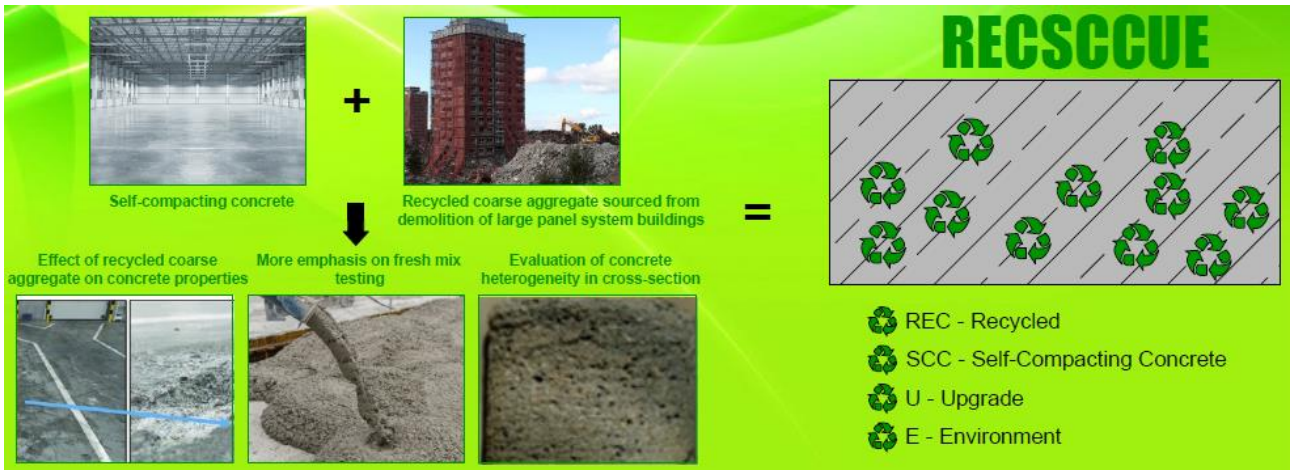


For the sake of the environment, there is a trend to replace natural coarse aggregate in concrete mix with recycled one, from construction waste. As coarse aggregate constitutes about 70% of the concrete volume, it would contribute to a real reduction of landfills. The industry already causes a constant build-up of wastes with little recovery of them. In the near future, there will be an inevitable problem of demolition large panel system buildings, which will increase construction waste landfills by huge amounts. Currently, there are 60,000 such buildings with 4 million flats in Poland, which is 30% of the national housing stock. As they are usually located in city centre, the significant costs of transporting old concrete should also be taken into account. The large-panel complex was planned to last 50 years and despite the renovation strategy and constant maintenance, demolition of some of them is a matter of time. One can only imagine how complicated the demolishing operation is for a 15-story edifice. The oldest structures from Western Europe have already undergone this process mainly due to the poor quality of construction joints, interestingly, with a fairly good condition of the concrete. As concrete for large-panel construction made in Poland in the 70s and 80s, has very good strength parameters, it could be reused as a recycled aggregate. Self-compacting concrete was selected for the project; it enables concreting structures with a significant degree of reinforcement and atypical forms, with high resistance to environmental conditions. Its practical feature is the lack of vibrations that leads to noise reduction, so it is perfect for investments in the city centre. Thanks to this, we will eliminate the transport of waste while still reducing it. Thus, the main innovation of the project will be the use of recycled coarse aggregate from the dismantling of large panel system buildings for the needs of self-compacting concrete. Conducting comprehensive basic research in this area could have significant benefits for the next generation of researchers and engineers. The first constructions of this type in Western Europe appeared in the 20s, and in Poland in the 60s, so it is the right time to prevent the problem, which is to be reminded by the acronym logo. However, in self-compacting concrete there is an important issue of changing the strength of the material along the direction of concreting. Coarse aggregate falling down the concrete mix contributes to the increase of porosity and low strength of the subsurface layer with relatively good strength in the middle of the material. It is also not known how the use of recycled aggregate may affect the microstructure of the transition zone surrounding the aggregate. This is important as the transition zone can often lack large cement grains that cannot physically pack close to the aggregate, resulting in a higher effective water-binder ratio. Meanwhile, the current state of knowledge assumes concrete homogeneity in cross-section and focuses on the hardened mixture. For this reason, there are many open questions and doubts, both scientific and research ones; will the morphology of large-panel recycled coarse aggregate affect the durability of self-compacting concrete, and will it also affect the properties of the fresh and hardened mix? How will it affect cross-section homogeneity, transition zone and bleeding? If recycled aggregate has a higher water absorption than natural aggregate, will its use reduce the high water demand in self-compacting concrete? What level of replacement for natural aggregate will be satisfactory? How to choose the right waste from the dismantling of large panel system buildings to be used as coarse aggregate? The aim of the project is to answer these bothering questions. The main result of the project will be a complex research of the properties of self-compacting concrete with the addition of recycled coarse aggregate. The research will allow for a real reduction of construction waste from demolition of large-panel buildings while limiting costly transport, easy concreting of structures even in city centre and obtaining the desired material properties by controlling the morphology of coarse aggregate with the usage of non-destructive testing.