

Development of Corrosion Inhibiting Geopolymers Based Cement for Transportation Infrastructure Dataset

Dataset available at: https://digitalcommons.lsu.edu/transet_data/82/

(This dataset supports report **Development of Corrosion Inhibiting Geopolymers Based Cement for Transportation Infrastructure**)

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The related final report **Development of Corrosion Inhibiting Geopolymers Based Cement for Transportation Infrastructure**, is available from the National Transportation Library's Digital Repository at <https://rosap.ntl.bts.gov/view/dot/56556>.

Metadata from the LSU Digital Commons Repository record:

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Abstract: Geopolymers are gaining attention as affordable, sustainable, and eco-friendly replacement for Ordinary Portland Cement (OPC) in concrete civil structures. More importantly, Geopolymer-based Cement (GPC) provide sustainable and environmentally friendly alternative to OPCs as GPC can be processed at room temperatures from aqueous solutions of waste materials (e.g., fly ash) or abounded natural sources (e.g., clay) and thus reduce significant CO₂ production associated with processing of OPC. Although, a lot of work has been done on improving mechanical properties of GPC over the last two decades, there are only a few studies on effects of GPC concrete on steel rebar reinforcement. Even though all those studies indicate that GPC inhibits corrosion of reinforcing steel when compared to OPC, the inhibition mechanism is still unclear and geopolymer composition is yet to be optimized to achieve the best inhibition properties. A collaborative research study is formulated by a team from TAMU to investigate the long-term durability of reinforced GPC concrete against chloride-induced corrosion. Various parameters of GPC such as Si/Al, water/solids, alkali ion/Al ratios would affect various structural and mechanical properties of GPC. Therefore, GPCs will need to be studied thoroughly in order to optimize the use of local waste and natural materials for transportation infrastructure in Region 6. As a part of the proposed study, durability tests under simulated marine environment are to be conducted on reinforced GPC concrete over long periods of time. Both material characterization studies related to micro to macro behavioral changes during long-term exposure of reinforced GPC concrete and steel rebar will be carried out as a part of this research.

Comments: Trans-SET Project: 19CTAM02

Recommended citation:

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Dataset description:

This dataset contains 1 .zip file collection described below.

GEOPOLYMERCONCRETEProject19CTAM02Database.zip:

The file collection contains 7 files and two file types, listed below.

- NYQUIST.xlsx
- BODE.xlsx
- FIT PARAMETERS.docx
- 19CTAM02_MixDesign.xlsx
- OCP.xlsx
- RP.xlsx
- XRD_K-GP_SurfaceCrystal.xlsx

The .xlsx file type is a Microsoft Excel file, which can be opened with Excel, and other free available software, such as OpenRefine.

The .docx file is a Microsoft Word file, which can be opened with Word and other free word processor programs, such as Kingsoft Writer, OpenOffice Writer, and ONLYOFFICE.

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/82 on 2021-07-15. 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.