

AMCA Policy Position

BUILDING INFORMATION MODELLING: DATA STANDARDS

February 2016

Statement of policy position

The Air Conditioning and Mechanical Contractors' Association is a strong advocate for the adoption of building information modelling as best practice in the delivery of building and construction process.

The successful adoption of BIM requires a deliberate and structured approach to the creation and maintenance of digital information. Standardisation of pre-defined parametric data fields ensures that information about a building structure, plant, equipment and fittings is precise enough to accurately represent the physical, spatial and functional characteristics of a building. The standardisation of data also enables practices and workflows to be developed to ensure that information is shared and applied routinely and consistently throughout the entire construction process, whilst maintaining the integrity of the design.

Agreed industry standards will lower the costs of transitioning to BIM-enabled project delivery and promote more efficient and competitive markets. Barriers to entry for all firms, particularly for SMEs, will be reduced due to the reduced costs and risk for firms considering investment in BIM capabilities.

In addition to the efficiency gains and competition effects, the creation of baseline industry standards would facilitate further innovation by industry. Currently, vital resources are being employed by competing firms to create similar digital content. Industry standards would allow skilled personnel to undertake alternative high value innovation projects that leverages off the 'standard' information contained within the BIM model to deliver improved building performance and management solutions.

While several approaches to information standardisation are available, the UK Government has prescribed the use of Construction Operations Building Information Exchange (COBIE) 2012 on all government projects. The AMCA is encouraged by the leadership demonstrated by the UK Government; however without refinement, the COBIE methodology and data drops present an unreasonable impost on the supply chain – especially suppliers and subcontractors. Consequently, the productivity gains available to subcontractors from the adoption of BIM practices are likely to be eroded by increased demands for data collection and exchange.

Whilst BIM-MEP^{AUS} supports the principles of COBie, a more targeted set of data templates and exchange protocols would allow more participants in the supply chain to derive benefits from BIM adoption, while distributing responsibility for data collection and maintenance to parties most capable of delivering it.

What is COBie?

Collecting information about a building or facility prior to handover has often involved trawling through boxes of paper or electronic paper PDFs. Not only is this an expensive exercise, but it inevitably leads to information gaps leading to cost inefficiencies and suboptimal and building performance. The Construction Operations Building Information Exchange (COBie) aims to address this issue by encouraging designers and contractors to capture and document information as it is created throughout the design, construction and commissioning process.

In essence, COBie captures information about two types of assets: equipment and spaces. This includes equipment lists, product data, warranty information and maintenance in a database schema, usually presented in a spreadsheet format. Members of the supply chain that are typically responsible for information creation are typically charged with responsibility for information capture. For example, designers provide floor, space and equipment layouts, while contractors provide make, model and serial numbers of installed equipment.

However, several weaknesses raise questions about its appropriateness as the data collection standard specified on building and construction projects.

Why not COBie?

A modest BIM project that is fully COBie compliant may produce a spreadsheet of 600,000 rows, while more complex projects could potentially exceed a million lines of data, technically beyond the capacity of a single Excel file. Not only is this a time consuming and costly exercise, but it can be of limited value unless owners and managers have critically analysed how it can be used to deliver improved building performance.

Unless owners and building managers undertake an evaluation process that prioritises and specifies the information to be captured, many of the supply chain benefits of BIM-enabled project delivery can be eroded. This is because COBie is effectively an additional deliverable. While logical and easy to understand, the spreadsheet format is non-geometric. This means that it does not directly contribute to the creation of a data rich, three dimensional building models (BIM), and is isolated from more integrated BIM workflows that have the ability to deliver efficiencies throughout the design and construction process.

The specification of COBie can therefore be counterproductive, while increasing the cost of the project.

Principles to guide data creation

While COBie provides a logical and easy to understand format for data creation, the abovementioned weaknesses present an opportunity for a more targeted approach that addresses the needs of owners and facility managers, while also presenting scope for benefits to the supply chain throughout the construction process.

The AMCA's approach to data creation standards and protocols is guided by the following principles:

1. The successful adoption of building information modelling construction practices depends on a deliberate and structured approach to the creation and maintenance of digital information.
2. Standards, templates and protocols for data collection should be targeted and fit for purpose.
3. Standards should promote the immediate and broad adoption of building information modelling across the building and construction industry.
4. Responsibility for data should be assigned to the party most capable of producing creating, storing and maintaining information.
5. Standards should promote increased competition for projects by lowering the cost of BIM adoption for firms of all sizes.
6. Data collection standards and protocols should be complemented by supporting documentation that integrates the data with other elements of the building and construction process.
7. Standards should be vendor neutral, but should initially be targeted in areas where there is demonstrable market concentration to promote rapid adoption.

Recommendations

The following recommendations have been selected based on their ability to expedite the adoption of BIM-enabled project delivery, lower the costs of adoption for firms of all sizes, and deliver maximum benefits to all participants in the supply chain.

Industry-led standards development

Standard development that is industry-led and agreed will be adopted more rapidly, delivering immediate operational and economic benefits. Therefore, standards should focus on technologies where there is market concentration and that are likely to deliver the greatest benefit to industry. *See Appendix A: About BIM-MEPAUS*

BIM-enabled project delivery for all government projects

As a major procurer of building and construction services, Government is able to influence the behaviour of industry via procurement processes. As part of their procurement process, government could specify the use of an industry-agreed standard, which would ensure that consistency is applied across government projects, and that genuinely engages with industry as a key stakeholder.

The specified use of BIM on government projects will promote more efficient project delivery, deliver improved built outcomes, and reduce the cost of government projects. These benefits are expected to translate to the private sector due to an increase in the stock of knowledge pertaining to BIM project delivery, and the subsequent transfer of skills across the building network.

Government endorsement of industry standards and codes of practice

Government is uniquely placed to facilitate the creation of industry standards by providing coordination services and industry leadership. This would see Government work more closely with industry (for example, participating on working committees) to strengthen and provide official endorsement for industry-driven standards and codes of practice.

A code of practice and implementation guidelines is required to ensure that there are clear expectations for government projects. Furthermore, the code will help to promote BIM adoption by the private sector by providing leadership and guidance about how to address key risks associated with more integrated projects.

For example, the code will help to address market concerns about changes in the contractual arrangements governing BIM-enabled project delivery. This includes a clearer definition of roles and responsibilities across the building network, as well as arrangements for decision making authority, issue escalation, liability, disputation and model ownership.

Document Control

Version	Date Approved	Approved By	Description
V.1			

Appendix A: About BIM-MEP^{AUS}

BIM-MEP^{AUS} is a global leading industry initiative that strives to address some of the barriers to the adoption of building information modelling (BIM) in the Australian building and construction sector.

What is building information modelling?

Building information modelling (BIM) is predicated on the idea that a building should be constructed twice: virtually first, physically second.

This requires a systematic process that enables the capture, recording, exchange and application of building and construction data using detailed three-dimensional modelling.

The success of the process depends on a deliberate and structured approach to the creation and maintenance of digital information. Standardisation of pre-defined parametric data fields ensures that information about a building structure, plant, equipment and fittings is precise enough to accurately represent the physical, spatial and functional characteristics of a building.

The standardisation of data also enables practices and workflows to be developed to ensure that information is shared and applied routinely and consistently throughout the entire construction process, whilst maintaining the integrity of the design.

Why is building information modelling so innovative?

Building design and construction is inherently a work in progress. As the building transitions from the architectural design model to the building services design model to the constructible model, changes to the overall physical, spatial and functional characteristics of the building are to be expected. Building information modelling allows these changes to be communicated among the key parties to a project during the design phase.

Earlier identification of issues, before they reach the construction process begins, facilitates better service coordination onsite with significant improvements in productivity, cost control and building performance.

Exactly what benefits can be expected from BIM projects?

Table 1 **Benefits of building information modelling**

Improvements in firm productivity	Improved workplace practices/ reduced onsite conflict
Reduction in reworks and material wastages	Better health and safety design and performance
Reduced costs	Environmentally sustainable design and operations
Reduction in schedule overruns	Improved building operability and energy efficiency
Cost reductions and improvements in competitiveness	Improved business to business relationships.

How does BIM-MEPAUS help achieve these goals?

To facilitate the exchange of design models and information, data must be standardised to ensure that it is representative of the physical, functional and spatial characteristics of a facility. The creation of a common set of protocols - standards, specifications, practices, models and workflow guidelines – ensures, not only that the data can be trusted, but that it can be continuously shared between all parties to a projects whilst maintaining the integrity of the model and design. It is these challenges that the BIM-MEPAUS initiative seeks to address.

Exactly what does BIM-MEPAUS produce?

Standards	<p>BIM-MEPAUS aims to publish a set of standards to ensure BIM design models are precise and accurate, practices are applied routinely and consistently, and the sharing of information follows a predictable workflow that provides all parties to a project with confidence in the integrity of both the model and the process.</p> <p>BIM-MEPAUS standards include:</p> <ul style="list-style-type: none">• Specifications for plant, equipment and fittings• Work practices (for example, standard operating procedures)• Guideline documents• Workflows
Practices	<p>BIM-MEPAUS practices will provide documented instructions for the performance of particular operations and functions throughout the BIM design process and workflow.</p>
Specifications	<p>Specifications detail explicit sets of requirements to be satisfied by a design model of plant, equipment and fittings. Specifications will include requirements for the physical and mechanical properties of both the design and manufacturer models to be used within the Revit MEP software.</p>
Guidelines	<p>BIM-MEPAUS guidelines provide a compendium of information or series of options to support the use of other BIM-MEPAUS standards such as specifications, practices and workflows.</p>
Models	<p>BIM-MEPAUS models are the three-dimension representation of the various physical, functional and spatial characteristics (specifications) of a particular piece of plant, equipment or fitting. These models have been design in consultation with designers, manufacturers and suppliers to ensure the defined parameters are consistent in terms of design and application.</p>
Workflows	<p>BIM-MEPAUS workflows promote the efficient transfer of building information throughout the project lifecycle. BIM-MEPAUS workflows achieve this by providing a clear pathway for the transfer of BIM models:</p> <p>Design model → Manufacturer model → Constructible model → Commissioned as-built model</p>

About the AMCA

Established in 1961, the Air Conditioning & Mechanical Contractors' Association (AMCA) is a nationwide trade association of member companies operating in the commercial and industrial air conditioning and mechanical services industry.

AMCA members are highly skilled companies with expertise in the design, manufacture and installation of air conditioning and ventilation systems, as well as the ongoing service and maintenance of plant, equipment and infrastructure.

This includes a diverse range of commercial and industrial appliances:

- Heating, ventilation & air conditioning
- Refrigeration
- Service and maintenance
- Fire protection
- Building management systems
- Laboratory and clear room technologies

About our industry

The air conditioning and mechanical services industry is an essential component of modern society; assisting households, businesses and entire industries adapt to changes in the way we live and work.

Consequently, AMCA members pride themselves on being dynamic, forward thinking businesses. This means taking a leadership role in Australia's evolution towards a more environmentally sustainable and innovative growth economy.

- 173,000 people employed
- 20,000 businesses in operation
- \$13.3 billion in wages per annum
- 1.7% of GDP
- \$5.9 b new expenditure annually
- \$533 million spent on refrigerant gas
- \$26.2 billion in annual expenditure

The role of AMCA

Since inception, the AMCA has strived to represent the interests and welfare of the air conditioning and mechanical services industry, its members, and ultimately the public.

We pursue these goals by advocating on behalf of industry to government and regulatory bodies, assisting members with workforce development and providing numerous other services to ensure AMCA members are prosperous, socially responsible and industry leading organisations.

- Policy and advocacy
- Government and regulatory advice
- Service Committee
- Technical Committee
- Market intelligence
- Training
- Industrial relations advice
- Occupational, health and safety advice
- Credit, contract and legal advice
- Human Resources support