BIM & Innovation

HS2 Supplier Conference Breakout Session
Agenda

• **Introduction to BIM**
  Bill Grose: Efficiency Challenge Group – Design & BIM

• **Government BIM Strategy – The Future**
  Adam Matthews: BIS BIM Task Group

• **BIM in HS2**
  Jon Kerbey: Head of Systems and Asset Information

• **BIM in Practice**
  Bob Thompson: Executive Director, Keller Ltd

• **Introduction to Innovation**
  Bill Grose: Efficiency Challenge Group – Design & BIM

• **HS2 Test-Bed for Innovation**
  Darryl Stephenson: Head of Innovation

• **Q&A**
  All
Q&A

Q1. How would you classify your company in the supply chain?

A. Tier 1, Lead designer, main contractor, JV partner or supplier, contracting directly to client

B. Tier 2, designer, supplier or subcontractor to tier 1

C. Tier 3, supplier to tier 2

D. Other
Q2. How many staff are directly employed by your company?

A. 1-25
B. 26-100
C. 100-500
D. Over 500
Q3. How would you classify your main line of business?

A. Design
B. Construction
C. Project management (including QS)
D. Manufacture & supply
E. Other professional services
F. Trade association, institution
G. Academia
H. Government & public sector
I. Logistics & Distribution
J. Other
Introduction to BIM

Bill Grose
The Acronym

Building Information Modelling or Management
Maybe AIM
Definition

HM Government

Building Information Modelling (BIM) is a collaborative way of working, underpinned by the digital technologies which unlock more efficient methods of...
## BIM Maturity

<table>
<thead>
<tr>
<th>BIM maturity level</th>
<th>Information Management</th>
<th>Information Modelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No project wide common standard for flow and production of information</td>
<td>2D CAD and paper issue</td>
</tr>
<tr>
<td>1</td>
<td>A project wide consistent approach to flow of information</td>
<td>2D/3D CAD produced independently by team members</td>
</tr>
<tr>
<td>2</td>
<td>A project wide consistent approach to flow and production of information</td>
<td>3D models produced by all team members to common level of detail using common tools</td>
</tr>
<tr>
<td>3 &quot;vision&quot;</td>
<td>As BIM level 2</td>
<td>Single project model</td>
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</tbody>
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A collaborative approach that improves project delivery through adopting standard processes and tools
Organisation Culture Model

**Hierarchy**
- Clear formal structure
- Rules, procedures & systems govern what people do
- People adhere to the rules
- Leaders are good coordinators

**Clan**
- Friendly place to work
- Organisation held together by trust & loyalty
- Teams really important
- Leaders are mentors, possibly parent figures

**Adhocracy**
- Dynamic entrepreneurial place to work
- Commitment to experiment & innovate
- Seek leading edge & change
- Leaders are innovators & risk takers

**Market**
- Results focused
- Priority is to get the job done
- Competitive goal oriented people
- Tough demanding leaders

**Control & Stability**
- Clear formal structure
- Rules, procedures & systems govern what people do
- People adhere to the rules
- Leaders are good coordinators

**Internal Maintenance**
- Friendly place to work
- Organisation held together by trust & loyalty
- Teams really important
- Leaders are mentors, possibly parent figures

**External Market Focus**
- Dynamic entrepreneurial place to work
- Commitment to experiment & innovate
- Seek leading edge & change
- Leaders are innovators & risk takers

**Flexible Individuality**
- Friendly place to work
- Organisation held together by trust & loyalty
- Teams really important
- Leaders are mentors, possibly parent figures

Based on Cameron & Quinn, 1999
HS2 Organisational Culture Comparison

HIERARCHY

Market

Now

Future

CLAN

ADHOCRACY
Government BIM Strategy: The Future

Adam Matthews
2.31 The Cabinet Office will co-ordinate Government’s drive to the development of standards enabling all members of the supply chain to work collaboratively through Building Information Modelling.

2.32 Government will require fully collaborative 3D BIM (with all project and asset information, documentation and data being electronic) as a minimum by 2016.
Central Funded Public Estate

8 x

Major Public Procurers
£20bn
Government Construction Strategy

"15-20% cost and carbon reduction on all centrally procured government construction projects within the current parliament (2016)"
Open Sharable Information

“Government as a client can derive significant improvements in cost, value and carbon performance through the use of open sharable asset information”
Level 2 - Business Case
All Government Departments 100% Level 2 BIM / GSL Enabled

2012 Discovery, Mobilise & Test L2 Model

2013 Accelerate Dept Pilot Delivery

2014 Embedding BIM/GSL in Depts

2015 BIM/GSL, Benefits Realisation

Departmental Summary Roadmap

2016 Legacy – Digital Built Britain

Rollout

Data – Manual Checking

Data – Digital Checking

Departmental Level 2 BIM Adoption

MOJ 100%BIM & 2# Pilots / Dept

All Govt departments have published BIM/GSL Strategies and Roadmaps and forward pipelines

All Government Departments 100% Level 2 BIM / GSL Enabled
"Hampshire County Council Property Services is currently adopting the Government's objective of BIM Level 2 maturity on two pilot Primary School projects. Early benefits of this adoption have been greater coordination of information across disciplines, an ability to produce and update information quickly and a better understanding of the project by the client and end users."

Bob Wallbridge, Strategic Manager for Design and Implementation in Property Services, HCC

Projects

Catterick Garrison, Healthcare Facility
Location: Catterick, Darlington
Facility Type: Healthcare
Approximate Value: £5.5m

Waterlooville School
Location: Waterlooville
Facility Type: School
Approximate Value: £8m

HMYOI Cookham Wood
Location: Cookham Wood
Facility Type: Prison
Approximate Value: £20m

These are BIM Early Adopter Projects, either in progress or on a candidate list under consideration to become Early-Adopters. This list will remain live and may change with circumstances. It does not commit any specific project to be confirmed as an Early Adopter.
What’s Next?
What is Level 3?

- Future Proof
- Online
- One Transparent Model
- Self Checking
- Secure
- Automated Processes
- Knowledge Based
- Artificial Intelligence
- Self Procured
- Market Futures
- Commercial Transaction Model
- Constraint Management
- Post Occupancy Automation and Productivity
BIM in HS2

Jon Kerbey
BIM Vision

STARTING ON THE RIGHT TRACK TO AN EFFICIENT, SUSTAINABLE FUTURE
BIM in Reality

Bob Thompson, Keller
Victoria Station Upgrade Jet Grouting
Victoria Station Upgrade Jet Grouting
Victoria Station Upgrade

Ground Conditions

- Made Ground
- Silt
- Sand, Gravel
- Clay

Treatment Area
Victoria Station Upgrade
Victoria Station Upgrade - Services
Victoria Station Upgrade – BIM/Microstation
Victoria Station Upgrade
Victoria Station Upgrade
Victoria Station Upgrade
VSU – Restricted Worksites
Victoria Station Upgrade – Gap Identification
Victoria Station Upgrade – Shape Accel Array
VSU – Design becomes “As Built”
Interactive Q&A

Use your voting buttons
Q&A

Q4. How embedded is BIM in your organisation?

A. Ingrained in everything we do
B. Understanding and techniques are applied to larger projects
C. Some parts of the business do it
D. Not at all
Q&A

Q5. How embedded is BIM in your suppliers?

A. Ingrained in everything they do
B. Understanding and techniques are applied to some of their projects
C. Some parts of their business do it
D. Not at all
Q&A

Q6. What is the single most important component for BIM to succeed in delivering savings?

A. Collaborative working
B. Earlier, more complete and more accurate information
C. Financial incentivisation
D. Early Contractor Involvement
Innovation
• **UK has a world-leading reputation for innovation.**
  - Top universities in the world
  - 1% world population, but 15% of most highly cited papers
  - Global innovation index – UK was 14th in 2009, then 10th then 5th then 3rd
    (World Intellectual Property Organisation, Cornell)

• **The top countries in the world for industry/academic collaboration -**
  - UK, Singapore, USA, Finland, Switzerland
HS2 & Innovation
Creating conditions for innovation

Innovative Environment

- Intelligent
- Collaborative
- Connected

HS2 Behaviours

- Resources
- Skills

Supply Chain

- Contracts

Time

Risk

Incentivisation

Liability

Contract Terms

For Approvals

For Research

Creating conditions for Innovation

Controls for Risk & Cost

- Safety
- Technical Risk
- ROI
- CBA
BIM as a test bed for innovation

Darryl Stephenson
HS2 requirements

- Dynamic suite of sense checked proposals
- Full market engagement
- Case study type evidence to add credibility
- Robust governance of the programme
- Better end product
Virtual construction modelling

- Rehearsing the real thing
- Increased confidence levels
- Test bed for innovations
- One of the building blocks of being an Informed Client
Data for 4D modelling

• Extract the data contained in BIM
• Simply a way of combining data sets for enhanced output
• No re-working of base data
Building the model

- May 2013 case study programme commenced
  Outline designs modelled by HS2 team
- Detailed programme review
- Changes to programme and drawings are automatically reflected in visualisation & Cost
4D Modelling
Water Orton Viaduct 1
Further dimensions

Construction Traffic Frequencies
Further dimensions

Men Working at Height
4D Programme

• Commence expansion of model
• Jan 2014 June 2014 test innovations
• Model becomes benchmark for tender purposes
The next steps

• Engagement with the market
• Detailed scenario modelling
• Suppliers to showcase their best products
• Work with you to get the very best possible result
Interactive Q&A

Use your voting buttons
Q&A

• Q7 Where should innovation be focused for greatest effect?

A. Procurement
B. Temporary works, staging and enabling work
C. Physical works
D. Operation & maintenance
Q&A

• Q8 Which of these has the most potential for innovative savings?
A. Materials
B. Standards & specifications
C. Design
D. Delivery
Q&A

• Q9 Which of these carries the highest risk of blocking innovation?

A. Government/Department
B. Client organisation
C. 3rd Parties/approvers
D. Form of contract
E. Industry
F. Other
BIM & Innovation

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