



***COBIE – Implementing  
Working Together via:  
buildingSMART,  
SpecsIntact,  
Unified Facilities Guide Specifications,  
ProjNet, &  
Whole Building Design Guide***

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Facilities Engineering and Real Property Division, NASA

- **Vision**

- A global environment where all participants can readily and transparently share, apply and maintain information about facilities and infrastructure

- **Mission**

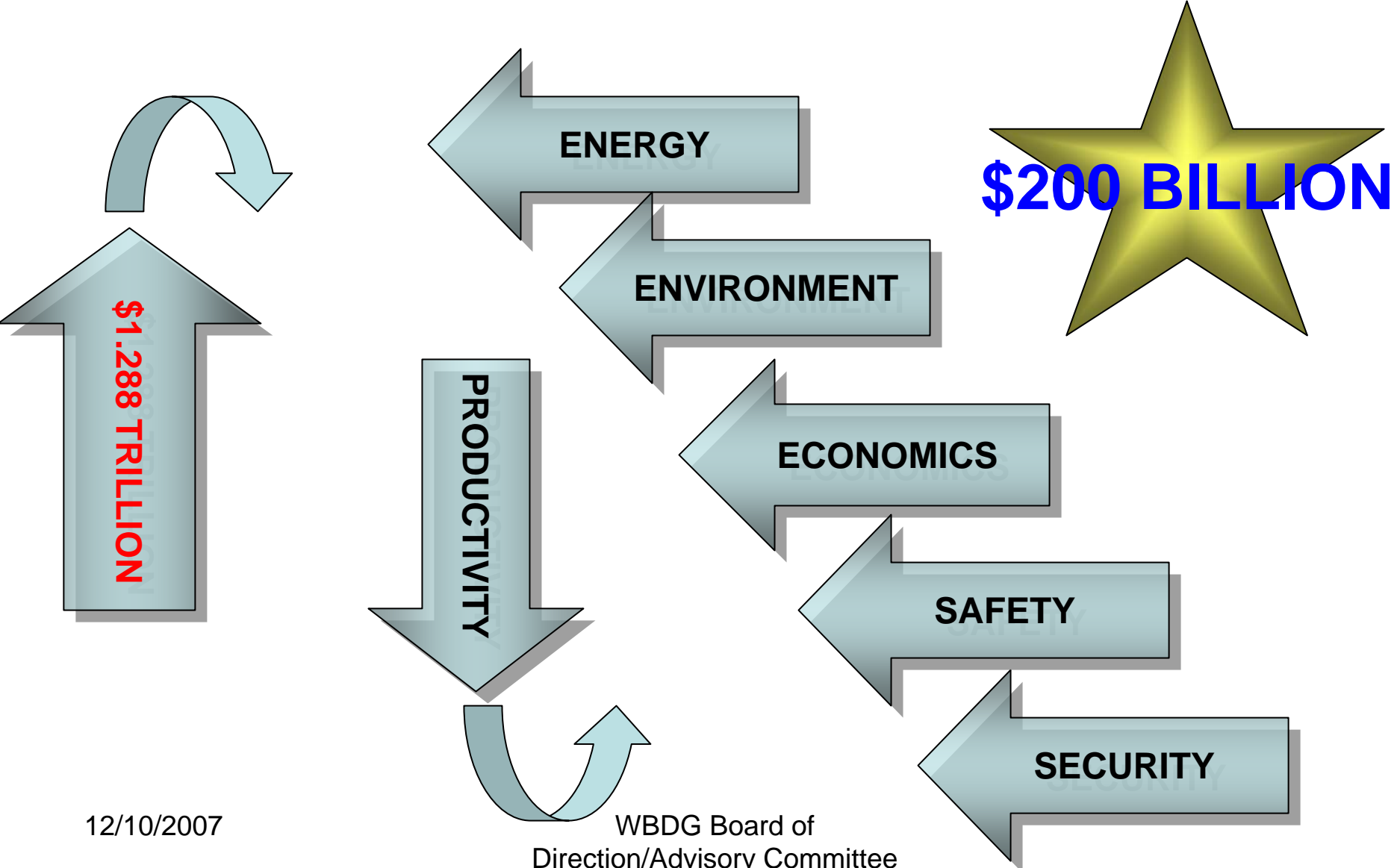
- Improve all aspects of the facility and infrastructure lifecycle by promoting collaboration, technology, integrated practices and open standards



# ***The Nation's and NASA's Facilities Problem . . .***

- Estimated 30% - 50% life-cycle waste in US facilities industry versus 25% - 30% in US manufacturing.
- Consume 40% of energy.
- Contribute 40% of emissions.
- Contribute 20% of land fills.
- \$15.8B waste due to lack of data interoperability.

# *An Opportunity*



12/10/2007

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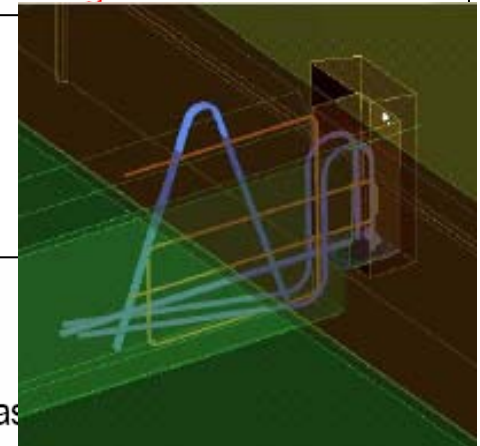
## Charlestown Casino & Slots Parking Garage



- Owner, Architect, Engineer of Record and Contractor were the customers
- Conversion of Contract Drawings to Initial Model was completed in **8 ½ Hours vs 60 Hours in 2D**
- Web View of Model and PDF's Submitted
- Additional Modifications
- Piece Report sent to Estimating For Pricing
- HCSI **awarded project 3 Days following initial submittal**

### Project Requirements / Specifications

- 585' Long
- 240' Wide
- 5 Supported Levels
- 1,290 Pieces of Precast
- Redesigned Bay Spacing from 36' to 45'
- Multiple Exterior Finishes
- Accommodate Fire Codes & Future Expansion/Additions



- **Zero drafting errors**
- **15% Under Budget**
  - Potential for greater savings as and libraries are developed
- **Project erected 3 weeks ahead of schedule**
  - Connections lining up
  - Pieces fit because the model fit



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Direction

# ***COBIE: A Data Standard for Use with Construction Specifications***

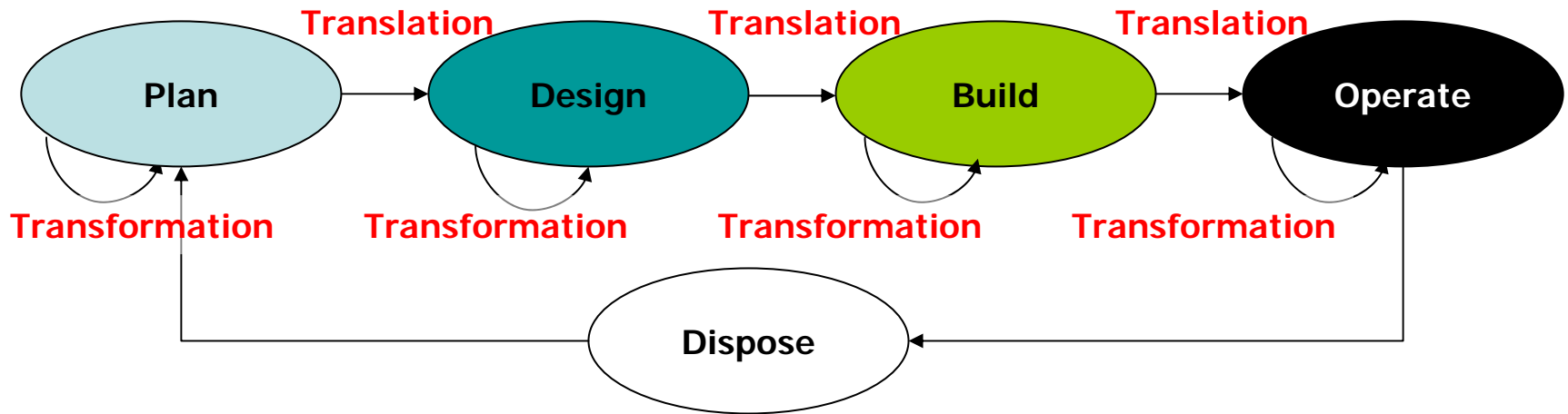
Problems exist in getting construction submittals to the end user, e.g. maintenance, community

COBIE defines a convenient structure and method for solving the problems.

Use of COBIE improves construction specification practices.

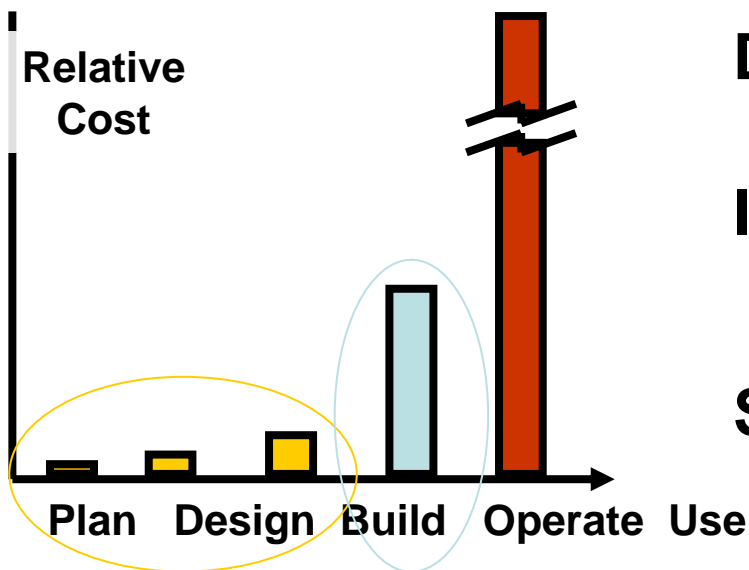


# Critical data is lost ...



- decisions made as ideas & parts are **transformed** into designs & buildings are not captured
- **translation** of information for downstream use loses much of what is known during the previous phase
- increased “owner” cost due to data losses = \$14.8B annually “Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industries,” NIST GCR 04-867/Aug 2004.

# Costs increase too!



**Cost of replacement parts ordering**

**Down time due to missing system information**

**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**

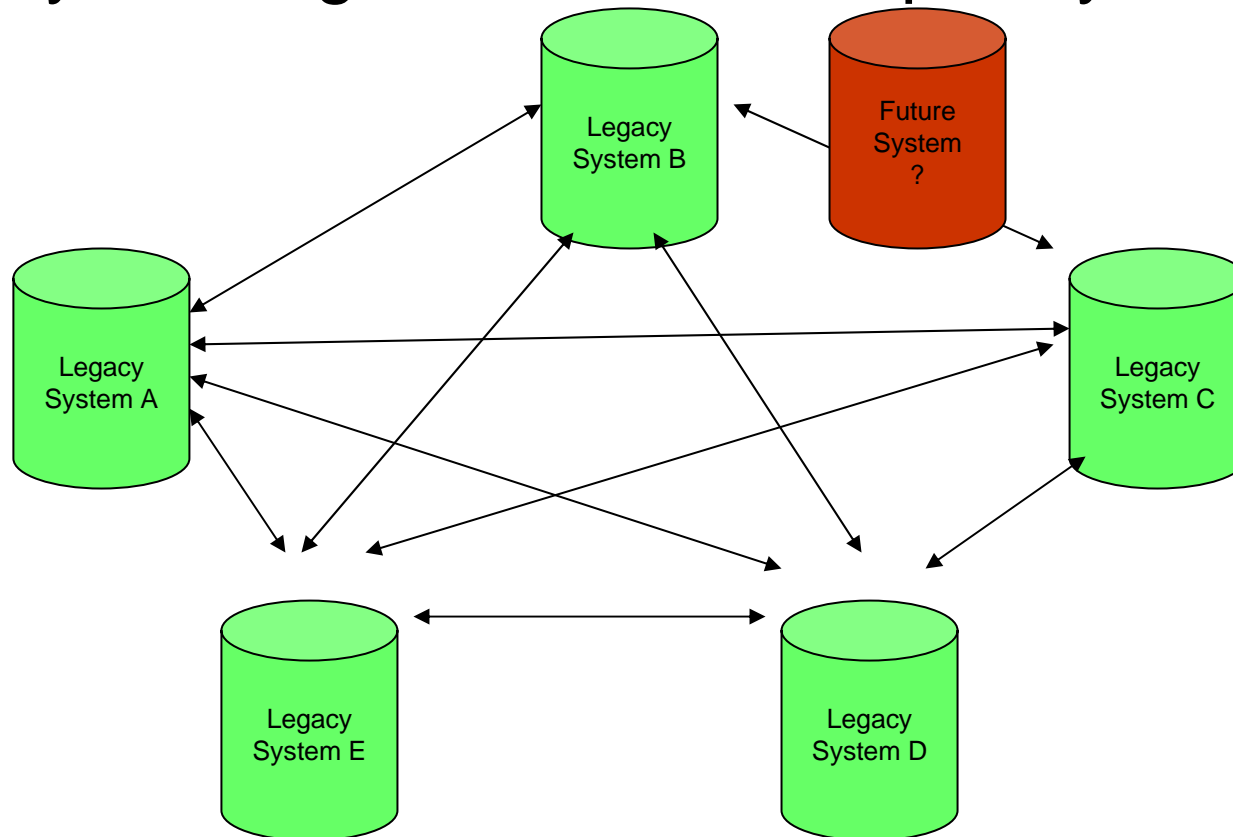
# *What Is In It For Me?*

1. Produce More Valuable Product for Client
2. Higher Quality Total Package
3. Lower Energy Usage
4. Shorter Delivery Time
5. Better Environmental Stewardship
6. Reliable Facility Information
7. Better Information Based Decisions
8. Lower Lifecycle Costs
9. Fewer Change Orders and RFI's
10. Accurate Picture of Facility Prior To and After Construction



# *People have tried ...*

directly linking contractor and government systems which yields high costs and complexity.

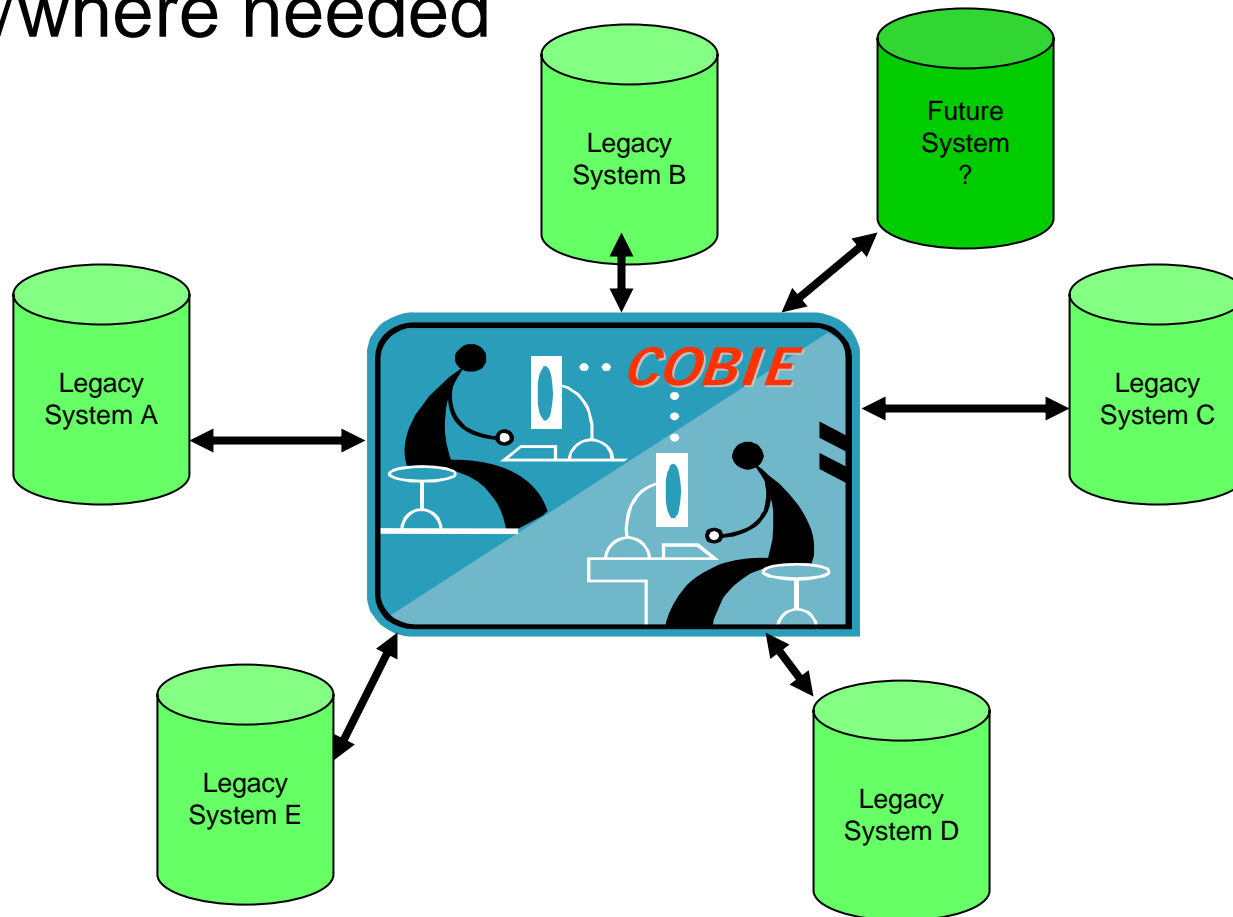


## ***COBIE goals . . .***

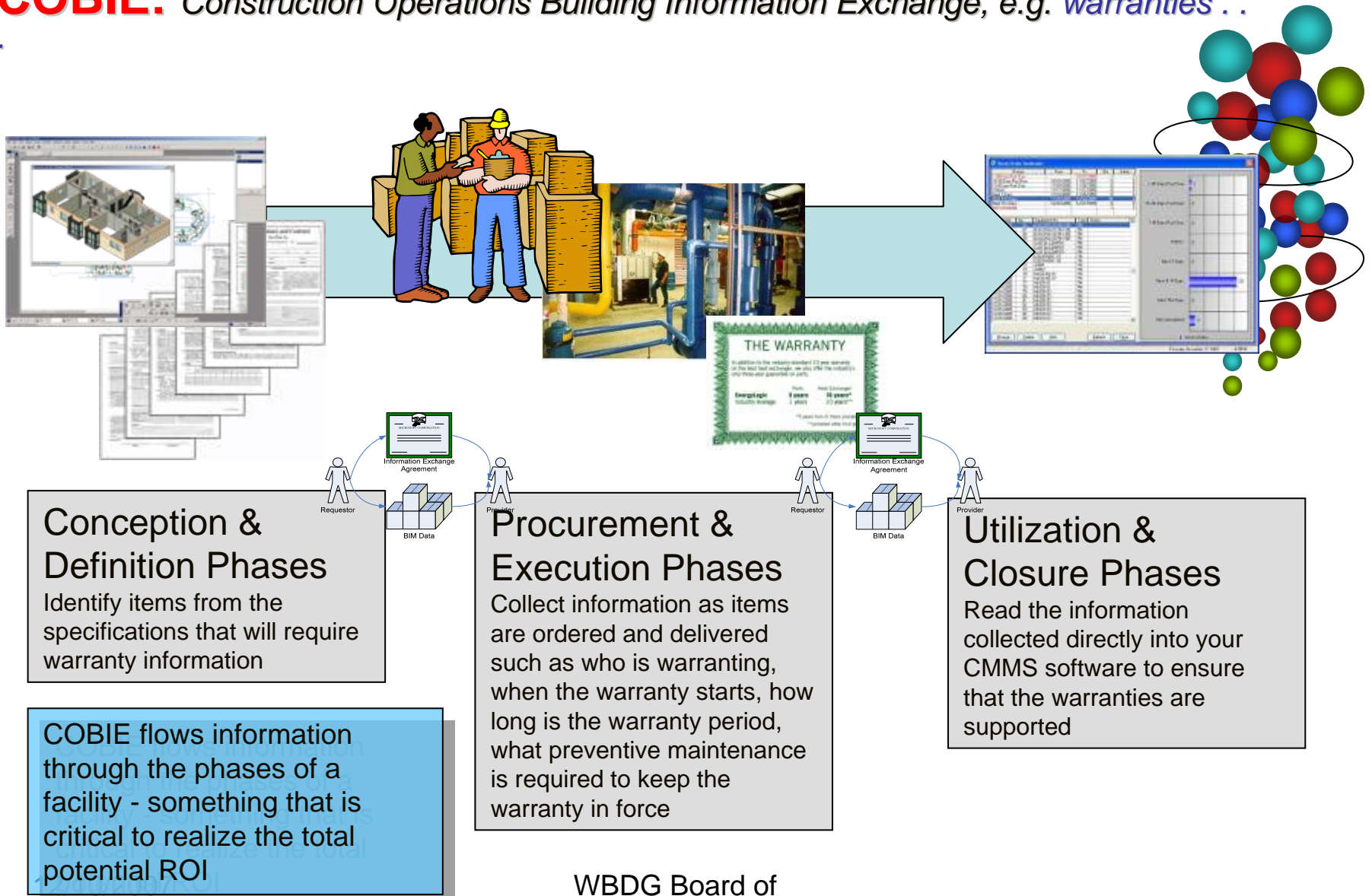
- 1) capture product, equipment, system, and warranty data as created during construction
- 2) transfer to maintainer's, operator's, and asset manager's systems.
- 3) produce format and specification
- 4) demonstrate software for captured during construction and exchange with commercial software

# COBIE ...

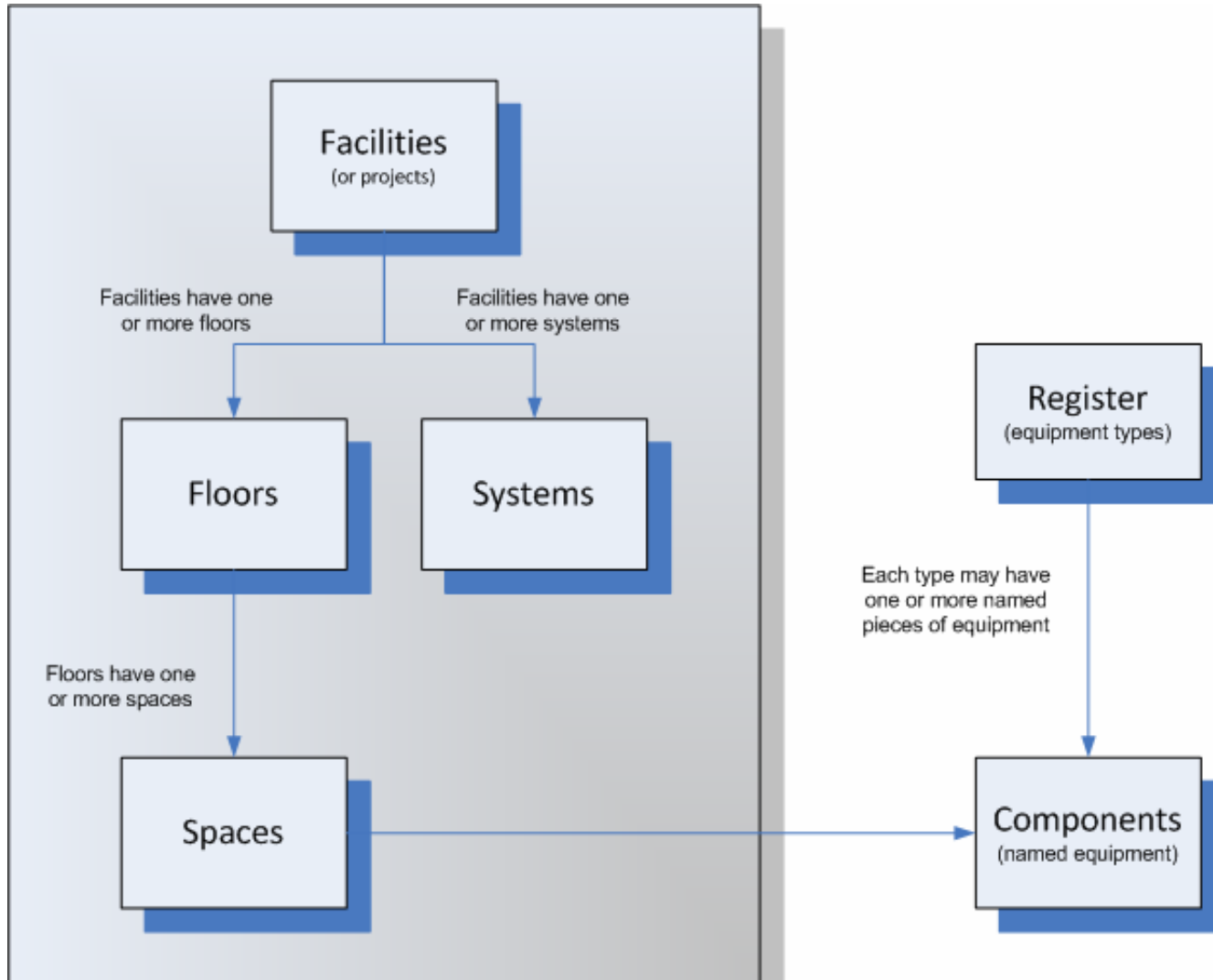
uses an international recognized standard and data definitions requirements to allow write-once read when/where needed



# COBIE: Construction Operations Building Information Exchange, e.g. warranties . .



# COBIE Structure



# COBIE as EXCEL Worksheets

|   |                              |               |   |           |            |
|---|------------------------------|---------------|---|-----------|------------|
| • | Contact Worksheet            |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 1                            | Contact       | People/offices/companies referenced in this file.     |           | All        |
| • | Design Worksheets            |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 2                            | Facility      | Identification of facility(ies) referenced in a file  |           | Designer   |
| • | 3                            | Floor         | Description of vertical levels                        |           | Designer   |
| • | 4                            | Space         | Spaces referenced in a project                        |           | Designer   |
| • | 5                            | System        | Systems referenced in a project                       |           | Designer   |
| • | 6                            | Register      | Material/equipment/etc. catalog (submittal register)  |           | Designer   |
| • | 7                            | Component     | Individually named materials and equipment            |           | Designer   |
| • | 8                            | Attribute     | Material/equipment/etc. properties                    |           | Designer   |
| • | 9                            | Coordinate    | Location of spaces and components                     |           | Designer   |
| • | Submittal Worksheets         |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 10                           | Schedule      | The planned and needed-by dates for submittals        |           | Contractor |
| • | 11                           | Document      | Documents referenced in this file                     |           | Contr./Mfg |
| • | 12                           | Transmit      | Transmittals for given submittal register item        |           | Contractor |
| • | 13                           | Approve       | The approval status of transmittals/submittals        |           | Owner Rep. |
| • | Installation Worksheets      |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 14                           | Installation  | Location and serial no. of installed components       |           | Contr./Mfg |
| • | 15                           | Manual        | Instruction manuals for sets of/or components         |           | Contr./Mfg |
| • | 16                           | Warranty      | Warranty information for sets of/or components        |           | Contr./Mfg |
| • | 17                           | Spare         | Spare/parts reordering info for sets of/or components |           | Contr./Mfg |
| • | Commissioning Worksheets     |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 18                           | Instruction   | Installation/operating instructions                   |           | Contr./Mfg |
| • | 19                           | Test          | System/component test results                         |           | Contractor |
| • | 20                           | Certification | Installation certifications                           |           | Contr./Mfg |
| • | Job Plan Resource Worksheets |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 21                           | Material      | Special materials needed for a given Job Plan Task    |           | Contr./Mfg |
| • | 22                           | Tool          | Special tools needed for a given Job Plan Task        |           | Contr./Mfg |
| • | 23                           | Training      | Special training needed for a given Job Plan Task     |           | Contr./Mfg |
| • | Job Plan Task Worksheets     |               |   |           |            |
| • | Number                       | Name          | Contents  | Author(s) |            |
| • | 24                           | PM            | Identifies specific PM tasks and frequency            |           | Contr./Mfg |
| • | 25                           | Safety        | Identifies required safety tasks                      |           | Contr./Mfg |
| • | 26                           | Trouble       | Maintenance trouble shooting procedures               |           | Contr./Mfg |
| • | 27                           | Start-Up      | Start-up procedures                                   |           | Contr./Mfg |
| • | 28                           | Shut-Down     | Shut-down procedures                                  |           | Contr./Mfg |
| • | 29                           | Emergency     | Emergency operating procedures                        |           | Contr./Mfg |

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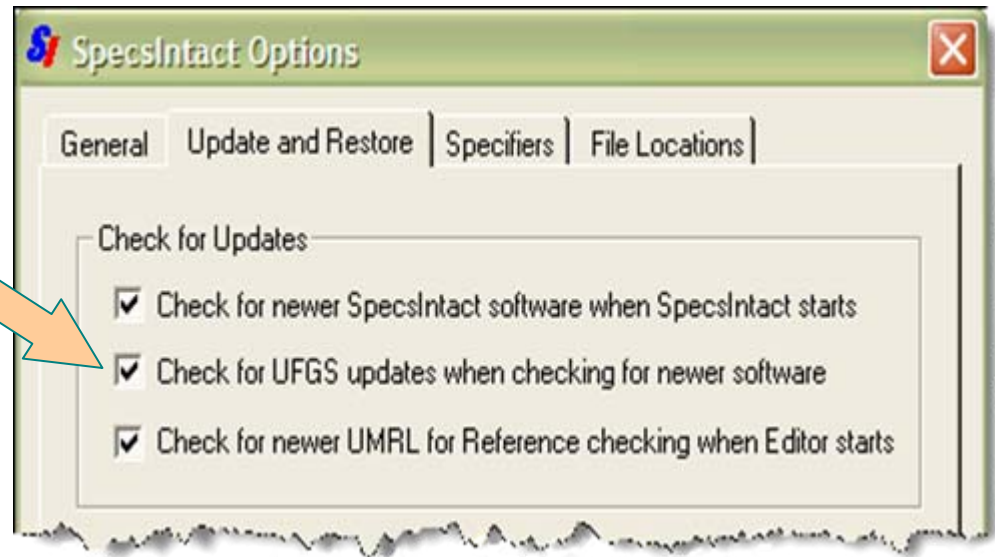
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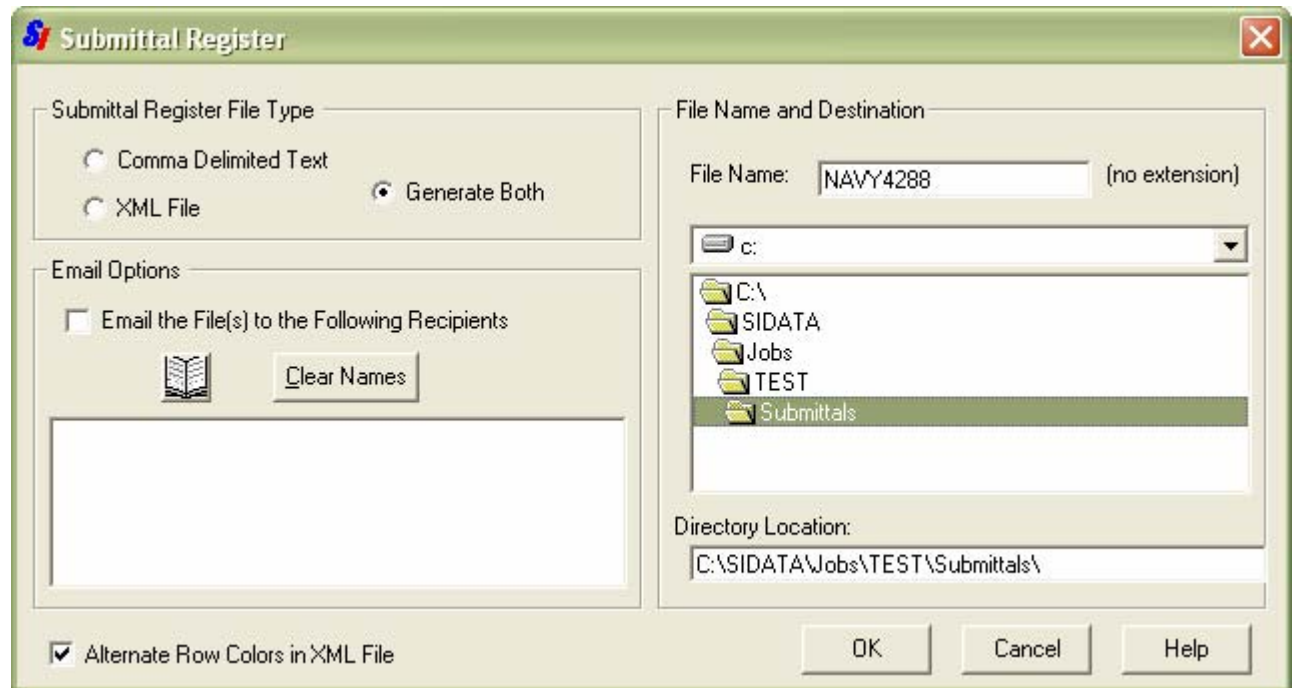
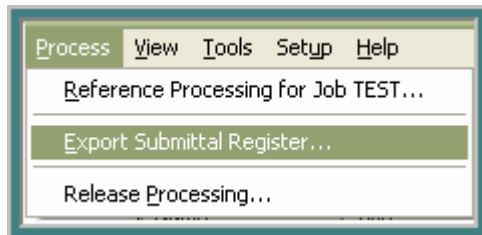
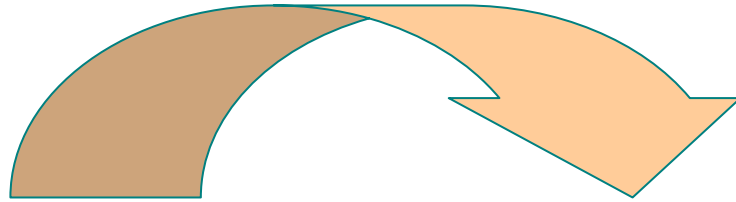
# *SpecsIntact and Unified Facilities Guide Specifications*

- **Automatically Checks for:**
  - New Software
  - New UFGS Master
  - Unified Master Reference List (UMRL)
- **More than 21000 users.**
- **Outstanding “Sustainable” requirements.**

**TABLES in January!**



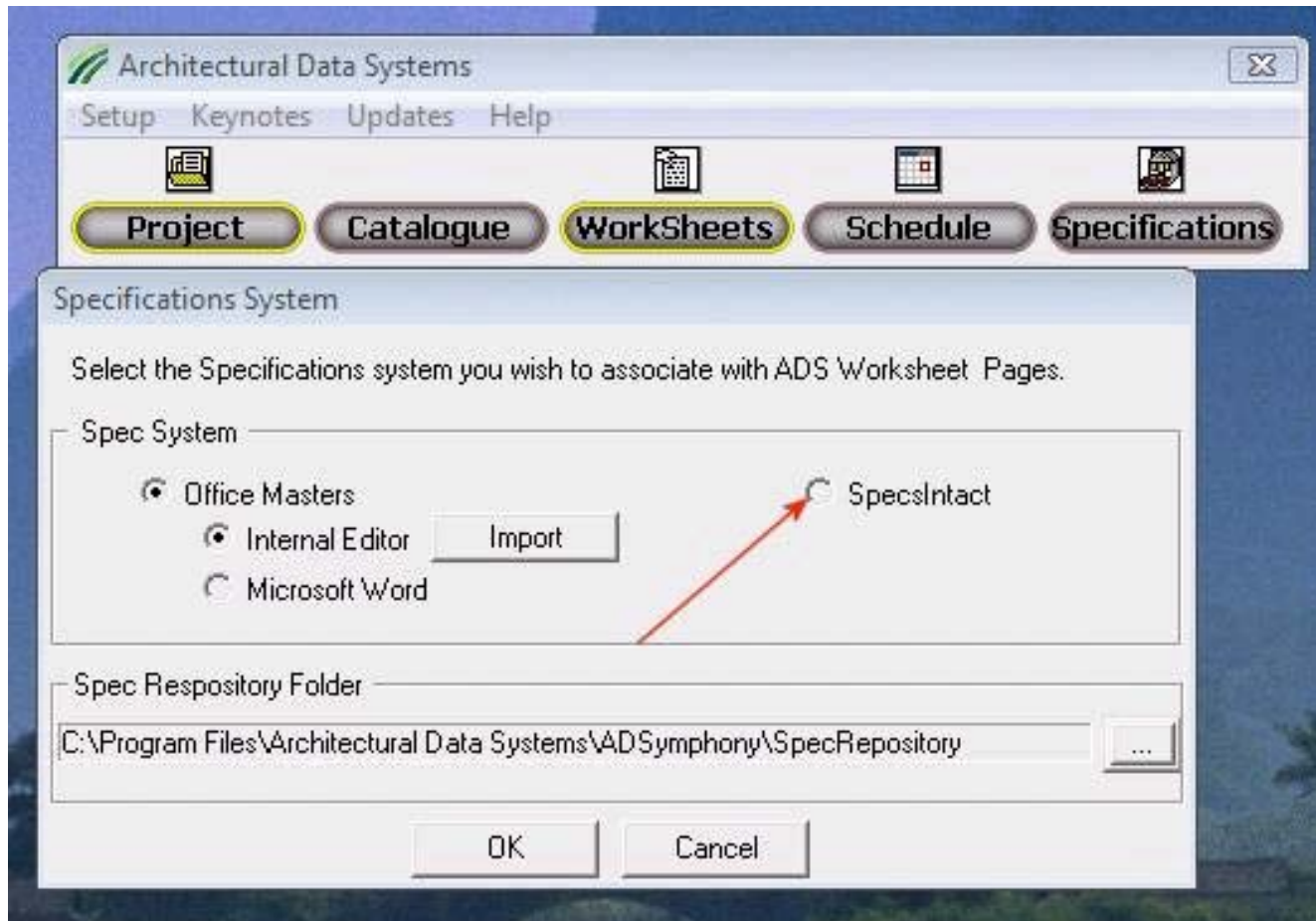
# Export **COBIE** suitable Submittal Register



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# Architectural Data Systems Integrates SpecsIntact



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# ***New Format Option Anticipated - January 2009***

## 1.4 SYSTEM DESCRIPTION

- A. Glazing Systems: Provide glazing systems capable of withstanding normal thermal movements, wind loads and impact loads, without failure, including loss due to defective manufacture, fabrication and installation; deterioration of glazing materials; and other defects on construction.
- B. Glass: Provide glass products in the thicknesses and strengths (annealed or heat-treated) required to meet or exceed the following criteria based on project loads and in-service conditions per ASTM E1300.
  - 1. Minimum thickness of annealed or heat-treated glass products is selected, so the worst-case probability of failure does not exceed the following:
    - a. 8 breaks per 1000 for glass installed vertically or not over 15 degrees from the vertical plane and under wind action.
    - b. 1 break per 1000 for glass installed 15 degrees or more from the vertical plane and under action of wind and/or snow.

## 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [ Product Data ]: Manufacturer's data sheets on each product to be used, including:

# The *ProjNet*<sub>sm</sub> contribution ...

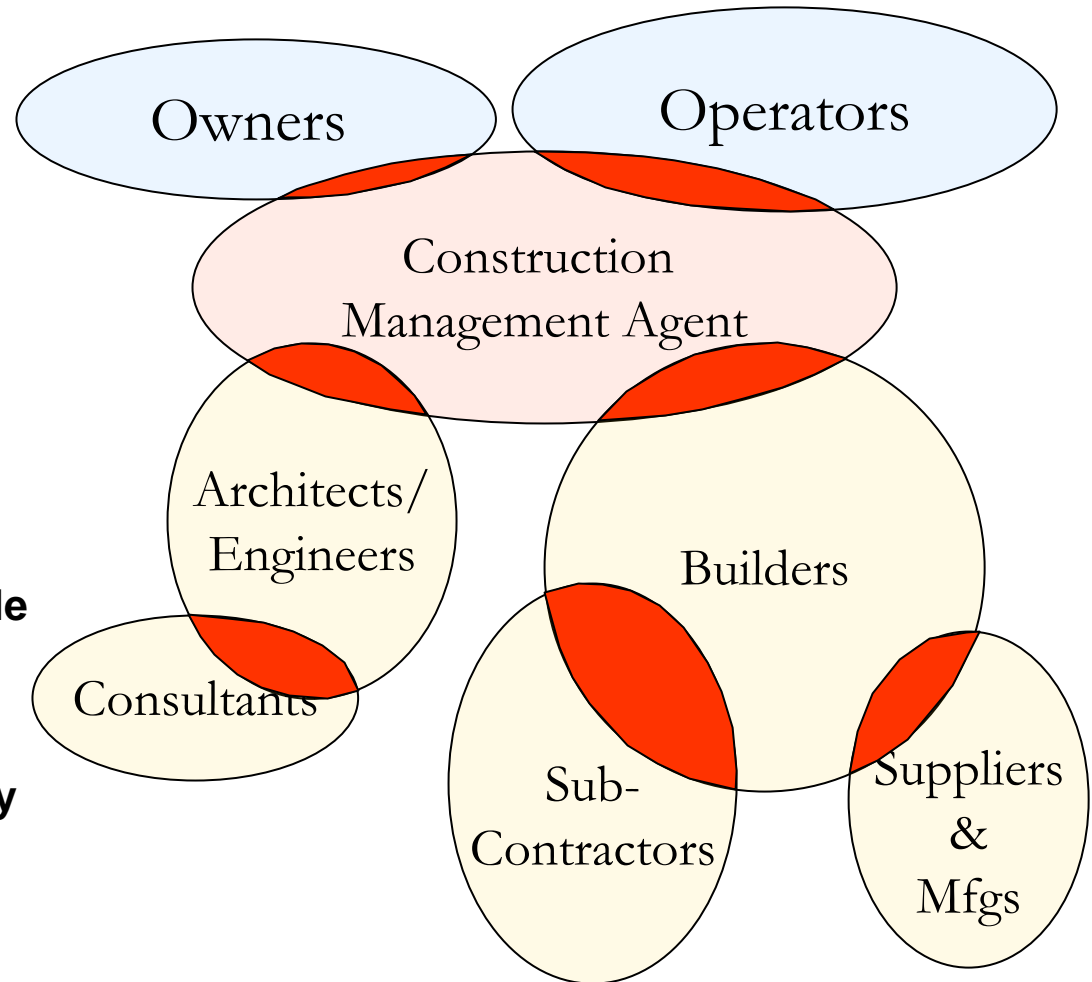
**A secure web-based information exchange platform**

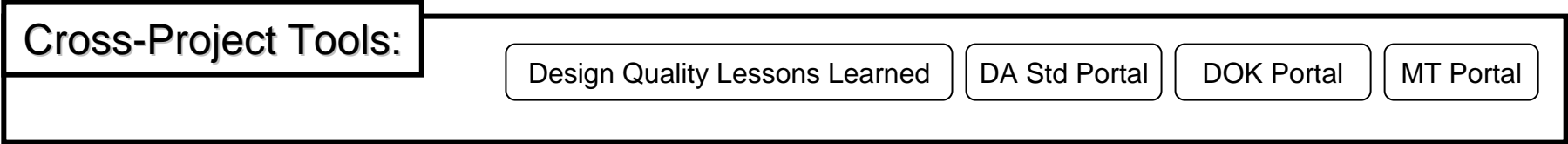
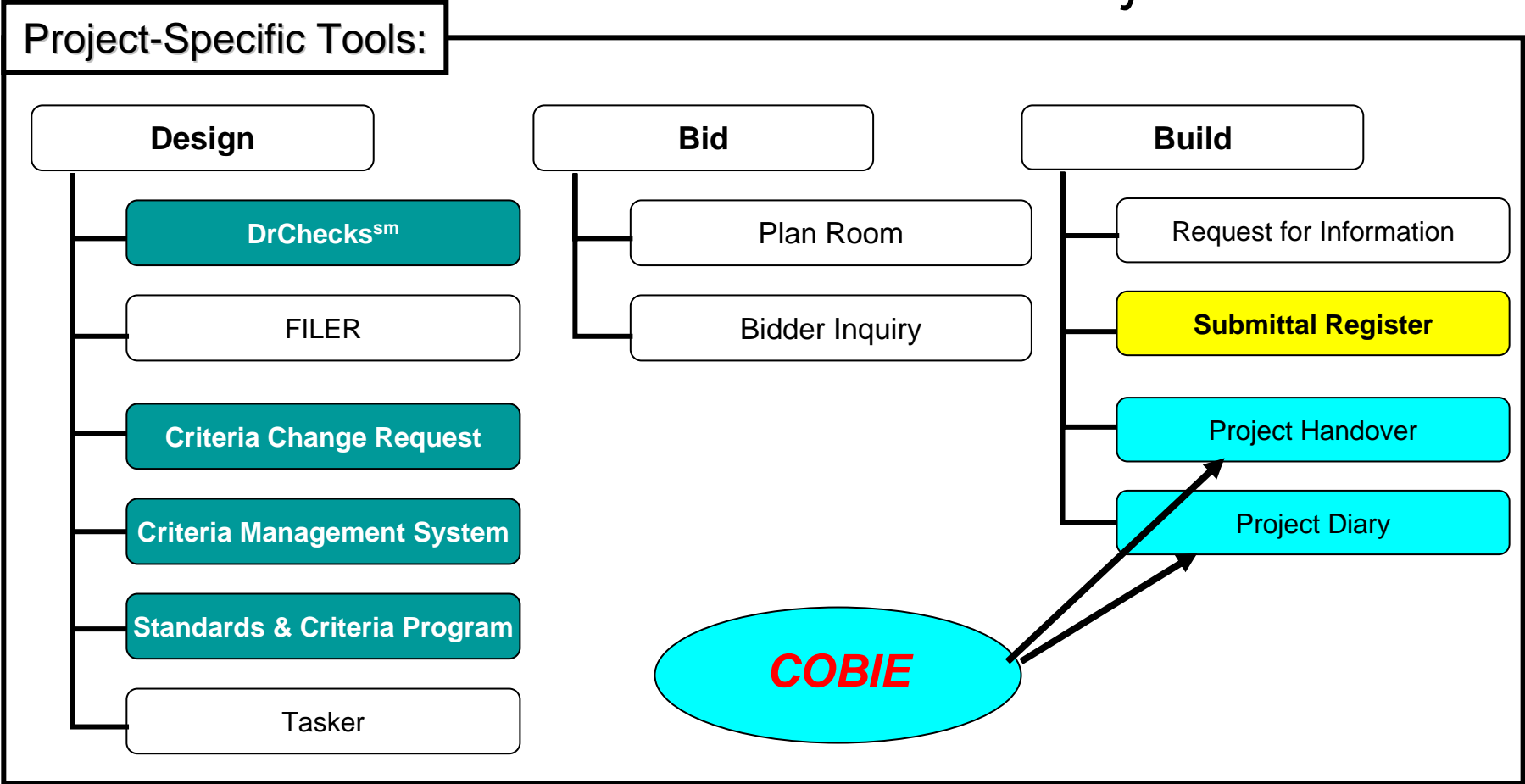
**Simple so anyone can use it – Internet browser**

**Cheap so everyone can use it – no per-seat fee**

**Supports specific tasks where information is exchanged so people know what to do.**

**Gives PM's tools to quickly identify unresolved technical issues and those who can resolve them.**





Legend:

- NASA (Teal box)
- Local Use (Yellow box)
- Not Used (White box)
- New (Cyan box)

# Product information to match with COBIE structure . . .

**WBDG**  
WHOLE BUILDING DESIGN GUIDE

HOME | ABOUT WBDG | SITE MAP | SEARCH SITE:

News, Events & Training | Design Guidance | Project Management | Mandates / References

## PRODUCT GUIDE

**Product Guide** is a new online service that features only products that comply with federal guide specifications. Product Guide was developed for A/E/C professionals researching products for federal construction projects. With Product Guide, architects, engineers and general contractors can quickly identify whether the products they want to use meet all applicable federal guide specs.

**Key Features include:**

- Reduces time needed to identify products that comply with federal guide specs
- Displays product information in an easy to understand format
- Provides product information directly to those with a need to know

[Explore Product Guide](#)

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If you have suggestions or want to comment on this website, please [contact us](#).

**Warranty, O&M Guide, Parts List, etc**

**FOAMULAR Extruded Polystyrene Insulation**  
**FOAMULAR® 404 & 604 FOA**

**Product Data**  
FOAMULAR 404 and 604 Insulation

**Material** Extruded polystyrene closed-cell on face and back surfaces. FOA Owens Corning patented RTR conditions of strict quality control.

**Thermal resistance\*** R-4.0 at 75 °F mean temp (R-value is the resistance of the R-value, the greater the R-value, the greater the resistance).

**Size** 1/2" x 24" x 48" (2' x 2')

**Edges** Foam-chamfered on all sides

**Weight** Approximately 2.0 lb/ft<sup>2</sup>

**Packaging** Shipped in units with two storage or exposure to be arranged.

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**FOAMULAR 404 RB and 604 RB Insulation**

**Material** Extruded polystyrene closed-cell on top side. FOAMULAR Owens Corning patented RTR quality control.

**Thermal resistance\*** R-4.0 at 75 °F mean temp (R-value is the resistance of the R-value, the greater the R-value, the greater the resistance).

**Size** 1/2" x 24" x 48" (2' x 2')

**Edges** Foam-chamfered on all sides

**Weight** Approximately 2.0 lb/ft<sup>2</sup>

**Packaging** Shipped in units with two storage or exposure to be arranged.

\*Assuming average relationship to the volume of insulation.

**Maximum Design Load Recommendation, PSF**

| FOAMULAR Product | Dead Load | Live Load |
|------------------|-----------|-----------|
| 404              | 1000      | 1100      |
| 404 RB           | 1100      | 600       |
| 604              | 2500      | 1700      |
| 604 RB           | 1000      | 1000      |

**OWENS CORNING SYSTEM THIN**  
OWENS CORNING WORLD HEAD  
ONE OWENS CORNING PARKWAY  
TOLEDO, OHIO 43660

1-800-GET-PINK  
www.owenscorning.com  
System, design and application details which are trademarks of Owens Corning  
® and ® designations are not intended to describe the features presented by this material under actual fire conditions.

**Product Data Sheet**

## FOAMULAR® 404 & 604 FOAMULAR 404 RB & 604 RB

**FOAMULAR Extruded Polystyrene Insulation**

**For use in Protected Roof Membrane Assemblies and plaza deck systems.**

**Owens Corning Has the System Solution for Protected Roof Membrane Assemblies (PRMA)**

- FOAMULAR 404 and 604 insulation products protect the roof membrane from damage, thermal stress and UV exposure in PRMA systems.
- Designed for use with pavers. FOAMULAR 404 RB and 604 RB insulation products support pavers without the need for pedestals and provide excellent drainage.
- High compressive strength - choose 40 or 60 psi.
- Outstanding moisture resistance gives long-term thermal performance.
- Superior R-value of 5 per inch of product thickness.
- Tough, lightweight panels handle, hoist and install quickly and easily.
- 15-year Owens Corning thermal warranty combines with membrane manufacturer warranties for assured performance.

**PRMA Product Solutions**

You may already know that extruded polystyrene is the only type of insulation recommended for PRMA applications. Owens Corning offers four specific types of FOAMULAR insulation for this use:

- FOAMULAR 404
- FOAMULAR 604

**Paved System Solutions**

When the designer prefers to place the insulation directly beneath the pavers, FOAMULAR 404 RB and FOAMULAR 604 RB insulation products are the materials of choice. In addition to providing strong support for the PRMA roof, these products offer excellent drainage characteristics. That's because they're manufactured with ribs that are cut the entire length of each panel. Coupled with the standard bottom-side rain channels, the ribs help drain moisture away from the underside of the paver to protect it from freeze/thaw cycle damage.

As a bonus, FOAMULAR 404 RB and FOAMULAR 604 RB insulation products eliminate the need for pedestals beneath the pavers. Result: significant savings in labor and materials.

**Compliance with Standards**

- Underwriters Laboratories, Inc. See Classification Certificate U-197
- BOCA I-91-54
- ICBO 3658
- SBCOT PST & EST 9727

**Physical Properties**

| Property   | ASTM           | FOAMULAR 404 Insulation | FOAMULAR 604 Insulation | FOAMULAR 404 RB Insulation | FOAMULAR 604 RB Insulation |
|--|----------------|-------------------------|-------------------------|----------------------------|----------------------------|
| R-value* (at 75 °F mean temp.)   | C 518 Modified | 4.0                     | 10                      | 9.5                        | 9.5                        |
| Compressive strength minimum (specification value) (lb/ft <sup>2</sup> ) | D 1521         | 40                      | 600                     | 40.0 <sup>†</sup>          | 60.0 <sup>†</sup>          |
| Water absorption (% by volume max.)                                      | C 272          | 0.07                    | 0.07                    | 0.07                       | 0.07                       |
| Dimensional stability (% linear change max.)                             | D 2136         | 2.0                     | 2.0                     | 2.0                        | 2.0                        |
| Linear coefficient of thermal expansion (in/in/°F max.)                  |                | 2.7 x 10 <sup>-4</sup>  | 2.7 x 10 <sup>-4</sup>  | 2.7 x 10 <sup>-4</sup>     | 2.7 x 10 <sup>-4</sup>     |
| Flame spread   | E 84           | 5                       | 5                       | 5                          | 5                          |

\* Based on 2" thickness  
† From core property use design load recommendations at right.

† These laboratory tests are not intended to describe the features presented by this material under actual fire conditions.

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