



# Level of Development and 3D-10D BIM

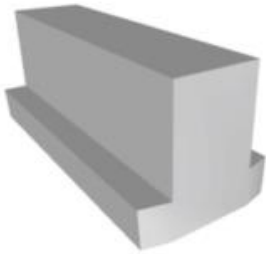
Ariana.kubart@ocellus.se



## Learning outcomes

- At the end of this lecture, the learner is expected to be able to
  - Explain role of different Levels of Development in BIM
  - Name diverse kinds of information which can be provided by BIM

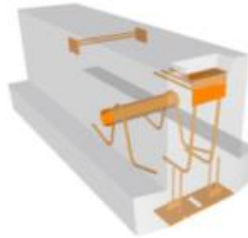
## Level of Development in BIM



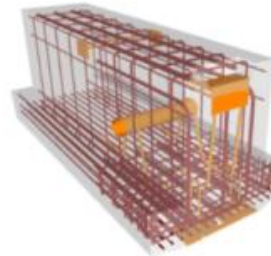
LOD 200



LOD 300



LOD 350



LOD 400

<https://i1.wp.com/revitq.com/wp-content/uploads/2021/07/image3.png?resize=768%2C283&ssl=1>

LoD – Level of Development, or even Level of Detail

Describes not only geometric features, but all BIM content for each element

## LoD Levels

LOD levels usually increase during the BIM process:

LOD 100 - Concept Design

LOD 200 - Schematic Design

LOD 300 - Detailed Design

LOD 350 - Construction

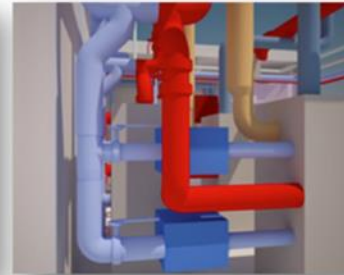
Documentation

LOD 400 - Fabrication & Assembly

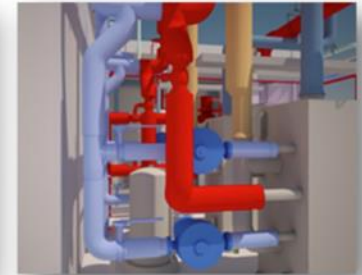
LOD 500 - As-Built



**LOD 200**



**LOD 300**



**LOD 350**



**LOD 400**



**LOD 500**

A piping project at various LOD (Levels of Development) levels

Source: <https://lanmarservices.com/2014/05/14/lod-in-scan-to-bim/>

## LoD Level - example

LoD for a chair:

LOD 100 = there is a chair

LOD 200 = a chair with space  
requirement

LOD 300 = a chair with arm  
rests and wheels

LOD 400 = manufacturer and  
model number

LOD 500 = manufacturer and  
model number, supplier,  
date purchased

LOD 100

(Only data in **red** is useable)



Concept (Presentation)

**DESCRIPTION:**

**Office Chair**  
Arms, Wheels  
**WIDTH:**

**DEPTH:**

**HEIGHT:**

**MANUFACTURER:**

Hermann Miller  
**MODEL:**

Mirra  
**LOD:**  
**100**

LOD 200



Design Development

**DESCRIPTION:**

**Office Chair**  
Arms, Wheels  
**WIDTH:**

**DEPTH:**

**HEIGHT:**

**MANUFACTURER:**

Hermann Miller  
**MODEL:**

Mirra  
**LOD:**  
**200**

LOD 300



Documentation

**DESCRIPTION:**

**Office Chair**  
Arms, Wheels  
**WIDTH:**

**DEPTH:**

**HEIGHT:**

**MANUFACTURER:**

Hermann Miller  
**MODEL:**

Mirra  
**LOD:**  
**300**

LOD 400



Construction

**DESCRIPTION:**

**Office Chair**  
Arms, Wheels  
**WIDTH:**

**DEPTH:**

**HEIGHT:**

**MANUFACTURER:**

Hermann Miller  
**MODEL:**

Mirra  
**LOD:**  
**400**

LOD 500



Facilities Management

**DESCRIPTION:**

**Office Chair**  
Arms, Wheels  
**WIDTH:**

**DEPTH:**

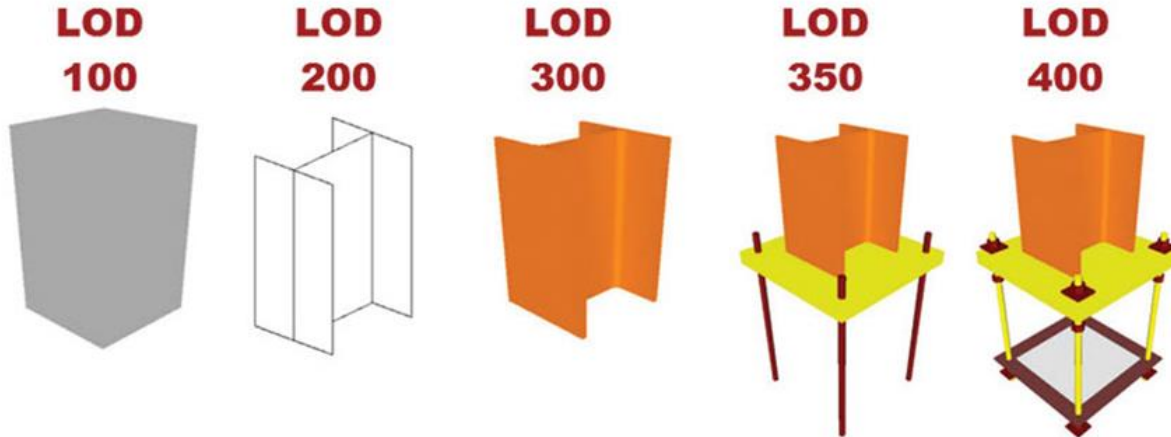
**HEIGHT:**

**MANUFACTURER:**

Hermann Miller  
**MODEL:**

Mirra  
**PURCHASE DATE:**  
**01/07/2015**

## Diverse LoD in the same model



[BIMForum Original Content – BIM Forum](#)

- LoD is a measure of progress in %
- LOD 500 is 100%, then LOD 100 = 20%, LOD 200 = 40% etc.
- At any stage the model will contain elements in diverse LoDs



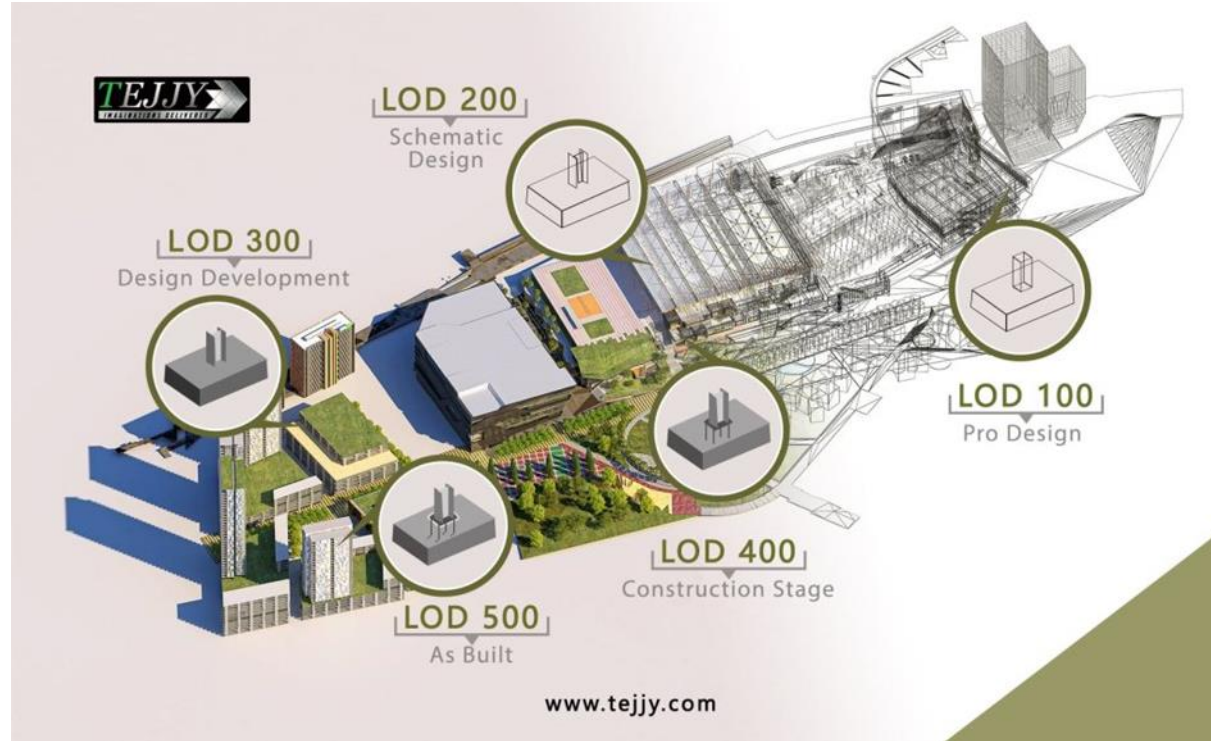
## LoD in Building Lifecycle

Different needs for BIM  
information during building  
lifecycle

= different BIM models in  
time

In reality, not always done  
until LoD 500

Though, LoD 500 BIM model  
for Facility Management is  
highly important



<https://www.tejyy.com/wp-content/uploads/2021/11/Level-of-Development-LOD-Tejyy-Inc-1-1024x627.jpg>



## BIM Dimensions 3D – 10D

BIM model = not only 3D geometry,  
even properties and much of additional  
information

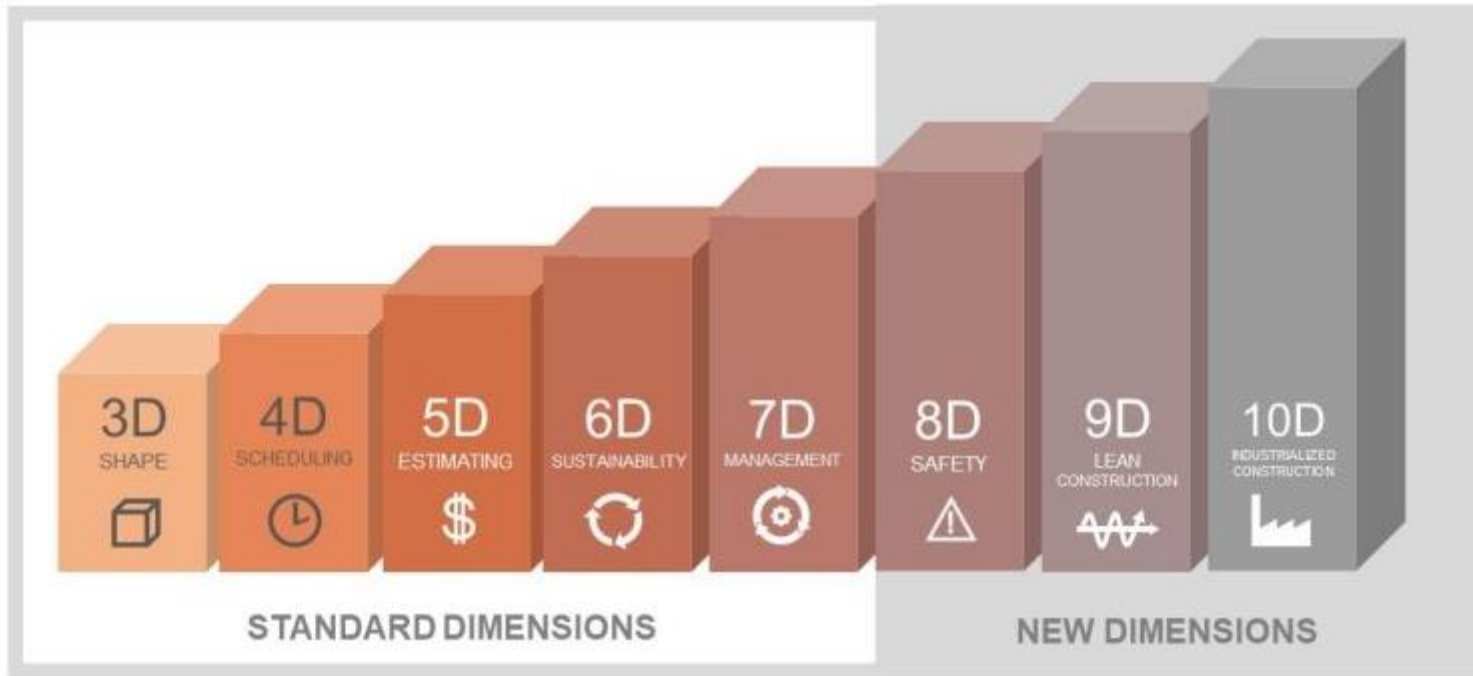
Analysis for multiple purposes can be  
done

These analyses:

- increases the value of the data (not possible in CAD)
- can be performed already in design phase = clear picture and less error in early stages



## BIM Dimensions II



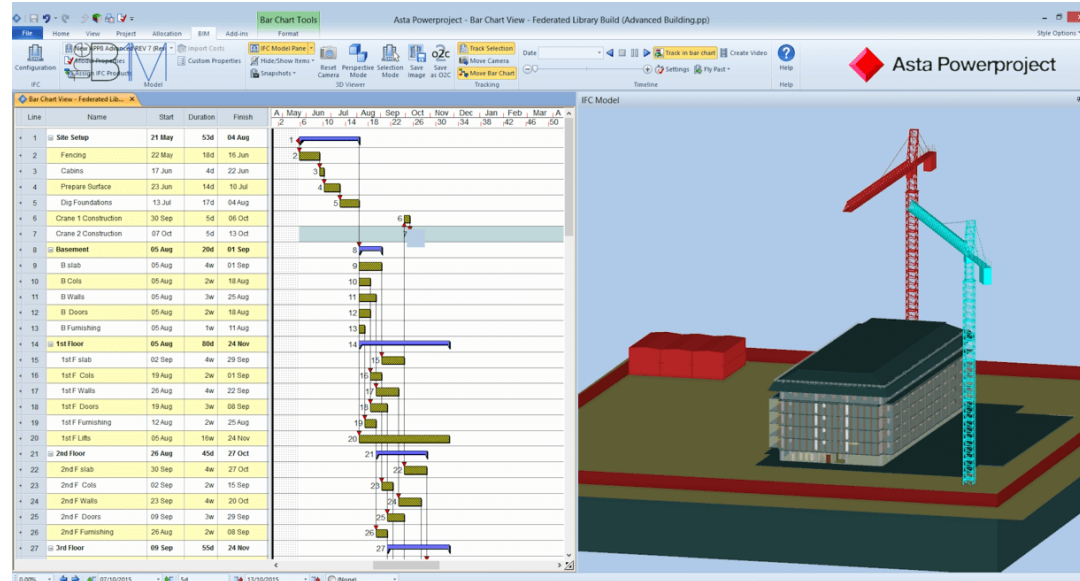
## 3D and 4D BIM modelling

### 3D

- the first step
- geometry enriched with properties

### 4D

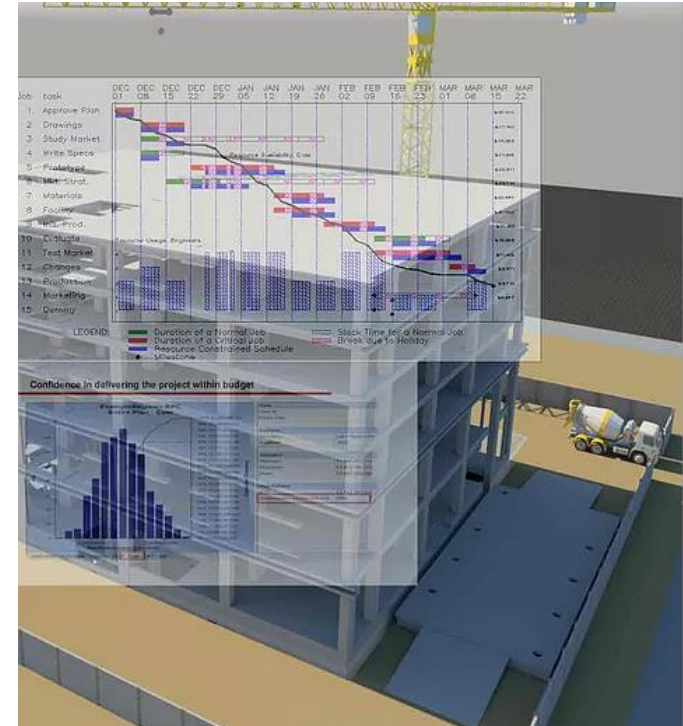
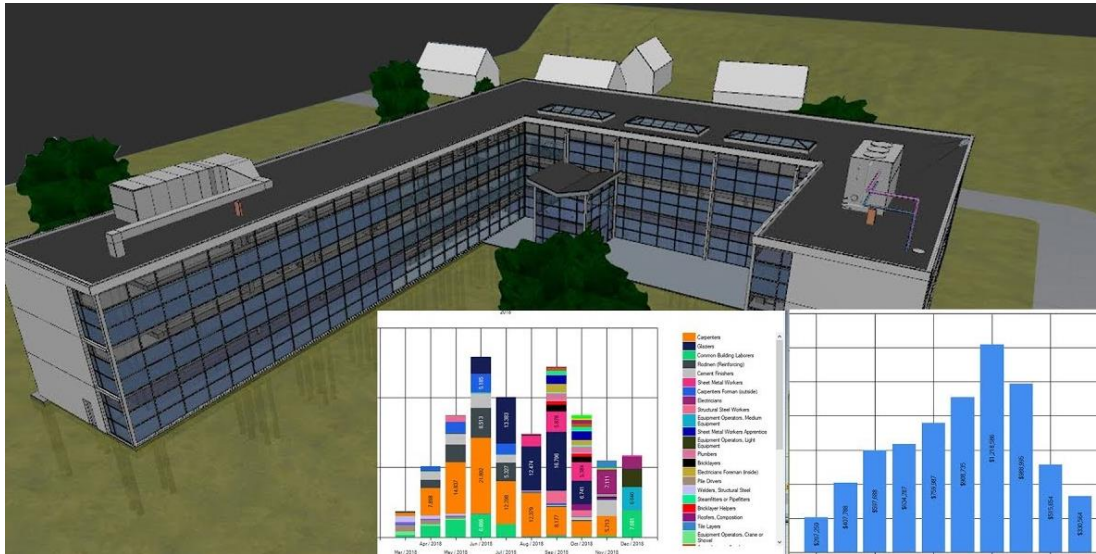
- time schedule and simulations
- sequence and duration of activities
- visualisation of the construction for stakeholders



[https://www.theb1m.com/assets/images/Asta+Powerproject+\(4D+BIM\)+on+The+B1M.png?Action=thumbnail&algorithm=fill\\_proportional&width=754](https://www.theb1m.com/assets/images/Asta+Powerproject+(4D+BIM)+on+The+B1M.png?Action=thumbnail&algorithm=fill_proportional&width=754)

## 5D BIM - Budget

- Automatic estimation of costs
- Comparing alternatives
- The cheapest not always the best option



[Up: 5D-BIM-SERVICES.png \(479x519\)](#)  
[\(sesbimcoordination.com\)](#)

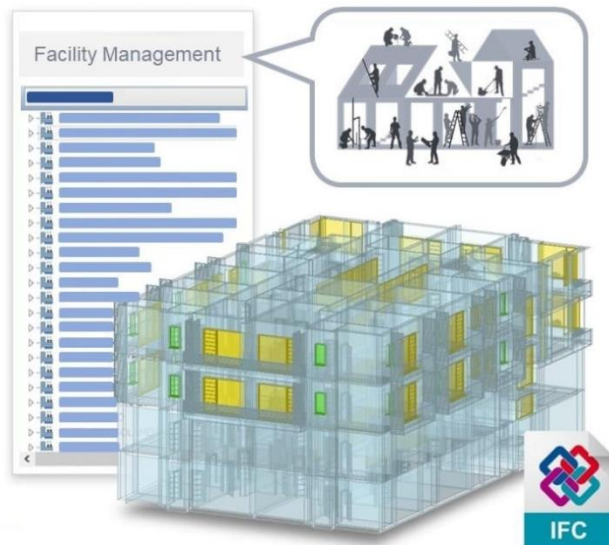
Left: [maxresdefault.jpg \(1280×720\) \(ytimg.com\)](#)

## 6D – 8D BIM

6D sustainability

7D facility management

8D health and safety



Up: <https://biblus.accasoftware.com/ptb/wp-content/uploads/sites/5/2021/11/BIM-6D-e-sustentabilidade.jpg>

Left: <https://biblus.accasoftware.com/fr/wp-content/uploads/sites/4/2021/11/BIM-7D-gestion-entretien-actifs-installations-usBIM.jpg>

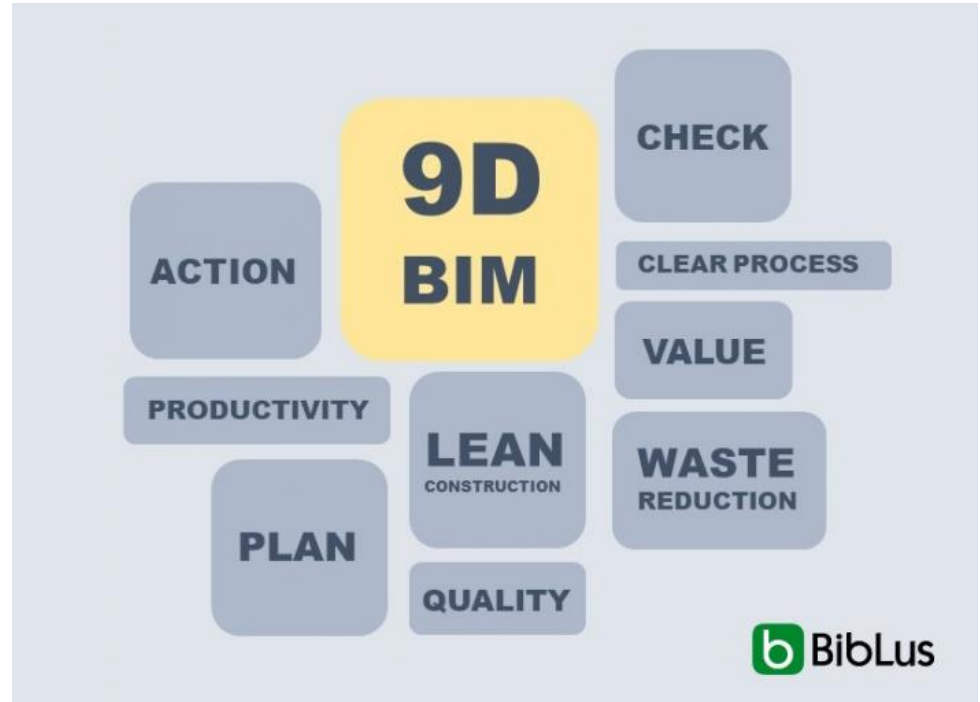
## 9D – 10D BIM

### 9D

- Lean construction
- Project management
- Construction simulations

### 10D

- Construction industrialisation
- Supply chain management
- Lifecycle & digital twin



[Dimensions-BIM-9D-lean-construction-usBIM-705x512.jpg](https://accasoft.com/Dimensions-BIM-9D-lean-construction-usBIM-705x512.jpg)  
(705x512) (accasoft.com)



**Thank you for your attention**



<https://birgitproject.eu/>

*This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*