Transforming Big Monitoring Data into Reliable Information About Movements

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SUMMARY

The demand for deformation monitoring has grown significantly in recent decades, driven by the need to enhance safety and mitigate risks in monitored areas. Coupled with requirements to optimise production, reduce costs, preserve evidence, and validate designs, the importance of information about movements is higher than ever. Modern monitoring systems must be able to adapt to the evolving environment and dynamics of monitoring projects, leading to rapid developments in monitoring technology.

During 35 years in the automated monitoring market, Leica Geosystems' solutions have evolved from simple readouts of the first total stations to highly resilient systems that incorporate multiple monitoring technologies. Since each technology has strengths and limitations, their fusion enables comprehensive and reliable information. Monitoring projects today are unimaginable without the use of hybrid techniques, like geodetic and geotechnical monitoring. As the size of monitored areas increases, so too does the range of monitoring sensors needed to achieve comprehensive data acquisition. For example, landslides and open pit mines often require the broadest spectrum of monitoring technologies to provide extensive coverage of several square kilometres with high density. This includes remote sensing technologies, like ground-based or satellite radar interferometry, together with webcams, manual inspections, imagery and a whole palette of other data sources.

As data capture sources become more advanced and comprehensive, the challenge lies in processing big monitoring data to provide reliable information about movements. In this context, the role of monitoring software is crucial. Efficiently cross-analysing vast amounts of data and displaying the deformations in a single interface enables the transformation of raw data into actionable insights. Improving and automating this transformation process drives the Leica Geosystems monitoring

solutions innovations, equally in hardware and software components. Critically, these innovations aid the engineers responsible for operating monitoring systems in their intricate responsibility to answer a fundamental question for decision-makers: what is the magnitude and direction of movements?