Introduction

This document describes the import and export of Industry Foundation Classes IFC 4 files to and from ETABS 2013.1.2 or later and SAP2000 16.0.2 or later. Files written in IFC2x3, the previous release of IFC, can also be imported and exported but this older functionality is not described here.

IFC files are repositories of Building Information Modeling BIM data. Most of this data is not relevant to structural analysis and accordingly not imported by ETABS or SAP2000. Various types of IFC data are organized into subsets named "views" which gather data types relevant to various aspects of building design, construction, and maintenance. There are several such views, but only two views are relevant to ETABS and SAP2000: the "structural analysis view", and the "architectural coordination view".

The structural analysis view describes a building structure in terms of nodes, elements, and loads. Files containing a structural analysis view are the most suitable for import into ETABS and SAP2000, but are written by very few if any 3D building modeling programs. Such files are suitable for export to other structural software, such as steel and concrete detailing applications.

The architectural coordination view describes the components of a building in architectural terms. Files containing an architectural coordination view are quite prevalent. Only some of the entities in these files are relevant to ETABS or SAP2000, and whether these entities can be imported or not depends on how their geometry is described. For example, if the external faces of a beam or column are specified in the IFC file but its centerline is not, the beam or column cannot be imported. Furthermore, because the geometric extents of framing elements stop at the external faces of their supports, the user needs to systematically adjust end points after import. Architectural coordination view files are suitable for export to most building design software as they are generally well imported.

Whether it is a structural analysis view or architectural coordination view file, an IFC file contains, in addition to top level entities from these views, entities from shared supporting IFC schemas which complete the description of the top level entities and establish relationships between them.

This document includes seven sections:
1. Account of which structural analysis view entities can be imported.
2. Account of which architectural coordination view entities can be imported.
3. Account of which shared supporting schemas entities can be imported.
4. Procedure for importing an IFC file into ETABS or SAP2000.
5. Accounts of which ETABS and SAP2000 model components can be exported to a structural analysis view file.
6. Accounts of which ETABS and SAP2000 model components can be exported to an architectural view coordination file.
7. Describes the procedure for exporting an IFC file from ETABS or SAP2000.

Structural Analysis View Import

Structural Analysis Domain Entities

The table below indicates for each of the IFC entity types in the Structural Analysis domain whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcRelConnectsStructuralActivity		
IfcRelConnectsStructuralMember		
IfcRelConnectsWithEccentricity		Imported for ETABS frame objects and SAP2000 line objects
IfcStructuralAnalysisModel		
IfcStructuralCurveAction		Imported if connected to a structural item.
IfcStructuralCurveConnection		
IfcStructuralCurveMember		
IfcStructuralCurveMemberVarying		Per the IFC 4 Specification, a curve member whose variation of profile properties can be sufficiently described by a start profile and an end profile (e.g. tapers) shall be modeled as a single direct instance of the supertype IfcStructuralCurveMember.
IfcStructuralCurveReaction		
IfcStructuralLinearAction		Imported if connected to a structural item.
IfcStructuralLoadCase		
IfcStructuralLoadGroup		
IfcStructuralPlanarAction		Imported if connected to a structural item. Temperature loads not imported for point objects and shell objects, displacement loads not imported for frame objects and shell objects
IfcStructuralPointAction		
IfcStructuralPointConnection		
IfcStructuralPointReaction		
IfcStructuralResultGroup		
IfcStructuralSurfaceAction		
IfcStructuralSurfaceConnection		
IfcStructuralSurfaceMember		
IfcStructuralSurfaceMemberVarying		
IfcStructuralSurfaceReaction		

Structural Load Resource Entities

The table below indicates for each of the IFC entity types in the Structural Load Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcBoundaryEdgeCondition		
IfcBoundaryFaceCondition		
IfcBoundaryNodeCondition		
IfcBoundaryNodeConditionWarping		
IfcFailureConnectionCondition		
IfcSlippageConnectionCondition		
IfcStructuralLoadConfiguration		
IfcStructuralLoadLinearForce		
IfcStructuralLoadPlanarForce		
IfcStructuralLoadSingleDisplacement		Imported for point objects
IfcStructuralLoadSingleDisplacementDistortion		
IfcStructuralLoadSingleForce		
IfcStructuralLoadSingleForceWarping		
IfcStructuralLoadTemperature		Imported for frame objects
IfcSurfaceReinforcementArea		

Architectural Coordination View Import

Shared Building Element Entities

The table below indicates for each of the IFC entity types in the Shared Building Element schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcBeam		Imported if it has a 'Body' shape representation with a 'SweptSolid' representation type and an IfcSweptAreaSolid; or if it has an 'Axis' shape with a 'Curve3D' representation type and an IfcBoundedCurve. The end points typically require adjustment by the user as they are at the face of the support – wall, column, or girder. Always imported as a straight line.
IfcBeamStandardCase		
IfcBeamType		
IfcBuildingElementProxy		
IfcBuildingElementProxyType		
IfcBuildingSystem		
IfcChimney		
IfcChimneyType		
IfcColumn		Imported if it has a 'Body' shape representation with a 'SweptSolid' representation type and an IfcSweptAreaSolid; or if it has an 'Axis' shape with a 'Curve3D' representation type and an IfcBoundedCurve. Always imported as a straight line.
IfcColumnStandardCase		
IfcColumnType		
IfcCovering		
IfcCoveringType		
IfcCurtainWall		
IfcCurtainWallType		
IfcDoor		
IfcDoorStandardCase		
IfcDoorType		
IfcMember		Imported if it has a 'Body' shape representation with a 'SweptSolid' representation type and an IfcSweptAreaSolid; or if it has an 'Axis' shape with a 'Curve3D' representation type and an IfcBoundedCurve. The end points typically require adjustment by the user as they are at the face of the support – wall, column, or girder. Always imported as a straight line.
IfcMemberStandardCase		
IfcMemberType		
IfcPlate		

IfcPlateStandardCase	 	
IfcPlateType	 	
IfcRailing	 	
IfcRailingType	 	
IfcRamp	 	
IfcRampFlight	 	
IfcRampFlightType	 	
IfcRampType	 	
IfcRelConnectsPathElements	 	
IfcRelCoversBldgElements	 	
IfcRelCoversSpaces	 	
IfcRoof	 	
IfcRoofType	 	
IfcShadingDevice	 	
IfcShadingDeviceType	 	
IfcSlab	 	Imported if it has a 'Body' shape representation with a 'SweptSolid' representation type and an IfcSweptAreaSolid; or if it has an 'Axis' shape with a 'Curve3D' representation type and an IfcBoundedCurve. Always imported as a straight line
IfcSlabElementedCase	 	
IfcSlabStandardCase	 	
IfcSlabType	 	
IfcStair	 	
IfcStairFlight	 	
IfcStairFlightType	 	
IfcStairType	 	
IfcWall	 	
IfcWallElementedCase	 	
IfcWallStandardCase	 	
IfcWallType	 	
IfcWindow	 	
IfcWindowStandardCase	 	
IfcWindowType	 	

Shared Schema Entity Import

Core Data Entities

The table below indicates for each of the IFC entity types in the Core Data schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcActor	🟥	
IfcGroup	🟨	Derived IfcStructuralLoadGroup entities imported
IfcProject	🟩	
IfcPropertySet	🟥	
IfcProxy	🟥	
IfcRelAssignsToGroup	🟩	
IfcRelAssignsToGroupByFactor	🟩	
IfcRelAssignsToProduct	🟥	
IfcRelDefinesByType	🟩	
IfcTypeObject	🟩	
IfcTypeProduct	🟩	

Geometric Constraint Resource Entities

The table below indicates for each of the IFC entity types in the Geometry Constraint Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcConnectionCurveGeometry	🟥	
IfcConnectionPointEccentricity	🟩	
IfcConnectionPointGeometry	🟩	
IfcConnectionSurfaceGeometry	🟥	
IfcConnectionVolumeGeometry	🟥	
IfcGridAxis	🟥	
IfcGridPlacement	🟥	
IfcLocalPlacement	🟩	
IfcVirtualGridIntersection	🟥	

Geometric Model Resource Entities

The table below indicates for each of the IFC entity types in the Geometry Model Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcAdvancedBrep	🟥	
IfcAdvancedBrepWithVoids	🟥	
IfcBlock	🟥	
IfcBooleanClippingResult	🟩	
IfcBooleanResult	🟥	
IfcBoundingBox	🟥	
IfcBoxedHalfSpace	🟥	
IfcCartesianPointList3D	🟥	
IfcCsgSolid	🟥	
IfcExtrudedAreaSolid	🟩	
IfcExtrudedAreaSolidTapered	🟩	
IfcFaceBasedSurfaceModel	🟥	
IfcFacetedBrep	🟥	
IfcFacetedBrepWithVoids	🟥	
IfcFixedReferenceSweptAreaSolid	🟥	
IfcHalfSpaceSolid	🟥	
IfcManifoldSolidBrep	🟥	
IfcPolygonalBoundedHalfSpace	🟥	
IfcRectangularPyramid	🟥	
IfcRevolvedAreaSolid	🟥	
IfcRevolvedAreaSolidTapered	🟥	
IfcRightCircularCone	🟥	
IfcRightCircularCylinder	🟥	
IfcShellBasedSurfaceModel	🟥	
IfcSphere	🟥	
IfcSurfaceCurveSweptAreaSolid	🟥	
IfcSweptAreaSolid	🟥	
IfcSweptDiskSolid	🟥	
IfcSweptDiskSolidPolygonal	🟥	
IfcTriangulatedFaceSet	🟥	

Geometry Resource Entities

The table below indicates for each of the IFC entity types in the Geometry Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcAxis1Placement		
IfcAxis2Placement2D		
IfcAxis2Placement3D		
IfcBoundaryCurve		
IfcBSplineCurveWithKnots		
IfcBSplineSurfaceWithKnots		
IfcCartesianPoint		
IfcCartesianTransformationOperator 2D		
IfcCartesianTransformationOperator 2DnonUniform		Imported as IfcCartesianTransformationOperator2D
IfcCartesianTransformationOperator 3D		
IfcCartesianTransformationOperator 3DnonUniform		Imported as IfcCartesianTransformationOperator3D
IfcCircle		
IfcCompositeCurve		
IfcCompositeCurveOnSurface		
IfcCompositeCurveSegment		
IfcCurveBoundedPlane		
IfcCurveBoundedSurface		
IfcCylindricalSurface		
IfcDirection		
IfcEllipse		
IfcLine		
IfcMappedItem		
IfcOffsetCurve2D		Imported only if BasisCurve is linear or circular
IfcOffsetCurve3D		Imported only if BasisCurve is linear or circular
IfcOuterBoundaryCurve		
IfcPcurve		
IfcPlane		
IfcPoint		
IfcPointOnCurve		
IfcPointOnSurface		
IfcPolyline		
IfcRationalBSplineCurveWithKnots		
IfcRationalBSplineSurfaceWithKnots		
IfcRectangularTrimmedSurface		

IfcReparametrisedCompositeCurve Segment	■	
IfcRepresentationMap	■	
IfcSurfaceOfLinearExtrusion	■	
IfcSurfaceOfRevolution	■	
IfcTrimmedCurve	■	
IfcVector	■	

Material Resource Entities

The table below indicates for each of the IFC entity types in the Material Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcMaterial	■	
IfcMaterialConstituent	■	
IfcMaterialConstituentSet	■	
IfcMaterialLayer	■	
IfcMaterialLayerSet	■	
IfcMaterialLayerSetUsage	■	
IfcMaterialLayerWithOffsets	■	
IfcMaterialProfile	■	
IfcMaterialProfileSet	■	
IfcMaterialProfileSetUsage	■	
IfcMaterialProfileSetUsageTapering	■	
IfcMaterialProfileWithOffsets	■	
IfcMaterialProperties	■	Only the three following property sets are imported: common, mechanical, concrete, and steel.

Measurement Resource Entities

The table below indicates for each of the IFC entity types in the Measurement Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcContextDependentUnit		
IfcConversionBasedUnit		
IfcConversionBasedUnitWithOffset		
IfcDerivedUnit		
IfcDerivedUnitElement		
IfcDimensionalExponents		
IfcMeasureWithUnit		
IfcMonetaryUnit		
IfcNamedUnit		
IfcSIUnit		
IfcUnitAssignment		

Product Extension Entities

The table below indicates for each of the IFC entity types in the Product Extension schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcBuilding		
IfcBuildingStorey		Imported in ETABS only
IfcGrid		
IfcOpeningElement		
IfcOpeningStandardCase		
IfcRelAssociatesMaterial		
IfcRelConnectsElements		
IfcRelContainedInSpatialStructure		
IfcSite		

Profile Resource Entities

The table below indicates for each of the IFC entity types in the Profile Resource schema whether it is imported into ETABS and SAP2000, and if is imported, notes any restrictions:

| IFC Entity	Imported	Restrictions
IfcArbitraryClosedProfileDef		Impoorted if the ProfileName attribute matches a section name in the .PRO or .XML catalog file specified when the file is imported
IfcArbitraryOpenProfileDef		
IfcArbitraryProfileDefWithVoids		
IfcAsymmetricIShapeProfileDef		
IfcCenterLineProfileDef		
IfcCircleHollowProfileDef		
IfcCircleProfileDef		
IfcCompositeProfileDef		Only double angle and double channel profiles are imported
IfcCShapeProfileDef		
IfcEllipseProfileDef		
IfcIShapeProfileDef		
IfcLShapeProfileDef		
IfcMirroredProfileDef		
IfcProfileProperties		
IfcRectangleHollowProfileDef		
IfcRectangleProfileDef		
IfcReinforcementBarProperties		
IfcRoundedRectangleProfileDef		
IfcSectionProperties		
IfcSectionReinforcementProperties		
IfcTrapeziumProfileDef		
IfcTShapeProfileDef		
IfcUShapeProfileDef		
IfcZShapeProfileDef		

Property Resource Entities

The table below indicates for each of the IFC entity types in the Property Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcComplexProperty		
IfcExtendedProperties		
IfcPreDefinedProperties		
IfcPropertyBoundedValue		
IfcPropertyListValue		
IfcPropertyReferenceValue		
IfcPropertySingleValue		
IfcPropertyTableValue		

Representation Resource Entities

The table below indicates for each of the IFC entity types in the Representation Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcGeometricRepresentationContext		
IfcGeometricRepresentationSub Context		
IfcProductDefinitionShape		
IfcProductRepresentation		
IfcShapeAspect		
IfcShapeRepresentation		
IfcTopologyRepresentation		

Topology Resource Entities

The table below indicates for each of the IFC entity types in the Representation Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

IFC Entity	Imported	Restrictions
IfcAdvancedFace	🟩	
IfcClosedShell	🟥	
IfcConnectedFaceSet	🟩	
IfcEdge	🟩	
IfcEdgeCurve	🟩	
IfcEdgeLoop	🟥	
IfcFace	🟥	
IfcFaceBound	🟥	
IfcFaceOuterBound	🟥	
IfcFaceSurface	🟥	
IfcOrientedEdge	🟩	
IfcPath	🟥	
IfcPolyLoop	🟥	
IfcSubEdge	🟩	
IfcVertex	🟨	Derived IfcVertexPoint entities imported
IfcVertexLoop	🟥	
IfcVertexPoint	🟩	

Utility Resource Entities

The table below indicates for each of the IFC entity types in the Utility Resource schema whether it is imported into ETABS and SAP2000, and if it is imported, notes any restrictions:

| IFC Entity	Imported	Restrictions
IfcApplication	🟥	
IfcOwnerHistory	🟥	

Import Procedure

Importing into ETABS 2013

- From the start page of ETABS, choose Import >IFC File… under the File menu. The Import IFC File form is displayed:
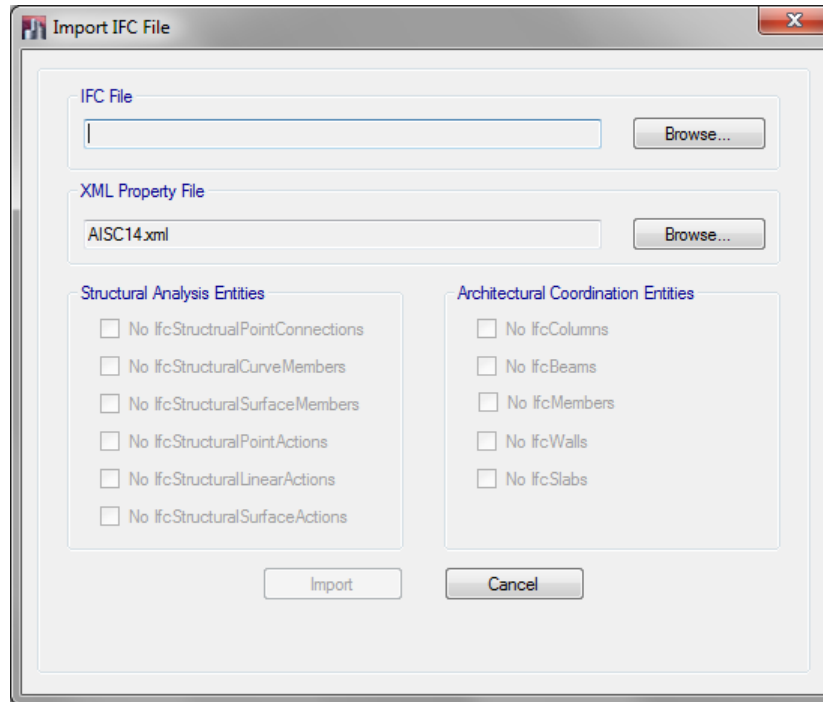
- Pick the Browse… button. The Open form is displyed. Navigate to the folder containing the IFC fie to import, and select it. ETABS parses the file, which may take a few seconds, and displays an account of its relevant content:
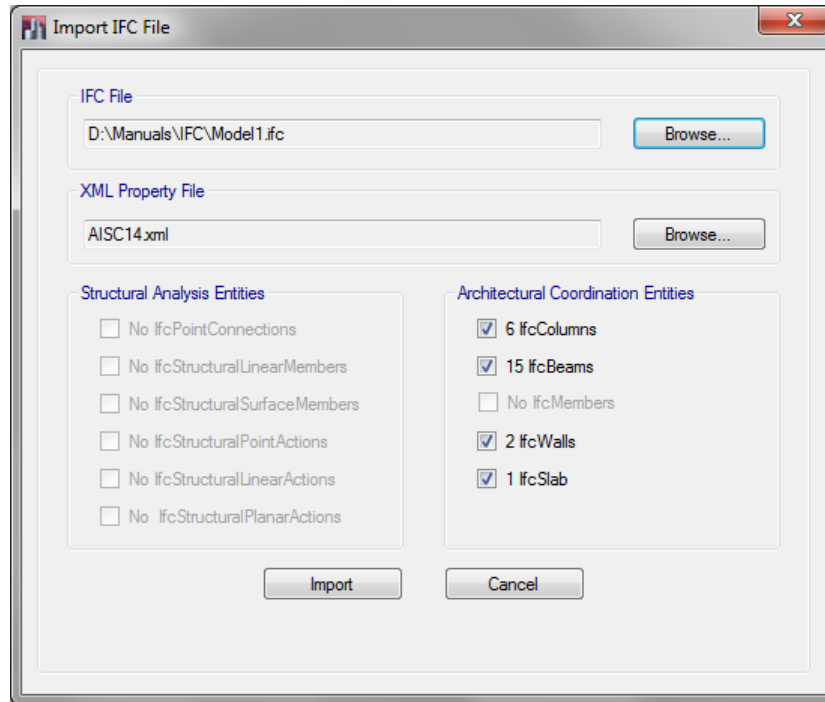
- To select a section catalog other than AISC14.xml, pick the Browse button and select a different .xml file in the Open form. ETABS imports most IFC profiles that are subtypes of IfcParameterizedProfileDef, with a few exceptions such as IfcEllipseProfileDef. However, many 3D building modeling programs do not export section profiles this way, and instead export them as IfcArbitraryClosedProfileDef entities which are defined by their outlines. Such profile entities are not directly useable for analysis and design. However, if their ProfileName attribute matches one of the section names in the section catalog you selected, these profile entities are imported as the corresponding ETABS section.

- Select the type of IFC entities to import. If the file includes both Structural Analysis view and Architectural Coodination view entities, you should choose one type or the other. If you import both, you may get duplicate members.

- Pick the Import button. After a few moments, ETABS displays the imported model. If there are error or warnings, a message box will be displayed to that effect. You should then review the log file. Its name and folder location are the same as those of the .IFC file you imported, with the extension changed to .ifcimp.log
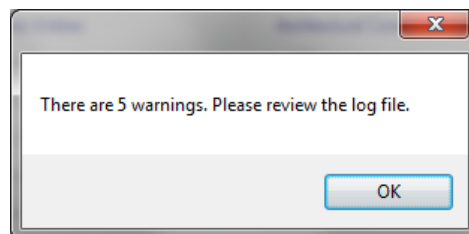
Importing into SAP2000

The procedure is identical. The differences are you access the Import > IFC File in the File menu from a blank SAP2000 model instead of the ETABS start page, and you specify a sections catalog file with a .pro file extension instead of .xml.

Reviewing the Log File (.ifcimp.log)

A typical log file is listed below. It includes:

- The name of the imported file, its IFC version, the version of the importing program, the date and time
- Any relevant warning or error messages, if the file could not be imported. Each IFC entity is listed with its item number in the .IFC file, its name, and its coordinates if it has any
- A list of imported entities
- A list of entities not processed

```
File "D:\Manuals\IFC\Model1.ifc" 2x3 imported in ETABS 2013 at 2013-06-27T11:35:10

IfcMaterial imported as No design in ETABS 2013 for the following items:
     92 named STEEL/A992
    245 named CONCRETE/3000
    408 named A615-60
  13292 named CONCRETE/1500
  13350 named STEEL/A500-GR.B


Imported entities:
3 of type IFCARBITRARYCLOSEDPROFILEDEF
3 of type IFCAXIS2PLACEMENT2D
160 of type IFCAXIS2PLACEMENT3D
15 of type IFCBEAM
6 of type IFCBEAMTYPE
1 of type IFCBUILDINGSTOREY
1192 of type IFCCARTESIANPOINT
1210 of type IFCCARTESIANTRANSFORMATIONOPERATOR3D
1 of type IFCCIRCLEPROFILEDEF
6 of type IFCCOLUMN
2 of type IFCCOLUMNTYPE
28 of type IFCDIRECTION
22 of type IFCEXTRUDEDAREASOLID
1 of type IFCGEOMETRICREPRESENTATIONCONTEXT
7 of type IFCISHAPEPROFILEDEF
144 of type IFCLOCALPLACEMENT
1 of type IFCLSHAPEPROFILEDEF
1210 of type IFCMAPPEDITEM
5 of type IFCMATERIAL
2 of type IFCMATERIALLAYER
2 of type IFCMATERIALLAYERSET
3 of type IFCMATERIALLAYERSETUSAGE
1 of type IFCOWNERHISTORY
5 of type IFCPOLYLINE
139 of type IFCPRODUCTDEFINITIONSHAPE
1 of type IFCPROJECT
4831 of type IFCPROPERTYSINGLEVALUE
2 of type IFCRECTANGLEPROFILEDEF
6 of type IFCRELASSOCIATESMATERIAL
1 of type IFCRELCONTAINEDINSPATIALSTRUCTURE
10 of type IFCRELDEFINESBYTYPE
1210 of type IFCREPRESENTATIONMAP
1351 of type IFCSHAPEREPRESENTATION
9 of type IFCSIUNIT
1 of type IFCSLAB
1 of type IFCSLABTYPE
38 of type IFCSTYLEDITEM
1 of type IFCUNITASSIGNMENT
2 of type IFCWALLSTANDARDCASE
1 of type IFCWALLTYPE

Other entities:
1 of type IFCAPPLICATION
```

```
1 of type IFCBUILDING
22 of type IFCCLOSEDSHELL
10 of type IFCCOLOURRGB
2 of type IFCELEMENTASSEMBLY
20 of type IFCELEMENTQUANTITY
441 of type IFCFACE
441 of type IFCFACEOUTERBOUND
26 of type IFCFACETEDBREP
3 of type IFCGEOMETRICREPRESENTATIONSUBCONTEXT
10 of type IFCOPENINGELEMENT
1 of type IFCORGANIZATION
1 of type IFCPERSON
1 of type IFCPERSONANDORGANIZATION
441 of type IFCPOLYLOOP
1 of type IFCPOSTALADDRESS
5 of type IFCPRESENTATIONLAYERASSIGNMENT
13 of type IFCPRESENTATIONSTYLEASSIGNMENT
284 of type IFCPROPERTYSET
19 of type IFCQUANTITYAREA
20 of type IFCQUANTITYLENGTH
20 of type IFCQUANTITYVOLUME
20 of type IFCQUANTITYWEIGHT
105 of type IFCREINFORCINGBAR
5 of type IFCRELAGGREGATES
304 of type IFCRELDEFINESBYPROPERTIES
10 of type IFCRELVOIDSELEMENT
1 of type IFCSITE
13 of type IFCSURFACESTYLE
10 of type IFCSURFACESTYLERENDERING
```

Structural Analysis View Export

Export from ETABS

The table below indicates for each of the ETABS model components whether it is exported to structural analysis view files, and if it is exported, the IFC entity written:

Model Element	Exported	IFC Entity
Project		
Project Information	🟩	IfcProject
Design Preferences	🟥	
Structure Layout		
Stories	🟩	IfcBuildingStorey
Grid Systems	🟥	
Properties		
Materials	🟨	IfcMaterial and IfcMaterialProperties. The mechanical properties of non-isotropic properties are not exported.
Frame Sections	🟩	Appropriate IfcParameterizedProfileDef subtype for basic profiles or IfcCompositeProfileDef in the case of double angle or double channels. Nonprismatic sections with two basic profiles of the same type at each end are exported as an IfcMaterialProfileSetUsageTapering; if the nonprismatic section has multiple segments, the internal sections are ignored and a single segment between the start and end section is assumed. Other sections are exported as an IfcProfileDef with an associated IfcProfileProperties describing the profile mechanical properties.
Insertion Point	🟩	IfcMaterialProfileSetUsage
Slab Sections	🟩	IfcStructuralSurfaceMember
Deck Sections	🟨	Exported as an IfcStructuralSurfaceMember with thickness equal to the concrete cover thickness
Wall Sections	🟩	IfcStructuralSurfaceMember
Reinforcing Bar Sizes	🟥	
Spring Properties	🟨	
Point Springs	🟩	IfcBoundaryCondition
Line Springs	🟥	
Area Springs	🟥	
Diaphragms	🟥	
Hinge Properties	🟥	
Panel Zones	🟥	
Structural Objects		
Joint Objects	🟨	IfcStructuralConnection at object ends. Intermediate joints on frame objects are not exported, and frame objects supported at intermediate joints are not connected.
Joint restraints	🟩	IfcBoundaryCondition
Columns	🟩	One IfcStructuralCurveMember per frame object
Beams	🟩	

Braces	🟩	One IfcStructuralCurveMember per frame object
Other Frame Objects	🟩	
Restraints	🟩	IfcBoundaryCondition
End Length Offsets	🟩	IfcRelConnectsWithEccentricity
Insertion Points	🟩	
Floors	🟩	IfcStructuralSurfaceMember
Walls	🟩	IfcStructuralSurfaceMember
Openings	🟥	
Other Shell Objects	🟥	
Link Objects	🟥	
Groups	🟥	
Loads		
Functions	🟥	
Load Patterns	🟨	IfcStructuralLoadGroup. Seismic and Wind Auto-lateral load patterns not exported.
Selfweight	🟩	
Modal Cases	🟥	
Static Load Cases	🟩	IfcStructuralLoadCase
Load Combinations	🟩	IfcStructuralLoadGroup
Shell Uniform Load Sets	🟥	
Joint Loads	🟨	IfcStructuralPointAction
Ground Displacement	🟩	
Force	🟩	
Temperature	🟥	
Frame Loads	🟩	
Point	🟩	IfcStructuralPointAction
Distributed	🟩	IfcStructuralCurveAction
Temperature	🟥	
Open Structure Wind Parameters	🟥	
Shell Loads	🟩	
Uniform Load Sets	🟥	
Uniform	🟩	IfcStructuralPlanarAction
Temperature	🟥	
Analysis Results		
Joint Displacement	🟥	
Support Reactions	🟥	
Frame Forces	🟥	
Shell Forces	🟥	

Export from SAP2000

The table below indicates for each of the possible SAP2000 model components whether it is exported to structural analysis view files, and if it is exported, the IFC entity written:

Model Element	Exported	IFC Entity
Project		
Project Information		IfcProject
Design Preferences		
Structure Layout		
		IfcBuildingStorey created for each point object z elevation in the model
Grid Systems		
Properties		
Materials		IfcMaterial and IfcMaterialProperties. The mechanical properties of non-isotropic properties are not exported.
Frame Sections		Appropriate IfcParameterizedProfileDef subtype for basic profiles or IfcCompositeProfileDef in the case of double angle or double channels. Other sections are exported as an IfcProfileDef with an associated IfcProfileProperties describing the profile mechanical properties.
Insertion Point		IfcMaterialProfileSetUsage
Area Sections		IfcStructuralSurfaceMember
Restraints		IfcBoundaryCondition
Spring Properties		
Point Springs		IfcBoundaryCondition
Line Springs		
Area Springs		
Structural Objects		
Joint Objects		IfcStructuralConnection at object ends. Intermediate joints on frame objects are not connected to the supporting frame objects.
Joint restraints and local axes		IfcBoundaryCondition
Joint Constraints		
Frame Objects		One IfcStructuralCurveMember per frame object
Restraints		IfcBoundaryCondition
End Length Offsets		IfcRelConnectsWithEccentricity
Joint Offsets		
Cable Objects		IfcStructuralCurveMember
Tendon Objects		
Area Objects		IfcStructuralSurfaceMember
Link Objects		
Solid Objects		
Groups		
Loads		
Functions		

Load Patterns		IfcStructuralLoadGroup. Seismic and Wind Auto-lateral load patterns not exported.
Selfweight		
Modal Cases		
Static Load Cases		IfcStructuralLoadCase
Load Combinations		IfcStructuralLoadGroup
Joint Loads		
Ground Displacement		IfcStructuralPointAction
Force		
Temperature		
Frame Loads		
Gravity		IfcStructuralCurveAction
Point		IfcStructuralPointAction
Distributed		IfcStructuralCurveAction
Temperature		
Strain		
Deformation		
Target Force		
Auto Wave Loading Parameters		
Open Structure Wind Parameters		
Shell Loads		
Gravity		
Uniform		IfcStructuralPlanarAction
Uniform to Frame		
Surface Pressure		
Temperature		
Strain		
Rotate		
Wind Pressure		
Solid Loads		
Analysis Results		
Joint Displacements		
Support Reactions		
Frame Forces		
Shell Forces		
Solid Forces		

Architectural Coordination View Export

Export from ETABS

The table below indicates for each of the possible ETABS model components whether it is exported to architectural coordination view files, and if it is exported, the IFC entity written:

Model Element	Exported	IFC Entity
Project		
Project Information	🟩	IfcProject
Structure Layout		
	🟩	IfcBuildingStorey created for each point object z elevation in the model
Grids	🟥	
Properties		
Materials	🟨	IfcMaterial and IfcMaterialProperties.
Frame Sections	🟨	Appropriate IfcParameterizedProfileDef subtype for basic profiles or IfcCompositeProfileDef in the case of double angle or double channels. Nonprismatic sections with two basic profiles of the same type at each end are exported as an IfcMaterialProfileSetUsageTapering; if the nonprismatic section has multiple segments, the internal sections are ignored and a single segment between the start and end section is assumed.
Insertion Point	🟩	IfcMaterialProfileSetUsage
Slab Sections	🟩	IfcMaterialLayerSetUsage
Deck Sections	🟨	Exported as an IfcMaterialLayerSetUsage with thickness equal to the deck total thickness
Wall Sections	🟩	IfcMaterialLayerSetUsage
Structural Objects		
Joint Objects	🟨	Frame and shell object locations are exported after adjusting for end length offsets and section insertion point
Columns	🟨	IfcColumnStandardCase or IfcColumn if the column has a nonprismatic section. Only exported if the section is a basic profile, a double angle, a double channel, or a nonprismatic section with two basic profiles of the same type at each end.
Beams	🟨	IfcBeamStandardCase or IfcBeam if the beam has a nonprismatic section. Only exported if the section is a basic profile, a double angle, a double channel, or a nonprismatic section with two basic profiles of the same type at each end.
Braces	🟨	IfcMemberStandardCase or IfcMember if the brace has a nonprismatic section. Only exported if the section is a basic profile, a double angle, a double channel, or a nonprismatic section with two basic profiles of the same type at each end.
Other Frame Objects	🟨	
End Length Offsets	🟩	
Joint Offsets	🟩	
Floors	🟩	IfcSlabStandardCase
Walls	🟨	Vertical walls exported as IfcWallStandardCase
Openings	🟥	
Other Shell Objects	🟥	

Groups		
Loads		
Any Load Data		

Export from SAP2000

The table below indicates for each of the possible SAP2000 model components whether it is exported to architectural coordination view files, and if it is exported, the IFC entity written:

Model Element	Exported	IFC Entity
Project		
Project Information		IfcProject
Structure Layout		
Stories		IfcBuildingStorey created for each point object z elevation in the model
Grids		
Properties		
Materials		IfcMaterial
Frame Sections		Appropriate IfcParameterizedProfileDef subtype
Insertion Point		IfcMaterialProfileSetUsage
Area Sections		IfcMaterialLayerSetUsage
Restraints		IfcBoundaryCondition
Spring Properties		
Diaphragms		
Hinge Properties		
Panel Zones		
Structural Objects		
Joint Objects		Locations exported for each frame or shell object after end length offsets and insertion point adjustments
Vertical Frame Objects		IfcColumnStandardCase or IfcColumn if the object has a nonprismatic section. Only exported if the profile is a basic profile or a double angle or double channel, or a nonprismatic section with two basic profiles of the same type at each end.
Horizontal Frame Objects		IfcBeamStandardCase or IfcBeam if the object has a nonprismatic section. Only exported if the profile is a basic profile or a double angle or double channel, or a nonprismatic section with two basic profiles of the same type at each end.
Other Frame Objects		IfcMemberStandardCase or IfcMember if the object has a nonprismatic section. Only exported if the profile is a basic profile or a double angle or double channel, or a nonprismatic section with two basic profiles of the same type at each end.
End Length Offsets		
Joint Offsets		
Cable Objects		
Tendon Objects		
Vertical Area Objects		IfcWallStandardCase
Other Area Objects		IfcSlabStandardCase
Solid Objects		
Other shell objects		
Groups		

| Loads		
Any type of load data	 	

Export Procedure

Exporting from ETABS 2013

- Open an ETABS model to export.

- To export only selected objects from the model, make a selection. This option is helpful when a model has been previously exported to another application and you wish to update it. You can then export only those objects that need updating.

- Choose Export >IFC File… under the File menu. The Create IFC File form is displayed:
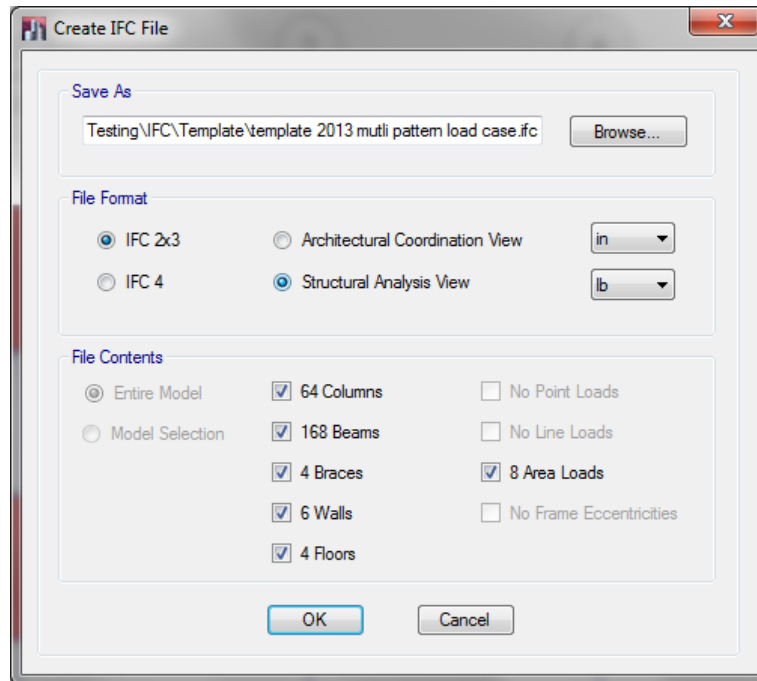
- To save the file under a different name or in a different folder location, click the Browse… button, and specify these in the Save As… form which is displayed.

- Make relevant file format selections: IFC2x3 or IFC4, Architectural Coordination view or Structural view, and the length and force units. Force units only apply if you are writing a Structural view file.

- Choose specific model contents to export by checking or unchecking the corresponding buttons and boxes. The button letting you choose between Entire Model and Model Selection is only active if there are selected objects. Loads can only be exported to a Structural View file.

- Click OK. ETABS writes the file. If there are warnings, a message box will be displayed to that effect. You should review the log file. Its name and folder location are the same as those of the model you exported, with the extension changed to .ifcexp.log
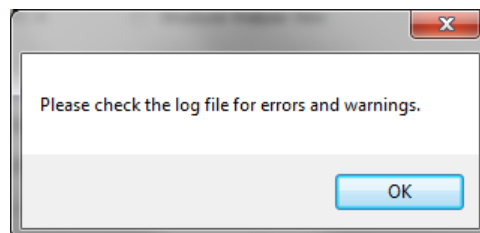
Exporting from SAP2000

The procedure is identical. The difference is you open a SAP2000 model instead of an ETABS model, and the model contents to export are of slightly different types: