2013 COBie Challenge for Designers

Building Innovation 2013
The National Institute of Building Sciences
Tested Product

Product name: AECOsim Building Designer™ V8i
Product version: 08.11.09.5xx (1Q13)
PC or Cloud: Desktop App (+ ProjectWise)
Website: www.bentley.com/AECOsim
1) Multi-discipline unified application
2) Integrated analysis
3) Integrated high quality rendering
4) Integrated clash detection
5) Flexible data management and reporting
6) IFC interoperability
Discipline Specific Points of Entry

- Architectural
- Structural
- Mechanical
- Load Electrical
IFC File Support

File name: _Clinic_Master_OffSpace.ifc.i.dgn
Files of type: CAD Files (*.dgn;*.dwg;*.dxf)

CAD Files (*.dgn;*.dwg;*.dxf)
MicroStation DGN Files (*.dgn)
MicroStation Cell Libraries (*.cel)
DGN Library Files (*.dgnlib)
Sheet Files (*.s*)
Hidden Line Files (*.h*)
Autodesk(R) DWG Files (*.dwg)
Autodesk(R) DXF Files (*.dxf)
Redline Files (*.rdl)
TriForma Document Files (*.d)
3D Studio Files (*.3ds)
Shapefiles (*.shp)
MIF/MID Files (*.mif)
TAB Files (*.tab)
Autodesk(R) FBX Files (*.fbx)
IFC Files (*.ifc)
Common Raster Formats (*.tif;*.tiff;*.tif;*.bmp;*.jpg;*.jpeg;*.jpe;*.sid;*.pdf;*.png)
Common Geo Ref Raster Formats (*.tif;*.tiff;*.hmr;*.tiff;*.tiff64;*.cit;*.tq4;*.ecw;*.ecw**)
BIM for the Project Lifecycle

- Spatial Databases
- Building Information Models
- Civil Works Information Models
- Maps and Drawings
- Specifications
- Data Files
- Photos
- Office Documents

<table>
<thead>
<tr>
<th>ProjectWise / Geospatial Server</th>
<th>AssetWise / eB Insight Services</th>
</tr>
</thead>
</table>

MicroStation
Most Recognized “Traditional” Handover

[Diagram showing phases of a project lifecycle with COBie highlighted]
Continuous Lifecycle Data Handover
Asset Lifecycle Information Management

Ensuring trustworthy information throughout the lifecycle of infrastructure

- Continuous managed handover
- Configuration management
- Change management
- Records management
- Knowledge management
- Workflow processes
- Compliance
Asset Operations
- Maintain
- Repair
- Compliance
- Safety
- Inspect
- Replace

Asset Lifecycle Information Management

- Project
- Project
- Project

Projects
- Expand
- Renovate
- Upgrade
- Retrofit
- Improve
- Design

Requirements Management
ERP
Human Resources
Finance
Incident Management
Engineering Maintenance

Design Optimization
Document Approvals
Analysis
Bentley Users

20 of the Top 20 in:
- General Building
- Transportation
- Power
- Manufacturing
- Water
- Sewer/Waste

19 of the Top 20 in:
- Industrial Process/Petroleum
- Telecommunications
- Hazardous Waste

47 of the Top 50 Designers in International
97 of the Top 100 Pure Design Firms
**2012 Bentley Infrastructure 500 Top Owners Ranking**

The Bentley Infrastructure 500 (BI500) 2012 Top Owners was compiled by Bentley Systems through direct interview with over US$1 trillion in infrastructure-related annual revenue, and Bentley Systems is committed to advancing ROIs through leveraging information modeling in integrated projects to create more intelligent infrastructure on behalf of owner organizations.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company Name</th>
<th>Headquarters Country</th>
<th>Infrastructure Value* (millions USD)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>UNITED STATES GOVERNMENT</td>
<td>United States</td>
<td>943,200</td>
</tr>
<tr>
<td>2</td>
<td>ESKOM MOBIL CORP</td>
<td>United States</td>
<td>214,664</td>
</tr>
<tr>
<td>3</td>
<td>STATE GRID CORPORATION OF CHINA</td>
<td>China</td>
<td>209,727</td>
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<tr>
<td>4</td>
<td>OPEN JOINT STOCK COMPANY GAZPROM</td>
<td>Russia</td>
<td>208,677</td>
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<td>5</td>
<td>PETROLEO BRASILEIRO S.A. - PETROBRAS</td>
<td>Brazil</td>
<td>182,133</td>
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<tr>
<td>6</td>
<td>HIGHWAYS AGENCY</td>
<td>United Kingdom</td>
<td>173,148</td>
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<td>7</td>
<td>ROYAL DUTCH SHELL PLC</td>
<td>Netherlands</td>
<td>162,081</td>
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<td>8</td>
<td>ELECTRICITE DE FRANCE SA - EDF</td>
<td>France</td>
<td>144,875</td>
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<tr>
<td>9</td>
<td>NIPPON TELEGRAPH AND TELEPHONE CORPORATION</td>
<td>Japan</td>
<td>125,110</td>
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<tr>
<td>10</td>
<td>CHEVRON CORPORATION</td>
<td>United States</td>
<td>122,008</td>
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<td>11</td>
<td>THE TOKYO ELECTRIC POWER COMPANY INCORPORATED</td>
<td>Japan</td>
<td>121,879</td>
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<tr>
<td>12</td>
<td>BP PLC.</td>
<td>United Kingdom</td>
<td>114,214</td>
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# Designers’ COBie Challenge Scope

<table>
<thead>
<tr>
<th>Information</th>
<th>COBie.Sheet</th>
<th>Exported</th>
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</thead>
<tbody>
<tr>
<td>Spaces and equipment</td>
<td>Space, Type, Component</td>
<td>✓</td>
</tr>
<tr>
<td>Space and equipment properties</td>
<td>Attribute</td>
<td>✓</td>
</tr>
<tr>
<td>Spatial zones</td>
<td>Zone</td>
<td>✓</td>
</tr>
<tr>
<td>Equipment systems</td>
<td>System</td>
<td>✓*</td>
</tr>
</tbody>
</table>

* geometry and properties are exported to IFC, but not modeled and tested for COBie Challenge
Process

Start AECOsim Building Designer

Create Project from COBie Template

ABD/COBie Schema?

Create BIM

Create COBie Workbook
Start AECOsim Building Designer

Create Project from COBie Template

ABD/COBie Schema?

Create BIM

Create COBie Workbook

Create User Types (Classes)

Create User Properties

Map Types and Properties to IFC

Project requires custom classes
Start AECOsim Building Designer
Create Project from COBie Template

Start AECOsim Building Designer

Create Project from COBie Template
ProjectWise Collaboration

Start AECOsim Building Designer

Create Project from COBie Template
Start AECOsim Building Designer

Create Project from COBie Template

ABD/COBie Schema?

Create BIM

Design

Architecture

Structural

Interiors

Mechanical Electrical Plumbing
Create COBie Workbook

Start AECOsim Building Designer

Create Project from COBie Template

ABD/COBie Schema?

Create BIM

Create COBie Workbook

Create COBie Workbook
Create COBie Workbook

Start AECOsim Building Designer

Create BIM

Create COBie Workbook

Model View Definitions: IFC2x3 Coordination View 2.0

Model View Definitions: Facilities Management Handover

Mapping Options
- Map DataGroup Types and Properties (primary mapping)
- Map Family/Parts (secondary mapping)

Spatial Structure
- Assign Building and Floors

Messages
### Start AECOsim Building Designer

### Create Project from COBie Template

### ABD/COBie Schema?

### Create BIM

### Create COBie Workbook
Create User Types (Classes)

Start AECOsim Building Designer

Create Project from COBie Template

ABD/COBie Schema?

Create BIM

Create COBie Workbook

Create User Types (Classes)
Create User Properties

1. Start AECOsim Building Designer
2. Create Project from COBie Template
3. ABD/COBie Schema?
4. Create User Types (Classes)
5. Create BIM
6. Create COBie Workbook
Map to IFC

1. Start AECOsim Building Designer
2. Create Project from COBie Template
3. ABD/COBie Schema
4. Create BIM
5. Create Workbook
6. Create User Types (Classes)
7. Create User Properties
8. Map Types and Properties to IFC
9. Map Data Group Types and Properties to IFC

Example:
- BMP_BathTub
- BMP_Sink
- BMP_TwinSink
- BMP_Urinal
- BMP_PumpBaseMounted
- BMP_SprinklerHead
- BMP_PumpSump
- BMP_PumpDiaphragm
- BMP_PumpMotorMounted
- BMP_PumpVerticalSplitCoupled
- HospitalEquipment
Navigating the IFC Schema
Searching for Specific Classifications

Image: IFC 2x3 Entities Classifications window showing a search for "shower" and the hierarchy of classifications including IfcDistributionFlowElementType, IfcFlowTerminalType, and IfcSanitaryTerminalType.shower.
Searching for Specific Classifications
Managing Multiple Standards
2.11 Map DataGroup to IFC

2.11.1 Map DataGroup types to IFC Entities/Classes

DataGroup types must be mapped to a corresponding IFC entities/class, otherwise they are recognized as IfcBuildingElementProxy and filtered out for COBie export. AECOsim Building Designer provides a tool to map DataGroup types to their corresponding IFC Class, Type and Predefined Type.

- Click 'Save' to save the catalog items.

- Open the 'Map DataGroup Types and Properties to IFC' dialog box from the Building Designer dropdown menu.

- Alternatively, the 'Map DataGroup Types and Properties to IFC' dialog box can be opened from the 'IFC Export' dialog.
The Be Inspired Awards program recognizes the world’s most outstanding infrastructure projects. The projects are submitted by Bentley’s software users and judged by a jury of independent experts, who adhere to the highest standards in determining which of the projects exemplify innovation, superior vision, and an unwavering commitment to exceptional quality and productivity. Bentley shares the innovation in best practices among the infrastructure professionals who make these projects possible by featuring their outstanding achievements across the globe in The Year in Infrastructure series of publications and special editions.
Scottish National Arena
Glasgow, Scotland
Foster + Partners
EEA & Tax Offices
Groningen, Netherlands
UNStudio
Music City Center
Nashville, Tennessee, USA
tvsdesign
The Francis Crick Institute
London, United Kingdom
HOK - PLP Architecture
Planning Innovation of a Medical Center
Sao Paulo, Brazil
Matec Engenharia
COBie Support

Name: 

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