OIM2 SYMPOSIUM
Talk Abstract Submission

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Talk Title *

From Failure Analysis Data to AI-Ready Manufacturing Intelligence: The TFA40 and FASTLabs Transformation

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ABSTRACT

Maximum 300 words, you can add figures to your abstract.

Failure Analysis (FA) laboratories generate vast amounts of technical data, including microscopy images, analytical results, process information, and engineering reports. However, in many organizations, these valuable assets remain fragmented across sites, stored in heterogeneous formats, and associated with limited metadata. As a consequence, historical knowledge is difficult to access, cross-site learning is constrained, and the adoption of advanced analytics and artificial intelligence (AI) remains challenging.

To address these limitations, we launched the TFA40 initiative, a global transformation program designed to convert distributed FA data into a structured, cloud-based, and AI-ready platform. The project combines a scalable data architecture with a comprehensive metadata framework integrating information from analytical equipment, sample technologies, manufacturing context, and failure investigation workflows. This approach enables large-scale data traceability, efficient information retrieval, and the creation of high-quality datasets suitable for advanced analysis.

Built upon this foundation, the FASTLabs ecosystem provides several complementary applications. FASTLabs Explorer offers intuitive access to worldwide FA data, images, and associated context, enabling efficient navigation and knowledge sharing across laboratories. FASTLabs Insights extends these capabilities through dataset construction, image comparison, and advanced search mechanisms, facilitating data-driven investigations and the preparation of training datasets for machine learning applications.

The next stage of the transformation is FASTLabs Analyzer, a framework allowing engineers to submit new analysis images and execute algorithms selected from a centralized library. These algorithms may include both conventional image-processing methods and AI-based models, providing actionable results directly within engineering workflows.

This presentation will describe the technical challenges, architectural choices, and deployment strategy behind TFA40 and FASTLabs. It will illustrate how a structured data platform can transform failure analysis from isolated investigations into a continuously growing source of collective intelligence, creating the foundation for AI-assisted manufacturing and engineering decision-making.

Keywords *

Failure Analysis, Digital Transformation, Data Platform, Artificial Intelligence, Manufacturing Intelligence

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