# 211in Model Uses Table

v1.26

https://doi.org/10.5281/zenodo.3563403

## I. Introduction

**BIM Excellence** (BIMe) is a unique *research-based* approach to digital innovation in the construction industry. It provides an integrated methodology and a modular language for performance assessment, learning and process optimisation. The **BIMe Initiative** is *not-for-profit effort* guided by a set of **Principles**[1] undertaken by volunteer researchers from both industry and academia. The BIMe Initiative is supported by in-kind contributions, commercial services, and institutional/corporate sponsorship.

> *This document must be read in conjunction with **101in BIMe Initiative Explainer**, **102in BIMe Initiative Knowledge Structures**, and **103in BIMe Initiative Projects*** (refer to list of publications). *The BIM Excellence approach and the BIMe Initiative are based on the published research of Dr. Bilal Succar and a growing cohort of esteemed international collaborators.*

## II. What are Model Uses

Model Uses identify and collate the **Information Requirements** that need to be delivered as – or embedded within – 3D digital models. As a Knowledge Block, Model Uses form part of a larger modular language that connects information requirements with System Units, Defined Roles, and Competency Items[2].

## III. Background Research

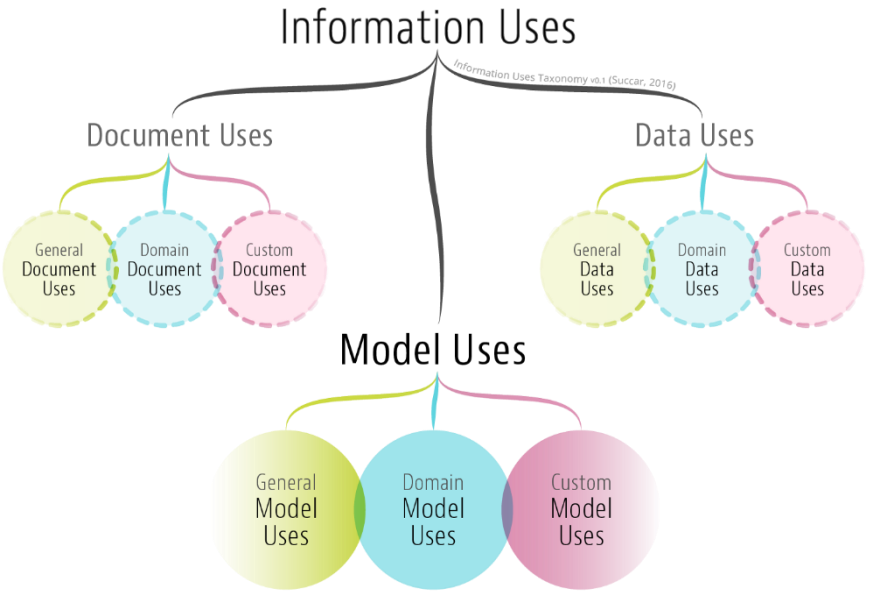

The conceptual background of Model Uses has been covered in a peer-reviewed conference paper[3] after being more extensively peer-reviewed by eight international subject matter experts (from four countries) through the BIM ThinkSpace[4] blog. A couple of related conceptual foundations were also briefly explained on the BIM Framework blog[5].

[1] BIMe Initiative Principles (BIMe Principles, or Principles for short) includes both General Principles and the Excellence Manifesto.
[2] The relations and applications of Knowledge Blocks will be covered by a future BIMe Initiative document.
[3] Succar, B., Saleeb, N., Sher, W. (2016). *Model Uses: Foundations for a Modular Requirements Clarification Language*, Australasian Universities Building Education (AUBEA2016), Cairns, Australia, July 6-8, 2016. http://bit.ly/BIMPaperA10
[4] Understanding Model Uses (Episode 24- Sep 9, 2015)
[5] Model Uses – Conceptual Structures (Post 37 - Sep 9, 2015) and Model Uses Taxonomy (Post 39 - May 24, 2016)

https://doi.org/10.5281/zenodo.3563403

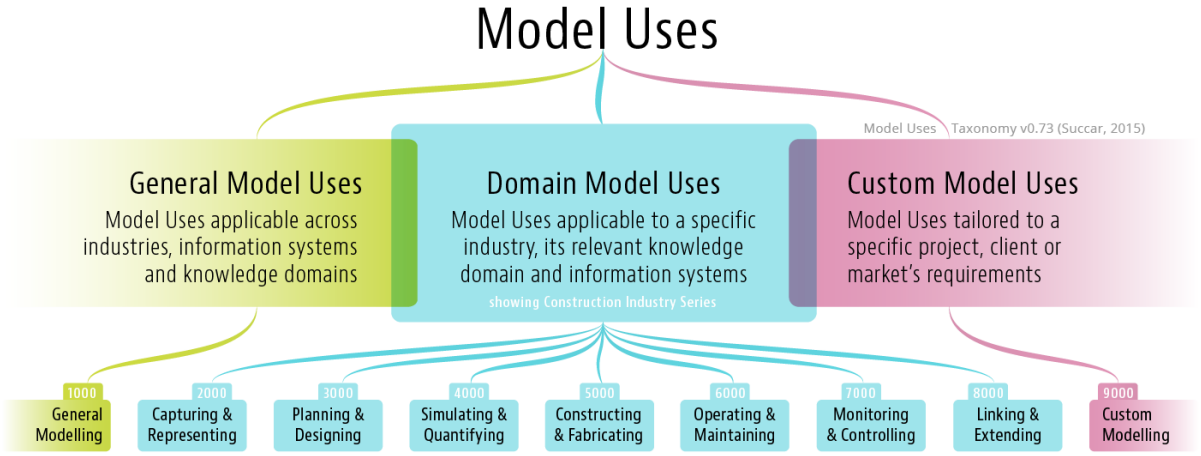
## IV. Information Uses

Model Uses are one type of Information Uses which also includes: Document Uses and Data Uses (to be covered in future BIMe Initiative documents).




## V. Model Use Categories

Model Uses are grouped into three categories:





BIMe Initiative by Change Agents AEC p/l
Melbourne, Australia | Phone: +61 (0) 412 556 671
ChangeAgents.com.au | info@ChangeAgents.com.au

https://doi.org/10.5281/zenodo.3563403

## CATEGORY I: Model Uses > General Model Uses

General Model Uses are applicable across industries, information systems and knowledge domains. General MUs include the word 'modelling' in their name and are typically measured using granularity metrics (e.g. Level of Definition , Level of Development and Granularity Level ) at component/item level. There are currently 52 General MUs – with 100s of potential synonyms – organized as a single MU Series, General Modelling (1000-1990):

The following is a list of General Model Uses [with a few synonyms]:

| CODE | GENERAL MODEL USE | SYNONYMS |
|---|---|---|
| **1010** | Architectural Modelling | Architectural Tectonics |
| **1020** | Audio-visual Systems Modelling | Sound Systems Modelling; Video-network Modelling |
| **1030** | Barrier Systems Modelling | Fence Modelling; Highway-barrier Modelling |
| **1040** | Brick Structures Modelling | Brick Information Modelling |
| **1050** | Concrete Structures Modelling | Concrete Frame Modelling |
| **1060** | Conservation Modelling | Historical Site Modelling; Historical Excavation Modelling; Ancient Monument Modelling |
| **1070** | Decorative Modelling | Wrought Iron Modelling; Gypsum Decorations Modelling; Sculptural Modelling; Fountain Design Modelling |
| **1080** | Display Systems Modelling | Exhibition Systems Modelling |
| **1090** | Drainage Systems Modelling | Flood-relief systems Modelling |
| **1100** | Ducted Systems Modelling | Fresh-air Systems Modelling; Exhaust Systems Modelling; Smoke-extraction Systems Modelling |
| **1110** | Extra-terrestrial Structures Modelling | Space-habitat Modelling |
| **1120** | Façade Systems Modelling | Glazing Systems Modelling; Cladding Systems Modelling; Curtain Systems Modelling |
| **1130** | Fire Systems Modelling | Sprinkler Systems Modelling |
| **1140** | Fitout Modelling | Interiors' Modelling; Tenant Modelling |
| **1150** | Flue Systems Modelling | Chimney Systems Modelling; Exhaust Systems Modelling |
| **1160** | Forensic Modelling | Criminal Investigations Modelling; Crime-scene Modelling |
| **1170** | Foundations Modelling | Piling-systems Modelling |
| **1180** | Fuel Systems Modelling | Liquefied-gas Supply Systems Modelling; Liquid-fuel Systems Modelling; Gas-supply Systems Modelling |
| **1190** | HVAC Systems Modelling | Heating Systems Modelling; Ventilation Systems Modelling; Air-conditioning Systems Modelling; |
| **1200** | Hydraulic Systems Modelling | Plumbing Systems Modelling; Compressed-air Systems Modelling; Steam Systems Modelling; Sewage Systems Modelling; Black-water Systems Modelling; Grey-water Systems Modelling |

# 211in Model Uses Table

v1.26

https://doi.org/10.5281/zenodo.3563403

| CODE | GENERAL MODEL USE | SYNONYMS |
|---|---|---|
| **1210** | Information Systems Modelling | Computer Systems Modelling; Communication Systems Modelling; Telecommunication Systems Modelling |
| **1220** | Infrastructure Systems Modelling | Underground Systems Modelling; Supply Systems Modelling |
| **1230** | Irrigation Systems Modelling | Hydrological Systems Modelling; |
| **1240** | Landscape Modelling | Hardscaping; Softscaping |
| **1250** | Lighting Systems Modelling | … |
| **1260** | Marine Structures Modelling | Oil Riggs Modelling |
| **1270** | Masonry Structures Modelling | … |
| **1280** | Medical Systems Modelling | Oxygen-pipes Modelling; Vacuum-pipes Modelling |
| **1290** | Modular Units Modelling | … |
| **1300** | Nuclear Systems Modelling | … |
| **1310** | Parametric Modelling | Object-based Modelling; Algorithmic Modelling; |
| **1320** | Power Systems Modelling | Generator Systems Modelling; Low-voltage Systems Modelling; Medium-voltage Systems Modelling; High-voltage Systems Modelling; Battery Systems Modelling; Electrical Systems Modelling |
| **1330** | Refrigeration Systems Modelling | … |
| **1340** | Renovation Modelling | Refurbishment Modelling; Retrofit Modelling |
| **1350** | Sanitary Systems Modelling | Septic Systems Modelling |
| **1360** | Security Systems Modelling | Surveillance Systems Modelling; Alarm Systems Modelling; Modelling; Listening Systems Modelling |
| **1370** | Signage Systems Modelling | Visual-guidance Modelling; Exit Systems Modelling |
| **1380** | Signalling Systems Modelling | |
| **1390** | Spatial Inspection Modelling | Zone Modelling; Height-inspection Modelling; Clearance-space Modelling; Line-of-sight Modelling; |
| **1400** | Steel Frame Modelling | Steel Structures Modelling |
| **1410** | Subterranean Spaces Modelling | Tunnel Modelling; Tunnel Shaft Modelling |
| **1420** | Temporary Structures Modelling | Scaffolding Systems Modelling; Fence Modelling |
| **1430** | Tensile Structures Modelling | Stressed Textile Modelling |
| **1440** | Terrain Modelling | Topographical Modelling; Site Modelling; Geological Modelling; Geotechnical Engineering Modelling; Open-pit Modelling |
| **1450** | Timber Structures Modelling | Timber Frame Modelling; Truss Systems Modelling |
| **1460** | Traffic Modelling | … |
| **1470** | Transportation Systems Modelling | Rail Systems Modelling; Road Systems Modelling |
| **1480** | Underwater Spaces Modelling | Aquatic Spaces Modelling |
| **1490** | Urban Modelling | City Modelling; Precinct Modelling |
| **1500** | Vertical Circulation Modelling | Elevator Systems Modelling; Stair Systems Modelling; Escalator Systems Modelling; Vertical Conveyance Modelling |
| **1510** | Waste-disposal Systems Modelling | Garbage Systems Modelling |
| **1520** | Wood Frame Modelling | Wood Structures Modelling |

https://doi.org/10.5281/zenodo.3563403

## CATEGORY II: Model Uses > Domain Model Uses

Domain Model Uses are industry-specific. The ones identified below are *Construction Domain* Model Uses (or BIM Uses for short). The naming format for each Domain Model Use is either a Noun + Adjective (or just an Adjective). There are currently 76 Domain MUs, organized in seven MU Series.

| CODE | MODE USE SERIES | MODEL USE [SYNONYMS NOT SHOWN] |
|---|---|---|
| 2010 | Capturing and Representing | 2D Documentation |
| 2020 | | 3D Detailing |
| 2030 | | As-constructed Representation |
| 2040 | | Generative Design |
| 2050 | | Laser Scanning |
| 2060 | | Photogrammetry |
| 2070 | | Record Keeping |
| 2080 | | Surveying |
| 2090 | | Visual Communication |
| 3010 | Planning and Designing | Conceptualization |
| 3020 | | Construction Planning |
| 3030 | | Demolition Planning |
| 3040 | | Design Authoring |
| 3050 | | Disaster Planning |
| 3060 | | Lean Process Analysis |
| 3070 | | Lift Planning |
| 3080 | | Operations Planning |
| 3090 | | Selection and Specification |
| 3100 | | Space Programming |
| 3110 | | Urban Planning |
| 3120 | | Value Analysis |
| 4010 | Simulating and Quantifying | Accessibility Analysis |
| 4020 | | Acoustic Analysis |
| 4030 | | Augmented Reality Simulation |
| 4040 | | Clash Detection (and avoidance) |
| 4050 | | Code Checking & Validation |
| 4060 | | Constructability Analysis |
| 4065 | | Construction Operation Analysis |
| 4070 | | Cost Estimation |
| 4080 | | Egress and Ingress |
| 4090 | | Energy Utilisation (replaces Energy Use) |
| 4100 | | Finite Element Analysis |
| 4110 | | Fire and Smoke Simulation |
| 4120 | | Lighting Analysis |
| 4130 | | Quantity Take-off |
| 4140 | | Reflectivity Analysis |
| 4150 | | Risk and Hazard Assessment |
| 4160 | | Safety Analysis |
| 4170 | | Security Analysis |

https://doi.org/10.5281/zenodo.3563403

| CODE | MODE USE SERIES | MODEL USE [SYNONYMS NOT SHOWN] |
|---|---|---|
| 4180 | | Site Analysis |
| 4190 | | Solar Analysis |
| 4200 | | Spatial Analysis |
| 4210 | | Structural Analysis |
| 4220 | | Sustainability Analysis |
| 4230 | | Thermal Analysis |
| 4240 | | Virtual Reality Simulation |
| 4250 | | Life Cycle Assessment (replaces Whole Life Cycle Analysis) |
| 4260 | | Wind Studies |
| 5010 | Constructing and Fabricating | 3D Printing |
| 5020 | | Architectural Modules Prefabrication |
| 5030 | | Casework Prefabrication |
| 5040 | | Concrete Precasting |
| 5050 | | Construction Logistics |
| 5055 | | Construction Waste Management |
| 5060 | | Mechanical Assemblies Prefabrication |
| 5070 | | Sheet Metal Forming |
| 5080 | | Site Set-outs |
| 6010 | Operating and Maintaining | Asset Maintenance |
| 6020 | | Asset Procurement |
| 6030 | | Asset Tracking |
| 6040 | | Building Inspection |
| 6050 | | Handover and Commissioning |
| 6060 | | Relocation Management |
| 6070 | | Space Management |
| 7010 | Monitoring and Controlling | Building Automation |
| 7020 | | Field BIM |
| 7030 | | Performance Monitoring |
| 7040 | | Real-time Utilization |
| 7050 | | Structural Health Monitoring |
| 8010 | Linking and Extending | BIM/Spec Linking |
| 8020 | | BIM/ERP Linking |
| 8030 | | BIM/FM Integration |
| 8040 | | BIM/GIS Overlapping |
| 8050 | | BIM/IOT Interfacing |
| 8060 | | BIM/PLM Overlapping |
| 8070 | | BIM/Web-services Extension |

## **CATEGORY III:** Model Uses > Custom Model Uses

Custom Model Uses are a combination of *General* and *Domain* model uses. Custom MUs are tailored – when needed – to each project, Client/Employer, or market's specific modelling requirements. There is no fixed number of Custom MUs and are all organized under a single MU Series, Custom Modelling (9000-9990).


BIMe Initiative by Change Agents AEC p/l
Melbourne, Australia | Phone: +61 (0) 412 556 671
ChangeAgents.com.au | info@ChangeAgents.com.au

The following are hypothetical *Custom Model Uses*:

- 9XXX Modelling of a floating sculpture with a wave-powered signalling beacon
- 9YYY Modelling security systems for a correctional facility
- 9ZZZ Modelling ventilation systems for an astronaut staging station on the moon

## VI. Applications of Model Uses

Model Uses can be applied in a multitude of ways – including:

- → Model Uses can simplify the identification of **Information Requirements** within project protocols (e.g. Employer's Information Requirements);
- → Model Uses can facilitate the pre-qualification of organisations and the assessment of supply chain abilities; and
- → Model Uses can facilitate – when combined with Competency Items and Defined Roles - the development of learning modules and project task lists.

## VII. More Info

The BIMe Initiative is currently developing sample Model Use templates, Information Exchange workflows and practical tools (matrices and online modules) that extend the application of Model Uses and connects them to Model View Definitions. To follow these developments, please follow the BIMe Initiative on Twitter (@BIMeInitiative) and/or subscribe to the Mailing List. If you'd like to participate in this effort, request more information or suggest an improvement, please Contact Us; thank you.

## VIII. License to Use



## IX. Change Log

| VERSION | DATE | DESCRIPTION |
|---|---|---|
| 0.1 | Sep 9, 2015 | First version (v0.76) published on BIMThinkSpace.com |
| 0.2 | July 6, 2016 | Concepts updated after publication of Paper A10 (http://bit.ly/BIMPaperA10) |
| 0.3 | Feb 8, 2017 | Updated Mode Use (4250) and added a new one (4065) |
| 0.4 | Oct 24, 2017 | Updated Model Use (4090) |
| 1.0 | Oct 26, 2017 | First released as a BIMe Initiative resource – 211in Model Uses Table |
| 1.1 | Oct 27, 2017 | Typos removed, |
| 1.2 | Dec 27, 2017 | Added 5055 Construction Waste Management and 7050 Structural Health Monitoring |
| 1.25 | Jan 27, 2019 | Typo fixed |
| 1.26 | Dec 5, 2019 | Fixed hyperlinks - Added 'Clash Avoidance' as a similar term |

...