

# Data Collection and Interpretation for Stress Change Monitoring

This joint research project, conducted in collaboration with the *University of Saskatchewan* and IMII minerals member companies *Nutrien* and *Mosaic*, focused on advancing data collection and interpretation techniques for stress change monitoring in potash mines. The study, part of a master's thesis research project at the Rocanville Mine, aimed to deploy sensors and obtain real-world stress change data within an active mining environment.

The project provided valuable insights to industry partners, contributing to the development of innovative smart monitoring technologies for rock deformation in potash mines. The research explored new methodologies that integrate advanced instrumentation to accurately and effectively monitor deformation events near mine workings. Specifically, two key monitoring tools were utilized: the **CSIRO HI cell** and the **Vibrating Wire Stressmeter**.

A novel **2-cell convergence method** was investigated, incorporating both stiff and soft cells to generate a more comprehensive dataset from borehole measurements. This approach demonstrated the potential for improved accuracy in monitoring stress changes in potash deposits. The findings set the groundwork for further research into this method and alternative approaches for stress and deformation monitoring.

One of the key takeaways from the study was the identification of discrepancies in the vibrating wire sensor calibration data. To refine these findings and enhance confidence in this monitoring approach, the project recommended additional laboratory and in-situ testing. Future studies should focus on addressing the observed variances in sensor calibration, validating new data, and refining methodologies to ensure reliable stress monitoring in potash mining operations.

**Proponent(s):** U of S, Nutrien, Mosaic

**Project Duration:** July 2021 to December 2022

**Project Cost:** \$36,419

IMII Contribution: \$22,266

Industry Members Contribution: \$13,359

Mitacs Contribution: \$ 7,500



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