI, by using different materials, can be generated by replacing Portland cement with different cement types and using recycled steel instead of virgin steel for the microfibers. Secondly, altering the dimensions and the placement of the steel fibres reduces the EI significantly. Using steel microfibres only on the top layer of the material lowers the EI by 66%. This reduction can increase up to 86% by making the MIRACLE concrete thinner (1 cm instead of 5 cm).

For more information, please contact Nick Adams ([nick.adams@kuleuven.be](mailto:nick.adams@kuleuven.be)) or visit our web page <http://miracle-concrete.eu>.



Single score environmental impact for the first composition of the MIRACLE mixture (5cm thickness & steel microfibers distributed over 5 cm thickness) compared to possible improvements.