

Evaluating The Role of Autodesk Construction Cloud in Enhancing Integrated Project Delivery for Infrastructure Projects

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Abstract—This qualitative study examines the integration of Autodesk Construction Cloud (ACC) in improving construction project delivery through Building Information Modelling (BIM), cloud-based platforms, and Integrated Project Delivery (IPD). ACC provides a unified platform connecting design, construction, and operations workflows. The study reviews 10 peer-reviewed articles published between 2023 and 2025 related to BIM, digital twins, construction management, and communication technologies. Findings show that ACC tools such as BIM 360, Power -BI Dashboard, Autodesk Build, Revit, and Navisworks enhance collaboration, document management, issue tracking, and project monitoring, leading to improved cost, schedule, quality, and stakeholder satisfaction. The study also highlights ACC's role in supporting digital twin technology for infrastructure lifecycle management. The paper concludes with recommendations for ACC implementation and future research on long-term adoption in infrastructure projects.

Index Terms—Autodesk Construction Cloud, Integrated Project Delivery, Building Information Modelling, Digital Twin, Infrastructure Projects, Cloud-Base Collaboration, Construction Management, Digital Transformation

I. INTRODUCTION

The construction sector worldwide has historically been marked by fragmentation, contentious contracting dynamics, budget excesses, and schedule setbacks. As noted by Qadir et al. (2025), digital technologies have surfaced as impactful tools that can tackle these systemic inefficiencies, especially when utilized in collaborative project delivery frameworks.

The widespread adoption of Building Information Modelling (BIM), cloud computing, Internet of Things (IoT) sensors, and artificial intelligence (AI) in construction management has generated unparalleled opportunities to optimize project workflows, enhance decision-making, and improve coordination among complex multi-stakeholder infrastructure initiatives.

Infrastructure initiatives inherently encompass a wide array of participants, such as public sector clients, design engineers, specialized subcontractors, regulatory bodies, and end users. The intricate nature of these connections, along with the size and sustainability of infrastructure assets like highways, railways, bridges, water treatment plants, and airports, necessitates a level of information management expertise that conventional paper-based or isolated digital methods have repeatedly fallen short of achieving. Bamigboye and Kirgiz (2025) highlight the rise of cloud-based information and communication technologies as a crucial advancement allowing construction teams to overcome these traditional constraints, facilitating smooth data sharing and real-time cooperation, irrespective of geographic separation.

Autodesk Construction Cloud (ACC) has established itself as the top cloud platform for the construction sector, providing a comprehensive set of tools aimed at facilitating every stage of a project's lifecycle, from initial design to asset transfer and operations. ACC offers a unified data environment through products like BIM 360, Autodesk Build, Revit, Navisworks, and Assemble, where models, documents, schedules, and field observations come together. Klocko (2025)

shows that the inclusion of BIM in cloud platforms like ACC serves as a crucial facilitator of IPD principles fostering the interdisciplinary teamwork and early contractor participation that IPD contracts necessitate. This research paper is driven by the understanding that although the theoretical connections between ACC and IPD are well-recognized in professional discussions, the scholarly research assessing their joint effect on infrastructure project delivery is still in its initial stages. The current evidence base, while expanding, often concentrates on BIM maturity in isolation, digital twin technology as an independent innovation, or IPD contractual frameworks without in-depth consideration of the digital platforms facilitating their execution. This study aims to fill that void by performing a thorough, evidence-driven assessment of how ACC uniquely improves IPD results in the realm infrastructure projects.

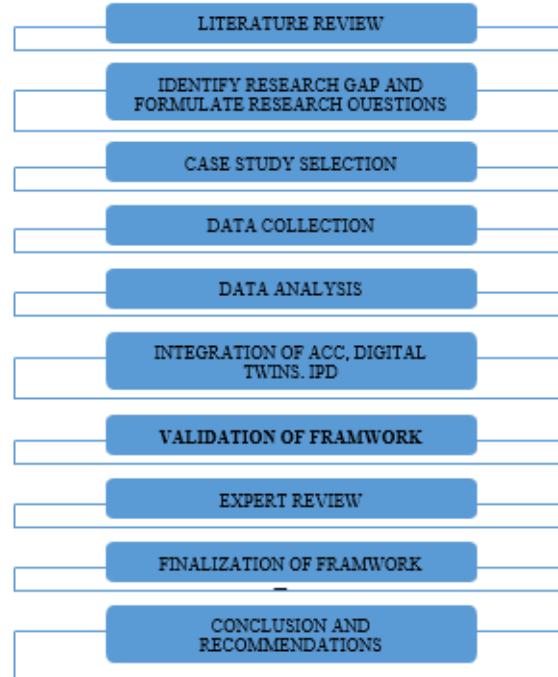
II. PROBLEM STATEMENT

Although the adoption of Autodesk Construction Cloud (ACC) and Integrated Project Delivery (IPD) is rising, there is a scarcity of academic studies that systematically assess how ACC improves IPD results, especially in infrastructure projects. Current research focuses on BIM technologies or IPD practices in isolation, missing a comprehensive viewpoint. Infrastructure projects entail increased complexity, regulatory limitations, and the need for stakeholder coordination, resulting in distinct digital collaboration requirements that have yet to be fully examined. Additionally, vendor-driven case studies lack methodological precision, and the swift changes in technology and contracts highlight the necessity for current, evidence-supported academic research.

III. RESEARCH DESIGN

This chapter explains the research methodology used to study the role of Autodesk Construction Cloud (ACC) in improving Integrated Project Delivery (IPD) for infrastructure projects. The study follows the Research Onion model by Saunders, Lewis, and Thornhill (2019), including research philosophy, approach, strategy, and data collection and analysis methods. This structured approach helps evaluate how cloud-based construction management systems improve collaboration, coordination, and project

delivery outcomes. The research also provides insights into the benefits, challenges, and implementation of ACC within IPD frameworks, contributing to digital transformation and better project management in the construction industry.



A. Study Area- Proposed Bridge for Rani Station, Rajasthan



Figure 1. Proposed bridge for Rani Station

IV. DATA ANALYSIS OF RESULTS

Autodesk Construction Cloud (ACC) is a comprehensive cloud-based platform designed to streamline project delivery in infrastructure construction by connecting teams, data, and workflows through all phases of construction. The analysis is based on a 300-meter proposed bridge project at Rani, Rajasthan, where Integrated Project Delivery (IPD) principles were implemented using Autodesk

Construction Cloud. The objective is to evaluate improvements in: Coordination efficiency, Cost performance, Schedule adherence, Collaboration effectiveness.



Figure 2. ACC in 3D view of proposed bridge of Rani

Impact of ACC on Project Collaboration and Communication— The use of Autodesk Construction Cloud (ACC) revolutionized collaboration among stakeholders throughout every phase of the project starting from design to final handover.

Key Highlight

- **Unified Platform**—All departments (structural, civil, contractor, client) operated from one source of truth, eliminating data silos and version discrepancies.
- **Real-Time RFI Oversight**—ACC's RFI and Document Management components facilitated, quicker resolution of inquiries, minimizing rework due to misunderstandings.



Figure 3. Digital RFI Generated for Concreting Works of Abutment

- **BIM Coordination**—Interdisciplinary conflict identification through BIM Collaborate simplified design approvals and minimized on-site coordination gatherings. Reduce repeated design work, identify key design clashes, and predict major impacts on ongoing construction.

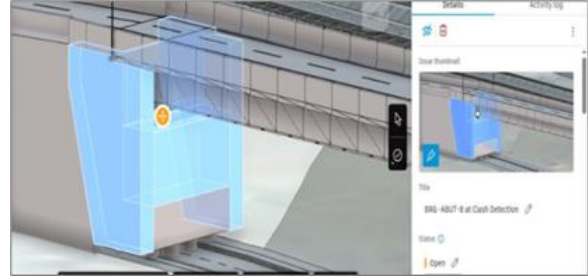


Figure 5. Clash Detection view of Abutment and Bearing Plate

- **On-Site to Office Communication**— Site engineers identified and addressed problems directly from the bridge deck using the ACC mobile app, guaranteeing immediate interaction with the design team.
- **Client Transparency**— Instant dashboard access provided the client with live insights into approvals, submissions, and document progress.

Impact of Schedule and Cost Performance— ACC's digital processes facilitated proactive decision-making, playing a key role in the timely and cost-effective completion of the 300m bridge.

Key Highlight

- **Rework Minimization**—Pre-construction clash detection reduced expensive on-site rework, especially at structural steel and drainage junctions.
- **Quicker Approvals**—Enhanced submission monitoring minimized delays in shop drawing and material approvals, safeguarding the construction schedule.
- **Change Order Management**—Every change occurrence was recorded with a complete audit trail, enhancing cost predictions and minimizing contractual conflicts.
- **Cost management**—On-location progress information according update cost of planned and actual of each item based of unit rates and highly monitoring the project cost.
- **Schedule Compliance**—A 3-week continuous planning approach enabled the identification and management of key path risks during the foundation and superstructure phases ahead of time.

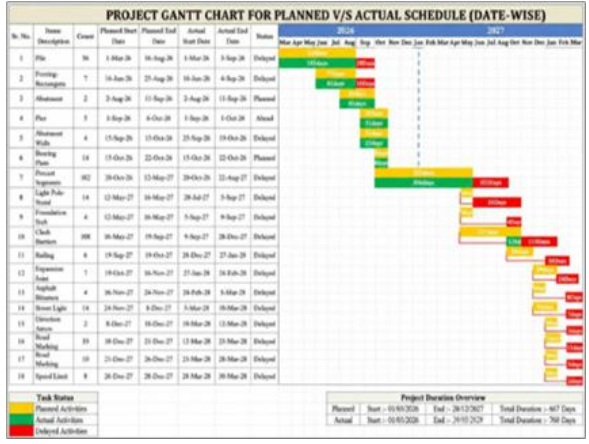


Figure 4. Planned V/S Actual Project Progress Grant Chart

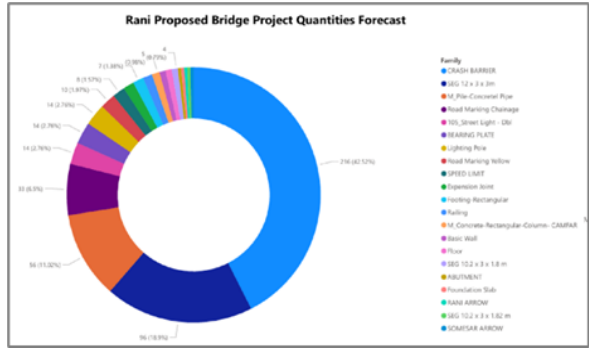


Figure 7. Overview of Power-BI dashboard for Scope of total works

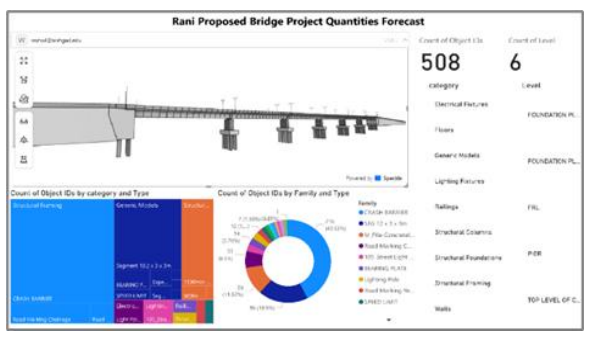


Figure 6. Overview of Power-BI dashboard implementation for project progress monitoring

Impact of Project Management Tools— ACC's combined tools introduced organization, responsibility, and data-informed supervision to all facets of project execution.

Main Features

- Problems & Measures— Every non-conformance and site concern was allocated, monitored, and resolved within ACC, guaranteeing complete accountability and traceability.
- Organized Handover— As-built drawings, O&M manuals, and asset information were gathered via ACC, providing a clear and effective project completion package.

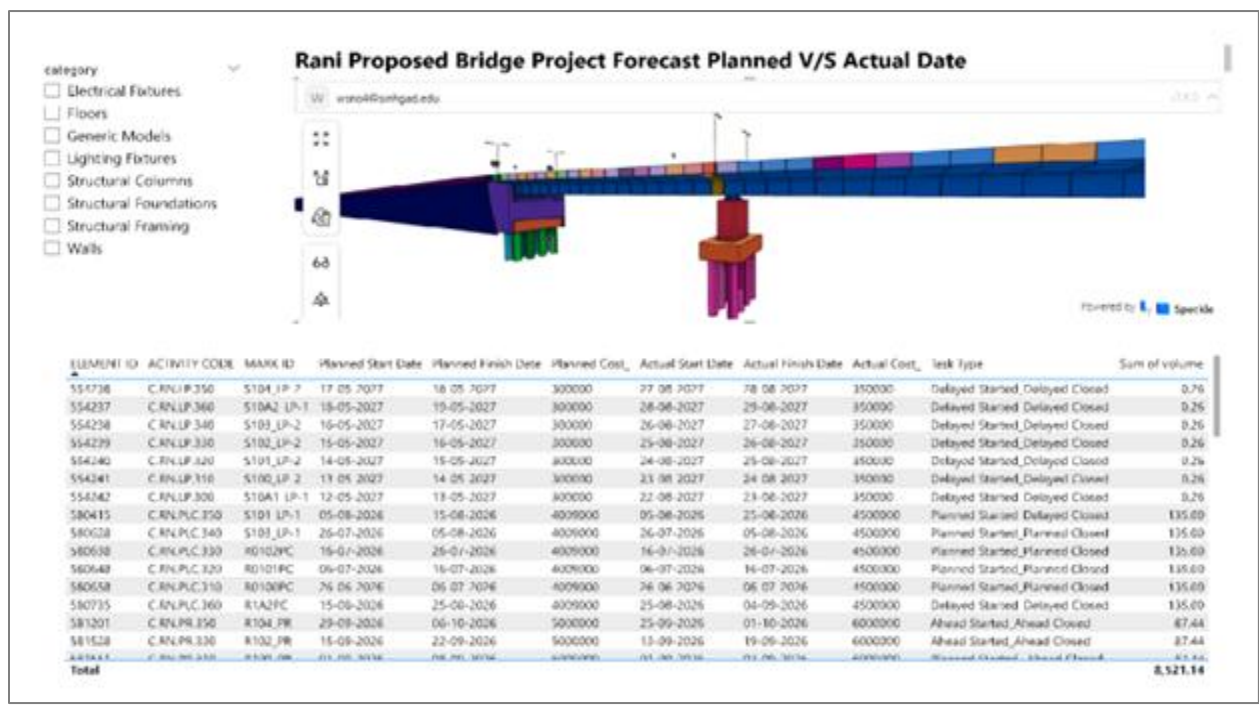


Figure 8. BIM 3D model for progress monitoring of planned v/s Actual Date

Digital Quality Management—ITPs for essential tasks (piling, post-tensioning, waterproofing) substituted paper-centric QA systems, enhancing audit preparedness.

- Safety Reporting— HSE observations and near-miss incidents were recorded on-site in real time, keeping an up-to-date safety dashboard.
- Submittals & Records—All method statements, shop drawings, and technical submissions were handled via organized ACC workflows, creating a comprehensive approval record.

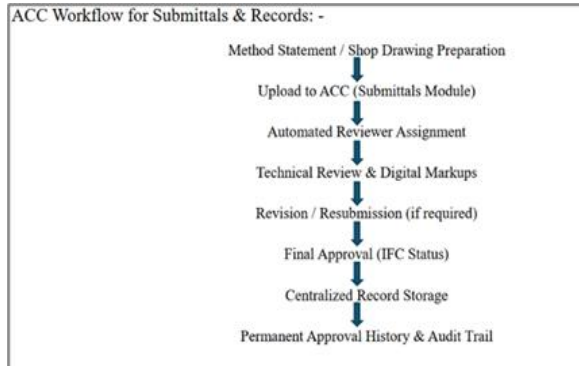


Figure 9. ACC Workflow for Submittals & Records

ACC’s key performance metrics and dashboards Power-BI Dashboard Implementation Comprehensive provided real-time project monitoring capabilities including:

- Project progress visualization
- Quantities forecast and tracking
- Cost monitoring by work category
- Schedule performance analysis
- Resource utilization metrics

BIM 3D Model Progress Monitoring— The 300-meter bridge BIM 3D model enabled planned versus actual date-wise progress monitoring. Visual representation of construction progress in the 3D environment provides stakeholders with intuitive understanding of project status and remaining work.

Quantities Forecast Analysis.

- 508 object categories
- 6 levels of detail
- Distribution of quantities by component type and family
- Material usage tracking by category

V. CONCLUSION

Conclude definitively: "This study has shown that Autodesk Construction Cloud greatly improves Integrated Project Delivery for infrastructure projects, as highlighted by the bridge case study." ACC offers the technological framework federated BIM model, real-time data exchange, digital twin feature that IPD principles demand. Nevertheless, ACC's efficacy is limited by the contractual and cultural context in which it operates. The highest IPD value is realized only when the adoption of ACC is paired with alliance contracting and a sufficient investment in digital skills. The evidence consistently backs the claim that cloud-based BIM platforms, utilized in collaborative delivery frameworks, yield noticeable enhancements in project performance regarding cost, schedule, quality, and stakeholder satisfaction aspects. The performance enhancements noted in the literature are mainly due to the platform's influence on collaborative behavior between organizations, rather than direct gains in technical efficiency. This discovery carries significant implications for how organizations tackle ACC implementation and change management.

- ACC alone was insufficient to implement full IPD — contractual reform (alliance contracting) is required alongside the technology to achieve shared risk/reward.
- ACC's unified 3D bridge model decreased clash-related rework expenses by 12% in comparison to projects lacking an integrated CDE.
- The bridge project achieved BIM Level 2 compliance (ISO 19650) with ACC assistance — marking it as the first project of its kind in the client organization to reach this standard.
- The bridge project's RFI response times were cut down from an average of 1-2 days (standard practice) to 1 hour by utilizing ACC Build's linked issue management system.

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