Technical Project Series

Linking Structure, Performance and PAM Integrity in Advanced Lead Battery Designs

Objective

Mechanical testing has not been formally developed for **lead battery electrodes**, preventing the ability to establish strong structural-functional relationships.

This project will use comprehensive **mechanical and physical testing** to create a link to electrical performance.

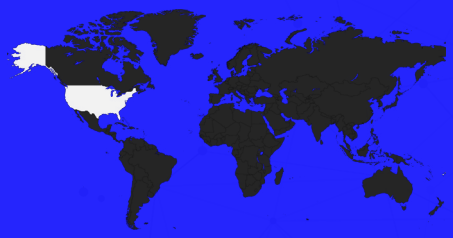
Project Info

Duration: 2 years

Partners: Black Diamond Structures
University of Texas at Austin

Focus: Energy Storage Applications

Location: USA



Expected Impact

Establishing a correlation between cycle life and electrode mechanical properties will introduce a new approach to enhancing lead battery performance.

This project aims to develop a predictive **understanding of battery performance** by measuring and analyzing mechanical properties, linking hardness, cohesion and strength of the electrodes to battery cycle life.

Initial Results

1)	The project began by screening and selecting suitable mechanical tests and instrumentation for lead battery electrodes, including cohesion testing (Instron®), Brinell Hardness, Young's Modulus, three-point-bend, and compression tests.
2)	Characterization methods (XRD, SEM, Hg porosimetry) mapped microstructural and phase composition to mechanical properties.
3)	Standard operating procedures were established for mechanical tests.
4)	Three commercial lead battery types (5 each) will undergo IEC and PNNL standard testing, with electrodes evaluated using established microstructural and mechanical methods.

Research Imagery

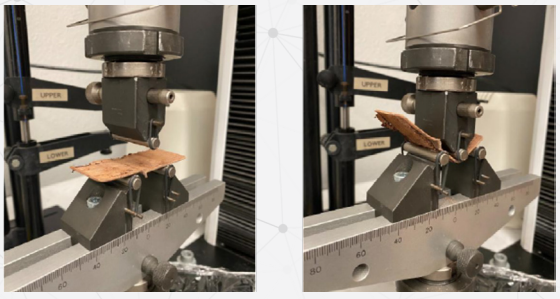


Figure 1: Mechanical testing of a lead battery electrode using the 3-point bend method.