

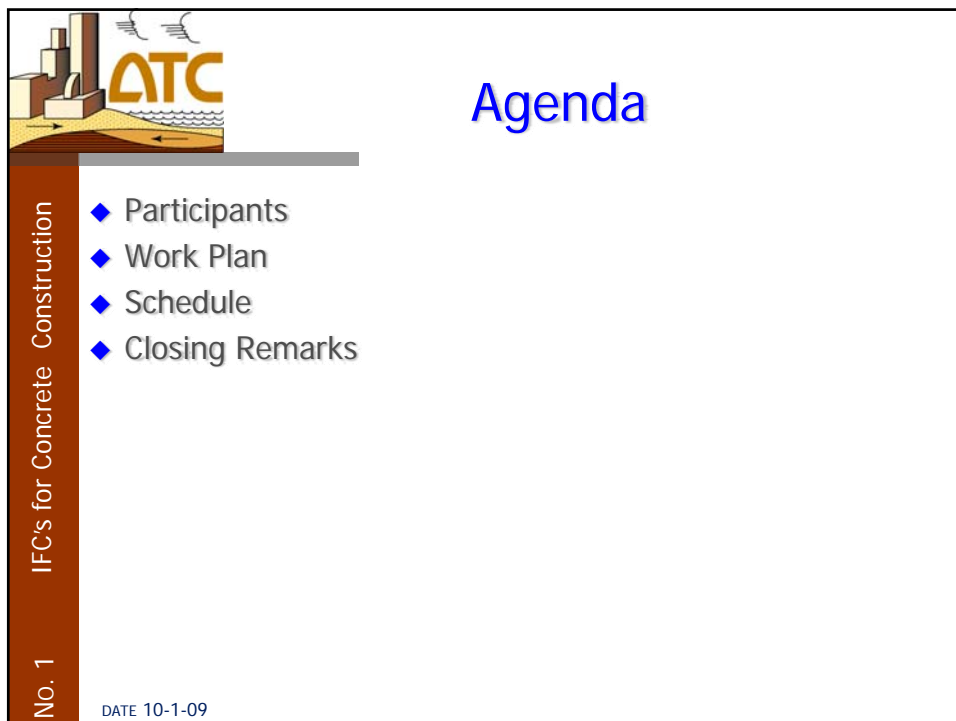


Developing a Strategic Plan for BIM and Structural Concrete



SDC Session #26
October 1, 2009
Inverness Hotel & Conference Center
Englewood, Colorado

27-09 0



Agenda

- ◆ Participants
- ◆ Work Plan
- ◆ Schedule
- ◆ Closing Remarks

No. 1 IFC's for Concrete Construction

DATE 10-1-09



Funding Organizations

The Charles Pankow Foundation




Ready Mixed Concrete Research and Education Foundation

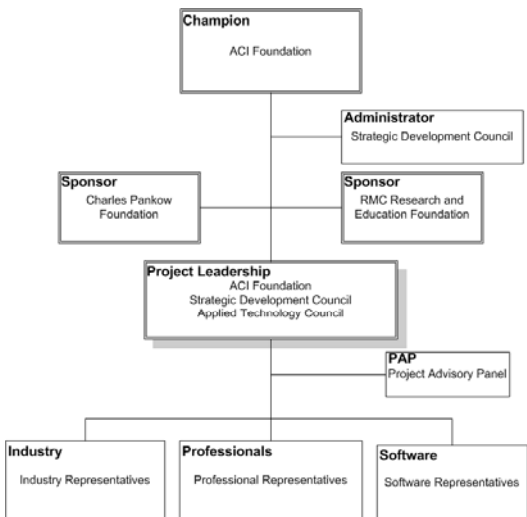


IFC's for Concrete Construction

No. 2



Project Organization



```

graph TD
    Champion[Champion  
ACI Foundation] --- Administrator[Administrator  
Strategic Development Council]
    Sponsor1[Sponsor  
Charles Pankow Foundation] --- Administrator
    Sponsor2[Sponsor  
RMC Research and Education Foundation] --- Administrator
    Administrator --- ProjectLeadership[Project Leadership  
ACI Foundation  
Strategic Development Council  
Applied Technology Council]
    ProjectLeadership --- PAP[PAP  
Project Advisory Panel]
    ProjectLeadership --- Industry[Industry  
Industry Representatives]
    ProjectLeadership --- Professionals[Professionals  
Professional Representatives]
    ProjectLeadership --- Software[Software  
Software Representatives]
    
```

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No. 3



Participants


MANAGEMENT

- ◆ Doug Sordyl, ACI Foundation
 - Program Manager
- ◆ Chris Darnell, SDC
 - Program Manager
- ◆ Thomas R. McLane, ATC
 - Project Manager
- ◆ Edwin T. Dean, Nishkian Dean
 - Principal Investigator
- ◆ Michelle Anderson, Nishkian Dean
 - Project Administrator

PROJECT ADVISORY PANEL

- ◆ François Grobler, PAP Chair
- ◆ Chuck Eastman
- ◆ Dan Frangopol
- ◆ Dave Hutchinson
- ◆ Jim Jacobi
- ◆ Steve Jones
- ◆ Paul Mlakar
- ◆ Deke Smith

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PMC Participants


ENGINEERING

- ◆ Erleen Hatfield, Buro Happold
- ◆ Aaron White, Walter P. Moore and Associates, Inc.
- ◆ Phil Williams, Webcor

INDUSTRY

- ◆ Pete Carato, ACI
 - Chair, ACI BIM Committee 131
- ◆ Mike Schneider, ASCC
 - Baker Concrete
- ◆ John Turner, CRSI
 - CRSI Regional Manager

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PMC Participants

No. 6 IFC's for Concrete Construction

SOFTWARE

- ◆ AEC Autodesk (Revit Structure)
 - Scott Hammond
- ◆ Bentley Systems
 - Raoul Karp
- ◆ Tekla
 - Alistair Wells
- ◆ Digital Project
 - Chi Ng
- ◆ aSa
 - Dave Grundler
- ◆ Computers and Structures, Inc.
 - Rob Tovani



WORK PLAN

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Objective

The results from the research effort will be to develop a comprehensive report that describes current state of the industry, attribute exchange priorities, and a strategy for implementing effective IFC exchanges.

INTEROPERABILITY


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Strategic Planning Tasks

- Task 1: Strategic Planning Research
- Task 2: Strategic Planning Session
- Task 3: Strategic Plan Report

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No. 10

Strategic Planning Research

TASK 1



Strategic Planning Research

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Assess and assemble the current state of the industry and opinion of industry participants, design professionals, suppliers and builders.

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Strategic Planning Research

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This information will be derived from:

1. Evaluation Strategic Development Council (SDC) BIM survey.
2. Telephone interviews will be conducted with select individuals to gain insight and industry perspective on the needs and opportunities that interoperability can achieve.
3. Assess applicability of concrete domain work prepared.

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Strategic Planning Research

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From the survey, interviews and domain report, a white paper will be developed to establish the state of the practice within the concrete industry on interoperability.

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Strategic Planning Session

TASK 2



Strategic Planning Session

The strategic planning session will bring together professionals and industry representatives in a forum to foster discussion, solicit input and gain support for industry initiatives for concrete BIM interoperability.

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Strategic Planning Session

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- ◆ One or Two-day strategic planning session will consist of an assortment of
 - plenary and
 - break-out meetings
- ◆ The objective of the planning session will be to coalesce ideas into strategic initiatives.

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TASK 3

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Strategic Plan Report

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Strategic Plan Report

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- ◆ The strategic planning research and the group planning session will be used to develop a Strategic Work Plan.
- ◆ This report will highlight the state of the industry and portray a vision for increasing interoperability through the use of IFCs.

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Strategic Plan Report

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- ◆ The exchange attribute priorities will be clearly defined and a direction offered for achieving interoperability through IFC implementation.
- ◆ The Strategic Plan will be the seminal guide for future industry investment in developing concrete BIM objectives.

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Schedule (Preliminary)

◆ Strategic Planning Research	1/2010
◆ Strategic Planning Session	3/2010
◆ Strategic Plan Report	6/2010

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Supplemental Information

IFC's for Concrete Construction

- ◆ What is an IFC
- ◆ ATC-75 Project

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WHAT IS AN IFC

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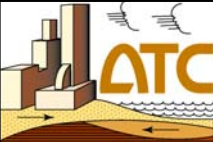


IFC

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- ◆ Industry Foundation Class – IFC
 - Exchange protocol;
 - Non proprietary, open architecture file format for exchanging data;
 - International NBIMS protocols maintained by buildingSMART

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Model View Definition (MVD)

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MVD - Axis

Reference	Version	1.0	Status	Draft
Relationships				
History	5 th August, 2008			
Authors	Matthias Weise (mwe@aec3.de)			
Document Owner	AEC3			

Usage in view definition diagram

```

graph LR
    RCn3[Product Shape Representation] --> RCn3[Axis Representation]
            
```

Instantiation diagram (example for a 2D axis)

```

classDef ProductShapeRepresentation
classDef Product
classDef AxisRepresentation
classDef RepresentationContext

classDef ProductShapeRepresentation
classDef Product
classDef AxisRepresentation
classDef RepresentationContext

classDef ProductShapeRepresentation
classDef Product
classDef AxisRepresentation
classDef RepresentationContext
            
```

IFC - Axis


```

Example (spt)
/***** Product *****/
#100= IFCWALLSTANDARDCASE('33PK_7u55pax0070w07110',#0,
'Mass-Ext-ERCO-2',5,0,#102,#103);
/**** Local Placement (relative to other spatial structure elements) *****/
#101= IFCLOCALPLACEMENT(#100,#100);
#102= IFCLOCALPLACEMENT(#100,#100);
#103= IFCLOCALPLACEMENT(#104,#107);
#104= IFCLOCALPLACEMENT(7,#107);
#105= IFCAXIS2DPLACEMENTID(#100,#110,#112);
#106= IFCAXIS2DPLACEMENTID(#109,#110,#111);
#107= IFCAXIS2DPLACEMENTID(#109,#110,#113);
#108= IFCARTERIANPOINT(12.5997603,-6.0964898,0.3);
#109= IFCARTERIANPOINT(10.0,0.0,0.3);
#110= IFCDIRECTION(10.0,0.0,0.3);
#111= IFCDIRECTION(10.0,0.0,0.3);
#112= IFCDIRECTION(10.0,0.0,0.3);

/**** Product Representation *****/
#120= IFCPRODUCTDEFINITIONSHAPE(7,5, (#121,#120));
/**** Axis Representation *****/
#121= IFCAXIS2DREPRESENTATION(#125,'Axis','Curve2D', (#122));
#122= IFCPOLYLINE(#123,#124);
#123= IFCARTERIANPOINT(10.0,0.0,0.3);
#124= IFCARTERIANPOINT(10.0,0.0,0.3);

CONTEXT '#1an', 'Model', 3.1.000000E+5,#107,#120);
*****
#125= IFCAXIS2DREPRESENTATION(
#123,#110,2.7);
REFLAXIS(5,#124);
100,#111);
2,#149,#140);
);
);
);
#440E-16);
CONTEXT '#1an', 'Design', 3.1.000000E+5,#107,#149);
            
```

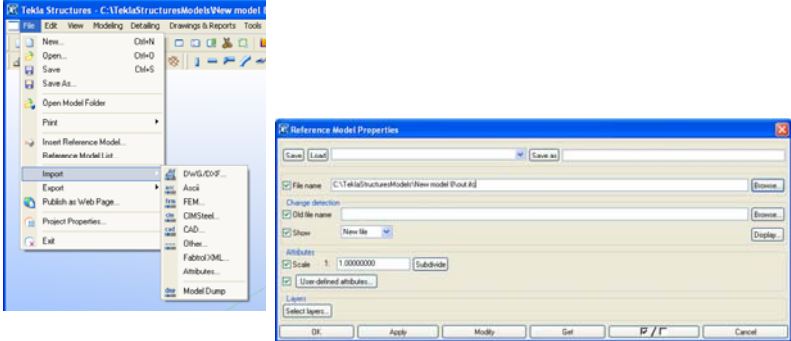
MVD's are used to develop the IFC code implemented by software programs




Example - TEKLA release 15

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IFC Export and Imports are accessed from the pull down menu.




The screenshot shows the Tekla Structures interface. The 'File' menu is open, highlighting 'Import' and 'Export'. The 'Reference Model Properties' dialog box is also visible, showing fields for file name, change direction, and scale.



ATC-75 PROJECT

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Vision

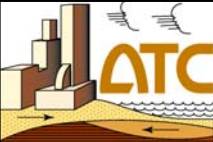
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Create a robust process for seamless, efficient, reproducible exchange of accurate and reliable structural information that is widely and routinely utilized among all tools and stakeholders.

Generate it once, use it many times – interoperability.



ATC-75 Project

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- ◆ Creating interoperability between BIM software platforms.
 - Identifying priority exchange attributes
 - Creating an industry definition – IDM
 - Generating software protocols – MVDs
- ◆ Increasing industry awareness
- ◆ Engaging BIM software platform support – getting onto the pull down menus

