

Wales Digital Best Practice Networking

Cardiff

30th November 2017

Sponsored by



Welcome

Tony Norris
Chair

South East Wales Best Practice Club

**ADEILADU
ARBENIGRWYDD**
Clwb De Ddwyrain Cymru



**CONSTRUCTING
EXCELLENCE**
South East Wales Club



**ADEILADU
ARBENIGRWYDD**
YNG NGHYMRU



**CONSTRUCTING
EXCELLENCE**
IN WALES

BAGLAN - DIGITAL CONSTRUCTION

BIM level 2 Aspirational project



By Ian Massey (BYUK Region 1 BIM Manager)

Client (Neath Port Talbot) BIM defined Project Brief

- Bring together in a single facility
 - Difficult closure of 4 schools all with very different demographic structuresbring together in a single facility.
- Built digital model for client use
 - From the outset the objective was to exceed 'more than just' and deliver a full as built digital model for client use.
- Difficulties around the 'unknown'
 - Difficulties around the 'unknown' 3-1 managing the public's 'anxiety' of the
- Fast timescale
 - Fast timescale compared to precedent
- NPT (Neath Port Talbot) defined EIR
 - From Stage 0 – NPT EIR defined a req
 - Industry Council's BIM protocol with
 - With this document only being releas
 - were cutting a path throughout this p

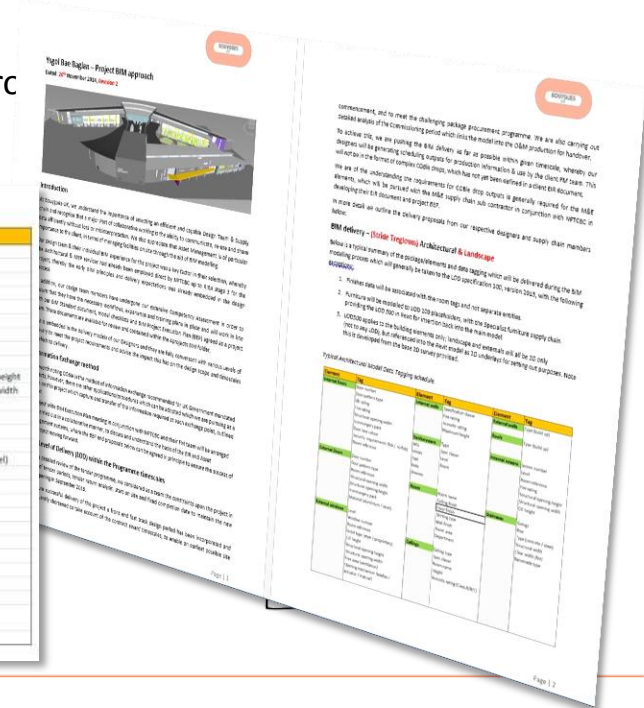


Client BIM defined Project Brief

- Client (NPT) Exemplar School BIM project aspiration
 - Path finder project to explore and define BIM requirements for NPT
 - Deliver a full as built digital model for client use.
- Utilise BIM Digital tools to enhance project due to constrained Procurement
 - Architectural BIM Model From Stage 1
 - FM BIM Model defined deliverable requirements from the start of project
 - Architecture
 - M&E (COBIE)

Typical Architectural Model Data Tagging schedule.

| Element | Tag | Element | Tag | Element | Tag |
|------------------|---|----------------|-------------------------------|------------------|---------------------------|
| Internal Doors | Door number | Internal walls | Specification clause | External walls | Type (build up) |
| | Door pattern type | | Fire rating | | Roofs |
| | dB rating | | Acoustic rating | Roofs | Type (build up) |
| | Fire rating | Sanitaryware | Maximum height | | Internal screens |
| | Structural opening width | | Type | Internal screens | Screen number |
| | Insulation pack | | Spec clause | | Level |
| | Door face colour | | Level | | Room reference |
| External Doors | Security requirements (fib / no fib) | Room | Room | | Fire rating |
| | Room reference | | Taps | | Structural opening height |
| | Door number | | Sinks | | Structural opening width |
| | Door pattern type | | Showers | | Cill height |
| External Windows | Room reference | Room | Room name | Staircases | Goings |
| | Structural opening width | | Ceiling finish | | Type (concrete / steel) |
| | Insulation pack | | Skirting type | | Structural width |
| | Material (aluminium / steel) | | Wall finish | | Clear width (fire) |
| | Level | Ceilings | Room area | | Balustrade type |
| External Windows | Window number | | Department | | |
| | Room reference | | Ceiling type | | |
| | Unit type (steel / proprietary) | | Spec clause | | |
| | Cill height | | Room name | | |
| | Structural opening height | | Height | | |
| | Structural opening width | | Acoustic rating (Class A/B/C) | | |
| | Free area (ventilation) | | | | |
| | Opening mechanism (telexflex / actuator / manual) | | | | |



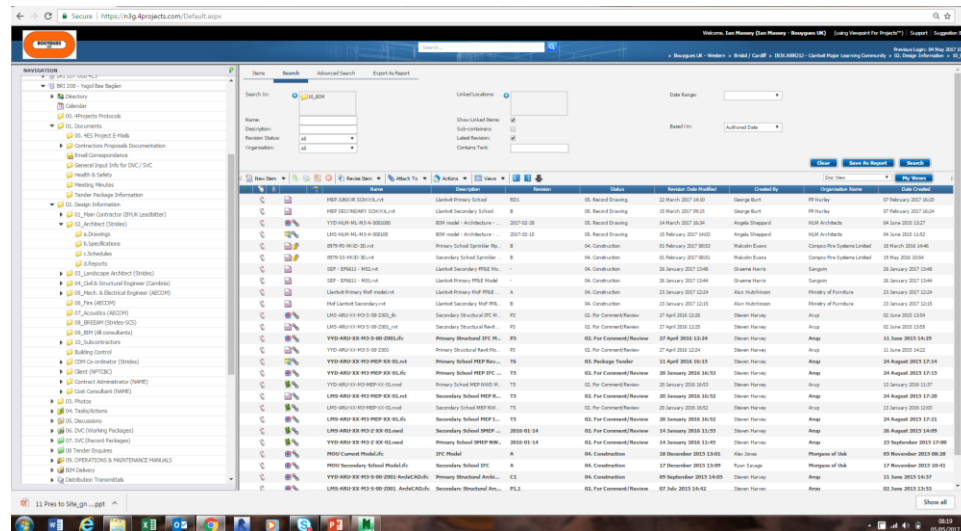
Early Design Development

- Client & Architect direct digital discussions to align design
 - Exchanging 3D Models/Visuals during early stages of Design
 - Bi-directional Comments
- End User Workshops
 - Early Teacher personnel interaction/familiarisation Workshop
 - Practicality of the Design ethos
 - 3D Model Visual Walkthrough to explain the building
 - Head Review with model, advise incorporated into design



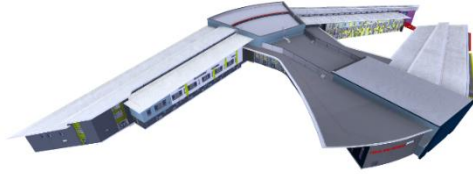
CDE (Common Data Environment)

- Viewpoint for Projects (4P)
 - Collaborative & Managed environment for all team members data
 - Ensured all disciplines used the same shared data set and models
 - Information is always the most up to date because of the weekly upload protocol managed by BYUK
 - Package Enquiry Issue & tracking
 - All Technical Submissions



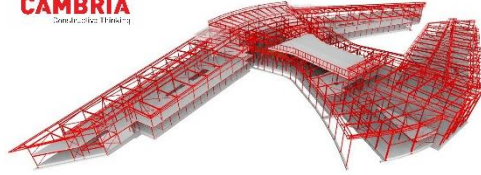
BIM Model – Stage 4a-Handover

STRIDE TREGLOWN



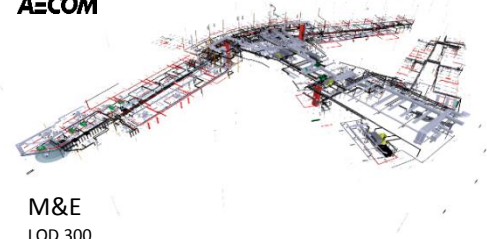
Envelope & Internals & FF&E
LOD 300

CAMBRIA
Construction Management



Structures
LOD 300

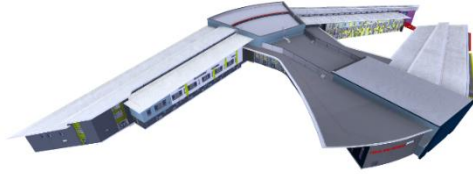
AECOM



M&E
LOD 300

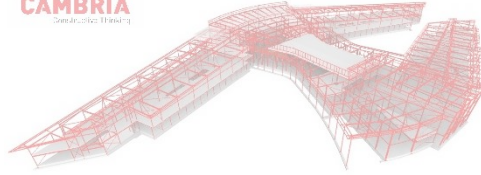
BIM Model – Stage 4a-Handover

STRIDE TREGLOWN



Envelope & Internals & FF&E
LOD 300

CAMBRIA
Construction Management



Structures (Concrete Only)
LOD 300

WHITEHEAD



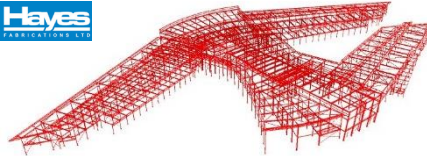
M&E
LOD 300/350

HAVELOCK
TORO PA



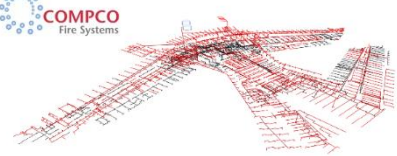
FF&E
LOD 300

Hayes
PROFESSIONAL LTD



Steel Frame
LOD 400

COMPCO
Fire Systems



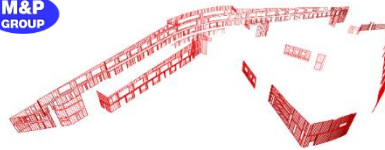
Sprinklers
LOD 300

SHINE
CLOTHING SYSTEMS



Kitchen
LOD 300

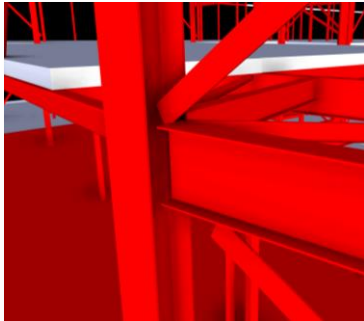
M&P
GROUP



SFS
LOD 300

Design Development

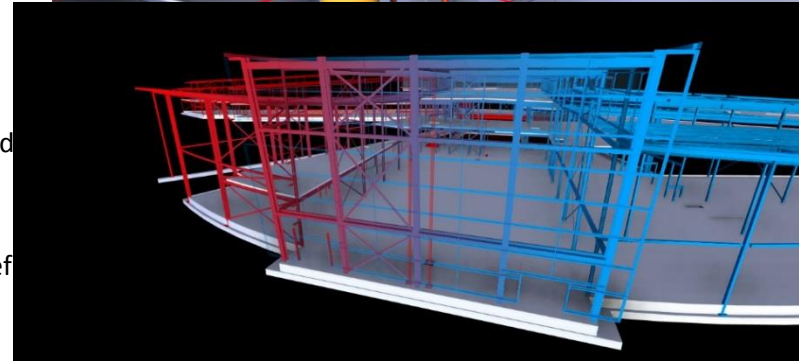
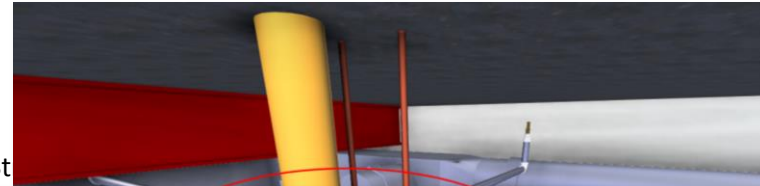
- BIM Enabled DTM's
- BIM Model Walkthroughs Workshops
 - Review visual clashing elements
 - Screen captures & Naviswork's Red Pen Mark-up reporting
- Cladding contractor
 - Early planning, details & comments via BIM Model
- Steel Frame contractor
 - Assist fabrication
 - 3D Model overlay/IFC steel frame, reimported into St
 - No On-site measurement
 - Steel Manufacturer list
 - Able to more efficient/specific fixed M&E BIM model
 - Streamlined handover from AECOM to Whitehead
 - Issues
 - 2D to 3D process (Post Processing)
 - Educated them to 3D to 2D process & benef



LOD 300

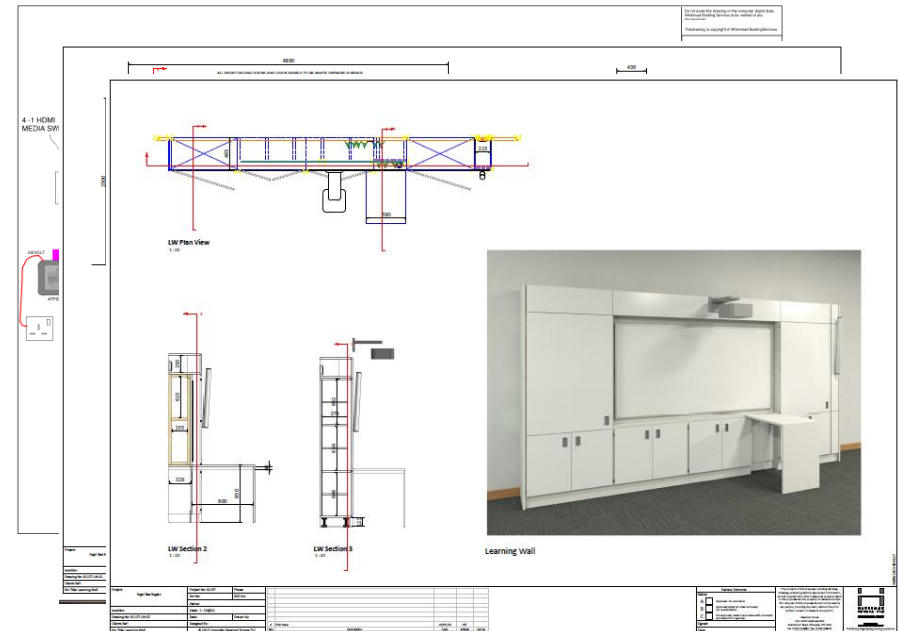


LOD 400



Microsoft Showcase School

- 1 of 10 Showcase Schools in the UK
 - Assisted Development of IT strategy with Head Teacher
 - Virtual mock-ups & Physical mock-ups
 - Teaching aids
 - Chrome Cast
 - Apple TV
 - Miracast



M&E - Whiteheads BIM Development

- Early Training strategy
 - Project Manager/Designer & Technicians (Revit & Navisworks courses)
 - Consultation from Autodesk representative (Strategy for Implementation/Manage & resolve BIM issues)
 - BIM Manager brought into Whiteheads company (Project & Region)
- Unique 'Consultant to Supply Chain' Direct BIM model handover
- Site based team

○ **AECOM**



presented in DT
orporated & co-ordin
training developmen
ons/pla
ilities ut
ated

WHITEHEAD



M&E – FM Model

- FM Attributed BIM Model & Excel COBie Data Datasheet Drop
 - Bespoke set of COBie headings defined for 'NPT' to maximise use for asset management
 - FM Attributes
 - Collection of input 'sources' populating M&E COBie Model directly
 - Model Directly 'drive's'

- M&E FM Attributes

- Name
- Finish
- Power
- Manufacturer
- Illuminance
- URL
- Voltage
- Part Number
- Description
- Life Duration
- Lamp
- Phone
- Control Gear Luminous Flux
- Colour Filter
- Mounting Type
- Shape
- Material
- Initial Colour Temperature
- Warrant Duration URL
- Etc. (25 Fields in Total)

The image displays two screenshots of the Revit Properties window, showing COBie data for a lighting fixture. Red boxes highlight specific fields in both windows.

Left Window (Properties):

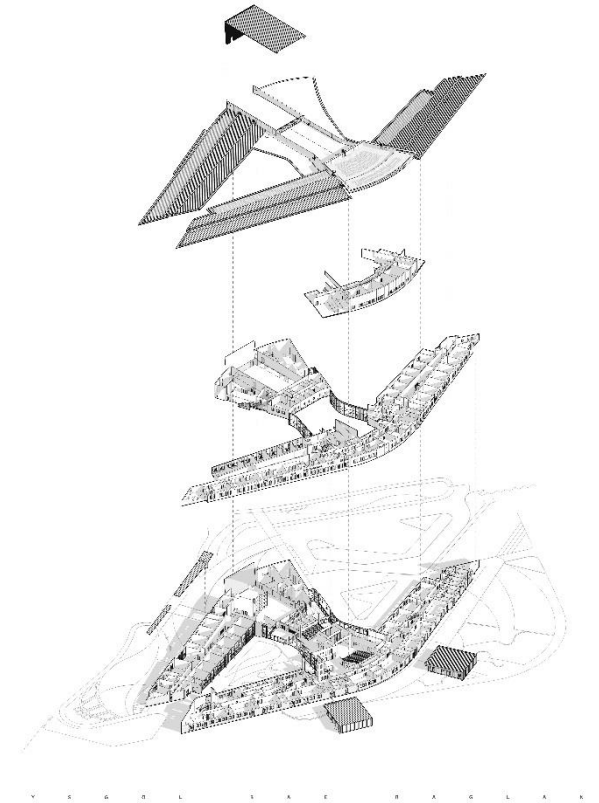
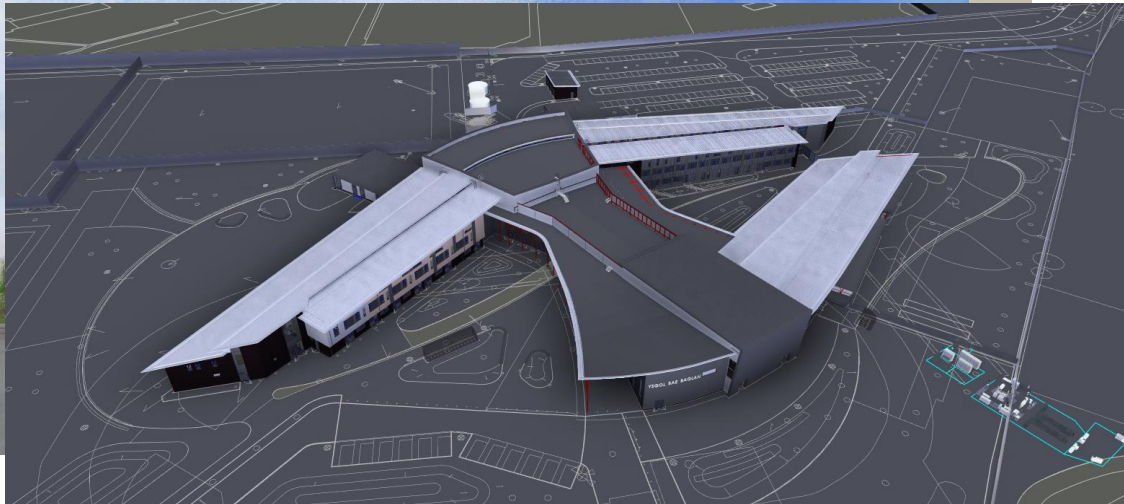
| Property | Value |
|----------------------------------|---|
| Name | Whitecroft-Lighting_Inspiration_2x49W_DALI |
| Category | Lighting Fixtures |
| NumberOfSources | 0 |
| NominalLength | 1.546 m |
| Finish | White RAL 9003 |
| IP_Code | IP40 |
| ElectricalDeviceNominalPower | 109 W |
| ManufacturersSpecificInformation | T5 fluorescent lighting system. Polycarbonate circular diffuser and quick co... |
| COBie Type Length | 0.000 m |
| Weight (Kg) | 3.300 |
| Tilt Angle | 0.00° |
| NominalWidth | 0.125 m |
| Illuminance | 54 lx |
| Cost | 0.00 |
| URL | http://www.whitecroftlighting.com/our-products/inspiration-surface |
| LightFixturePlacingType | Ceiling |
| MethodOfMeasurement | mm |
| NominalVoltage | 230V + 8% |
| Part Number | INSY249W |
| COBie Type | T5 |
| Description | T5 fluorescent lighting system. Polycarbonate circular diffuser and quick co... |
| ServiceLifeDuration | T5 30,000 hrs |
| NominalHeight | 0.118 m |
| Lamp | 2x 49W T5 ECO |
| SerialNumber | INSY249W |
| Luminaire | 1.546 m |
| ModelNumber | INSY249W |
| Phone | +44 (0)870 5087 087 |
| CreatedOn | Created 05/07/2016 - Current Technical Data 05/07/2016 |
| Control Gear | DALI |
| Efficacy | 58 lm/W |
| Total Light Loss Factor | 1.000 |
| HasProtectiveEarth | 1 |

Right Window (Properties):

| Property | Value |
|----------------------------------|---|
| Phone | +44 (0)870 5087 087 |
| CreatedOn | Created 05/07/2016 - Current Technical Data 05/07/2016 |
| Control Gear | DALI |
| Efficacy | 58 lm/W |
| Total Light Loss Factor | 1.000 |
| HasProtectiveEarth | 1 |
| Uniclass2 | PR_70_70_48 |
| PhaseAngle | 0.00° |
| Photometric Web File | INSY249W IES |
| Manufacturer | Whitecroft Lighting |
| ExpectedLife | 30,000 hrs |
| Luminous Flux | 6330 lm |
| COBie Type | T5 |
| Color Filter | 16777215 |
| TotalWattage | 109 W |
| COBie Type | 0 |
| Apparent Load | 109 VA |
| Initial Intensity | 0 |
| NominalCurrent | 0 A |
| Contact | http://www.whitecroftlighting.com |
| Initial Colour | 0 |
| COBie Type.NominalLength | 0.000 m |
| Light Source Definition (family) | Point+Photometric Web |
| UsageCurrent | 0 A |
| Dimming Lamp Color Temperat... | 0 |
| Light Loss Factor | 0 |
| LightFixtureMountingType | Surface mounted Track/Suspended Track |
| COBie Type.NominalHeight | 0.000 m |
| Shape | Cylinder |
| Wattage | 109 W |
| ServiceLifeType | T5 30,000 hrs |
| MaintenanceFactor | 0.000 |
| Emergency | N/A |
| Material | Polycarbonate |
| COBie Type Area | 0.000 m² |
| Initial Color Temperature | 4000 K |
| OR | 73.87% |
| Family Name | Inspiration Luminaire BAG |
| WarrantyDurationLabor | http://www.whitecroftlighting.com |
| Luminous Intensity | 504 cd |
| Size | 125mm x 1546mm x 118mm |
| COBie Type.Description | T5 fluorescent lighting system. Polycarbonate circular diffuser and quick co... |
| Color | Material "Glow 1", #5282862 |

Stride Treglown

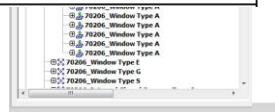
- BIM & Digitals used from Stage 1 onwards
 - Model development
 - Visualisation
 - All Drawing, section and schedule production



Architecture – FM Model

Architectural FM Elements

| Element | Tag |
|------------------|--|
| Internal Doors | Door number Door pattern type dB rating Fire rating Structural opening width Ironmongery pack Door face colour Security requirements (fob / no fob) Room reference |
| External Doors | Door number Door pattern type Room reference Structural opening width Structural opening height Ironmongery pack Material (aluminium / steel) |
| External windows | Level Window number Room reference Lintel type (steel / proprietary) Cill height Structural opening height Structural opening width Free area (ventilation) Opening mechanism (teleflex / actuator / manual) |
| External walls | Type (build up) |
| Roofs | Type (build up) |



Architectural FM Elements

| Element | Tag |
|--|---|
| Internal screens | Screen number Level Room reference Fire rating Structural opening height Structural opening width Cill height |
| Staircases | Goings Rise Type (concrete / steel) Structural width Clear width (fire) Balustrade type |
| Internal walls | Specification clause Fire rating Acoustic rating Maximum height |
| Sanitaryware WCs, Urinals, Taps, Sinks, Showers | Type Spec clause Level Room |
| Room | Room name Ceiling finish Floor finish Skirting type Wall finish Room area Department |
| Ceilings | Ceiling type Spec clause Room name Height Acoustic rating (Class A/B/C) |

Site Digital Tools

- Viewpoint Field View App
 - Snagging
 - RFI Reduction
- Esav
 - Post-Handover Defects
 - Direct Client Team tracking/assigning/reporting
- Site Accommodation
 - Digital Enabled Meeting rooms
 - BIM models & CDE 4P Access
- Earthworks
 - GPS Levels feed into Vehicles to track earthwork completion
 - 2D spot levels to 3D cut & fill



Client Interaction

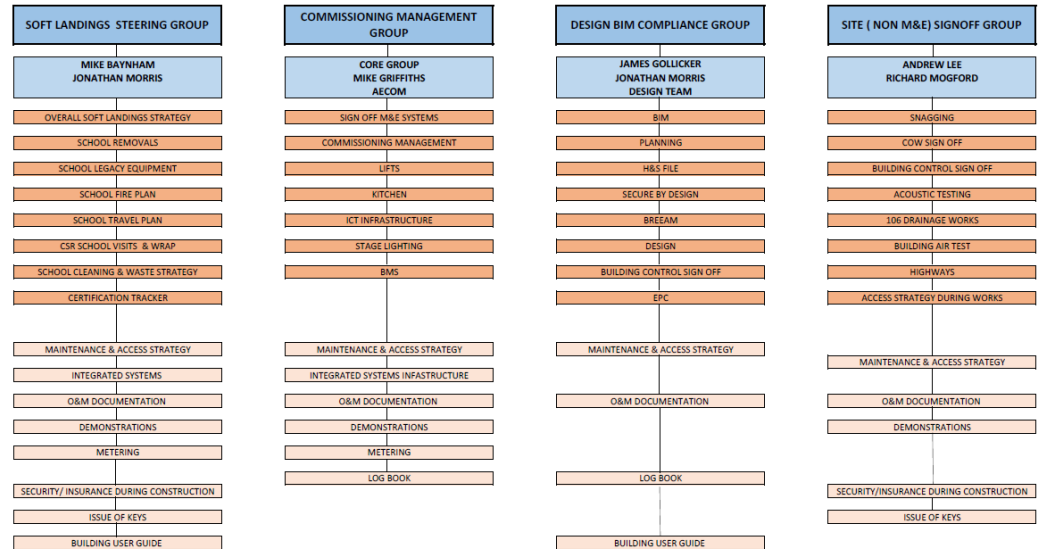
- Learning/skills
 - BYUK Hosted - Navisworks training workshop
 - FM possibilities
 - Current & future
- FM Strategy discussions
 - Client Internal Discussions about 'A Way Forward'
 - BIM Model interaction wider than FM team
 - NPT has an electronic property management system, onto which as built information gets stored
 - Accessed by the maintenance surveyors and in-house maintenance contractors.
 - Although access to the information provided at completion is beyond the skillset of many users it is encouraging and nurtures personal development in some members of staff.
 - Need to mention Jonathan Watkins, and his development and use of the system whilst with BYUK and position with NPT



Soft Landings

- BYUK Soft Landing Strategy Document
 - BIM Model to assist understanding
- Commissioning Engineer involvement
- Video Record
 - Training sessions

BRI208 Ysgol Bae Baglan
SOFT LANDINGS STRATEGY- APRIL 2016 DRAFT



Lessons Learnt

- Timing / Early adoption in Project essential
- BIM contractual agreements
 - BEP (BIM Execution Plan) & MPDT in place at start of project
 - COBie/FM requirements 'information fields' defined
- CDE setup to BS1192:2007
- Clash Detection Workshop (CDW)
 - Structured & Managed, official tracking of workshops & Clash Resolution Actions
- M&E
 - BIM Model elements designed/built with 'future proof' in mind
 - Understanding of commitment/process to complete 'as-constructed & COBie' BIM models
- Sprinkler & FF&E
 - Early engagement & Buy-in
 - 3D rather than 2D (BIM coordination benefits)
- BIM Awareness
 - Buy-in & Interest
 - Appetite & Aspiration to use/embrace & improve
 - Support, Enforce & Coordination of BIM Process

**The Team realised BIM Is a collaborative process that utilises Digital Tools
and is not just 3D**

BAGLAN - DIGITAL CONSTRUCTION



By Ian Massey (BYUK Region 1 BIM Manager)

Neath Port Talbot
County Borough Council

STRIDE TREGLOWN

Hayes
FABRICATIONS LTD

M&P
GROUP

CAMBRIA
Constructive Thinking

HAYLOCK
EUROPA

BOUYGUES
UK

AECOM

COMPCO
Fire Systems

WHITEHEAD

SHINE
catering systems

Shaping a Better Life

ACE Cymru Wales Autumn Reception

**BIM for Infrastructure Projects in Wales
– Where are we really?**

With Support from:



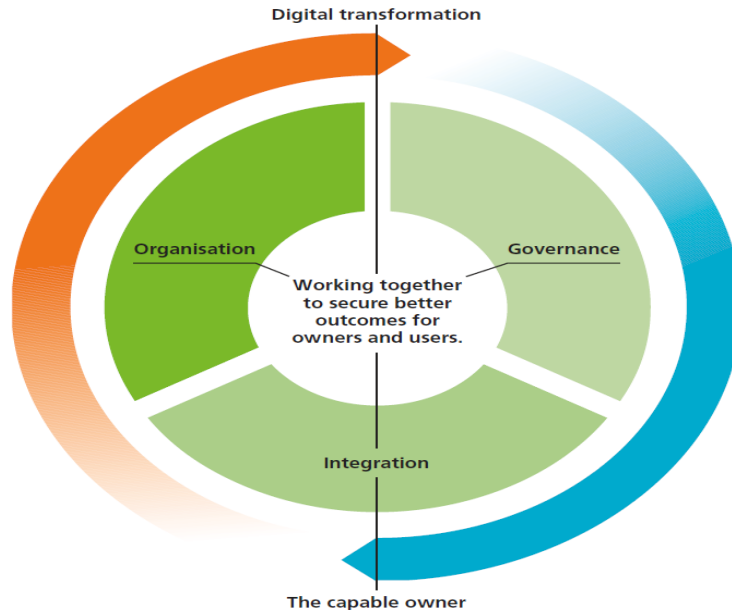
Organised in association with:



NOT ANOTHER BIM EVENT ?!

Infrastructure Client Group – Project 13

March 2017



Digital transformation

Digital transformation is in its infancy in the UK infrastructure sector. There are however examples of new practices. Transport for London has used contactless payment technologies to improve passenger flows and transform its relationships with Londoners. Highways England is using its smart motorway technologies to monitor and control traffic flows in real time. The UK Government is using its Digital Built Britain initiative to pave the way for the adoption of Level 3 BIM on publicly funded projects. And it is encouraging the use of advanced manufacturing techniques in construction.

The Motion:

“This house believes that the Welsh infrastructure Sector is not using BLM in a coordinated way and so will not benefit fully from BLM’s potential”

The Objective:

***To promote open discussion on current
“state of play” and consider if more
collective effort is needed and possible***

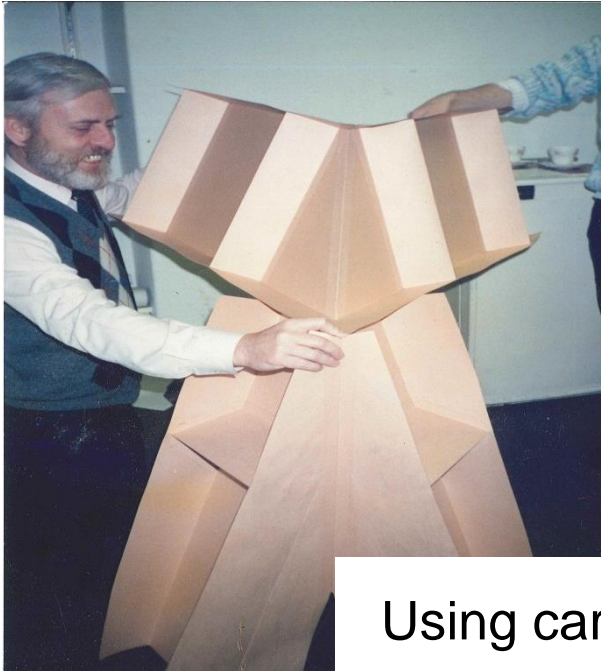
The Speakers

- Karl Henderson - Costain / Vinci
- Luke Cooper - Arup
- Tom Fasham - Atkins
- Ed Atherton - Cass Hayward LLP

Practitioners' All

Before BIM -

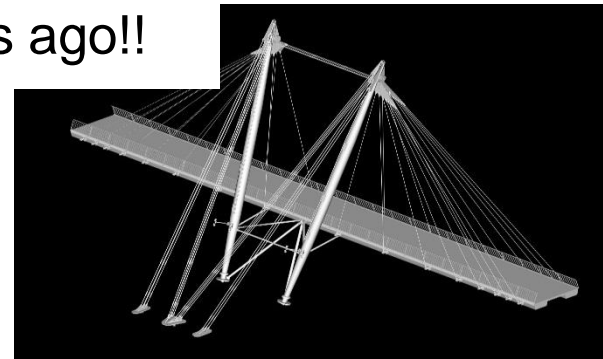
- 3D modelling aspect prominent for many years



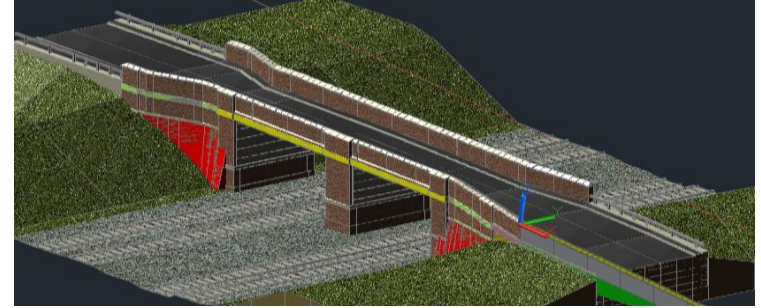
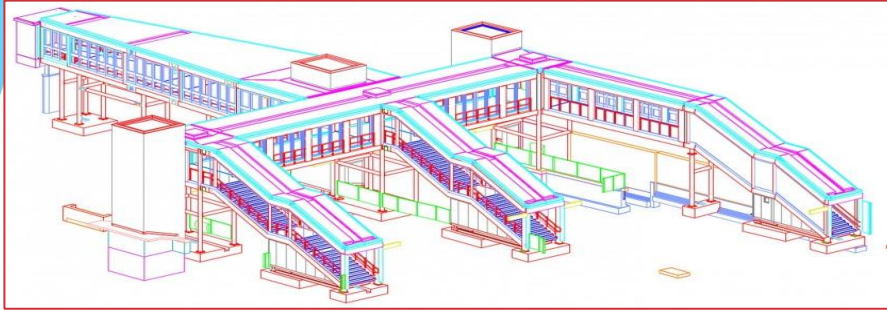
Using cardboard
27 years ago!!



Hungerford Bridge
17 years ago!!



Then BIM came along -



- Network Rail – Great Western Electrification
- Cross Rail – London Stations Improvements
- Wales – Eastern Bay Link



BIM - Planning & Delivery

- Understanding and providing for Contractor Client Requirements
- Understanding and providing for End Client Requirements
- Processing data efficiently, control of input costs
- Clarity of roles and responsibilities
- Purchasing, maintaining and upgrading software
- Training engineers and technicians
- Recruiting engineers and technicians
- Maintaining engineering quality

Workshop Discussion

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