



Case Study: Private 5G-Enabled Digital Transformation at Hindalco Industries

Achieving Precision Manufacturing, Seamless Mobility & IT/OT Convergence

Summary

Hindalco Industries operates complex, high-temperature copper processing facilities where operational precision, real-time visibility, and seamless communication are critical to productivity, quality, and safety. However, legacy connectivity systems and a fragmented digital infrastructure limited workforce mobility, slowed decision-making, and caused inefficiencies in material handling and operational workflows. To address these challenges, Hindalco undertook a comprehensive digital transformation initiative powered by a Private 5G network, enabling real-time operations, precise material control, and secure IT/OT integration across the plant.



Problem Statement

Hindalco faced multiple operational constraints impacting efficiency, quality, and scalability:

- Limited Connectivity:** Critical applications were unusable on mobile devices due to a lack of network coverage, forcing operators to be physically present in specific network zones.
- Inefficient Communication:** Walkie-talkie systems were difficult to operate and unreliable during critical operational scenarios.
- IT/OT Silos:** Information Technology (IT) and Operational Technology (OT) systems functioned independently, restricting real-time data flow.
- Raw Material Handling Inaccuracies:** Even minor inaccuracies in copper concentrate blending led to substandard output, reprocessing, and significant financial losses.

Proposed Solution

Hindalco deployed a Private 5G-based digital infrastructure as a unified connectivity backbone to support multiple operational use cases across the facility. The solution focused on:

- Private 5G-Enabled Mobility:** Deployed a secure, high-performance Private 5G network providing seamless connectivity across the plant, enabling operators to access applications, approvals, and workflows from any location.



- Precision Raw Material Management:** Implemented 1x1 foot accurate location and inventory tracking for raw materials.
- Smart Monitoring & Alerts:** Deployed industrial IoT sensors and optimized camera systems resilient to dust-heavy environments.
- Secure IT/OT Integration:** Built a unified technology platform on 5G infrastructure, bridging IT and OT systems.

Outcome and Impact

The deployment of the Private 5G network delivered significant improvements across operations:

Metric	Result
Connectivity	Seamless connectivity across all mobile devices, eliminating location dependency.
Communication	Faster communication; mobile-based communication replaced unreliable walkie-talkies.
Approvals	Accelerated approvals; permission workflows enabled remotely, significantly reducing turnaround time.
Material Handling	Accurate material handling; real-time monitoring and alerts ensured optimal raw material proportioning.

This transformation eliminated productivity losses, reduced product defects and material waste, minimized financial losses, and enhanced safety across hazardous operational zones.

Conclusion

The Private 5G deployment at Hindalco has established a scalable, future-ready platform capable of supporting AI analytics, automation, and additional Industry 4.0 use cases. It has successfully addressed critical operational challenges, paving the way for a new era of efficiency, quality, and safety in manufacturing.