9 Dec 2008, 0900-1200

W106 - All About COBIE

the “06” series of sessions presents open-standard information exchange projects

E. William (Bill) East, PhD, PE
Research Civil Engineer
Engineering Research and Development Center
why can’t they just use the approved submittals instead of specifying construction handover documents?
how can I eliminate the copying cost of handover documents?
how can I deliver the required as-built information at the least cost?
how can I get the benefit from my company’s IT investments?
Information Technology, BIM & Interoperability Track

Monday, December 8
- 9:00am – 12:00pm  buildingSMART alliance™ International Symposium
- 1:00pm – 2:00pm  buildingSMART alliance™ Executive Committee Meeting
- 2:00pm – 4:00pm  buildingSMART alliance™ Board of Directors Meeting

Tuesday, December 9
- 9:00am – 12:00pm  driving the Details of the Industry Foundation Classes (IFC) Standards: Advanced Session
- 1:00pm – 3:00pm  BIM and Facility Management: What Every Owner and Facility Manager Needs to Know
- 1:30pm – 4:30pm  Collaborative BIM Advocacy

Wednesday, December 10
- 8:00am – 5:00pm  LEDspec
- 8:30am – 9:30am  Code Compliance & Building Construction Regulations and e-Government Initiatives
- 10:00am – 10:30am  BIM in Education: An Information Exchange for Educators and Industry—Focus on West/ Midwest Universities
- 11:00am – 12:00pm  Solutions
- 1:00pm – 2:00pm  Construction Management: Digital Review Process
- 2:30pm – 4:00pm  BIM Benefits Integrated Practice
- 3:00pm – 3:30pm  Introduction to Autodesk Green Building Studio

how will these questions be answered?
describing solution process
1. programming

what problem is being solved?
2. design

how will we solve the problem?
3. build

how do we create the solution?
4. deploy how can I use it?
the “I” in bim
Geometric descriptions are ‘meaningless’ outside very specific context.

Exchange of information about what the geometry creates provides cross-context meaning.

what are these diagrams about?

shared descriptions provide meaning & allow interoperability

so let’s just all agree on a shared meaning...

- What kinds of ‘things’ are needed to define meaning?
- How do these resources combine to create meaning?
- How is meaning shared across different stakeholder perspectives?
- What unique kinds of information are needed?
- Who gets to decide what’s shared and what’s unique?
- How and what information is shared when?
- Relatively minor issue of data format?

source: IFC Implementation Guide
what me worry?
when is a fan not a fan?
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industry foundation class

ISO 10303 “Standard Exchange of Product Data Models,” Part 21 is SPFF
Welcome
This website is the source of all information about the technical specifications issued by buildingSMART International (formerly International Alliance for Interoperability, IAI). The website is managed by the Model Support Group, MSG established by buildingSMART to develop and maintain the technical specifications with the Industry Foundation Classes IFC being the main standard deliverable. The IFC specifications and related materials are copyrighted by buildingSMART.

Short introduction to the website
The site is intended to be a source of information for the technical specifications of buildingSMART and particularly the IFC specification. This includes:
- the buildingSMART interoperability specifications
- the IFC release specifications
- the ifcXML release specifications
- the Property Set definitions
- the IFC View definitions
- accompanying documentations
- development schedule and development news
- frequently asked questions
- services and guidelines
- implementation guidelines, supporting tools and information
- implementation examples and source code

Short introduction to MSG
The www.iai-tech.org site is managed by the Model Support Group MSG within buildingSMART international. The MSG is established as a technical group and is responsible for the IFC development. It provides services for:
- IFC extension integration (developing new releases of IFC)
- IFC specification documentation (editorial work for the IFC release)
- IFC maintenance (continuous improvement of the specification and running the issue database)
- IFC property set content development and publishing the property set XML definitions
- IFC implementation support (supporting the Implementer Support Group and certification process)
- ifcXML development (converting the IFC specification into XSD)
buildersnet.org/IFC-BIM

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**scope**

**Shape (explicit)**
beams, pipes, ducts, walls etc.

**Shape (extrusions)**
line representations for pipe, duct, etc.

**Shape (topology)**
Building Elements
wall, door, window, roof, stairs, etc.

**HVAC Equipment**
chillers, fans, pumps, boilers, coils, cooling towers, heaters, heat exchangers, etc..

**Sanitary Elements**
WC’s, urinals, baths, bidets, traps gulleys

**Fire Protection Elements**
sprinklers, hose reels, hydrants, wet/dry rising mains

**Furniture**
inc. system furniture

**Spaces, Space Structure**
space, storey, part, building, site

**Structural analysis:**
structural members, boundary conditions, connections, supports, loads, etc.

**Structural Elements**
members, profiles, rebars, properties, joints, features, surface

**Electrical Elements**
transformers, motors, generators, switches, protective devices, power and communication outlets panels, cubicles

**Relations Between Elements**
holes, chases, voids, zones
**scope**

**Systems**
piping, ducting, cable, structural

**Lighting**
 fittings, rendering, photo-accurate lighting

**Manholes**
 manholes, inspection chambers, access chambers, meter chambers, valve chambers

**Time Series**
 time related events

**Constraints**
 rules, specifications, requirements trigger conditions

**Environmental Impact**
 embodied energy, CO₂

**Controls, Instruments**
sensor, actuator, controller, gauge, meter

**Grids**

**Draughting**

**Holes and Bases**
holes, sleeves, packing, framing, upstands, vibration isolation

**Accessories**
brackets, drop rods, steel sections, bracket assemblies, screws, bolts etc.

**Asset Management**
maintenance history, inventories

**Help**
request, action, permit, warranty, operation
scope

Actors
people, organizations, addresses

Costing
cost planning, estimates, budgets, whole life

Work Plans and Schedules
inc. nested schedules, resource allocation

Orders
work orders, change orders, purchase orders

Connectivity
services, structure, building

Geographical Elements
features, contours, regions

Coordinate Mapping
geodetic, cartesian

External Data

Classification

Associated Documents
life-cycle

Knowledge databases
- Best practise knowledge
- Own practice

Briefing
- Functional req.
- Estimates
- Conditions
- Requirements

Demolition, refurbishment
- Rebuild
- Demolition
- Restoration

Facility management
- Letting, sale, operations
- Maintenance
- Guaranties

Construction management
- Scheduling
- Logistics, 4D

CAD software
- Drawings, calculations

VRML
- Visualisation, 3D models

Simulations
- Comfort
- Ventilation, heating
- Life cycle cost
- Light, sound
- Insulation
- Fire, usage
- Environment
- Life time predictions

Specifications
- Specification sheets
- Classification standards
- Estimates, accounting

Procurement
- Product databases
- Price databases

( Lars Bjørkhaug, Norwegian Building Research Institute)
scale

Geospatial Information

World
Country
Installation / Region
State / Province
City / County
Site
Real Property Asset
Land / Parcel

Facility

Floor
Space
System*
Types
Components

Building information Models

(ref: buildingSMART Alliance briefing)

* structural systems
HVAC systems
utility systems
what were we deciding about again?

- What kinds of ‘things’ are needed to define meaning?
- How do these resources combine to create meaning?
- How is meaning shared across different stakeholder perspectives?
- What unique kinds of information are needed?
- Who gets to decide what’s shared and what’s unique?
- How and what information is shared when?
- Relatively minor issue of data format?

source: IFC Implementation Guide
POP QUIZ...

can IFC solve all your problems?

what is really required to solve the problems?

will these problems get solved by themselves?

what are you doing to help solve these problems?
IFC = least common denominator

helps put the “I” in BIM by moving question from format to content and context
1. programming

what problem is being solved?
Laws and regulations
- Building regulations
- Building specifications

Knowledge databases
- Best practice knowledge
- Own practice

Briefing
- Functional req.
- Estimates
- Conditions
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Demolition, refurbishment
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Specifications
- Specification sheets
- Classification standards
- Estimates, accounting

Procurement
- Product databases
- Price databases

{ Lars Bjørkhaug, Norwegian Building Research Institute}
1.1 workgroup formation

who is mad enough to do something?
so what?

78,029 Paved Miles
(3 times around earth)

1.1 Billion Square Feet
(40 Sq. Miles Under One Roof)

Replacement Value: $168.5 Billion
Over 150 Large Installations Worldwide
Approximately 40% of DoD

12.1 Million Acres
(NJ, Conn, Delaware, RI)

Over 400 Boiler Plants
Payments for supplemental operator survey

Additional payments for items already under warranty

Increased costs of replacement parts ordering

Increased down time due to missing system information

2% of the total facility life-cycle cost

6% of the total facility life-cycle cost
Inappropriate utilization resulting in decreased performance or unneeded new construction

Space underutilization resulting in over-building or higher energy costs

Inability to optimize alternative facility use

Inability to simulate contingency operations

Inappropriate allocation of facility as overhead cost vs. means of production

Lost worker productivity due to inefficient building operations
prior efforts

- **Operations & Maintenance System Information (OMSI) Specification**
  e-paper submission of O&M documents

- **U.S. Army, Department of Public Works, Fort Lewis, WA**
  Pockets of local, proprietary information exchange & expertise

- **Electronic construction submittal register**
  Construction Criteria Base, federal UFGS and UFC’s. SpecsIntact software.

- **International Alliance for Interoperability (IAI)**
  FM Project has been proposed using Industry Foundation Classes (IFC)

- **FIATECH Automated Equipment information eXchange (AEX)**
  Exchange of supply chains information among tiered stakeholders

- **Machinery Information Management Open Systems Alliance (MIMOSA)**
  Exchange standard for equipment telemetry

- **Open Standards Consortium for Real Estate (OSCRE)**
  Asset management and valuation exchange

- **National Institute of Science and Technology (NIST)**
who was mad enough to do something?

project invitation sent 01-Nov-2005
1.2 process map

who does what now?
how does handover happen now?

- receives boxes full of paper
- questionable data accuracy
- owners pays two or three times
- full-time transcribers needed
when does handover happen now?

- data created upstream
- different parties create different sets of data
- manufacturers provide catalog cut sheets
- designers provide shop drawings for engineered components
- approval processes
- commissioning activities provide additional information
clear definitions required...

who does what to whom,

when do they do it, and

how do they do it?
business process modeling notation

Figure 9.34 - Message Flow connecting to Flow Objects within two Pools
Workflow Management Coalition – bpmn - xpdl
what did we discover?

maintenance
– warranties
– spare/replacement parts
– pm tasks
– resources

operations
– start-up/shut-down procedure
– trouble shooting procedures

assets
– space measurement
– fixed or movable property
– space-function capabilities
mapping information exchange processes

<table>
<thead>
<tr>
<th>Designer</th>
<th>Construction Manager</th>
<th>Prime Contractor</th>
<th>SubContractor</th>
<th>Supplier</th>
<th>Manufacturer</th>
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<td>3.1 Register &amp; Schedule</td>
<td>3.2 Submit Request</td>
<td>3.3 Receive Request</td>
<td>3.4 Process Request</td>
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</table>
1.3 exchange requirements

what information is exchanged?
designers’ data

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<th>Facility</th>
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<tr>
<td>Floor</td>
<td>Description of vertical levels</td>
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<tr>
<td>Space</td>
<td>Spaces referenced in a project</td>
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<tr>
<td>System</td>
<td>Systems referenced in a project</td>
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<tr>
<td>Register</td>
<td>Material/equipment/etc. catalog (submittal register)</td>
</tr>
<tr>
<td>Component</td>
<td>Individually named materials and equipment</td>
</tr>
</tbody>
</table>
link to portfolio via. owner’s facility id

Building information Models

Facility

Geospatial Information

Country
Installation / Region
State / Province
City / County
Site
Real Property Asset
Land / Parcel
Floor
Space
System*
Types
Components

* structural systems
HVAC systems
utility systems

(ref: buildingSMART Alliance briefing)
space capabilities

OmniClass Table 13 “Spaces by Function”

(ref: Rejprt tp ASTM Subcommittee E-6.25, by Subcommittee E06.25 Whole Buildings and Facilities, used by permission of Gerald Davis, Chair)

30-Dec-08 Contracted Information Exchange Demo 21
space measurement

IFMA and BOMA requirements for spatial measurement have been harmonized as represented in:
ASTM E 1836-01 Standard Practice for Building Floor Area Measurements for Facility Management and
ANSI standard being updated
Point of Contact: davis-gerald@icf-cebe.com

Comprehensive measurement rules

(Ref: Reprt tp ASTM Subcommittee E-6.25, by Subcommittee E06.25 Whole Buildings and Facilities, used by permission of Gerald Davis, Chair)
# builders’ data

<table>
<thead>
<tr>
<th>Installation</th>
<th>Location and serial no. of installed components</th>
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<tr>
<td>Manual</td>
<td>Instruction manuals for sets of/or components</td>
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<tr>
<td>Warranty</td>
<td>Warranty information for sets of/or components</td>
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<tr>
<td>Spare</td>
<td>Spare/parts reordering info for sets of/or components</td>
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</table>

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Installation/operating instructions</th>
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<tr>
<td>Test</td>
<td>System/component test results</td>
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<tr>
<td>Certification</td>
<td>Installation certifications</td>
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</table>
commissioning agents’ data

<p>| | |</p>
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<th></th>
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<tbody>
<tr>
<td><strong>PM</strong></td>
<td>Identifies specific PM tasks and frequency</td>
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<td><strong>Safety</strong></td>
<td>Identifies required safety tasks</td>
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<td><strong>Trouble</strong></td>
<td>Maintenance trouble shooting procedures</td>
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<tr>
<td><strong>Start-Up</strong></td>
<td>Start-up procedures</td>
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<td><strong>Shut-Down</strong></td>
<td>Shut-down procedures</td>
</tr>
<tr>
<td><strong>Emergency</strong></td>
<td>Emergency operating procedures</td>
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</tbody>
</table>

|                  |                                                                 |
| **Material**     | Special materials needed for a given Job Plan Task             |
| **Tool**         | Special tools needed for a given Job Plan Task                  |
| **Training**     | Special training needed for a given Job Plan Task               |
1.4 generic “bim” guide

how is that information organized?
how is this information organized?

Requirements for information exchange directly match IFC model.

difficulties?

• specification for information delivery

• insuring consistent nomenclature across domains

• implementation of cobie model view definition in commercial software
how should the information be exchanged?

• different software types provide/ use different sets/subsets

• ultimately need “file > save-as cobie” and “file > import cobie” wherever needed but...

• spreadsheet provides common-ground until software companies in each sector provide routines
  – widely useful by all
  – IFC / spreadsheet translation rules provided free of charge
  – can be created by hand, CADD, BIM, and other software
  – extend value of BIM ideas to widest possible stakeholders
draft cobie specification

specifications must follow existing facility delivery process

performance-based specifications should allow any team to create the needed data

specifications must reflect real cost to owners of failure to receive this data

designer submits “pre-built” cobie information

builder submits “as-built” cobie information
1. programming
what problem is being solved?

&

how can we solve it?
2. design

how will we solve this problem?
2.1 exchange requirement models

identify exactly what is required when
A basic building model is defined as "the set of information that provides both a graphical representation of the elements of a building and key pieces of information about the building's life cycle performance" (see ISO 16739). A building model provides information about the building, layout of building elements, and energy use.

It is required with the basic building model to support COBIE (Common Data Object for Building Exchange) identification purposes and the units generally used are defined. Ideally, the current phase of the project may be given such a building is located including the geographical location (latitude and the base level for the site datum) and shape of the site may be provided including land title number and address.
COBIE info at:
concept design
COBIE info at: 
early design stages
COBIE info at:
mid-design stages
COBIE info at:
preconstruction stage
Pop quiz….

is the designer providing anything new here?
COBIE provided as owner furnished data
COBIE from contractor: submittals
COBIE from contractor:
make, model, serial no.,
tags
COBIE from contractor:
holder of warranty
parts providers
COBIE from contractor:

tests, certifications, O&M manuals, job plans
Pop quiz....

is the contractor providing anything new here?
COBIE is already in contracts you just format it so people can re-use it?
2.2 generic MVD

**IFC components needed to implement**

mvd.buildingSMART.com
Interesting yes, but can we please move on...
2.3 implementation specs

expected implementation rules
Interesting yes, but can we please move on...

Each named component will be identified by its component type. We would expect, therefore, that the ratio of individual items to types would be well greater than one.
2. **design**

*how will we solve this problem?*

*who is “We” in this question?*

*a detailed technical standard for software engineers to implement IFC within their own products.*
3. construct
3.1 facilitate implementation
• how much can be reasonably achieved?

• is there a order of implementation?

• what is the “low hanging fruit”

COBIE implementation

• equipment lists

• warranty guarantors

• replacement part suppliers
Construction Operations Building Information Exchange (COBIE)

Introduction

Today, most contracts require the handover of paper documents containing equipment lists, product data sheets, warranties, spare parts lists, preventive maintenance schedules, and other information. This information is crucial to support the operations, maintenance, and the management of the facilities assets by the owner and/or property manager.

Gathering this information at the end of the job, today's standard practice, is expensive, since most of the information has to be repeated from information created earlier. COBIE simplifies the work required to capture and record project handover data.

The COBIE approach is to enter the data as it is created during design, construction, and commissioning, see Figure 1. Designers provide floor, space, and equipment layouts. Contractors provide make, model, and serial numbers of installed equipment. Much of the data provided by contractors comes directly from product manufacturers who can also participate in COBIE. Please see Project Delivery Teams for more information.

While COBIE is designed to work with Building Information Models (BIM), COBIE data may also be created and exchanged using simple spreadsheets. The COBIE team selected spreadsheets so that the benefits of the COBIE approach can be widely used throughout the facility acquisition industry, not just on large, high-visibility projects. By allowing the exchange of COBIE data using spreadsheets even small facilities can provide a valuable COBIE database.
This is a general description of COBIE. Detailed information and a user guide (PDF 40KB) may be found through documents identified in the Reference section of this document.

A. Early Design Stage

As the design begins the vertical and horizontal spaces that are necessary to fulfill the owner's requirements for the building, facility, or infrastructure project are defined. Within these buildings, facilities, or projects are also defined the different types of systems that are needed to satisfy the owner's requirements. Please see Project Planning & Development for more information.

Figure 2 illustrates how this information is provided through COBIE. COBIE data begins with the listing of one or more Facilities (e.g., buildings or projects). Each of these facilities has one or more Floors. Within each floor there are Spaces. In buildings, these spaces will typically have room numbers. Outside the building, spaces can be referenced by function, such as "parking lot" or "pavement seating." For non-building projects COBIE users can create "floors" and "spaces" that provide the most meaningful partition of the physical regions that comprise those projects.

Fig 2: Early Design Stage Information

Early in the design, projects are developed by listing spaces and identifying specific functions required to meet the owner's requirements. To allow these spaces to perform as intended, specific building Systems are also required for all projects. For buildings, these systems include electrical, heating, ventilating and air conditioning (HVAC), potable water, wastewater, fire protection, intrusion detection and alarms and other systems. In COBIE, there must be at least one System for each Facility.

Since significant benefit can be achieved for Asset Managers, COBIE allows the exchange of space function and area calculations provided directly by the designer's CAD or BIM software.

B. Construction Documents Design Stage

As the design progresses the products (including materials and equipment) needed to create the systems are specified. Typical construction projects require the designer to create a "submittal register" listing these products and the necessary information that will ensure their installation. This list, the Register, is a catalog of all the types of items to be installed in the project.
 example data sets template
• how much can be reasonably achieved?

• is there a order of implementation?

• what is the “low hanging fruit”

the answers to these questions also directly impact what specific items should be checked.

e.g. COBIE:  
equipment lists hinge on describing individual products as instances of product types  
allow vendor identified space calculation method
3.2 certification and testing
transparency of live demo in large public venu
“what happened?”
“does it work?”

available at buildingSMARTalliance

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<tr>
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<th>Focus</th>
<th>Route</th>
<th>SCIE</th>
<th>CVIE</th>
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1 software not tested against this requirement.

2 re-testing one week later showed sufficient compliance for this to be upgraded to “pass.”
available at buildingSMARTalliance

* existence of “proxy” elements
* components per type

<table>
<thead>
<tr>
<th>System</th>
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<th>Route</th>
<th>SCIE</th>
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\(^1\) software not tested against this requirement.

“how good is it?”

“end of the beginning” not end
4 deploy

how can I use it?
contracted information exchange

CONSENSUS COBIE SPECIFICATION SECTIONS (version 2.0)

*****************************************************************************

SPECIFIER INSTRUCTION: Include the following section if COBIE data is required in any contract.
*****************************************************************************

Electronic O&M Data

In lieu of the submission of paper handover documents, the contractor shall provide all required O&M data to the government electronically in the Construction Operations Building Information Exchange (COBIE) format. The specification of the COBIE format may be found on the "Tools" section of the Whole Building Design Guide (WBDG) (www.wbdg.org). Training and documentation materials, as well as sample files are also provided on the COBIE pages of the WBDG.

a. Four (4) copies of the COBIE data set shall be provided.

(1) The technology used for the data transmission shall be selected to ensure that the data is provided on one single "disk" or "drive." The contractor shall provide data on either disk-based (CD or DVD) or portable hard drive media. The selection of disk-based on drive-based media shall be made by the government.

(2) If disk-based media is provided, a printed label on the data disk shall list the name of the project, project location, contract number, prime contractor name, title of submission, and security classification. To insure that any problems with the data or media can be easily resolved the label shall also include the name and contact information of the individual who produced the
presentations and how-to guides

Implementation
COBIE allows the exchange of IFC-based facility management data. A meeting was held on February 20, 2008 at the U.S. Army Corps of Engineers, Chicago District Office to discuss the implementation of COBIE. The linked files below document the results of that meeting and provide the presentations and handouts that might be of interest to those using COBIE.

- COBIE Meeting Report (PDF 44 KB)
- COBIE Introduction Presentation (PDF 280 KB)
- COBIE Overview Presentation (PDF 1 MB)
- Consensus COBIE Specification Sections (PDF 30 KB)
- COBIE HTML (ZIP 1.9 MB)

Relevant Codes and Standards
- COBIE Information Delivery Manual
- COBIE Requirements Analysis Report (PDF 1.1 MB, 201 pgs)
- COBIE and IAI FM.10 (PDF 74 KB, 1 pgs)

Additional Resources
- COBIE Template Spreadsheet
- "Step-by-Step Guide to COBIE" (PDF 481 KB, 28 pgs)

Briefings
- Overview (for managers) (PDF 518 KB, 26 pgs)
- Data Organization (for information modelers) (PDF 502 KB, 28 pgs)
- Spreadsheet Demo (for designers and contractors) (PDF 5.8 MB, 88 pgs)
- Designer-Side COBIE Worksheets (PDF 1.3 MB, 30 pgs)
loading COBIE designer-side data

a demonstration

look at example project
pilot projects

- Maintenance Building, Ft. Lewis, WA
- All Army Reserve Projects
- CENTCOM HQ, McDill AFB
- Implementation guides for CMMS systems
- Integration w/Corporate IT systems
“inside the box”

- Owners
- Operators
- Construction Management Agent
- Builders
- Architects/Engineers
- Consultants
- Sub-Contractors
- Suppliers & Mfgs
Construction Management Agent

Owners
Operators
Architects/Engineers
Consultants
Builders
Sub-Contractors
Suppliers & Mfgs

ProjNetSM
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### Submittals / Select Project / Select Register / Select Submittal

**Project:** CLV ML (Structure)  **Register:** Submittals

Use the forms below to search or browse projects.

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Use the form below to generate reports on this project's submittals:

- **a. Report Type (req.)**
  - Detailed
  - Summary

- **b. Submittal Type (opt.)**
  - Please select from below

- **c. Current Status (opt.)**
  - Please select from below

- **d. Keyword(s) (opt.)**
  - 

- **e. Status Start Date (opt.)**
  - 

- **f. Status End Date (opt.)**
  - 

- **g. Overdue Response to Contractor**
  - Please select from below

[Generate Report]
Use the form below to generate reports on this project's submittals:

- **Report Type (req.)**: Detailed or Summary
- **Submittal Type (opt.)**: Please select from below
- **Current Status (opt.)**: Pending CQC Review
- **Keyword(s) (opt.)**: 
- **Status Start Date (opt.)**: 
- **Status End Date (opt.)**: 
- **Overdue Response to Contractor**: Please select from below

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### Description: Erection Plan

#### Transmittals:

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<td>John Baumeister (Hensel Phelps Construction Co.-Orlando, FL)</td>
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#### Evaluation(s)

**Status:** Revise and Resubmit on 11-Sep-08 by Stephanie Jordan (Reynolds Smith and Hills-Merritt Island, FL)

**Details:** Revise and Resubmit

Contractor shall demonstrate compliance with Specification Section 05 12 00 Paragraph 1.6.2.1. It should be noted that this requires submittal of calculations as well as providing documentation that demonstrates a Florida Registered Professional Engineer developed the plan.

Additionally, the erection plan submittal can not be approved or approved as noted until it is a final document. This submittal is denoted as 70%-Issued for Approval. Interim coordination and review requires contracting officer authorization.

Future approval or approval as noted on the erection plan will not relieve contractor of the responsibility for error, omissions, and compliance with contract requirements. Future approval or approval as noted on the erection plan does not mean endorsement of the presented erection techniques and methodologies.

Agree with RS&H evaluation: ACL

Submitted by Michael Canicatti (KSC Constellation Project Office (NASA)) on 03-Jun-08 09:29 AM
COBIE using the ProjNet\textsuperscript{SM} Submittal Register
what’s next

standard properties allowing rapid product replacement
what’s next

equipment layout drawings
4 deploy

how can I use it?
or
please help my friend Lyle
Information Technology, BIM & Interoperability Track

**Monday, December 8**
- 9:00am – 12:00pm: buildingSMART Alliance® International Symposium
- 1:00pm – 2:00pm: buildingSMART Alliance® Executive Committee Meeting
- 2:00pm – 4:00pm: buildingSMART Alliance® Board of Directors Meeting

**Tuesday, December 9**
- 9:00am – 12:00pm: buildingSMART Alliance® Days: Industry Focus Track
  - W102: Information Exchange (IE) - What's New in buildingSMART's BIMAPP
  - W202: Building Information Modelling in the Real World
  - W205: BIM Best Practices: Case Studies

**Wednesday, December 10**
- 8:00am – 5:00pm: FEDexpo
- 8:30am – 9:30am: Code Compliance BIM for Building Construction Regulations and e-Government
- 9:00am – 9:30am: BIM in Education: An Information Exchange for Educators and Industry - Focus on WSU’s Michigan University

*any questions?*