Adoption of geo-spatial technology at Nagpur Metro Rail Project

Adoption of Geo spacial Technology at Nagpur Metro Rail Project

Agenda

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• About Nagpur Metro Project
• Why New way of project management?
• Geospatial Concept : In Metro Rail Perspectives
• Geospatial Planning
• Drone Usage
• Asset Management & Clash Detection with resolution
• Design co-ordination
• Way Forward

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NMRCL: India's first metro on 5D BIM integrated with ERP

2	North South: 19.7 km; 17 Stations East West: 18.6 km; 19 Stations
15	Major contractors (> 300 Cr)
55	Major contract packages worth 8680 Cr
25	DDCs & 3D Modeling teams
1000	Combined Users on Digital Platform

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5D BIM + ERP – One project one platform
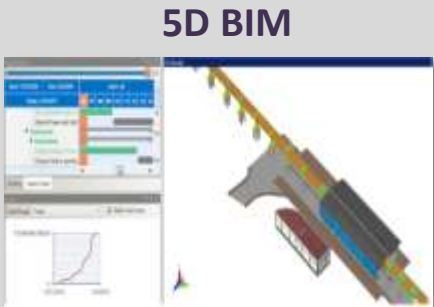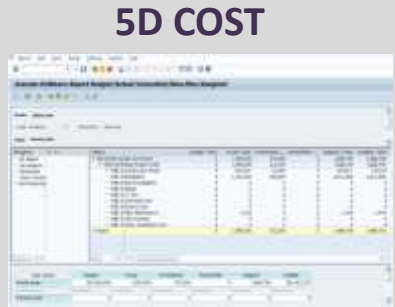

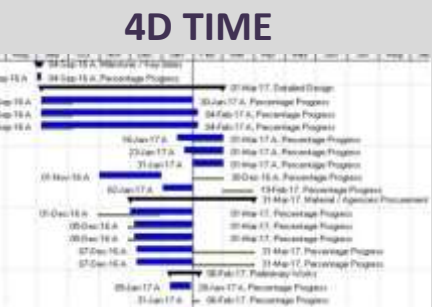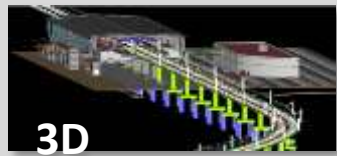| Design Management | Time & Progress Management | Multiple Contracts Management | Cost & Revenue Management | Integrated Asset Management |

2D

3D

4D TIME   **5D COST**   **5D BIM**

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How NMRCL Ecosystem Works

DDC 1
DDC 2

Detailed Design Consultants Across Globe

DDC 3

GC

Review & Approvals

NMRCL

Common Data Environment

CONTRACTORS

Execution Contracts Awarded

Schedule Submission & progress updates by Contractors

GC & NMRCL Approval

3D Model Collaboration & Final Preparation

GC/NMRCL:
1. Model based analysis
2. Schedule & progress updates
3. Cost monitoring
4. 5D Simulation & Visualization

Contractors, GC, NMRCL

1. Monthly Billing Processes
2. Approval of Bills & Payments
3. Payroll Processing
4. Safety, Quality Processes

Helpdesk

NMRCL DATA CENTER

5D BIM: CONVERTING REAL INTO VIRTUAL

Virtual World

Visualisations · Spatial · 3D Models & Assets · Documentation

Simulate BIM model on Geo data

Virtual To Real

At NMRCL all the above has been used

Geo Spatial uses at Nagpur Metro

- Carried out Drone Survey along the alignment of the corridor

- Used it for rechecking the GAD

- Created the 3D model of Drone data

- Used that 3D model in spatial planning of the various stations & viaduct for checking probable clashes

- Superimposed the 3D Model on drone output to detect the clashes with public utilities

- Used geo referenced models for multi disciplinary clash detection

- Common Platform used for design coordination

Use of Drones at Nagpur Metro

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Drone digital 3D Model Usages

Digital Surface Model

- It's Virtual reality 3D Model.
- Used for geometric measurements in all directions

A. 3D Model form Drone Survey

B. Model superimposed on Drone data for 3D visualization & coordination

C. For actual measurements - horizontal.

D. For actual measurements - Verticals.

E. Measuring Surface Areas

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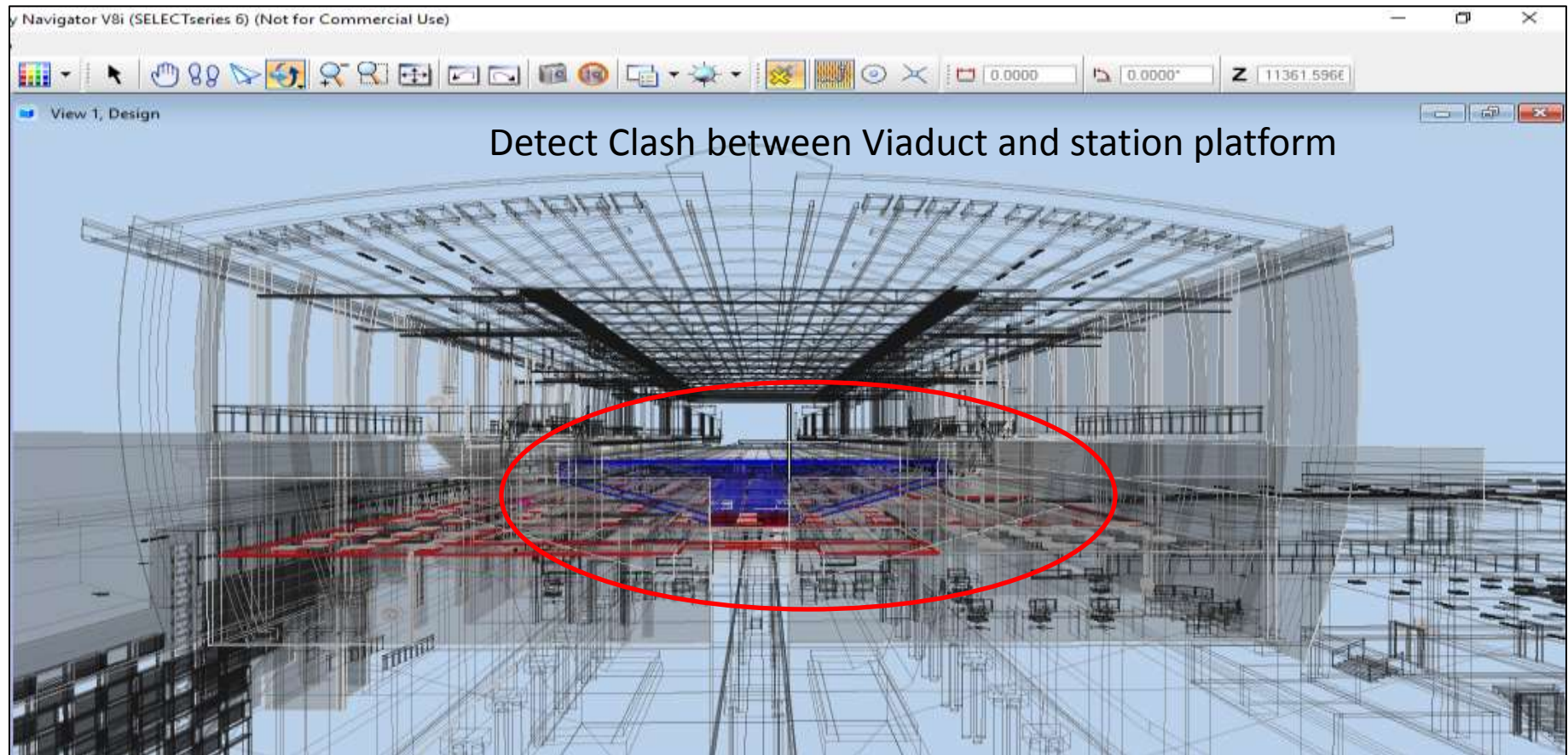
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3D Model: Clash Detection & conflict resolution

Detect Clash between Viaduct and station platform

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Use of technology for asset management

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3D Model: Playing significant role in Asset Management in O & M Phase

- Using Bentleys Assetwsie tool to manage Asset Tags creations

- Asset tags are being created in the 3D models .

- Assets & components shall be maintained in the system

- Documents shall be referenced to each asset

- Will be integrated with SAP for the maintenance activity

- Navigation to 3D model to & from document is enabled.

3D Model: Playing significant role in Asset Management in O & M Phase

Documents are linked to Assets identified through relations (Ex: linked documents to CCTV are shown below

Another example: Select door shutter on platform and see associated documents

Relationship	Number	Revision	Title	Class	Status	Document Status
Document	DED01-FHD-AR-BAS-MIH-3DM-0002	P01.1	3D MODEL	Drawing\3D Model	Approved	Current
Document	DED01-FHD-AR-BAS-MIH-3DM-0002	P02	3D MODEL	Drawing\3D Model	Not Approved	Draft
Document	DED01-FHD-AR-BAS-MIH-3DM-0005	P01.1	Manoj 3D Model	Drawing\3D Model	Not Approved	Draft

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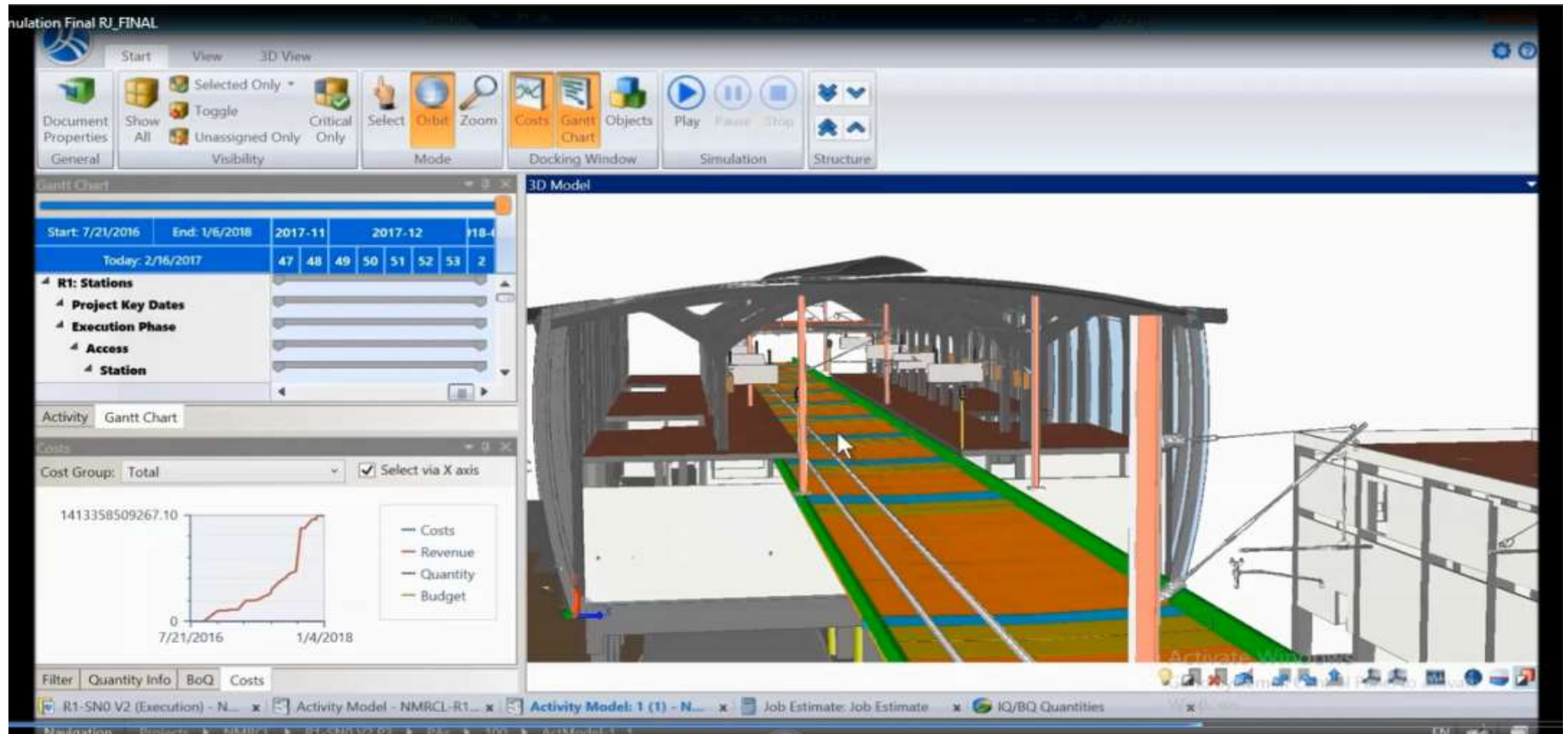
Technology using geo spatial co-ordination

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Technology using Geo spatial

- All the 3D models are geo referenced

- Models are created referencing to the base 3 D models of other systems

- Federated models are created by combining various models

- On these models the BOQ & Schedules are linked for Simulation & Project monitoring

- Integrated information for time & cost used for project monitoring

Simulation showing technology enabling geo spatial coordination

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Way Forward

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