Planning and delivering infrastructure that lasts

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With Special thanks to Terry Bills (Esri Inc)

SkyCity may get $40 million from Fletcher Building for convention centre delays, analyst says
“We are thrilled to partner with SKYCITY to realise their vision for a truly world-class facility. We will build and complete the design of the 32,000m² NZICC, the five-star, 300-room Horizon hotel, the retail laneway linking Nelson and Hobson streets, and 1327 carparks under the NZICC.”

It doesn’t have to be so costly

- 40% to 60% of Engineering time is spent locating and validating information
- Effective data and information communication can reduce project delivery time by 20% to 50%
- Poor communication between systems wastes up to 30% of project costs
- Effective data management from the early project stages could save up to 14% of Operation and Maintenance costs
Integrated Information Systems

- Modern Infrastructure Projects are Complex Multi-Year Projects which require careful monitoring, coordination, and management
- Require access to large amounts of data and information in real-time

What is BIM?

- You really should know this by now!

“Building Information Modeling (BIM) is an intelligent 3D model-based process that gives architecture, engineering, and construction (AEC) professionals the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure”
BIM in Europe

- PAS 1192 → ISO 19650
- UK: Level 2 Required on All Large Public Projects
- France: Required on Govt. Projects - PTNB
- Nordic Countries have High Requirements
BIM in New Zealand

- No government mandate but:

Estimated proportion of industry projects that use BIM

https://www.biminnz.co.nz

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BIM in New Zealand

Integrating digital spatial and asset information with management systems

Almost half are integrating digital asset and/or spatial information with asset management systems:

- 55%
- 26%
- 11%
- 9%

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BIM in the US

- Furthest along in airports
- Requirement to manage CAD, BIM and GIS data
- Decision is which is going to be the system of record
- Data is accessed through the GIS

https://houstonairports.maps.arcgis.com/apps/webappviewer3d/index.html?id=f9a87dfaedd41437c6e424950ffdafce

I thought this was supposed to be about transport?
What if I’m building road or rail?

- Good point!
- Challenges presented by infrastructure construction are different from building construction
  - Potentially larger
  - Spatially awkward
  - More complex
- BIM becomes CIM!
- Civil Integrated Management
  - Still a new term/concept

“Civil Integrated Management (CIM) is the technology-enabled collection, organization, managed accessibility, and the use of accurate data and information throughout the life cycle of a transportation asset.

The concept may be used by all affected parties for a wide range of purposes, including planning, environmental assessment, surveying, construction, maintenance, asset management, and risk assessment.”
CIM in the US

States with Major BIM / CIM Initiatives:

• Wisconsin
• Florida
• Oregon
• Utah
• New York
• Ohio

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CIM in the NZ...

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Esri / Autodesk Collaboration

Enabling point workflows through integration

- Enabling engineers to access GIS data for preliminary design and design evaluation
  - Connect engineers to proprietary project information in the GIS system of record
    - Autodesk Connector for ArcGIS in Infraworks

- Enabling GIS users to access BIM for visualization, planning, and engagement
  - Enable GIS staff to use BIM models for visualization, program management and communication
    - Direct Revit reading in ArcGIS Pro
    - Direct read of IFC/BIM 360/other formats (Future)

- Enabling Civil engineers and architects access to GIS data for design and construction
  - Connect engineers to proprietary project information in the GIS system of record
    - Autodesk Connector for ArcGIS in Infraworks
    - Autodesk Connector for ArcGIS in Civil 3D (Future)
    - ArcGIS for Revit (Future)

- Connecting field collection to design and construction workflows
  - Put integrated GIS location and condition collection in the hands of field staff
    - ArcGIS Collector
    - Survey123
    - ArcGIS Collector integration with Autodesk (Future)
Realizing Smart Cities workflows with BIM and GIS

- Capture sites and urban areas in high res for use as basemap context
  - Capture reality
  - Use multiple inputs
  - At diverse scales
  - Extract features
  - Use in analyses and reports

- Integrate BIM and GIS into planning and design evaluation workflows
  - Create plans and projects
  - Assign indicators
  - Evaluate BIM models against constraints and context
  - Report and estimate

- Provide a common operational dashboard view into asset performance
  - Combine GIS and BIM
  - Link to detailed BIM, asset, and project information
  - Initiate work orders and events
  - View real time information

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Crossrail

Crossrail, currently Europe’s biggest civil engineering project, is being built under central London to link existing Network Rail lines to the east and west of the capital.

When it opens in 2021 it will provide rail services from Maidenhead and Heathrow in the west to Shenfield and Abbey Wood in the east.
What's New?

- New SJF (Stations in the central area) Map.
- New Railways and Roads Map now includes a new station.
- New Crossrail Maps now include all stations.
- New Crossrail Maps now include all roads.
- New Crossrail Maps now include all railway lines.

Legal Information

Crossrail Maps is a data source which offers immediate access to spatial information relating to the Crossrail project. By obtaining information from this site, you agree to the following:

- All data contained in Crossrail Maps is confidential and you shall not disclose any data or information obtained from Crossrail Maps to any person without the prior written consent of Crossrail Limited.
- In the event that any data or information is disclosed to any person without the written consent of Crossrail Maps or the ability to Crossrail Limited, you shall be liable to Crossrail Limited for any damage or expense incurred on account of such disclosure.
US Construction Costs

While construction has appeared stuck in a time warp, other sectors have transformed themselves. Consider that in the United States between 1947 and 2010, agriculture achieved cumulative real growth in its productivity of 1,510% and manufacturing 760%. Construction managed only 6%. U.S. construction-sector productivity is lower today than it was in 1968, and investment has fallen over the past decade. Market Watch: https://on.mktw.net/2ClCN7W

The Infrastructure Crisis

- State and Local Infrastructure Spending at a 30 Year Low
- Federal Investment in Infrastructure has Dropped by Half During the Past 30 Years, from 1 Percent to 0.5 Percent of GDP
  - China: 8.6% of GDP
  - India: 5.2% of GDP
  - Australia: 4.7%
  - Canada: 3.5%
  - US: 2.4%

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A Network Derailed

How America's transportation infrastructure fell into disrepair—and why we need to fix it, quick.


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Rethink Data?

Presentation Name / August 2018
Rethinking Data: Issues

- Think about workflows
- Interoperability
- Data formats / data management
- Data governance
- Accessibility of data is critical
- Linking field to office

Interoperable System of Record?
Importance of Data Governance

New Data Types and Big Data
Rethinking Data

Additional Sources


https://www.geospatialworld.net/article/bim-adoption-around-the-world-how-good-are-we/