Memo

Project:	TPF-5(372) BIM for Bridges and Structures
Date:	11/15/2019
To:	Working Group 1
From:	Francesca Maier and Aaron Costin
Subject:	Terminology Database

Summary

This memo provides an introduction to Terminology Database and the process of creating a Glossary of Terms. An example Glossary of Terms is also provided.

Terminology Database

The terminology database is a Microsoft Excel file that has the following metadata:

- **Term:** The name of entity being described
- **Abbreviation:** Common abbreviation or acronym of the term
- **Definition:** The meaning of the term
- **Definition notes:** Notes that appeared in the source of the term
- **Subject:** The topic that the term falls into
- **Term reference:** The local identification or specific reference of the term within the source
- **Related:** Any similar or related terms, such as any terms within the definition that need to be defined
- **Notes:** Notes from the developer of the Microsoft Excel Terminology Database.
- **Reference:** The reference code or standard that defined the term
- **Source:** The hyperlink to the source. (Any local documents will be updated to link to the final storage of the source, such as the DOI or ISBN)
- **Publication year:** The year of the publication of the source.

Terminology was collected from a variety of sources with the original source definition. The intent of the database is to be the main repository of all the terminology gathered throughout the TPF-5(372) project. During Task 1, the database was established and populated with an initial collection of terminology. This terminology will subsequently be used in other tasks.

The database will continue to grow as more terms are collected and stored during these tasks that use the terminology. The initial collection was approximately 400 terms. The collection now includes over 2,000 terms. In some cases, there are multiple definitions for terms, which will be reconciled when the term is used. Synonyms and related terms will be linked when the terms are used.

The next revision will add terms from the ANSI /AISC 303-16 Code of Standard Practice for Steel Buildings and Bridge, the buildingSMART Data Dictionary, and any other terms needed for the Design to Fabrication IDM Development. The final TPF-5(372) deliverables will include a final version of the database and an updated memo.

Using the Terminology Database

The intended users of the terminology repository are developers, who will use the terminology for specific applications that require terminology. The database stores the terminology to serve different uses over the TPF-5(372) project, such as being curated into a glossary of terms for each specific use case application. The following steps result in a glossary of terms for a specific use:

1. Define the intent
2. Identify the relevant topics
3. Separate into subsections (if necessary)
4. Select necessary terms
5. Export term and definition

Glossaries of terms can be created from the terminology database to support many different use cases, such as stakeholder outreach activities. Term selection is a manual process, as is selecting the most appropriate definition where there are multiple definitions available. The export includes the term, any abbreviations, the definition, and the reference.

- **Intent**: Provide foundational vocabulary for TPF-5(372) technical tasks.
- **Topics:**
  - **General BIM terminology**- High-level terminology needed to understand the basic concepts and functions of Building Information Modeling (BIM)
  - **BIM Processes**- Terminology related to the creation of standardized BIM workflows and information exchanges.
- **Subsections:** General process mapping, Business Process Modeling and Notation (BPMN), BIM standardization, Industry Foundation Classes (IFC), and information management.

Example Glossary of Terms

The following table is an example of a glossary of terms that was curated from the terminology database for the purpose of referencing fundamental vocabulary for the TPF-5(372) project.

Term	Definition
BIM Process Map	A diagram showing how BIM will be applied on a project. The BIM project execution plan proposes two levels of process maps: BIM overview map and detailed BIM use process maps that define associated activities and information exchanges. [National BIM Standard - US V3]. See Process Map.
Building Information Modeling (BIM)	BIM is a term which represents three separate but linked functions: Building Information Modeling: Is a BUSINESS PROCESS for generating and leveraging building data to design, construct and operate the building during its lifecycle. BIM allows all stakeholders to have access to the same information at the same time through interoperability between technology platforms. Building Information Model: Is the DIGITAL REPRESENTATION of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life cycle from inception onwards. Building Information Management: Is the ORGANIZATION & CONTROL of the business process by utilizing the information in the digital prototype to effect the sharing of information over the entire lifecycle of an asset. The benefits include centralized and visual communication, early exploration of options, sustainability, efficient design, integration of disciplines, site control, as built documentation, etc.– effectively developing an asset lifecycle process and model from conception to final retirement. [National BIM Standard - US V3]
buildingSMART Data Dictionary (bSDD)	A specific Data Dictionary based on EN ISO 12006-3:2016 and is developed and maintained by buildingSMART International. ISO 12006-3:2016 specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works. It enables classification systems, information models, object models and process models to be referenced from within a common framework. [JRC Technical Report (Poljanšek 2017)]
Classification	categorization, the act of distributing things into classes or categories of the same type
Concept	rules on using a subset of the schema structure identified as a concept template to enable a certain functionality within the context of a concept root contained in a model view. [ISO 16739-1:2018(E)] NOTE The utilization of material definitions for a particular concept root representing a wall is an example of a concept.
Data	Raw factual bits of unprocessed information. Can be structured, but as an aggregate, has no more meaning than the individual facts alone convey. [National BIM Standard - US V3]
Data Dictionary	A data-semantic dictionary specifying concepts (entities, properties, classification and other concepts) and their relations. A data dictionary defines entities and properties uniquely, understandable and machine readable. It is possible to connect different data dictionaries and to harmonize the understanding of the content we want to share. [JRC Technical Report (Poljanšek 2017)]

Term	Definition
Data Exchange	The process of taking data structured under a source schema to transform and restructure into a target schema, so the target data are an accurate representation of the source data within specified requirements and minimal loss of content. ISO 16739 specifies a conceptual data schema and an exchange file format for Building Information Modeling BIM data. The conceptual schema is defined in EXPRESS data specification language (EXPRESS) as specified in ISO 10303-11. ISO 16739 represents an open international standard for BIM data that is exchanged and shared among software Applications used by the various participants in a building construction or facility management project. ISO 16739 consists of the data schema, represented as an EXPRESS schema specification, and reference data, represented as definitions of properties and quantities. [National BIM Standard - US V3]
Data Model	A specified set of entities and their related properties and attributes representing a virtual model of one or more domains structured by a modelling language. The buildingSMART Data Model is the same as the IFC data model. [JRC Technical Report (Poljanšek 2017)]
Detailed BIM Use Process Maps	A comprehensive BIM process map that defines the various sequences to perform a specific application of BIM or BIM use. These maps also identify the responsible parties for each process, reference information content, and the information exchanges, which will be created and shared with other processes. [National BIM Standard - US V3] See Process Map.
Dictionary	collection of words, terms or concepts, with their definition
Document	1. Is a container for persistent information that can be managed and interchanged as a unit. [BS1192:2007] 2. information for the use in the briefing, design, construction, operation, maintenance or decommissioning of a construction project, including but not limited to correspondence, drawings, schedules, specifications, calculations, spreadsheet. [PAS 1192-2:2013]
Exchange Requirement	A non-technical description of the information needed by a business process to be executed, as well as the information produced by that business process. [National BIM Standard - US V3]
Exchange Requirements Model (ERM)	The data model addressing requirements for a single industry process. [National BIM Standard - US V3]
Industry Foundation Classes (IFC)	It is a neutral data format to describe, exchange and share information typically used within the building and facility management industry sector. IFC is the international standard for openBIM and registered as EN ISO 16739:2016. [JRC Technical Report (Poljanšek 2017)]
Information	Data that has been interpreted, translated, or transformed to reveal the underlying meaning. [National BIM Standard - US V3] See also: data

Term	Definition
Information Delivery Manual (IDM)	1. Documentation which captures the business process and gives detailed specifications of the information that a user fulfilling a particular role would need to provide at a particular point within a project. [ISO 29481-1:2016(E)] Note 1 to entry: This can be referred to as an information delivery specification (IDS). 2. A standard for processes specified when certain types of information are required during the construction of a project or the operation of a built asset. It also provides detailed specification of the information that a particular user (such as, architect or building services engineer) needs to provide at a point in time and groups together information that is needed in associated activities: cost estimating, volume of materials and job scheduling are natural partners. [National BIM Standard - US V3]
Information Exchange	Packages of information passed from one party to another in a BIM process, or the act of passing such information. Can be a deliverable. Parties involved agree upon and understand what information content and format will be exchanged. [National BIM Standard - US V3]
Information Model	is a model comprising: documentation, non-graphical information and graphical information (as defined by PAS 1192-2:2013) OR is all documentation, non-graphical information which the Project Team is required to provide into the Information Model by the Scope of Services for the Project Team and which is provided for the purpose of delivering Project Outputs (as defined by the CIC Outline Scope of Services for the Role of Information Management)
Instance	occurrence of an entity NOTE Similar to the term "instance of a class" in object oriented programming. [ISO 16739-1:2018(E)]
Interoperability	Interoperability is the ability of diverse systems and organizations to work together (inter-operate). The term is often used in a technical systems engineering sense, or alternatively in a broad sense, taking into account social, political, and organizational factors that impact system to system performance. [National BIM Standard - US V3]
Library	catalogue, database or holder of data, that is relevant to information in the data set. [ISO 16739-1:2018(E)] NOTE It is information referenced from an external source that is not copied into the data set.

Term	Definition
Model	1. representation of a system that allows for investigation of the properties of the system. ISO 29481-1:2016(E) 2. a data set, governed by the structure of an underlying schema, to meet certain data requirements. [ISO 16739-1:2018(E)] NOTE Information models and building information models are examples for a model. NOTE In scope of this standard IFC models are populations of the IFC schema.
Model View	subset of a schema, representing the data structure required to fulfil the data requirements within one or several exchange scenarios. [ISO 16739-1:2018(E)] NOTE Beside being a subset of a schema, a model view (or model view definition) may also impose additional constraints to the population of the subset schema
Model View Definition (MVD)	An IFC View Definition, or Model View Definition, MVD, defines a subset of the IFC schema that is needed to satisfy one or many Exchange Requirements of the AEC industry. The method used and propagated by buildingSMART to define such Exchange Requirements is the Information Delivery Manual, IDM (also ISO/DIS 29481). An IFC Model View Definition defines a legal subset of the IFC Schema (being complete) and provides implementation guidance (or implementation agreements) for the IFC concepts (classes, attributes, relationships, property sets, quantity definitions, etc.) used within this subset. It thereby represents the software requirement specification for the implementation of an IFC interface to satisfy the exchange requirements. [National BIM Standard - US V3]
Ontology	In computer science and information science, an ontology is a formal data model that represents a domain (such as Architecture or Engineering or Construction or Facilities Management) and is used to reason about the specialized objects in that domain, the relations between them, and then make inferences and conclusions. [National BIM Standard - US V3]
Overview Map	A high-level BIM process map that illustrates the relationship between BIM uses which will be employed on the Facility. Each of the BIM Uses then gets its own lower level Process Map. [National BIM Standard - US V3] See Process Map.
Process Map	representation of the relevant characteristics of a process associated with a defined business purpose. [ISO 29481-1:2016(E)]
Representation	unit of information describing how an object is displayed, such as physical shape or topology.
Roadmap	The overall implementation strategy document used to set the definition, direction, sequence and usually milestones for an initiative. [National BIM Standard - US V3]
Schema	the definition of the structure to organize data for storage, exchange and sharing, using a formal language. [ISO 16739-1:2018(E)] NOTE The formal languages EXPRESS [ISO 10303-11] and XML Schema [W3C Recommendation] are currently used to define the schemata of this standard

Term	Definition
Taxonomy	One of several ways to organize the structure of topics and subtopics for the purpose of retrieval and information exchange. A taxonomy is a tree structure with one root and several branches having unique and common properties. An example is IFC hierarchy, with the controlled vocabulary of floors, walls, etc. The alternative to a hierarchy is a network structure. [National BIM Standard - US V3]
Thesaurus	1. Another way to organize the hierarchical structure of topics and subtopics. A Thesaurus is different from a Taxonomy in that topics are defined, their synonyms are defined, and an effort is often made to show the kinds of relationships between terms. A Taxonomy may be combined with a Thesaurus to create a Taxo-Thesaurus, as the World Bank has done to make document management more accurate and less expensive. Commitments may be made to use a specific controlled vocabulary or ontology for a domain of interest. [National BIM Standard - US V3] 2. A way of organizing subject matter. Differs from a Taxonomy in that topics are grouped with their synonyms or references and these groupings ordered a in nonhierarchical way by name of the topic, rather than being organized as topics and sub-topics in conceptually related groupings. May be combined with a Taxonomy to create a Taxo-Thesaurus. The World Bank has created such a system. [National BIM Standard - US V3]