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USING THE MODEL PROGRESSION SPECIFICATION

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Topics

- MPS: A Brief History
- Problem Definition
- Goal
- Solution
 - Level of Detail (Level of Development)
 - Stages
 - Building Element Categories
 - Primitives
 - Aspects
- Example





MPS: A Brief History

- Model Progression Specification
- E202
- MPS 2.0, MPS 3.0

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|--------------------|---------|---------|---------|---------|---------|
| Site Preparation | 100 | 100 | 100 | 200 | 200 |
| Sub Structure | 100 | 200 | 200 | 300 | 400 |
| Superstructure | 100 | 100 | 200 | 200 | 300 |
| Exterior Enclosure | 100 | 100 | 200 | 200 | 200 |
| Interior Build Out | 100 | 100 | 150 | 100 | 200 |
| MEP Systems | 100 | 100 | 100 | 100 | 200 |
| Site Improvements | 100 | 100 | 100 | 100 | 200 |

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| 2 PROTOCOL | | | |





Problem Definition

Part 1

Integration requires coordinated input from multiple disciplines involved in design and preconstruction phases.





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Problem Definition

Part 2

BIM allows for **larger number of releases**, with increasing information richness, which has to be coordinated and planned based on **decision making requirements**.



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Problem Definition

Part 3

Not all design parts of the project **progress** at the same **pace**.



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Problem Definition

Part 4

Project teams are working in different locations.







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Problem Definition - Conclusion

Model Progression Planning is a **must** to ensure successful integrated use of BIM for design, cost estimating and schedule planning.

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* Kim Caputo, "CMM Implementation Guide," Addison-Wesley (1998)

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| | ASPECTS | AND CLASSES | MPS MATRIX | | | | | |
|-----------|---------|--|---------------|---------|----|----|--|--|
| ASPECTS | CLASSES | DESCRIPTION | TARGET LOD | ASPECTS | | | | |
| | МО | No Model | | М | С | S | | |
| | M1 | Building/Spatial/Room Massing | 000 | MO | C1 | S1 | | |
| | M2 | Building elements with approximate dimensions (SD) | 050 | MO | C2 | S2 | | |
| MODEL 'M' | M3 | Building elements with design dimensions (DD) | 100 | M1 | C2 | S2 | | |
| | M4 | Construction Model (CD) | 200 | M2 | C3 | S3 | | |
| | M5 | Fabrication / Virtual Mockup | 300 | M3 | C3 | S3 | | |
| | M6 | As Built | 400 | M4 | C4 | S3 | | |
| | C1 | Division Level Ranges | 450 | M4 | C5 | S4 | | |
| | C2 | Massing Driven Ratios & Ranges | 500 | M5 | C5 | S4 | | |
| | C3 | Element Driven - Assumption Based - Resource Level & Ranges | 550 | M5 | C5 | S5 | | |
| COST 'C' | C4 | Element Driven - Specification Based | 600 | Me | | 86 | | |

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Definition of Element Aspects







Primitives

- Modeling Behavior
- Quantity Data Extracted
- Cost Data Linked
- Schedule Data Linked

Defined per Aspect:

- Model
- Cost
- Schedule

| Rectangular solid components |
|----------------------------------|
| Solid wall |
| Solid rectangular / round column |
| Solid rectangular beam |
| Solid slab |
| Solid pitched roof |
| Profiled solid components |
| Profiled wall |
| Profiled column |
| Profiled beam |
| Multi-layered components |
| Composite wall |
| Composite slab |
| Flooring |
| Composite pitched roof |
| Multi-component systems |
| Curtain wall |
| Ceilings |
| Built-up column |
| Built-up beam/truss |
| Complex slab |
| Door/window |
| Stair |
| Fixture/device |

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Primitives for Progression Plan

- Limited Collection of Basic Elements
- Specified Classes
- "Building Blocks"







LOD 200 LOD 300 LOD 400 LOD 500 M2 M3 Μ4 M5 Model Class Model: Basic diversification by Thickness and type per schedules Thickness, type per schedules Thickness, type per schedules material and construction Diversification and additional properties (related and additional properties (related to estimating/scheduling) to estimating/scheduling) method One typical size used to model all instances of similar types Model: Modeled with rectangular Modeled with exact rectangular Modeled with exact rectangular Modeled with exact rectangular cross sectional geometry cross sectional geometry cross sectional geometry cross sectional geometry Geometry Modeled with exact inclination Modeled with exact inclination Modeled with exact inclination Slanted elements modeled with ±5 degree tolerance Windows and doors only Windows and doors only Windows, doors and main MEP Windows, doors and all modeled Model: Penetrations runs MEP runs Not Modeled Not Modeled Modeled with Components Model: Modeled Connections **Estimating Class C**3 **C4 C5 C5** Cost per unique element. Cost per unique element. Estimating: Average cost Requirements resources level resources level **Scheduling Class S4 S**5 Scheduling: Average proc Production rate from resource Production rate from resource Requirements per element hours hours

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Primitives for Progression Plan







Progression Specification

| | A | В | С | D | E | F | G | Н | I | J | К |
|----|--------|------|----------|--|---------|----------------------------|-----------|-----------|-----------|-----------|-----------|
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| 1 | | | | | | | | | | | |
| 2 | Code 🗸 | Code | Code 👻 | Description | ✓ Units | ✓ Primitive | Stage 1 💌 | Author 🔻 | Stage 2 💌 | Author 💌 | Stage 3 💌 |
| 3 | Α | | | SUBSTRUCTURE | | | | | | | |
| 4 | | A10 | | FOUNDATIONS | | | | | | | |
| 5 | | | A1010 | STANDARD FOUNDATIONS | | SOLID SLAB | 100 | Architect | 300 | Engineer | |
| 6 | | | A1020 | SPECIAL FOUNDATIONS | | SOLID SLAB | 150 | Architect | 200 | Engineer | |
| 7 | | A20 | | SUBGRADE ENCLOSURES | | | | | | | |
| 9 | | A40 | | SLABS-ON-GRADE | | | | | | | |
| 15 | | A60 | | WATER & GAS MITIGATION | | | | | | | |
| 18 | _ | A90 | | SUBSTRUCTURE RELATED ACTIVITIES | | | | | | | |
| 23 | В | - | | SHELL | | | | | | | |
| 24 | | B10 | | | | | | | | | |
| 29 | | B20 | | EXTERIOR VERTICAL ENCLOSURES | | | | | | | |
| 36 | C | B30 | | EXTERIOR HORIZONTAL ENCLOSURES | | | | | | | |
| 42 | L | C40 | | | | | | | | | |
| 43 | | C10 | 01000 | | | | 100 | Arabitaat | 100 | Arabitaat | |
| 44 | - | | C1000 | INTERIOR CONSTRUCTION MEANS & METHODS | | COLID WALL | 100 | Architect | 100 | Architect | |
| 40 | | | C1010 | | | DOORANINDOW | 100 | Architect | 200 | Architect | |
| 40 | | | C1020 | | | DOORWINDOW | 100 | Architect | 100 | Architect | |
| 48 | | | C1040 | INTERIOR GRILLES & GATES | | INSTRUMENTATION & CONTROLS | 100 | Architect | 100 | Architect | |
| 49 | | | C1060 | RAISED FLOOR CONSTRUCTION | | | 100 | Architect | 100 | Architect | |
| 50 | | | C1070 | SUSPENDED CEILING CONSTRUCTION | | | 100 | Architect | 100 | Architect | |
| 51 | | | C1090 | INTERIOR SPECIALTIES | | | 100 | Architect | 100 | Architect | |
| 52 | | C20 | | INTERIOR FINISHES | | | | | | | |
| 59 | D | | | SERVICES | | | | | | | |
| 60 | | D10 | | CONVEYING | | | | | | | |
| 64 | | D20 | | PLUMBING | | | | | | | |
| 71 | | D30 | | HEATING, VENTILATION & AIR CONDITIONING (HVAC) | | | | | | | |
| 79 | | D40 | | FIRE PROTECTION | | | | | | | |
| 82 | | D50 | | ELECTRICAL | | | | | | | |
| 89 | | D60 | | COMMUNICATIONS INFRASTRUCTURE | | | | | | | |





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