

Leveraging Digital Technology in Utkal Alumina Expansion Project

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Abstract



Utkal Alumina International Limited (UAIL) has its captive alumina refinery facility at Rayagada, Odisha. To bolster the existing alumina production capacity, by leveraging the ownership of existing high yield bauxite mine, UAIL is expanding its capacity by 0.5 MTPA. The ongoing Project is a true reflection of Marquee investment plan as part of the Company's transformation journey. Leveraging digital technology for Project Management has been one of the success factors for Project strategy and execution. Digitalization across the entire Project lifecycle has been instrumental for productivity improvement, safety, and resource management. Drone based analytics is being used for better visualization, real time analysis and broader coverage among others. Project Improvement and Visualization Online Tool (PIVOT) has been adopted for effective monitoring and control. Implementation of CCTV surveillance has facilitated rich insights, progress, mitigation of risk elements, virtual tour, etc. Utilization of Primavera P6 for schedule integration & analysis and Document Management System (DMS) for engineering management has played a pivotal role for Project governance protocols. Application of Realwear tool for virtual assistance has been effective during the construction and commissioning of critical equipments. Digitalization has been effective in visualizing real time progress, resolving troubleshoots, mitigating challenges and risks, managing interfaces and complexities, etc.

Keywords: Project Management, Digital technology, Drone based analytics, Rich insights, Schedule integration & analysis, Virtual assistance.

1. Introduction

Utkal alumina refinery, located at Doraguda, in Rayagada district of Odisha, India is a 100% subsidiary of Hindalco Industries Ltd., of the Aditya Birla Group. The refinery nameplate capacity was 1.5 MTPA and the greenfield plant was taken in operation since October 2013. The strategic decision to include similar Plant and Machineries by adding equivalent capacity of 0.5 MTPA to make the complete plant capacity as 2.0 MTPA was the scope of this brownfield expansion – Project Suryaprabha.

Utkal Alumina International Limited (UAIL) has recently commissioned its expansion hydrate circuit for 0.5 MTPA. The Project is a true reflection of UAIL's transformation journey. The Project has sailed successfully through the unprecedented COVID crisis, which derailed Projects across industries, posing numerous challenges regarding contractual obligations, availability of resources, deliverables, health and safety measures, and project delays or cancellations. Despite the challenges, UAIL continued to execute site works by adopting strategies vis-à-vis New Normal in the context of COVID by taking proactive measures like quarantine & testing protocol and continuous engagement with workmen.

For the Brown Field expansion Project. Hybrid Contracting Model was adopted, comprising of in-house basic engineering and overall coordination, combination of LSTK, EPCM and Item-rate contractors, and PMO for Project oversight and optimisation support. The Project witnessed several challenges like presence of extensive volume of hard rock in major expansion facilities, varying sub-surface soil conditions, high labor attrition, movement of heavy equipment through hilly terrain and interfacing with existing facilities.

2. Technical Details of Expansion Project

Following are the basic concept of Utkal brownfield expansion by 0.5 MTPA:

- Utilizing the capacity of existing areas such as Power plant, Bauxite transportation, Security filtration, main pipe rakes etc.
- Utilizing the existing standby system as common standby for existing as well added facility in almost all area.
- Addition of new facilities, similar to existing one for better maintainability and spare management

Based on the above philosophy, detailed engineering was done. Following are the area wise expansion details of major Process areas:

- One bauxite reclaimer and one crusher in Bauxite Handling unit.
- One Bauxite Silo, rod mill and pumping system in Bauxite Grinding unit
- 3 IBSH, 4 PDS tanks and pumping system in Predisilication unit.
- 1 digestion unit of 4 digester vessel, 2 sets of heaters, 4 flash vessels and accessories in Digestion unit.
- 1 High rake decanter, 6 washers, Flocculant dosing arrangement in Mud wash unit.
- 1 evaporation unit
- 10 precipitation tanks
- 3 Coarse seed filters
- 1 Calciner unit

Project Scope:

- Around 80000 m³ of Concrete work
- ~ 21000 MT of Structural steel and 14000 MT of equipment
- 11.3 lakh Inch meter of Piping
- ~ 1000 km of electric cable

Project Challenges:

- Two waves of Covid-19 during peak time of project
- Remote location
- High labor attrition
- Local conflicts
- Appropriate local engagement basis competency level
- Brownfield Project - Interfacing with external and internal stakeholders
- Presence of hard rock in major areas of the expansion; varying soil conditions

5. References

1. V A Kudryavtseva and N V Vasileva 2021 IOP Conf. Ser.: Earth Environ. Sci. 751 012100, *Digitalization as the basis for the construction industry development*
2. George W, Didier B and Andrew M, *Leading digital Turning Technology into business transformation*, Harvard Business review press
3. Rice, C., Siebel, T. M. (2019). *Digital Transformation: Survive and Thrive in an Era of Mass Extinction*. United States: RosettaBooks.
4. Visual Project Management Tools to Visualize Projects Better. <https://kissflow.com/project/visual-project-management/>
5. Drones in Construction and Infrastructure: Why and how to use drones in construction and infrastructure, <https://wingtra.com/drone-mapping-applications/drones-in-construction-and-infrastructure>