NATSPEC// Construction Information

ICIS INTEGRATING CONSTRUCTION

NATIONAL BIM OBJECT LIBRARY SURVEY – SUMMARY REPORT

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INTRODUCTION

Challenge
NATSPEC has been challenged by the Australian Government and industry with the task of developing a National BIM object library for Australia. To assist in deciding the best approach to take, a survey was developed in conjunction with Konrad Stuhlmacher of Dr. Schiller & Partner GmbH, who was previously DIN's representative at ICIS (www.icis.org).

Objective
This survey aimed to identify what National BIM object libraries currently exist globally. The survey was completed in December 2014 and was open to ICIS Members, buildingSMART Chapters and ISO TC59 SC13 members, plus representatives of other countries.

The purpose of this report is to summarise the findings of that survey and assist in global knowledge.

Respondents
There was a great response to the survey with 39 respondents from 19 countries across the globe. The countries represented were:

- Australia (11)   - Austria (1)
- Belgium (1)   - Canada (3)
- China (1)   - Czech Republic (1)
- Denmark (1)   - England (1)
- Finland (2)   - Germany (1)
- Japan (2)   - Netherlands (2)
- New Zealand (3)   - Norway (3)
- Singapore (1)   - South Africa (1)
- Sweden (2)   - Switzerland (1)
- USA (1)

SURVEY FINDINGS

Libraries and standards

The respondents to the survey highlighted the fact that there are currently very few National BIM Object libraries in existence. Whilst many private entities and software providers supply BIM objects, the only National libraries that were identified by the respondents were the UK National BIM Library and the Australian BIM-MEP[aus] object library. Further investigation found that Korea is currently half way through a three year project to develop a National object library, with over 500 objects and a guideline for object development already produced.

Many countries appear to be moving towards the development of National BIM object libraries and in particular, the standards that would be required for creating and naming BIM objects that are to be part of such libraries. Countries currently in the process of producing standards relating to BIM objects include Norway (NS 8360), China, Denmark, Sweden, Netherlands and Australia.

A number of respondents also indicated that some standards already exist for object creation and naming in their countries. These included Australia (ANZRS and BIM-MEP[aus]), Netherlands (DRS, CB-NL, and COINS), England (NBS BIM Object Standard), New Zealand (ANZRS) and Singapore (Singapore BIM Guide).

Object file format

A number of questions in the survey enquired about the data format(s) required for objects in a National BIM object library. It was agreed that all objects should be provided in the IFC data format, with the majority of respondents suggesting both IFC2x3 and IFC4 should be offered. 4 respondents thought only IFC2x3 should be offered and 5 respondents thought only IFC4 should be offered.

In addition to the IFC data format the majority of respondents also indicated that objects should be provided in Revit (Autodesk) and ArchiCAD (Graphisoft) formats. Other data formats were also suggested.

The general consensus appeared to be that respondents felt that a National BIM object library should be open in nature and not reliant on any one (or more) commercial data formats.

Object data content

One way of dealing with the issue of growing/changing information demand for an object library is to offer generic objects as well as proprietary objects from product manufacturers. By exchanging one with the other you can step up from a generic level of information / detail (LOD) to a higher level of information / detail. The majority of respondents believed that this would initially be sufficient for a National BIM object library.

However, it was noted that the generic objects should ideally allow for the LOD to increase without the need for replacing the object with a more detailed graphical representation, until a proprietary product had been selected. This could be achieved by having the generic object sufficiently graphically detailed to cover all LOD's and having sufficient parameters / data fields defined within the non-graphical part of the object to populate with further data as the LOD increased.

The respondents identified Clearances and Maintenance / Access zones as being the primary additional features that they would like to see included in library objects.

Object classification

BIM objects can be referenced / linked to external information sources to save overloading the model with information. A classification system can be utilised to make this reference / link. The majority of respondents unsurprisingly suggested that the classification system used most prominently in their country should be offered for objects in a National library, whilst also recognising OmniClass and Uniclass2. The majority of respondents also opted for mapping to the buildingSMART Data Dictionary (bSDD).

Regarding how standard specification text should be linked to BIM objects, there was no clear preference from respondents as to which classification system should be used. Many respondents felt that the classification system of the specification text should be used but also recognised that it is dependent on the stage of design and need / use of that specification data (i.e. it could be elements, systems / work results and products).

Object data formats & property sets

In general the results indicated that COBie, as a data format, does not play the same role in the majority of respondents' countries as it does in the UK. However, a number of respondents did believe that the objects in a National BIM object library should be COBie compliant.

Standardised property sets are essential for a successful object library. Twelve of the nineteen countries indicated that they already have or are currently working on standardised property sets for BIM objects: Norway, Switzerland, Czech Republic, Canada, Austria, Australia, Finland, Sweden, Denmark, Netherlands, USA and New Zealand.

The majority of countries also thought that the bSDD should be used as the basis for naming the object properties in a National BIM object library. However, it was noted that there is still work to be done with the bSDD to allow this to happen.

FINALLY

Other considerations

As a final question the respondents were asked if there were any aspects of a National BIM object library that had not been discussed in the survey but that would be important to consider. The following responses were received:

- Australia – Collaboration with product manufacturers and cost estimators.
- Australia – Compliance of all library items with National Standards and Codes. Non-conforming products be excluded from library.
- Australia – How easily accessible it is. What costs are involved for using it. How extensive and up to date it is.
- Australia – The focus should be on IFC format files first and then native formats.
- Austria – EU integration, EU standardisation.
- Canada – Object library should also have guideline for its use.
- Denmark – The user perspective is important; the approach to the use of object libraries could be different in different stages of the construction lifecycle.
- Netherlands – To consider who the users of the library will be, who the users of the data will be and what their needs for the data are.
- Netherlands – To learn from each other, globally.
- New Zealand – Establish how objects are to be built to ensure a consistent object quality.
- New Zealand – Open to multiple content developers, with a known standard for object development. Also include an assessment function for users to rate the objects.
- Norway – Handling of quantities.
- Singapore – Country codes and standards.
- Switzerland – Free market.
- USA – Need to recognise that different stages of the design / documentation process will require different levels of information, objects should not be required to have all information all of the time.

APPENDIX A – DETAILED SURVEY INFORMATION

National BIM Object Library Survey

Q3 Is there a National BIM Object Library in your country?

Answered: 39 Skipped: 0

Those who answered yes

- Australia: AMCA BIM-MEP[aus]
- Australia: http://buildingsmart.org.au/campaigns/the-national-bim-initiative-nbi/#.VH6kFTGUcj4
- Canada: https://www.buildingsmartcanada.ca/about-us/
- England: www.nationalbimlibrary.com
- Norway: NS 8360: no URL at present. See www.standard.no

Other comments

- Netherlands: cb-nl.org. There is also one for the Dutch water and road board which is not publically available.
- USA: Many private businesses offer BIM objects.

NATSPEC further findings

- The only Australian National library is the AMCA BIM-MEP[aus] library, which is REVIT based, specifically for MEP objects.
- Canada does not yet have a National object library.
- NS 8360 is not an object library but a standard for naming and creation of objects and object libraries, which is currently at committee stage and not yet published.
- The Netherlands cb-nl concept library is not an object library but a digital dictionary: a collection of definitions of objects and spaces.
- buildingSmart Korea are half way through a three year project to develop a National object library, with a draft object development guide and over 500 REVIT objects already created.

Q4 Is there a standard for creating BIM objects in your country?

Answered: 38 Skipped: 1

Those who answered yes:

- Australia: BIM-MEP[aus]
- Australia: For REVIT objects we have the Australian and New Zealand Revit Standards (ANZRS).
- Australia: http://bim.natspec.org/index.php/natspec-bim-documents/national-bim-guide
- England: NBS BIM Object Standard.
- Netherlands: CB-NL, concept library; DRS Dutch Revit Standard.
- Netherlands: COINS format http://www.coinsweb.nl/
- Norway: NS 8360 (x3).
- Singapore: BIM Guides Singapore and others.

Other comments

- China: We have a standard equal to IFC and are developing application standard and relative standards.
- Denmark: We are initially discussing object libraries at the moment.

NATSPEC further findings

- Other than BIM-MEP[aus] for MEP objects and ANZRS for REVIT objects, there are no other standards for object creation in Australia.
- CB-NL is a digital dictionary: a collection of definitions of objects and spaces.
- NS 8360 is currently at committee stage and as yet unpublished.
- buildingSmart Korea are in the process of developing an object development guide.

Q5 In addition to IFC which data formats should BIM objects be offered in a National BIM library?

Answered: 33 Skipped: 6

Autodesk® Revit® : 15 Countries
- Australia x 8
- Austria x 1
- Belgium x 1
- Canada x 3
- China x 1
- Czech Republic x 1
- England x 1
- Finland x 1
- Japan x 1
- Netherlands x 1
- New Zealand x 3
- Norway x 1
- Singapore x 1
- Sweden x 2
- USA x 1

Bentley AECOsim : 3 Countries
- Australia x 4
- Canada x 1
- Singapore x 1

Graphisoft ArchiCAD : 12 Countries
- Australia x 6
- Canada x 2
- England x 1
- Finland x 1
- Japan x 2
- Netherlands x 1
- New Zealand x 3
- Norway x 1
- Singapore x 1
- Sweden x 2
- Switzerland x 1
- USA x 1

Nemetschek Vectorworks : 8 Countries
- Australia x 4
- Austria x 1
- Canada x 1
- Czech Republic x 1
- Japan x 2
- New Zealand x 2
- Singapore x 1
- Switzerland x 1

Tekla Structures : 7 Countries
- Australia x 4
- Canada x 1
- Japan x 2
- Netherlands x 1
- New Zealand x 1
- Singapore x 1
- Sweden x 2

Others
- Australia - Sketchup
- Canada – Any consensus or recognised open format
- Singapore - QS Softwares

Countries
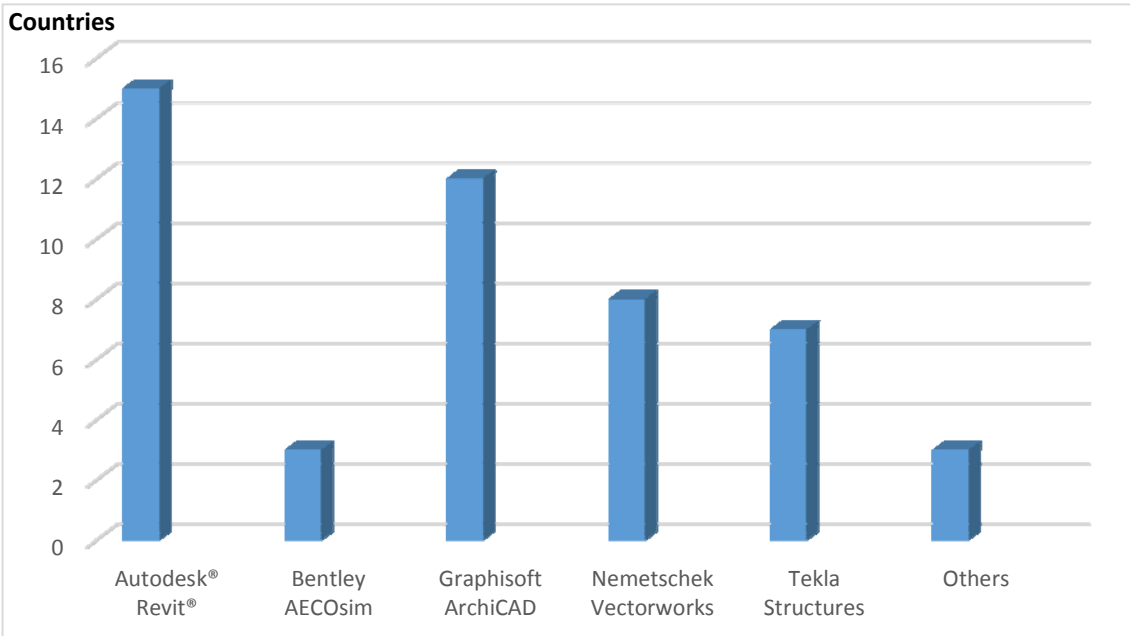
Comments
- Australia: Compatible for all applications and users.
- Australia: With support of vendors "limitations" can be solved.
- Canada: All IFC-compliant software, but the software company to provide the objects to the National Object Standard. (NATSPEC further findings: A National Object Standard does not yet exist in Canada.)
- Denmark: We have not decided yet.

- Netherlands: The Dutch vision is not to be reliant on commercial formats – we don't want to annotate other formats but to have geometry as a property of the object. The commercial vendors should follow the dictates of the government -defined objects.
- Norway: There should be a harmonised IFC data exchange based on an open standard.

Q6 Should IFC4 be offered next to IFC 2x3?

Answered: 34 Skipped: 5

Yes, both	**73.5%** 25
No, only IFC2x3	**11.8%** 4
No, only IFC4	**14.7%** 5

Comments

- Australia: IFC 2x3 will be in use for a number of years still. Software claims that it can communicate in IFC 4 but they don't cover all of the data requirements of IFC 4 and won't for some time.
- Australia: IFC4 many improvements including the library files.
- Australia: Start with widely supported IFC2x3, and then wait for IFC4 vendor release.
- Australia: Yes, why not? Will 'future proof' objects and also encourage adoption of IFC 4.
- Canada: Assuming can use IFC4 within 2x3 when need be.
- Canada: So far IFC2x3 is the only recognized format.
- Denmark: We need to push the SW-industry to move faster.
- England: Until IFC4 is recognised by the software vendors then this should not be delivered.
- Norway: There should be only one standard to avoid conflicts in the data exchange. IFC4 is an ISO standard and seems to provide more performance.
- USA: With a time limit so as to encourage upward migration.

Q7 Are there standards on naming BIM objects in your country?

Answered: 36 Skipped: 3

Those who answered yes:

- Australia: ANZRS for REVIT objects and also the International bSDD project.
- England: NBS BIM Object Standard.
- Netherlands: crow.nl, stabu.nl
- Norway: NS 8360 (x 3).
- Sweden: There is an ongoing project on this subject in Sweden called BIP.

Other Comments

- Australia: There are several vendor specific guides, but no National standard.
- Canada: Canada has access to USA National Standards Version 2.
- Denmark: We are discussing the topic.
- New Zealand: However, Australia New Zealand Revit Standard (ANZRS) by some.

NATSPEC further findings

- The CB-NL could be used a resource for naming objects as it is a digital dictionary: a collection of definitions of objects and spaces.
- NS 8360 is still at committee stage and as yet unpublished.
- buildingSmart Korea are in the process of developing an object development guide.

Q8 By exchanging a generic object with a proprietary object you can step up from a generic level of information / detail to a higher level of information / detail. Would that be sufficient for an object library?

Answered: 35 Skipped: 4

|	
Yes	**80.0%** 28
No	**20.0%** 7

Comments

- Australia: Both generic and proprietary objects are required in the library but that alone is not sufficient. The generic object should be sufficiently graphically detailed to cover all LOD's so that it does not need to be changed until a proprietary product has been selected. The generic object should have sufficient parameters/data fields defined within the non-graphical part of the object to populate with further info as the LOD increases. i.e. The generic object has to allow for the LOD to increase without the need for replacing the object with a more detailed graphical representation or a proprietary object.
- Finland: Not replace, you also need the generic objects in FM.
- Netherlands: Next to definitions you will need content within a context to give meaning.
- Netherlands: Propriety objects are offered by the manufacturers as an extension of the BIM library and are not the responsibility of the National BIM caretakers.
- New Zealand: An additional generic concept design would be helpful.
- Sweden: The optimal solution is provision of different LOD's for BIM objects, but in the short run, the two options mentioned above could suffice.
- USA: Generic for the National library; proprietary by businesses.

Q9 Which additional features would you like to see for the BIM objects?

Answered: 29 Skipped: 10

2D	**48.3%** 14
2D symbols	**69.0%** 20
Clearances	**82.8%** 24
Maintenance/access zones	**72.4%** 21
Others:	**27.6%** 8
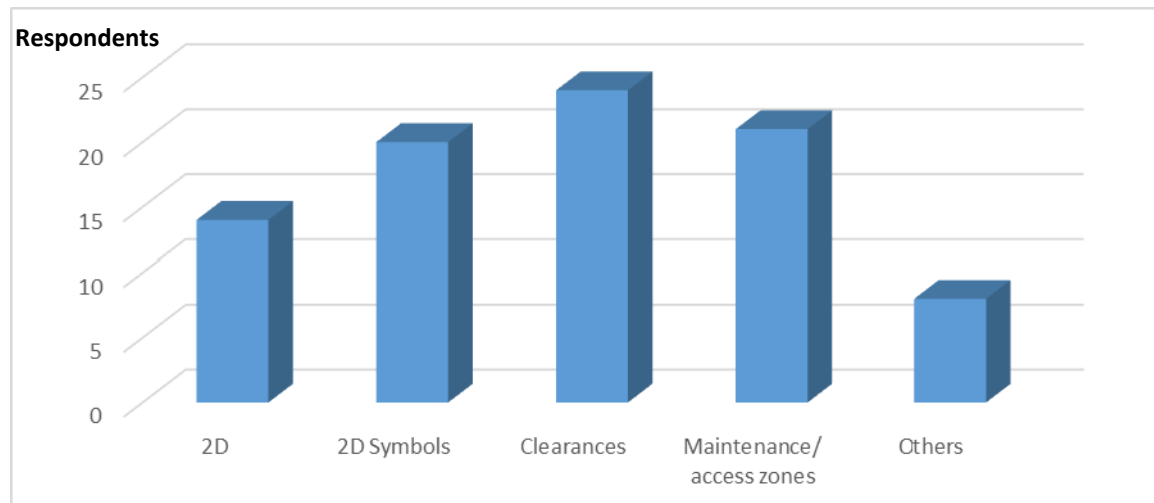
Comments

- Australia: As development proceeds, and clients for example define their asset management requirements there may be many other data required. Start simple and build as demand matures.
- Australia: Compliance with Australian Standards and Codes.
- Australia: Specification info/link.
- Czech Republic: Measurement rules.
- Netherlands: Non-geometrical features, for example prices for those involved in finance, geometrical shapes for those involved in engineering or design, instances for those involved in manufacturing.
- Netherlands: This is all representations of Data, so: Any.
- New Zealand: Standard materials and properties. Depending on the object: the above four 'tick' items might be needed.
- New Zealand: Standardised properties and property sets that allow for real world costing and specification.
- Singapore: Cost.
- Switzerland: Link to costs.

Q10 Which classification systems should be offered (either already mapped or to be filled in later by the user)?

Answered: 30 Skipped: 9

OmniClass™ : 9 Countries
- Australia x 2
- Austria x 1
- Canada x 3
- China x 1
- Czech Republic x 1
- Japan x 2
- Singapore x 1
- Sweden x 1
- USA x 1

Uniclass2 : 9 Countries
- Australia x 3
- Canada x 1
- Czech Republic x 1
- England x 1
- Japan x 2
- New Zealand x 1
- Singapore x 1
- Sweden x 1
- USA x 1

**buildingSMART Data Dictionary (bSDD) : 14 Countries**
- Australia x 5
- Austria x 1
- Canada x 3
- China x 1
- Czech Republic x 1
- Denmark x 1
- England x 1
- Finland x 1
- Japan x 2
- New Zealand x 3
- Norway x 1
- Singapore x 1
- Sweden x 2
- USA x 1

eCl@ss : 1 Country
- Germany x 1

Others
- Australia - NATSPEC
- Denmark - CSS
- Germany - A system (maybe based on 12006-3) with clarified responsibility, rules, quality assurance and structure.
- New Zealand (x2) - CBI
- Norway - NS 3420
- Norway - National Classification Tables
- Switzerland - eBKP

Countries
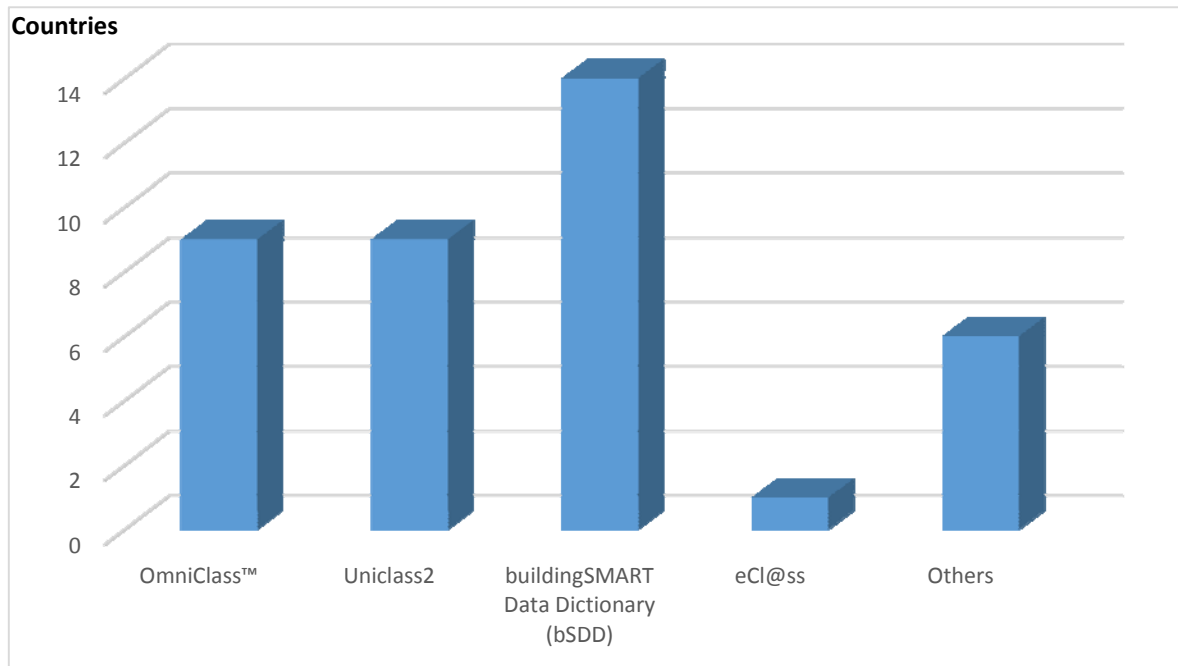
Comments

- Finland: bSDD is not a classification system, you can store systems in it.
- Germany: At this moment bSDD is not an option.
- Netherlands: Any classification system should be to attach. bSDD is not a classification but can connect classification with each other.
- Netherlands: If you are referring to the library, classification is the best method. If you referring to instances (real world objects) then references to external sources is the best way.

Q11 Which classification system should be used to link standard specification text with the BIM objects?

Answered: 25 Skipped: 14

OmniClass™ Table 21 Elements : 7 Countries
- Australia x 1
- Austria x 1
- Canada x 2
- China x 1
- Japan x 1
- Singapore x 1
- Sweden x 1

OmniClass™ Table 22 Work Results : 5 Countries
- Australia x 1
- Canada x 2
- China x 1
- Japan x 1
- Sweden x 1

OmniClass™ Table 23 Products : 5 Countries
- Canada x 1
- China x 1
- Japan x 1
- Singapore x 1
- Sweden x 1

Uniclass2 Table Ee - Elements : 7 Countries
- Australia x 2
- China x 1
- England x 1
- Japan x 1
- New Zealand x 1
- Singapore x 1
- Sweden x 1

Uniclass2 Table Ss - Systems : 6 Countries
- Australia x 2
- China x 1
- England x 1
- Japan x 1
- New Zealand x 1
- Sweden x 1

Uniclass2 Table Pr - Products : 7 Countries
- Australia x 2
- China x 1
- England x 1
- Japan x 1
- New Zealand x 1
- Singapore x 1
- Sweden x 1

Classification system of the specification text : 8 Countries
- Australia x 3
- Canada x 1
- China x 1
- Czech Republic x 1
- Germany x 1
- New Zealand x 1
- Norway x 1
- Singapore x 1
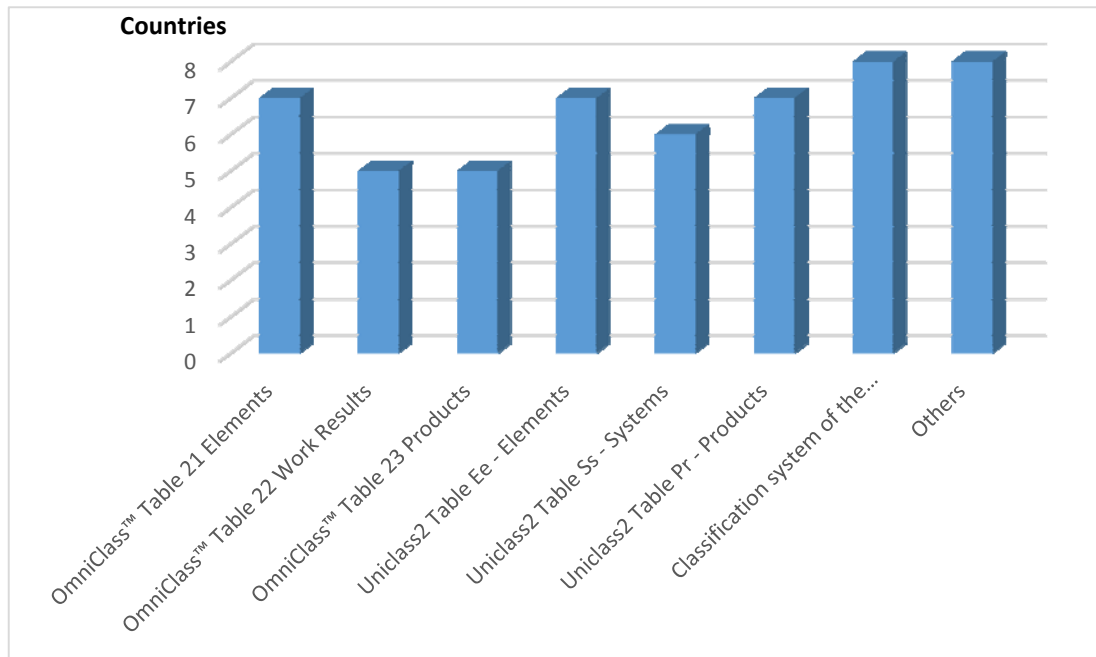
Comments

- Australia: Whichever provides the clearest identification of the element/product.
- Australia: It will depend on the construction type. Data in many cases needs to be stored at a variety of levels. Take a wall for example it is an Element that has certain properties, then as a system it has fire resistance and Sound ratings and that system is made up of a series of products that also need data attached. Depending on the need / use data at different levels is required.
- Denmark: The Danish CCS for both Classification and Identification.
- Germany: There will be a BIM classification (DIN Spec 91400) that connects our specification text with BIM objects but can also Link to classifications based on 12006-2.
- Netherlands: This is dependent on the environment you are working at. Purpose of use determines the 'standard' classification used.
- Netherlands: Use triples or linked data - it is not a classification it is a declaration.
- New Zealand: Appropriate properties.
- New Zealand: CBI.
- Norway: NS 3420.
- Switzerland: eBKP, NPK.
- USA: It depends on the stage of design - elements for prelim, work results for detailed design.

Q12 Does COBie play the same role in your country as it does in the UK and would you like to see it incorporated within BIM objects of a National BIM library by default?

Answered: 33 Skipped: 6

Yes : 8 Countries
- Australia x 4
- Canada x 3
- Czech Republic x 1
- England x 1
- Finland x 1
- Japan x 1
- New Zealand x 1
- Norway x 1

No : 14 Countries

- Australia x 3
- Austria x 1
- China x 1
- Denmark x 1
- Finland x 1
- Germany x 1
- Japan x 1
- Netherlands x 2
- New Zealand x 2
- Norway x 2
- Singapore x 1
- Sweden x 2
- Switzerland x 1
- USA x 1

Comments

- Australia: Asset management is probably the most important issue for Government portfolio management. COBie is a good beginning and completes coverage of the product life-cycle.
- Australia: We need to follow a system that has already been implemented rather than creating our own. There really needs to be an international BIM Data deliverable protocol, not different systems for each country.
- Canada: In Canada, I can't see going in a different direction to either the US or the UK.
- Canada: This is 2 questions. It does NOT play the same role, but it SHOULD be included.
- Denmark: We are discussing maybe to adapt a Danish version of COBie.
- Netherlands: This issue is under debate - obviously it is in a different language to begin with - COINS is the form currently being used in the Netherlands. COINS is in the process of being overhauled.
- New Zealand: COBie plays very minor role in NZ at moment. But would like to see it being part of a National BIM library.
- New Zealand: It doesn't play a role but I think it should and probably will at some point.
- Sweden: COBie could be used as a guideline, but as a standard and a format to be used in practice, it has many shortcomings.
- USA: COBie is not rigorous in its structure, language, etc.; this is actually 2 questions.

Q13 Are there standardized property lists/sets for building products in your country, that the objects of a BIM library could utilise?

Answered: 33 Skipped: 6

Those who answered yes

- Australia (x4): BIM-MEP[aus] and vendor product guides start this process. IFC.
- Austria
- Canada: Included in the National Master Specification (NMS) master-guide spec.
- Czech Republic.
- Denmark: We have decided of the structure for handling properties and will start in 2015 to make the first properties available for use.
- England: The NBS BIM Object Standard will provide some high level consistent properties. Building onto this the use of NBS Create product and systems properties will provide further consistency.
- Finland.

- Netherlands (x2): etim.nl. However, this is only for Electro Technical sector. Standardised property lists/sets for building products are planned to be incorporated into the CB-NL in the near future. STABU delivers properties based on European standards for product information.
- Norway.
- Sweden: The under-development BIP standards for properties.
- Switzerland: NPK.

Other comments

- Australia: Schedules included in NATSPEC specifications could be a start.
- New Zealand: A few property sets are defined in ANZRS.
- USA: Work is being done on SPie, but it is volunteer and not proceeding very quickly; again it is not rigorous or structured.

Q14 Do you think bSDD should be used as the basis for the object properties of your National BIM Library?

Answered: 32 Skipped: 7

Yes : 11 Countries
- Australia x 5
- Austria x 1
- Canada x 3
- Czech Republic x 1
- Denmark x 1
- Japan x 2
- Netherlands x 2
- New Zealand x 3
- Norway x 2
- Singapore x 1
- Sweden x 2

No : 8 Countries
- Australia x 2
- China x 1
- England x 1
- Finland x 1
- Germany x 1
- Norway x 1
- Switzerland x 1
- USA x 1

Comments

- Australia: Considerable effort has gone into improving bSDD lately and it still offers the most effective vehicle for harmonisation. It should at least aim to align with bSDD but it must also match what is being used in that country at that time.
- Australia: If it hasn't been used successfully why use it here. Implement the same system that the UK NBS has incorporated so that there is consistency at least between two countries.
- Denmark: bSDD In a longer term perspective. There are some initial preparations and clarifying things to be done.
- England: I think the properties we use should contribute to developing the IFD/bSDD.

- Norway: Difficult to match objects to bSDD.
- Norway: Yes to IFD, but not to bSDD at this moment (see question 10).
- Switzerland: National DD is linked to bSDD.
- USA: If the Govt wants standardized properties, they should financially support their use - bSDD requires info providers to license the system.

Q15 Are there standards in your country that determine/classify the properties themselves?

Answered: 30 Skipped: 9

Those who answered yes

- Australia (x3).
- Austria.
- Canada: buildingSMART / OmniClass.
- Denmark: The standard has been developed this year. It consists of 15 superior classes.
- England: Yes the development of the BIM toolkit for the UK Government will aid.
- Finland.
- Netherlands: ISO 15 926 for the process industry.
- Norway: Don't really understand this question.
- Singapore: CEMS, etc.
- Sweden: BIP.
- USA: OmniClass; SPie is trying but doesn't use classification principles.

Other comments

- Australia: Not entirely sure if NO is correct, but think it is very likely.
- Switzerland: NPK by crb.ch.

Q16 If no standard, how do you make sure that the different property lists/sets contain a comparable level of information?

Answered: 16 Skipped: 23

- Australia: Appoint a team of specialists from industry to ensure all life-cycle interests are included, undertaken by our National Specification body NATSPEC. I am sure this is not easy but development of technical memoranda for these issues - in cooperation internationally will ensure an effective outcome.
- Australia: Building codes.
- Australia: Currently we do not use data in our BIM as it isn't a deliverable from our client and there is no standard in Australia. Once a standard is created I would use the data required and undertake a check using a model checking software like Solibri Model Checker.
- Austria: Not yet the case, standardisation on the way, BIM not yet common practice.
- Canada: You can't; the user must fill in any missing property values.
- Denmark: We are working with the development and use of CCS Level of information combining LOD and LOI (as we know it) being seen in the same context.
- England: Ensuring there is not duplication of properties is an issue we deal with on a regular basis. These may occur between the sources of properties whether these be IFC or NBS Create. We apply rules as stated in the NBS BIM Object standard to control the duplication of properties.
- Netherlands: It needs to be managed.
- Netherlands: You don't. This is where you need a concept library like bSDD/CB-NL.

- New Zealand: There is nothing now. I think that there should be a central curator who manages properties and sets on behalf of the library to ensure consistency using bSDD as the management backbone.
- Norway: Distinguish between requirement and actual performance of objects.
- Singapore: Developing a new system now, at initial stage.
- Switzerland: Manual.
- USA: Unknown.

Q17 What other aspects are important for establishing a National BIM Library?

Answered: 18 Skipped: 21

- Australia: Collaboration with the product manufacturers is essential, in addition to cost estimators; both groups have been unwilling to participate in BIM wholeheartedly and if we are to develop (inter)national BIM object libraries their participation is fundamental.
- Australia: Compliance of all library items with Australian Standards and Codes - non conforming products (imports in particular) are excluded.
- Australia: How easily accessible it is. What costs are involved for using it. How extensive and up to date it is.
- Australia: That it doesn't focus on Native Format files as that will lead to an unbalanced output. The focus should be on IFC first and then native formats.
- Austria: EU integration, EU standardisation.
- Canada: Guidelines for its use.
- Canada: No additional info. Tkx for the excellent work.
- Denmark: The user perspective is very important. It shows that the approach to the use of Object libraries could be different in different stages of the Construction lifecycle.
- England: Clearly defining property definitions is important. Controlling the levels of detail is important and understanding how these can impact on a designers experience of using the content.
- Japan: All of the stakeholders to be improve in a same speed.
- Netherlands: Learning from each other - the Dutch CB-NL team is keen to be of assistance!
- Netherlands: Who will be the users of the library? Who will be the users of the data? (design, build, finance, operate, maintain) And what are their needs for data?
- New Zealand: Also important is to establish HOW objects are to be built (geometric and parametric functionality)to ensure a consistent object quality.
- New Zealand: Open to multiple content developers. Known standard for object development to ensure minimum quality. Probably include an assessment with each object as to how well it complies (rather than only have a pass fail - users can choose what works for them).
- Norway: Handling of quantities.
- Singapore: Country code.
- Switzerland: Free market.
- USA: Need to recognize that different stages of the design/documentation process require different levels of information; objects should not be required to have all information all of the time. We should also recognize that manufacturers need proprietary properties in addition to standard ones.