

## c<sup>5</sup>Lab WP10c - Use of recycled materials (2020-2023)



Partners: CIMPOR, IST (CERIS), ITECONS, LNEC and SECIL

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[www.c5lab.pt](http://www.c5lab.pt)

**Summary description:** The main goal of the project is the evaluation of the viability of using recycled aggregates in concrete and mortars at the industrial level, from a technical, economical, and environmental standpoint. The project includes the optimization of the production of recycled aggregates from construction and demolition waste at quarries; the definition of aggregate requirements (aggregates totally or partially composed of recycled materials) for concrete and mortar applications; the optimization of concrete and mortar mix designs covering a broad range of applications; and the evaluation and comparison of costs and environmental impacts of aggregates, mortars, and concrete with those of typical products used by the industry.

**CERIS participation:** laboratory study of recycled aggregates, recycled aggregate concrete, and recycled aggregate mortar, definition of adaptations to mix design, and life-cycle assessment.

**Output:** definition of industrial processes for recycled aggregate production intended for mortar and concrete mixes, and evaluation of mix design and economic and environmental impacts of concrete and mortars produced with recycled aggregates; industrial demonstration of the feasibility of producing concrete and mortar with recycled aggregates in industrial units.

### Illustrations:



On the left: Stockpile of recycled aggregates of a construction and demolition waste plant; on the right: ready-mixed plant.

**Indicators:** 2 papers in international conferences; two ongoing PhD thesis; 5 research reports.

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1. Pacheco, J.; Dias, A.; Cenci, C.; Costa, M.; **Flores-Colen, I.**; Silvestre, J. D.; Tadeu, A.; Martins, I. M.; Veiga, R.; Pereira, P.; Brito, J. de: 'Progress report: 1<sup>st</sup> semester" (in Portuguese). c<sup>5</sup>Lab/WP10c **2020** report, RS1, Lisbon.
2. Pacheco, J.; Dias, A.; Cenci, C.; Costa, M.; **Flores-Colen, I.**; Silvestre, J. D.; Tadeu, A.; Martins, I. M.; Veiga, R.; Pereira, P.; Brito, J. de: "Concrete aggregates - visit report: Atouguia Quarry" (in Portuguese). c<sup>5</sup>Lab/WP10c **2020** report, RA1, Lisbon.
3. Dias, A.; Pacheco, J.; Cenci, C.; Costa, M.; **Flores-Colen, I.**; Silvestre, J. D.; Tadeu, A.; Martins, I. M.; Veiga, R.; Pereira, P.; Brito, J. de: "Concrete aggregates - report 3: Preliminary environmental and economic life cycle assessment of the production of recycled aggregates in construction and demolition waste management operators and in quarries" (in Portuguese). c<sup>5</sup>Lab/WP10c **2020** report, RA3, Lisbon.
4. Cenci, C.; Pacheco, J.; Dias, A.; **Flores-Colen, I.**; Silvestre, J. D.; Tadeu, A.; Veiga, R.; Pereira, P.; Costa, M.; Brito, J. de: "Aggregates for Concrete - report 2: Procedures and test plan for physical characterization of recycled coarse aggregates" (in Portuguese). c<sup>5</sup>Lab/WP10c **2021** report, RA2, Lisbon.