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Assessment of the use of clam shell in concrete

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Today, the demands for housing and public constructions in the world are increasing. It may cause high contruction material demands. The global market for construction aggregates is expected to increase 5.2 percent per year through 2015 to 48.3 billion metric tons. The Asia/Pacific region will register the largest increases in product sales, as construction activity will rise rapidly, particularly in China and India. To meet this need, the exploitation of the building materials are going strong, especially sand and stone exploitation. Overexploitation of natural resources can cause destruction of habitat. Therefore, it is suggested to research on finding out the source of new materials and environmentally friendly alternative to sand, stone building. Realizing the potential of replacing sand and stone of the clam shell by products in contruction, the study using experiment methods to evaluate the mechanical and physical - chemical characteristics of the clam shell. Clam shell was directly substituted for the natural aggregate at different percentage by mass in concrete mix grade 250. The experiment results showed that the clam shell can replace 30% sand and 15% stone by mass in concrete mix. The concrete from clam shells not only achieve the technical requirements, but also saving on material costs to more than 27% and having more environmental advantages than traditional concrete. Besides, the study also proposed to material collecting plans from different resources and development plans for this material.

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Optimization of industrial wastewater treatment process

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The developemt of industries is releated to continued efforts to find the better wastewater treatment processes. The aim of this research is to optimize and evaluate the technical and economical feasibility of industrial wastes treatment plant. Different kinds of wastewaters with heavy metals, with oil emulsions, with chrome, with surfactants, spent pickling liquors are treated. Chemical-physical and biological treatments are reproduced in laboratory tests to find the better operating conditions. In addition to measurements of COD and total solids, values of OUR are carried out to have the disposal facility in the Fenton reactor, used for biological treatment. Results suggest that in chemical-physical treatment, it is preferable to achieve a maximum value of pH equal to 7.5 with the addition of acid waste and Ca(OH)2 solution. To break the emulsions, solution of Aquafil 60 AP at 10% is used. Values of COD, OUR, total solids are respectively equal to 4920 mgO2/L, -0.494 mgO2/Lmin, 17.63 g/L. Clarified fraction is 79% while mud filtrate fraction is 21%. The optimal conditions for Fenton reactor are: 12.5 mL of ferrous sulfate solution, 0.3 mL of hydrogen peroxide solution, initial pH between 2 and 3. A modeling of the process is developed with Pro II software using the better operation conditions obtained in the experimental analysis. Treating 10 m3/h of feed, the process has at the outlet 49 kgO2/h of COD with a reduction of 89%. The VAN is 35769000 €: the process is economical feasibility. Future researches should verify the obtain results in the real plant.

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