

Navigating Precision with Network Controls for Construction Continuity

Paa Kwesi Ezanator Akuffo Owusu-Ensaw, Ernest Obiri-Yeboah, Anthony Wordi, Joseph Owusu-Awuah and Portia Gyemfah Addo (Ghana)

Key words: Deformation measurement; Engineering survey; Positioning; Reference systems; network controls; least squares adjustments; iron ore concentrator plant

SUMMARY

This conference paper explores the Control Benchmarks Network Adjustment Project undertaken by Multigeomatics Limited in the Arcelormittal Iron Ore Mine, Liberia, early in 2023. Over four months, the project's main goal was to create a solid survey network, connecting separated survey controls with existing structures, with a strong focus on reducing errors, to start off a brownfield plant construction of the Iron Ore Concentrator Plant.

The project began with a significant challenge: most of the reference points were missing due to a long break before resuming the earlier Phase I, leading to the loss of established controls. To address this, the project team identified two essential starting points, GBCT 06 and GBM 07, forming the basis for their work. Additionally, they carefully placed 23 new control points across the designated construction area. Another aspect of this project was the need to seamlessly integrate the new controls with

Navigating Precision with Network Controls for Construction Continuity (12587)

Paa Kwesi Ezanator Akuffo Owusu-Ensaw, Ernest Obiri-Yeboah, Anthony Wordi, Joseph Owusu-Awuah and Portia Gyemfah Addo (Ghana)

FIG Working Week 2024

Your World, Our World: Resilient Environment and Sustainable Resource Management for all
Accra, Ghana, 19–24 May 2024

existing

structures. It turned out that the original construction used different control points, causing an approximate 60 mm misalignment with the new controls. To solve this, a transformation method was developed and executed precisely using Trimble Business Centre, resulting in an impressive minimum error of ± 3 mm.

The control network was further refined using the least square adjustment method, widely recognised as the industry's best practice for ensuring the reliability and accuracy of station networks.

The Control Bench Marks Network Adjustment Project at the Arcelormittal Iron Ore Mine is a remarkable example of precise survey work, innovative problem-solving, and careful planning. The successful execution of this project not only reconnected survey controls but also ensured a seamless transition between existing and new structural installations. This paper provides insights into the project's methodology, challenges, and successful outcomes, offering valuable lessons learnt in the world of surveying.

Navigating Precision with Network Controls for Construction Continuity (12587)

Paa Kwesi Ezanator Akuffo Owusu-Ensaw, Ernest Obiri-Yeboah, Anthony Wordi, Joseph Owusu-Awuah and Portia Gyemfah Addo (Ghana)

FIG Working Week 2024

Your World, Our World: Resilient Environment and Sustainable Resource Management for all
Accra, Ghana, 19–24 May 2024