Evaluation of Bagasse Ash as Cement and Sand Replacement for the Production of Engineered Cementitious Composites (ECC) Dataset

Dataset available at: https://digitalcommons.lsu.edu/transet_data/88/

(This dataset supports report **Evaluation of Bagasse Ash As Cement and Sand Replacement for the Production of Engineered Cementitious Composites (ECC)**)

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The related final report **Evaluation of Bagasse Ash As Cement and Sand Replacement for the Production of Engineered Cementitious Composites (ECC)**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/56592

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Abstract: The objective of this study was to develop novel Engineered Cementitious Composites (ECC) materials implementing sugarcane bagasse ash (SCBA). To this end, the effects on the mechanical and physical properties of ECC materials of: (1) Louisiana raw SCBA (RBA) as a partial and complete replacement of sand (i.e., class S mixtures); (2) Louisiana post-processed SCBA (PBA) as a partial replacement of cement (i.e., class C mixtures); and (3) Ecuador raw SCBA (EBA) as a partial and complete replacement of sand (i.e., class S-E mixtures) were studied. Sand replacement levels with RBA and EBA evaluated were 25, 50, 75, and 100% (by volume), while cement replacement levels with PBA studied were 40, 50, and 60% (by mass). RBA and EBA were subjected to minor processing by drying and sieving to remove moisture and coarse impurities. On the other hand, PBA was produced by further processing of RBA through burning and grinding. RBA and EBA were mainly composed of silica; yet, presented high carbon content and large particle size relative to cement. Conversely, PBA exhibited low carbon content and small particle size. Tests conducted for class S and class C mixtures included compressive strength, uniaxial tensile, surface resistivity, shrinkage, coefficient of thermal expansion, and slant shear tests. In the case of S-E mixtures, tests conducted included compressive strength and flexural strength tests. The use of RBA as sand replacement caused minor reductions in the compressive strength of ECC (up to 11%), yet it produced a dramatic improvement in the tensile ductility (up to 311%). Moreover, the tensile strength of all RBA admixed ECC also improved (up to 22.3%). Implementation of RBA also produced a decrease in surface resistivity and an increase in shrinkage. For class S-E mixtures, the implementation of EBA as sand replacement produced an increase in compressive strength and flexural strength. For class C mixtures, the implementation of PBA as cement replacement produced significant reductions in compressive strength (up to 39.1%) and tensile strength (up to 28.1%). Nevertheless, it increased the tensile ductility of the composites (up to 85%). Furthermore, the surface resistivity and shrinkage of PBA admixed ECC increased with the increment in cement replacement with PBA.
Comments: Tran-SET Project: 19CLSU03

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Dataset description:
This dataset contains 1 file collection described below.

19CLSU03_Data_2_.zip:
- Sand Replacement
  - M2-1.5-BA-75.xlsx
  - M2-1.5-BA-50.xlsx
  - M2-1.5-BA-25.xlsx
  - M2-1.5-BA-100.xlsx
  - M2-1.5-BA-0.xlsx
  - August 2020 Results ECC Sand Replacement W_C=0.32.xlsx
  - Mix Folder
    - M2-1.5-S-75-W2.xlsx
    - M2-1.5-S-50-W2.xlsx
    - M2-1.5-S-25-W2.xlsx
    - M2-1.5-S-100-W2.xlsx
    - M2-1.5-S-0-W2.xlsx
  - M2-1.5-BA-75 (28) Folder
    - M2-1.5-BA-75-F (28) 2-26-2019 11 00 27 AM Folder
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    - M2-1.5-BA-75-E (28) 2-26-2019 10 33 52 AM Folder
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    - M2-1.5-BA-75-C (28) 2-26-2019 9 54 08 AM Folder
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    - M2-1.5-BA-75-A (28) 2-26-2019 9 26 02 AM Folder
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- Cement Replacement
  - Results ECC Cement Replacement W_C=0.32.xlsx
  - Compiled Tensile Tests.xlsx

- o Mix Folder
  - ▪ M-1.5-C-0-W2.xlsx
- o M-1.5-C-60-W2 Folder
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  - ▪ M-1.5-C-60-W2-A-28 10-24-2019 3 50 10 PM Folder
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- o M-1.5-C-50-W2 Folder
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- o M-1.5-C-40-W2 Folder
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- o M-1.5-C-0-W2 Folder
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    - Acquire time data – (Timed).csv

The .xlsx and .xls file types are Microsoft Excel files, which can be opened with Excel, and other free available software, such as OpenRefine.

The .csv, Comma Separated Value, file is a simple format that is designed for a database table and supported by many applications. The .csv file is often used for moving tabular data between two different computer programs, due to its open format. The most common software used to open .csv files are Microsoft Excel and RecordEditor, (for more information on .csv files and software, please visit https://www.file-extensions.org/csv-file-extension).

National Transportation Library (NTL) Curation Note:
As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (https://ntl.bts.gov/public-access) Section 7.4.2 Data, the NTL staff has performed *NO* additional curation actions on this dataset. NTL staff last accessed this dataset at https://digitalcommons.lsu.edu/transet_data/88 on 2021-07-22. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.