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INTRODUCTION TO
BUILDING INFORMATION MODELING


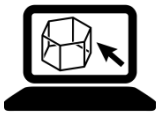



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This *Introduction to Building Information Modeling* responds to some of the most frequently asked questions regarding Building Information Modeling. It is the first resource in the Harvard *Getting Started with Building Information Modeling* series.

GETTING STARTED

Getting Started with Building Information Modeling (BIM) on a project can be overwhelming – there seem to be an endless amount of technical terms, acronyms, and software programs. The UCMC BIM Subcommittee created the following set of resources to support Harvard stakeholders, whether the language of BIM populates your everyday conversations or this is your first time learning about BIM.

Beginners may find it helpful to start with the *Introduction to BIM* and progress sequentially to the *BIM Uses Guide*. Others may start with the *BIM Procurement Guide*, flip back to the *BIM Uses Guide*, and then jump to the *BIM Execution Plan Template*.

“What is BIM?”	“How can I use BIM on my project?”	“Should I use BIM on my project?”	“How can I select a BIM-enabled team?”	“How do I implement BIM on my project?”
 1	 2	 3	 4	 5
<p>INTRODUCTION TO BIM</p>	<p>BIM USES GUIDE</p>	<p>BIM DECISION MATRIX</p>	<p>BIM PROCUREMENT GUIDE</p>	<p>BIM EXECUTION PLAN TEMPLATE</p>
<p>Addresses questions including:</p> <ul style="list-style-type: none"> ▪ What is BIM? ▪ Why should I use BIM? ▪ Does BIM cost more? ▪ Take longer? 	<p>Explains the different ways project stakeholders can use BIM. Future documents reference the <i>BIM Uses Guide</i>.</p>	<p>Helps Harvard stakeholders determine if a project can benefit from BIM, and if so, what specific BIM Uses are best suited for that project.</p> <p>* Includes <i>BIM Decision Matrix</i> instructions</p>	<p>Includes:</p> <ul style="list-style-type: none"> ▪ Sample RFP language ▪ BIM-capability evaluation methods ▪ Procurement Best Practices 	<p>A standardized framework for teams to plan, document, and implement BIM on a project.</p> <p>* Includes <i>Guide to BIM Execution Planning</i></p>



What is Building Information Model (BIM)?

According to National Institute of Building Sciences, BIM is a digital representation of physical and functional characteristics of a facility. A BIM is comprised of intelligent 3D objects, which understand their properties and relationships to other objects. As a result, BIM is both a database and a visual representation of a building. As an acronym, BIM is used to refer to both the Building Information Model and the process of using the model, Building Information Modeling.

Why should I use BIM?

BIM increases reliability. Teams properly using BIM can reduce schedule and cost, improve quality and improve coordination of projects. Specific BIM Uses include:

See Harvard's *BIM Uses Guide* for a full list of BIM Uses.

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- Design Visualization
- Coordinated Design Documentation
- Construction Coordination (i.e. Clash Detection)
- Quantity Extraction and Costing
- Schedule Simulation

Similar universities and institutions (e.g. Penn State) use BIM to significantly reduce building operational costs.

Does BIM cost more? Does BIM take longer?

With the right team on an appropriate project, BIM doesn't cost more or take longer, but requires more upfront planning in order to create value. Industry results show that BIM doesn't cost more than traditional methods, but shifts workload forward as shown in the MacLeamy Curve (Figure 1). In Figure 1, Curve 1 indicates

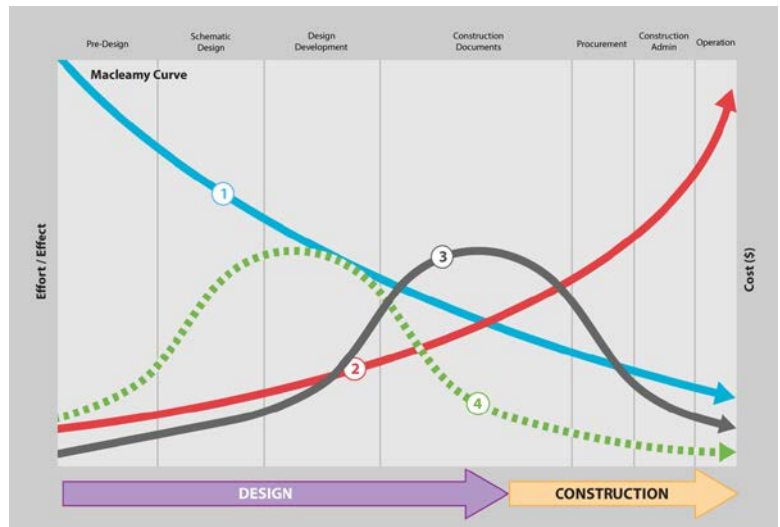


Figure 1: MacLeamy Curve

ability to impact cost and building function; Curve 2, cost of design change; Curve 3, tradition process; Curve 4, BIM-enabled process.

Similarly, using BIM may require reallocation of fee to early phases. For example, when the State of Wisconsin issued its BIM Standard and Mandate, it also issued a modified fee schedule (Table 1). The reallocation also takes into account a BIM learning curve that can affect less experienced design and construction teams.

What do 4D, 5D and 6D mean?

The industry uses these terms to refer to groups of BIM Uses; however these terms do not adequately describe the variety of ways BIM can be used. In general:

- 4D: Integration of the BIM with the Schedule
- 5D: Quantity Extraction from the BIM
- 6D: Use of the BIM for Facilities Management

Who owns the BIM?

The BIM is treated like any other digital asset (e.g. CAD). At the end of the project, the model belongs to Harvard.

What resources are available learn more about BIM?

Users can check out the rest of the *Getting Start with BIM*, including Harvard's BIM Decision Matrix and BIM Execution Plan Template. Contact Gary Younger (gary_younger@harvard.edu) for additional training materials.

	Traditional	BIM
Concept Design	0%	0%
Schematic Design	10%	15%
Design Development	25%	30%
Construction Documents	40%	35%
Buyout & Shop Drawing Review	5%	5%
Construction & Closeout	20%	20%

Table 1: State of Wisconsin Fee Schedule¹ (Adapted)

¹ http://doaftp04.doa.state.wi.us/master_spec/DSF%20BIM%20Guidelines%20&%20Standards/BIM%20Guidelines%20and%20Standards.pdf