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Analysis of Recycled Aggregates Properties for Unbound Granular Asphalt Pavement Layers

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ABSTRACT: The main purpose of this paper is to analyse the most important properties of recycled aggregates from construction and demolition waste (CDW) for the use in road construction and maintenance, especially in unbound base and sub-base pavement layers. National Laboratory of Civil Engineering (LNEC), in cooperation with Technical University of Lisbon (IST), is carrying out a research project concerning the study of crushed concrete, which represents the majority of CDW generated by building and bridges construction in Portugal. Two origins of crushed concrete were analyzed: material from laboratory crushing of cubic concrete specimens, used previously in compression strength tests; material from in situ crushing of CDW, obtained from a concrete building demolition near Lisbon. Geometrical, physical and mechanical characterization of materials in laboratory was based on European standard tests established for natural aggregates: particle size distribution, shape index, flakiness index, Los Angeles fragmentation, micro-Deval wear, crushed and broken surfaces, sand equivalent, methylene blue and compaction test. A chemical characterization of all materials was also accomplished. The paper presents the laboratory test results and also discusses the main critical aspects related to the test procedures taking into account the non-traditional nature of the CDW material. In 2006, LNEC has published a guide for the use of recycled aggregates in unbound base and sub-base pavement layers - LNEC E 473. Test results were compared with the requirements covered by this guide. Main conclusions and recommendations derived from this analysis are presented in the paper.

KEY WORDS: Road pavement, CDW, concrete, recycled aggregate, unbound granular material.