Optimizing the Geometric Configuration and Manufacturing Process of High Mast Illumination Poles Dataset

Dataset available at: https://doi.org/10.5281/zenodo.4273215

(This dataset supports report **Optimizing the Geometric Configuration and Manufacturing Process of High Mast Illumination Poles,** https://doi.org/10.5281/zenodo.4273213**)**

This U.S. Department of Transportation-funded dataset is preserved in the Zenodo Repository (https://zenodo.org/), and is available at https://doi.org/10.5281/zenodo.4273215

The related final report **Optimizing the Geometric Configuration and Manufacturing Process of High Mast Illumination Poles**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/61007.

Metadata from the Zenodo Repository record:

Title: Optimizing the Geometric Configuration and Manufacturing Process of High Mast Illumination Poles

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Description: This work presents the development of a high-fidelity model that accounts for the cumulative effect of welding and hot- dip galvanizing on the determining the resulting residual stresses and deformations induced during the manufacturing process of high mast illumination poles (HMIPs). This model is meant to elucidate the root causes of weld toe cracks in HMIPs. A TxDOT pole-to-base plate connection detail was used as the reference model in the analysis. Welding was modeled using the plug-in Abaqus Welding Interface (AWI), which automatically implements a series of sequential thermal and mechanical analyses. Then, the welding stress results were used as initial input to the galvanizing analysis. The cumulative stress results were compared against simulations that only considered the galvanizing process. A parametric study was then conducted to quantify the variation in the residual stresses and equivalent plastic strain magnitudes induced during the welding and galvanizing of HMIPs due to changes in welding and galvanizing practices. The results revealed that the cumulative effects of the different processes involved in the manufacturing of HMIPs contribute to the formation of galvanizing cracks in HMIPs. Also, increasing the dipping submersion speed during galvanizing and lowering the torch temperature magnitude during welding results in fewer zones prone to cracking. Altering the angle of inclination effect did not have a significant impact on the results. Performing variations in the manufacturing practices used for the fabrication of HMIPs can contribute to reducing the extensive inspection procedures conducted post-galvanizing to identify cracks.

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Dataset description:
This dataset contains 1 file described below.

19STUTSA02_Data.xlsx:
The .xlsx and .xls file types are Microsoft Excel files, which can be opened with Excel, and other free available software, such as OpenRefine.

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://doi.org/10.5281/zenodo.4273215 on 2022-05-10. 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.