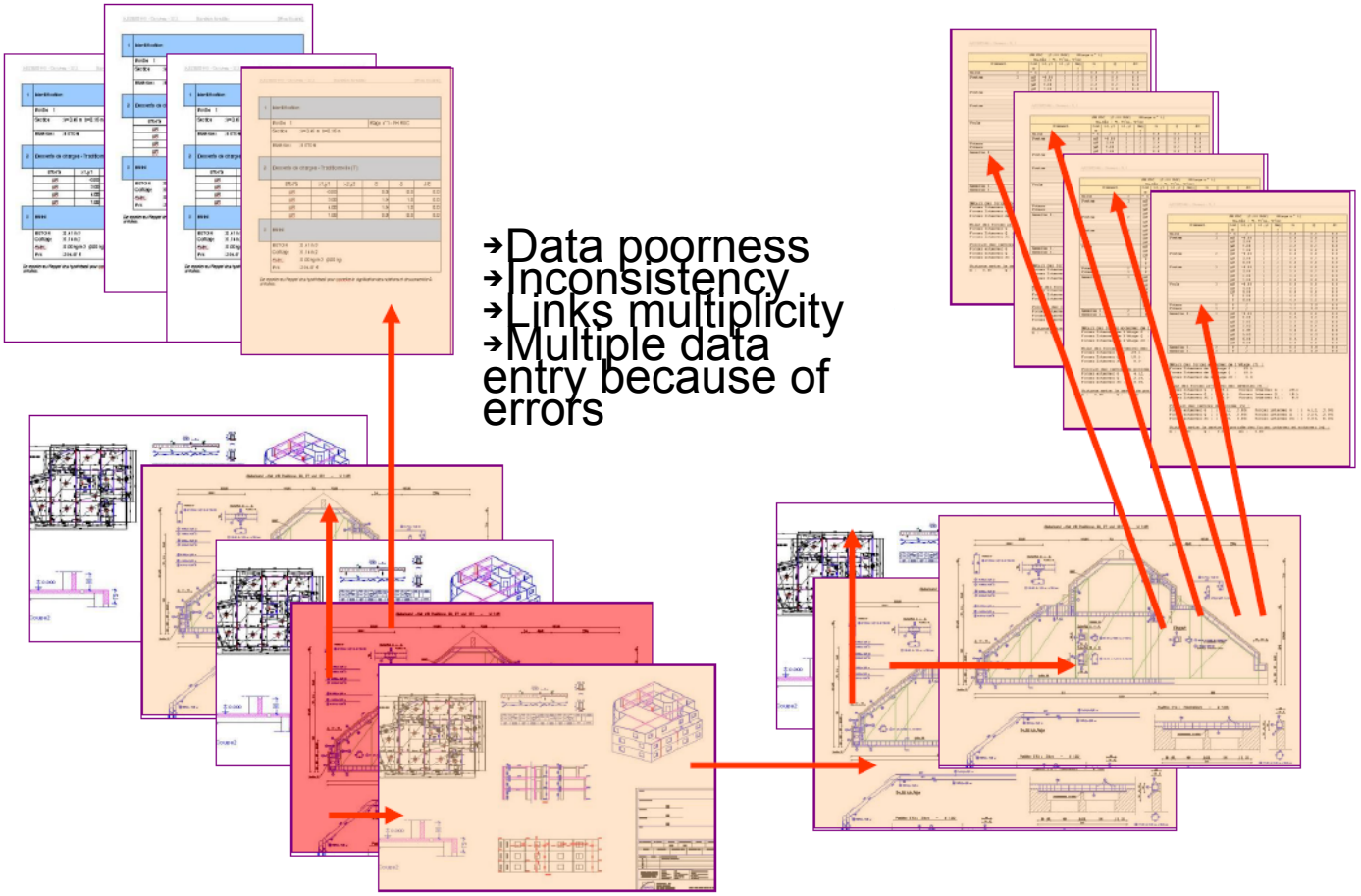
To dream for a while :

https://vimeo.com/64543487

Summary

- ✓ Current project design and management
- ✓ What does BIM mean ?
- ✓ BIM for what ?
- ✓ BIM or 3D model ?
- ✓ BIM is a « PROCESS »
- ✓ The different levels of BIM
- ✓ Tools and formats
- ✓ Viewers

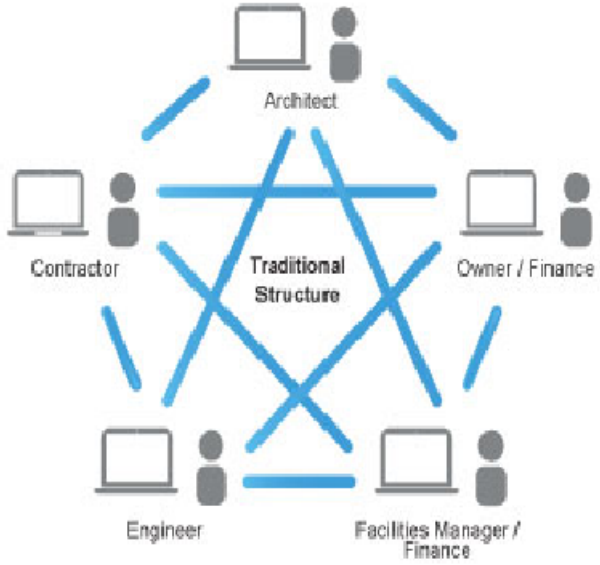
Current project management, what consequences ????

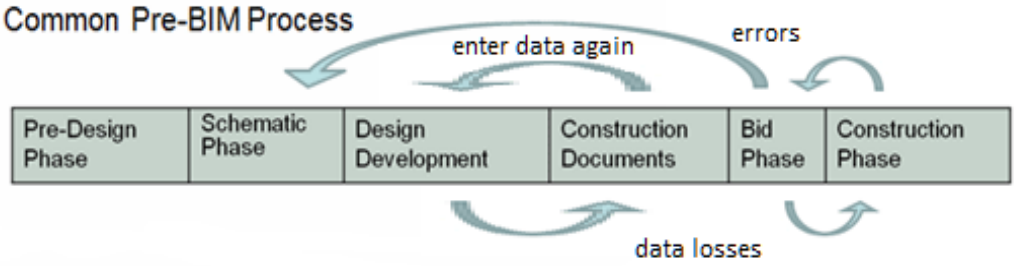


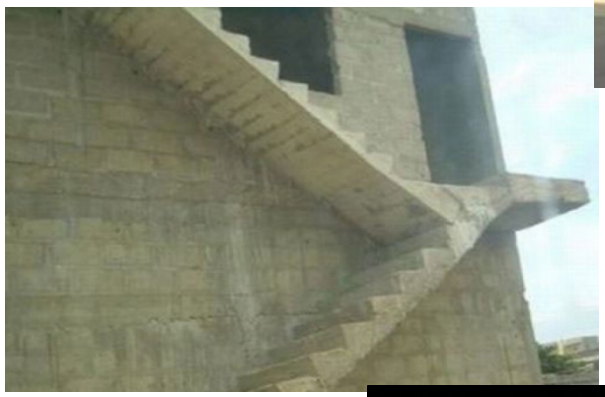
- Data poorness
- Inconsistency
- Links multiplicity
- Multiple data entry because of errors

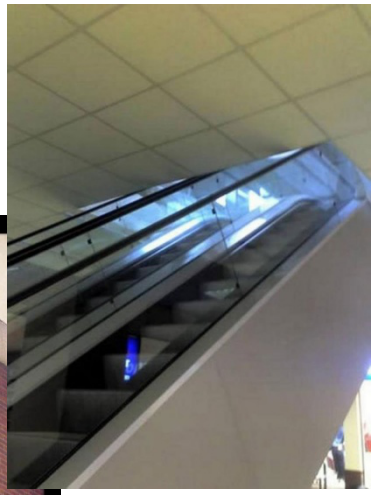
Current project management

Here is a current technical working data flow of a standard building management project









What does BIM mean ?

BIM stands for three words. The « B » (Building) and the « I » (Information) are not ambiguous.
The « M » of the acronym may mean as the case may be : MODEL, MODELLING, MANAGEMENT.

This ambiguity is not a problem because the M means the three.

BIM

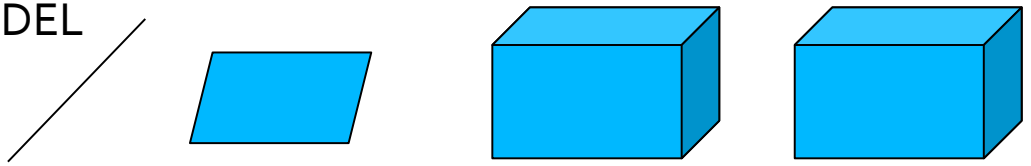
- Building
- Information
- Modeling

MODEL
MODELLING
MANAGEMENT

BIM Protocol

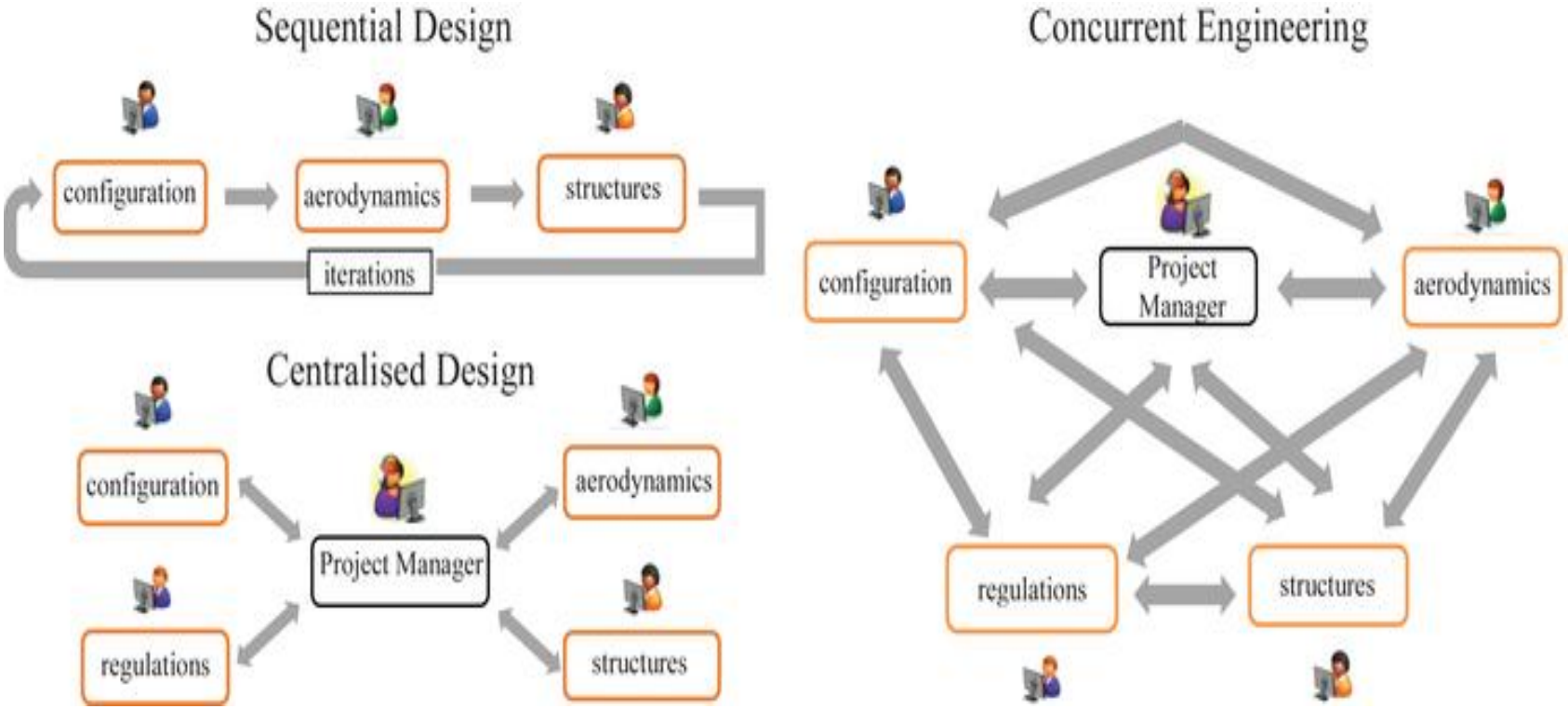
Building Information MODEL

Object (ex: foundation)



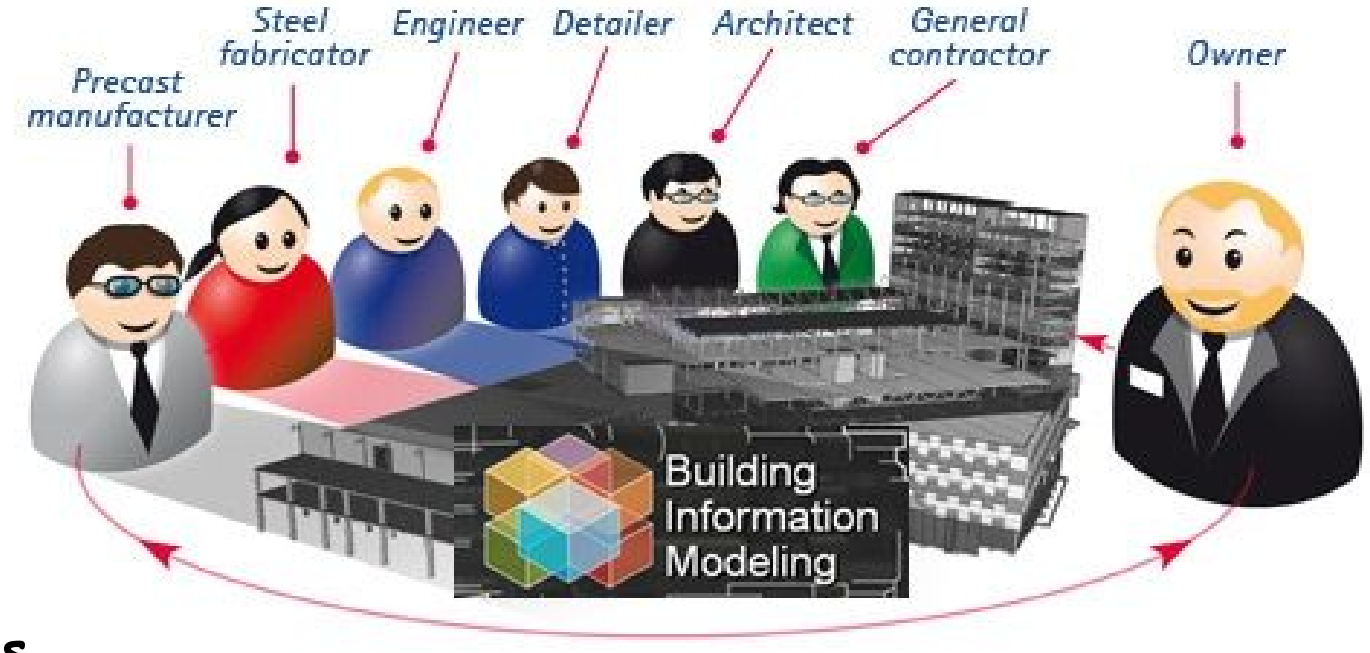
A Building Information Model is
... the output of the business process resulting in a **digital prototype**, a virtual computer model of a project which holds selected structured data about the asset (design, quantity, physical and thermal properties, time, cost, as-built, etc).

MODELING



Building Information Modelling is

… a **business process** for generating and leveraging building data to design, construct and operate the building during its lifecycle. NB: not just buildings, infrastructure, etc too



Advantages

Concurrent Engineering provides benefits such as reduced product development time, reduced design rework, reduced product development cost and improved communications.

Examples from companies using Concurrent Engineering techniques show significant increases in overall quality, 30-40% reduction in project times and costs, and 60-80% reductions in design changes after release.

MANAGEMENT
Process

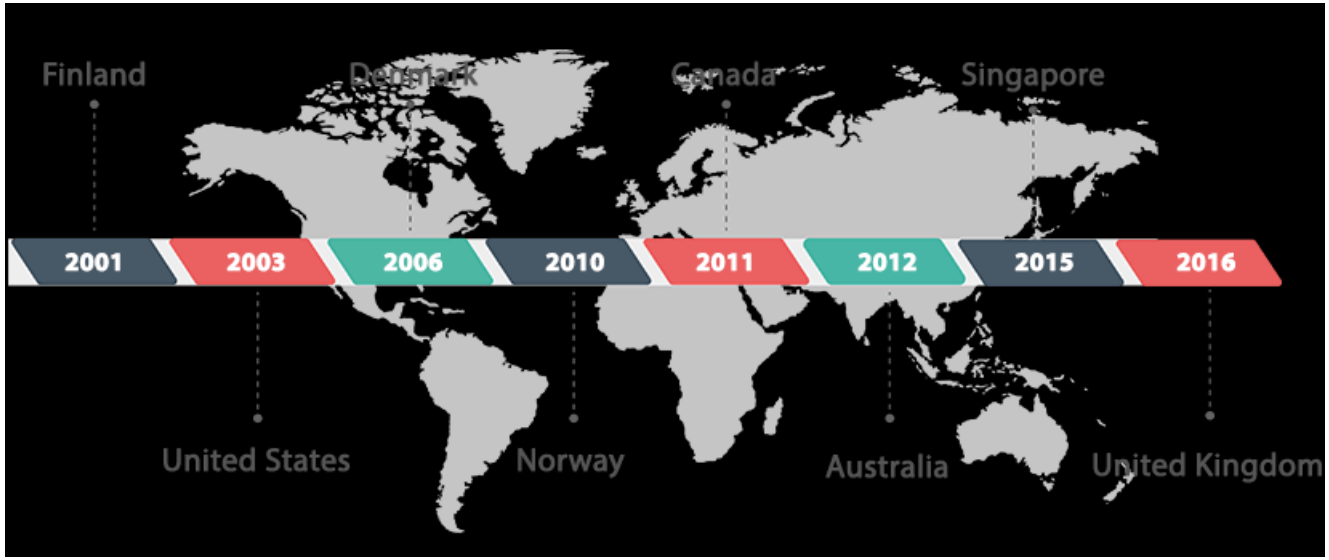
Building Information Management is

… the **organisation and control** of the business process using the digital prototype to effect the sharing of information over the entire lifecycle of an asset.

(NB: whole life approach)

REGULATION :

In many countries the use of BIM standard software will be a legal obligation for all public projects (2017 in EU) and, almost certainly, for all big projects. BIM is not a unique software but a new standard of design and communication between different parties.



académie Nantes
éducation nationale enseignement supérieur recherche

WHY THE BIM ?

Lower costs

33%

reduction in the initial cost of construction and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

Lower emissions

50%

reduction in greenhouse gas emissions in the built environment

Improvement in exports

50%

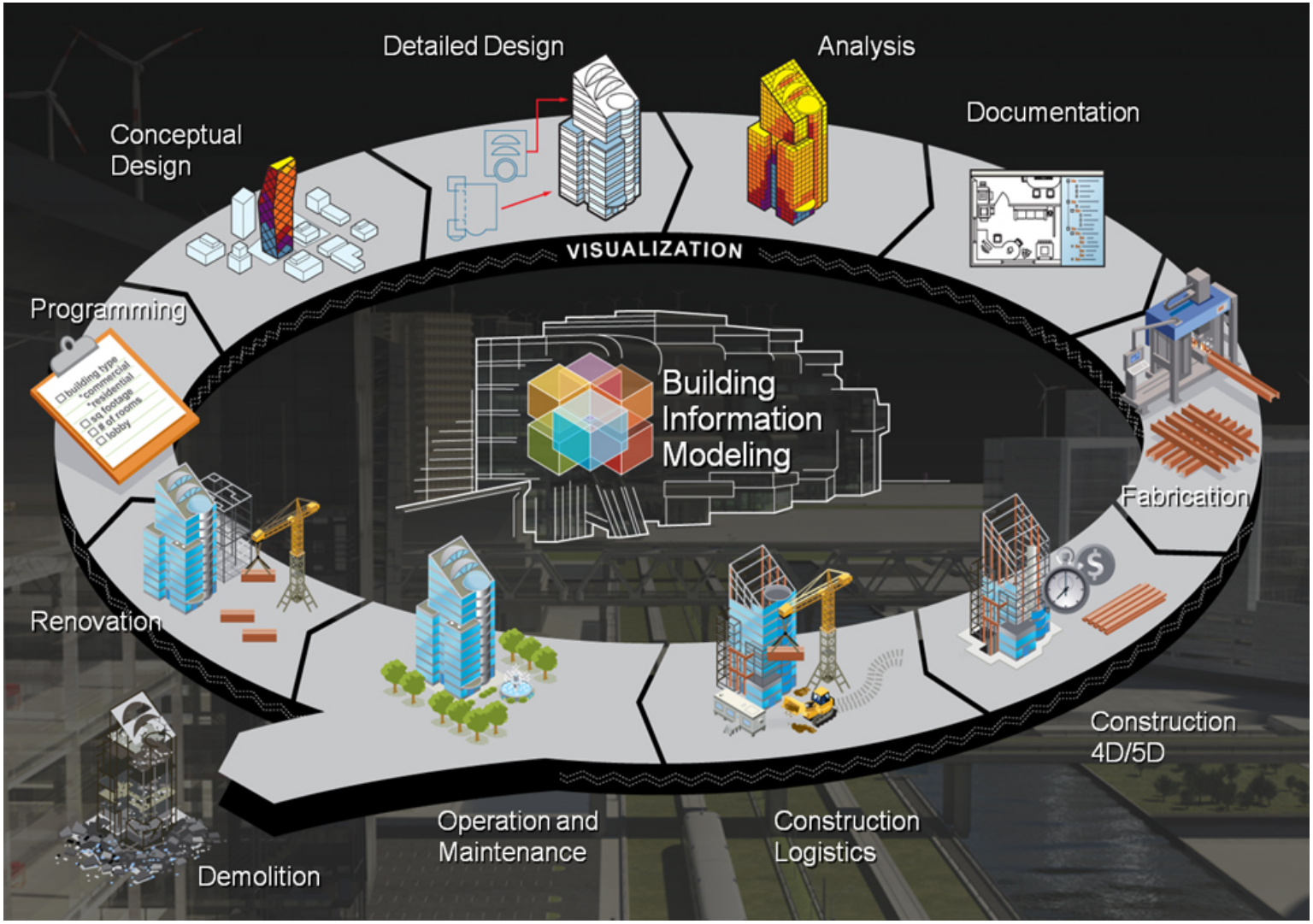
reduction in the trade gap between total exports and total imports for construction products and materials

FACILITIES AND MANAGEMENT

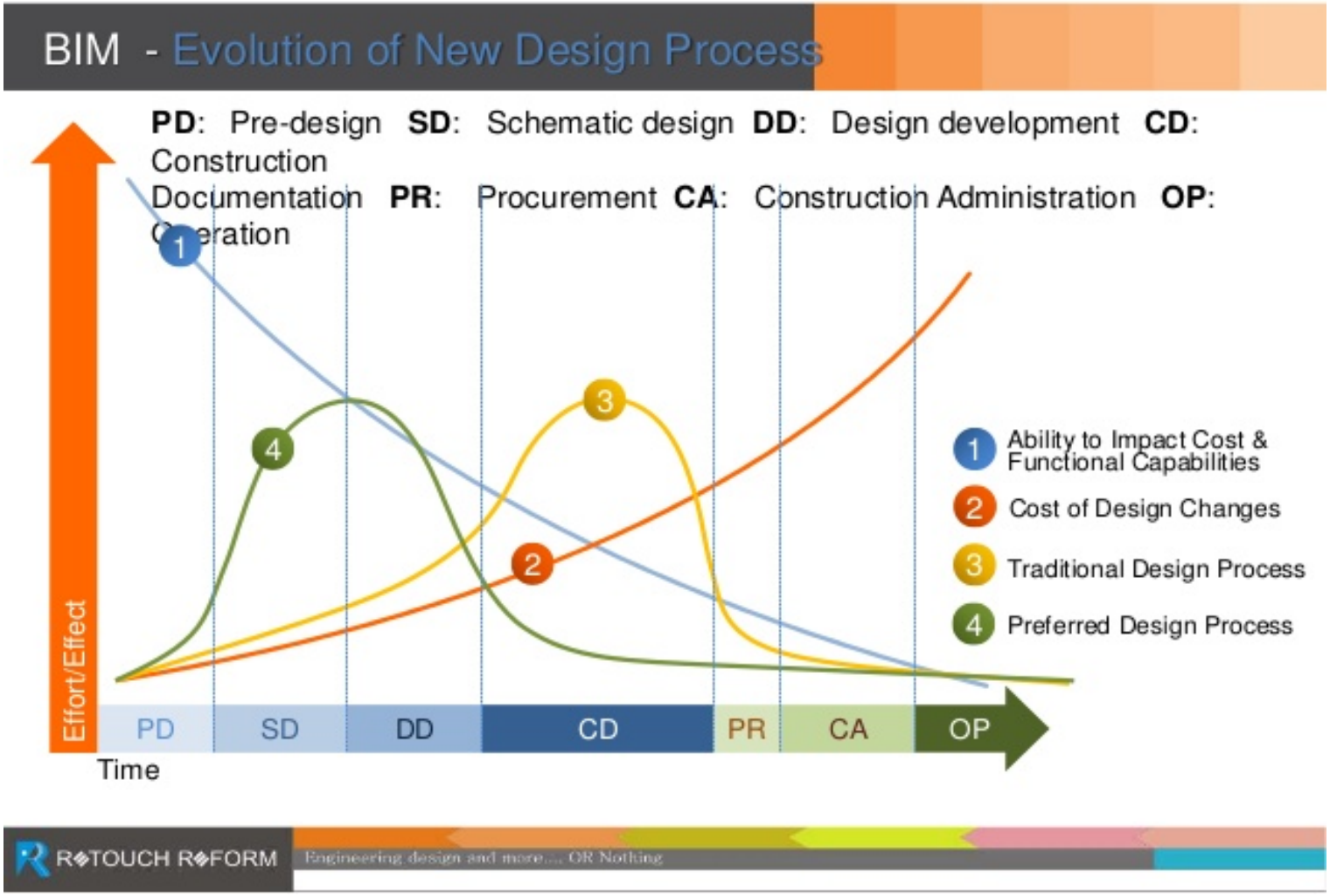
The BIM model is archived as a resource. From here the performance of the complete structure can be tested and the model be utilised for facilities management.

This will create better performing more energy efficient buildings and the improvements for facilities management contribute by enabling the building to be better operated.

PROJECT LIFE CYCLE
Project Management



BIM process consequences analysis on the project costs



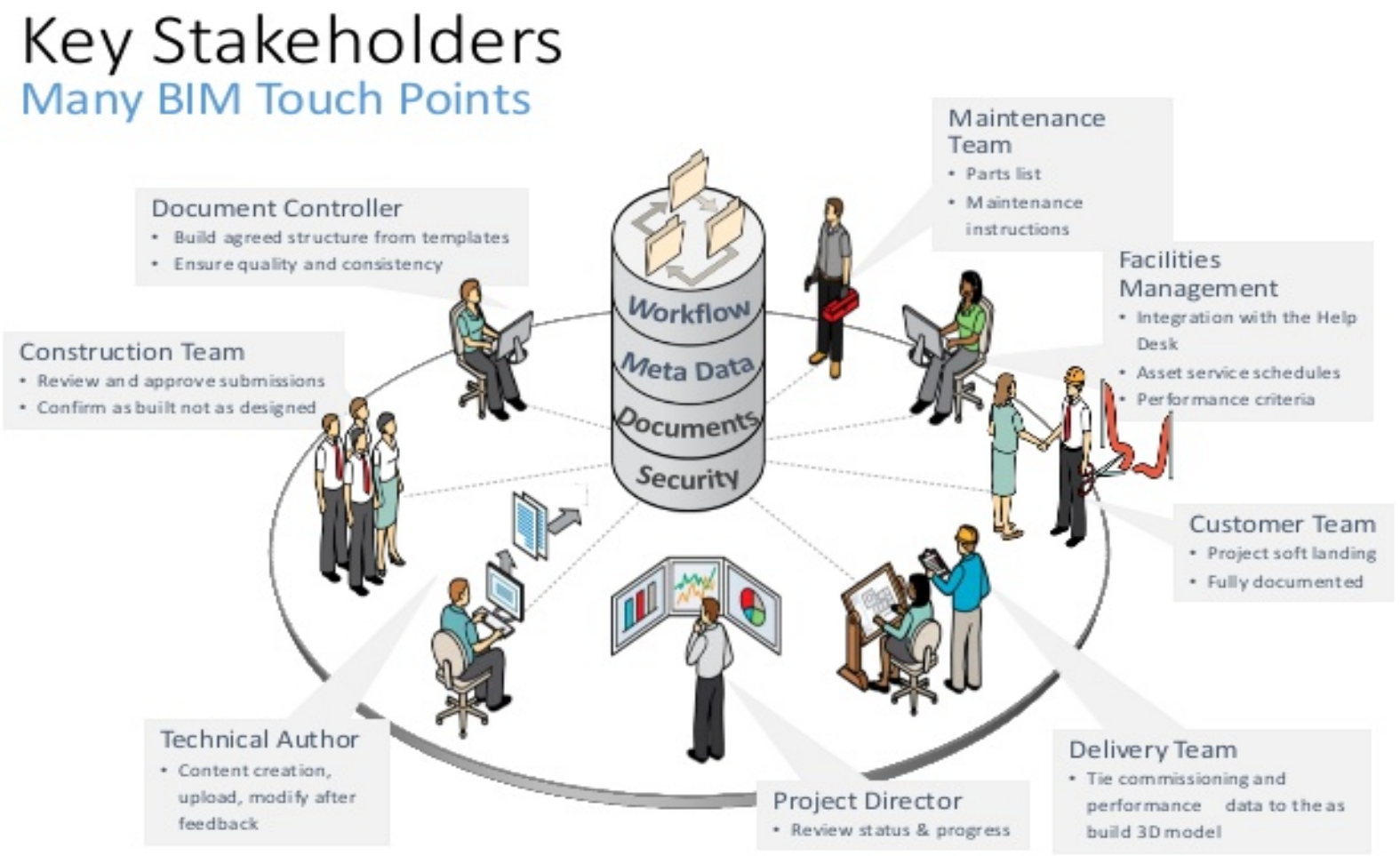
Preventative Maintenance Scheduling

- Tracking and maintaining lifecycle information about the building structure (wall, floors, roof, etc.) as well as the equipment serving the building (mechanical, electrical, plumbing, etc.) to plan and schedule a program of maintenance activities that will improve building performance, reduce repairs, and reduce overall maintenance costs.[Asset management, control and maintenance of equipments] Gestion du patrimoine, pilotage et maintenance des équipements.

Asset Management

- Linking data in a BIM record model to a database of building assets to assist in efficiently maintaining and operating the facility. These assets often include the building elements, systems, and equipment that must be maintained and operated efficiently to satisfy the facility users' requirements in a cost effective way.

More understanding with the BIM



BIM is not CAD ("Computer Aided Design")

“CAD helps people to draw. BIM helps people to construct.” (Richard Saxon, Ecobuild, February 2009)

“BIM is not CAD. BIM was never meant to be CAD. CAD is a replacement for pen and paper, a documentation tool. By comparison, BIM programs are design applications in which the documentation flows from and is a derivative of the process, from schematic design to construction to facility management.” (Pete Zyskowski, Cadalyst)

“Drawing is Dead – Long Live Modelling” (CPIC)

BIM is not ...

BIM is not

… new

… just an IT "Information Technology" issue... or just software

… 3D

… something designers do

… just about project delivery

… a short-lived fad

… irrelevant to small projects

… “the silver bullet” or “Holy Grail”

… optional?

I of BIM = information,
the main point in the process.

Previously, 'documents' such as drawings, schedules and specifications were written, now this information is being digitally generated from well-structured information models. We are starting to see a construction industry in which digital information flows from inception through to demolition, making big efficiency and accuracy savings along the way.!

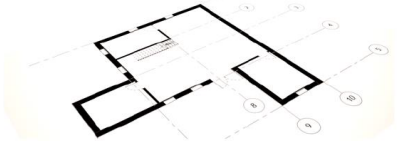
	COBie UK 2012	NBS
Accessible	BarCode	AirTransferGrille
AcousticRating	InstallationDate	AntiFingerTrapReq.
FinalExit	Manufacturer	BreakOutFacility
FireRating	Model	DoorNumber
IsExternal	ProductionYear	ElectronicLock
SecurityRating	ReplacementCost	GlassType
SelfClosing	WarrantyDescription	HardwareSet
...	...	construction products association

BIM LEVELS

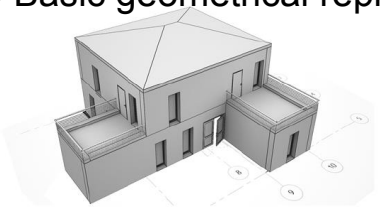
There are 3 criteria to know for which BIM process we talk about.

1) The use level :

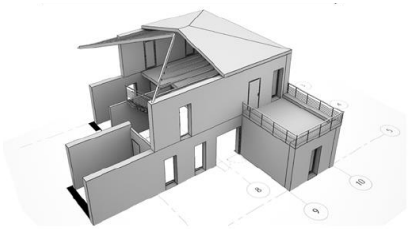
2D visualisation of the 3D on a plan



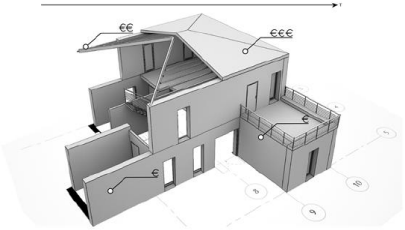
3D Basic geometrical representation



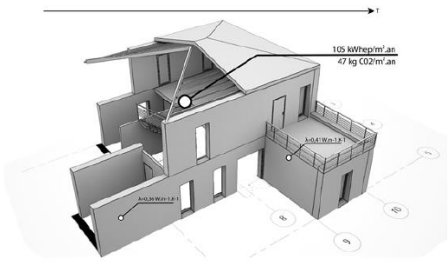
4D + Scheduling



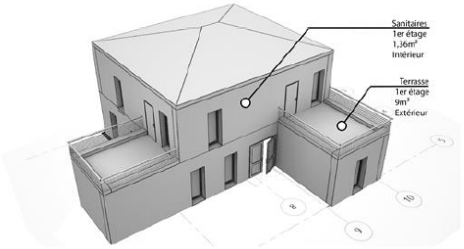
5D + Estimating



6D + Sustainability



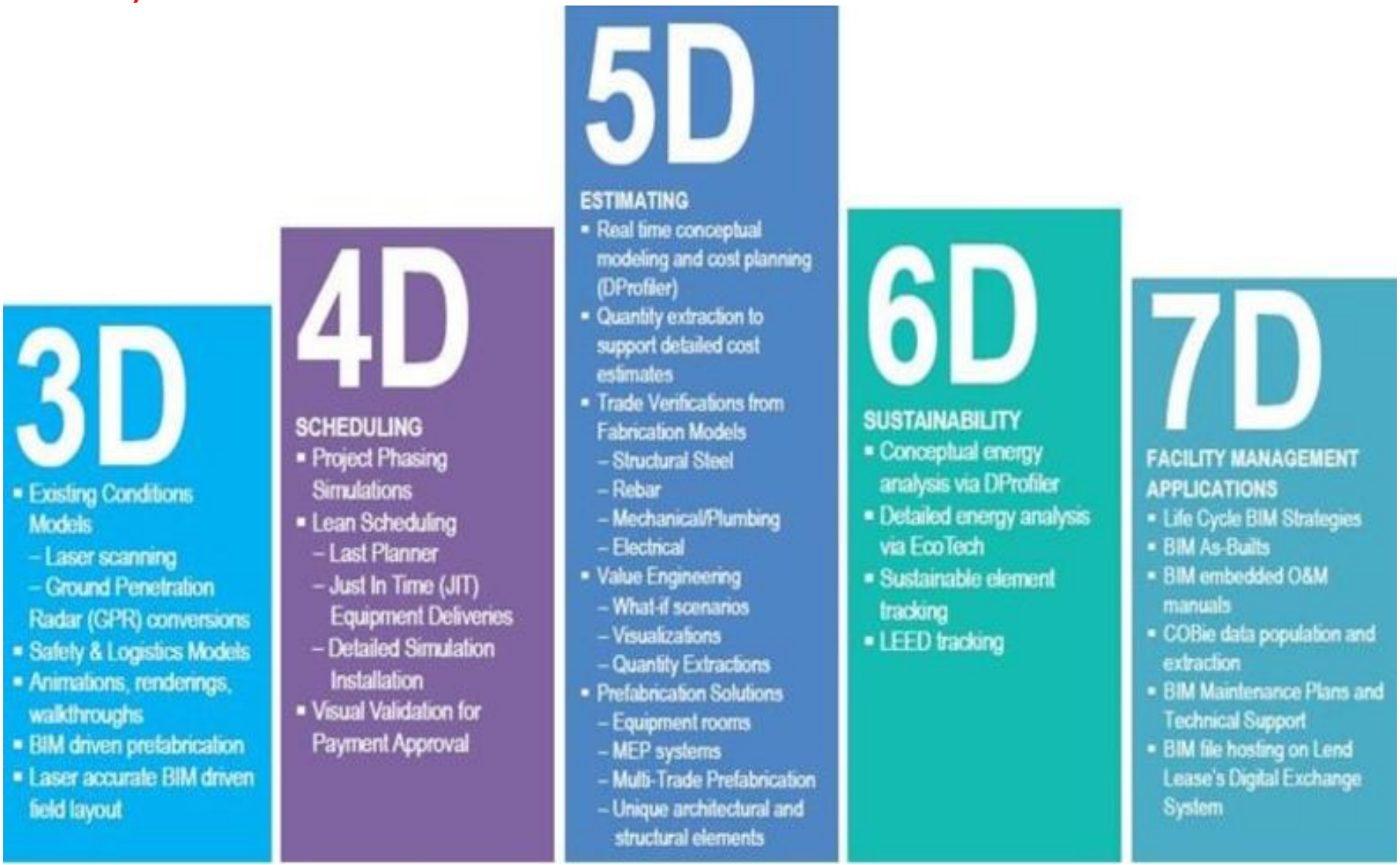
7D + Facility management applications.



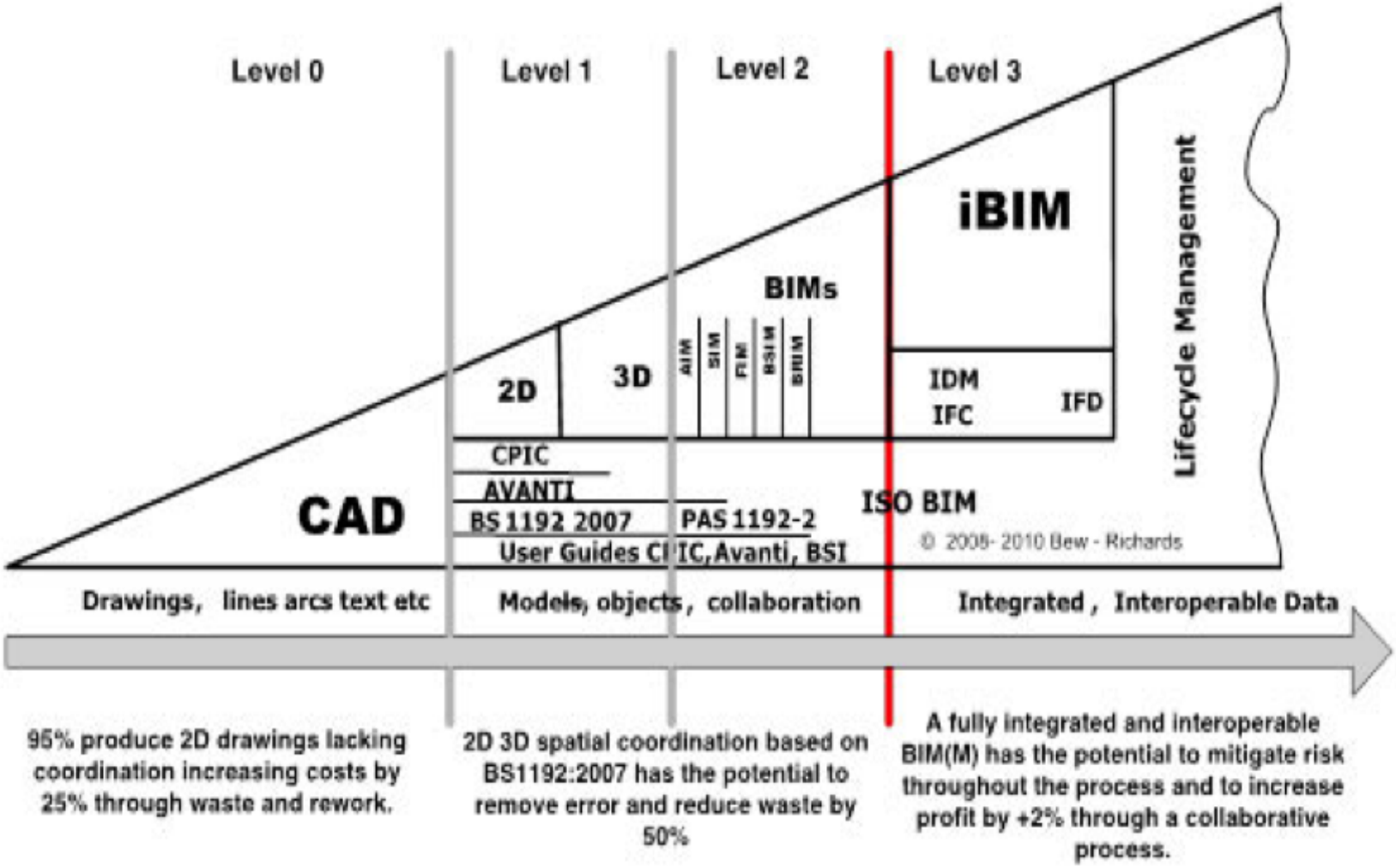
XD The next ones : comfort ? Security ?

BIM LEVELS

1) The use level : detailed



IN ANOTHER WAY : BIM MATURITY LEVEL



2) Level of development

LOD

100

200

300

350

400

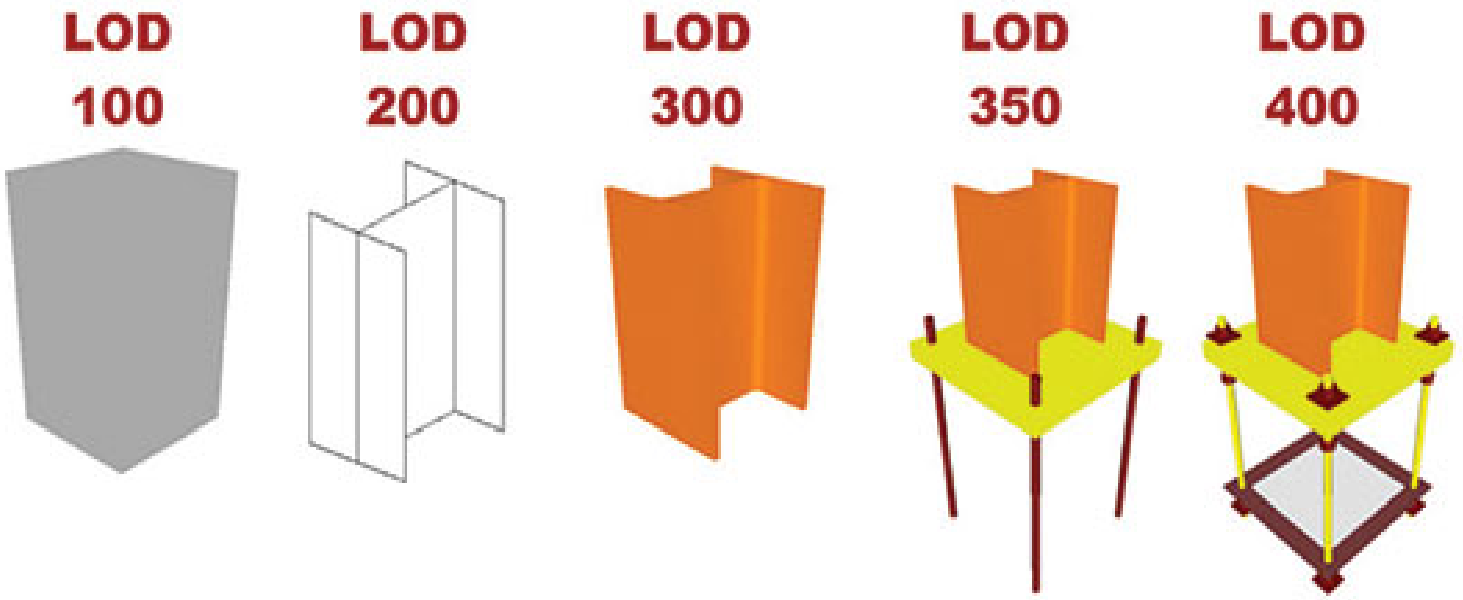
500

B – Ext. Wall	Part 1 - Attribute Description				Part 2 - LOD Profile				
	Data Type	Units	Option Examples	Commentary	100	200	300	350	400
Material - insulation									
Coatings (if applicable)									
Wind Load Capacity (pressure)			psf						
Wind Load Capacity (drag)			psf						
Thermal Resistance			R-value (h·ft2·°F/Btu)						
Condensation Resistance			options:[yes, no, class]						
Water Resistance			options:[yes, no, class]						
Air Infiltration			options:[yes, no, class]						
Fire Rating			options: [UL label - A,B,C,D,E,S]						
Impact resistance (hail)			options:[yes, no, class]						
UV Resistance			options:[yes, no, class]						

2) Level of development

LOD

Below is graphic representation of the concept. As the LOD increases we get more information about the beam, although graphically that may not indicate a huge jump such as between LOD 200 and 300.

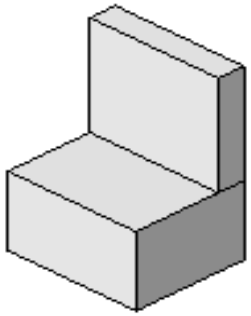


2) Level of detail

LOD Too !

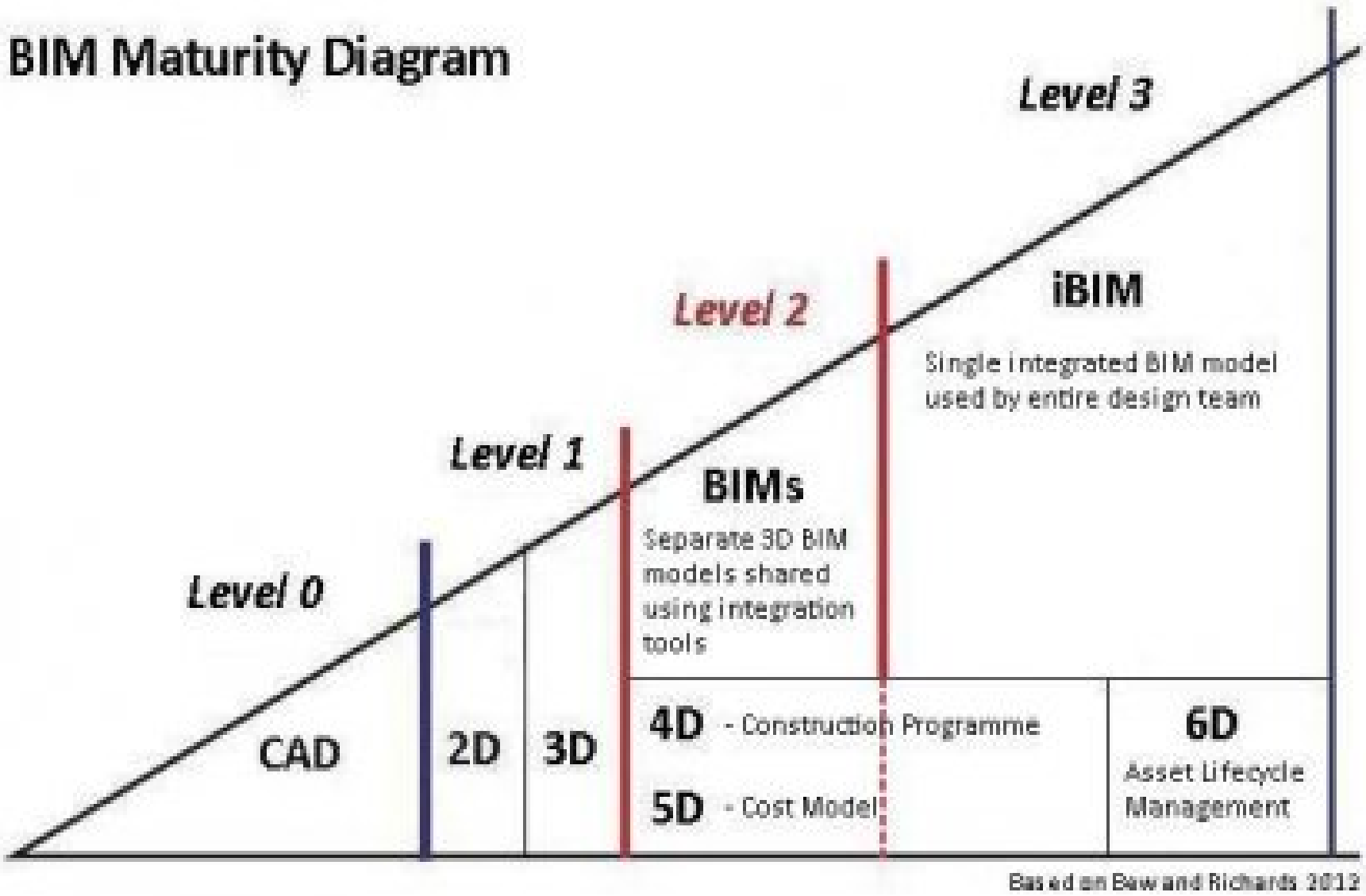
Level of Detail refers to the amount of information provided. With level of detail, it is assumed that all the provided information is relevant to the project and can be relied upon with certainty.

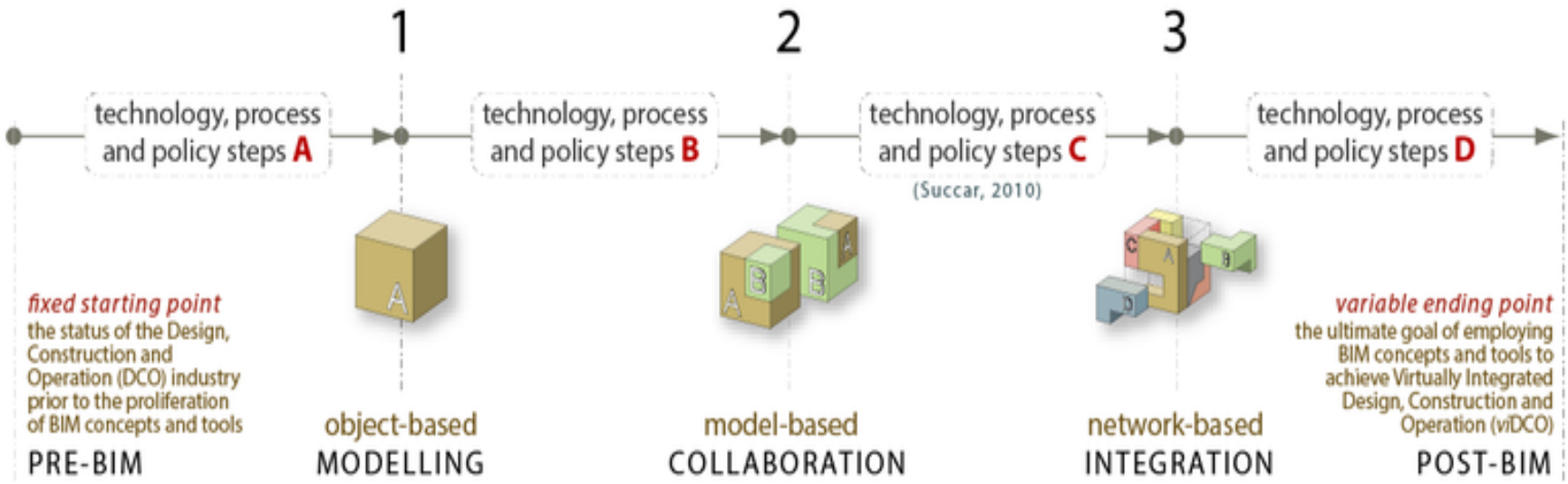
LEVEL of DETAIL

G0	G1	G2	G3
			
Schematic	Concept	Defined	Rendered
DESCRIPTION: Office Chair WIDTH: DEPTH: HEIGHT: MANUFACTURER: MODEL:	DESCRIPTION: Office Chair WIDTH: 700 DEPTH: 450 HEIGHT: 1100 MANUFACTURER: MODEL:	DESCRIPTION: Office Chair Arms, Wheels WIDTH: 700 DEPTH: 450 HEIGHT: 1100 MANUFACTURER: Herman Miller, Inc MODEL: Mirra	DESCRIPTION: Office Chair Arms, Wheels WIDTH: 700 DEPTH: 450 HEIGHT: 1100 MANUFACTURER: Herman Miller, Inc MODEL: Mirra

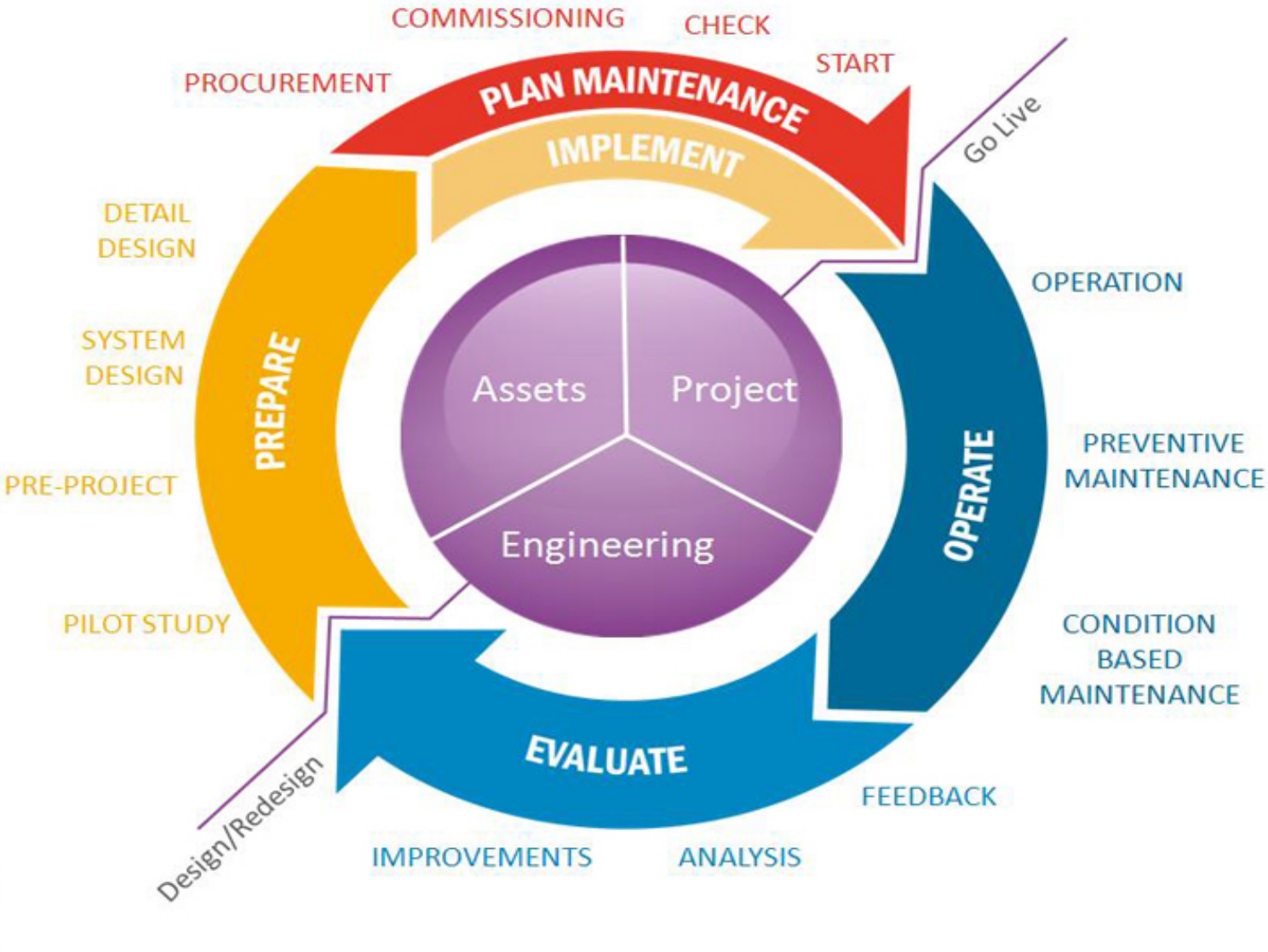
(based on AEC [UK] BIMprotocol v2.0 - Component Grade)

3) BIM MATURITY LEVEL




1
2
3
technology, process and policy steps A
technology, process and policy steps B
technology, process and policy steps C
technology, process and policy steps D
(Succar, 2010)
fixed starting point
the status of the Design, Construction and Operation (DCO) industry prior to the proliferation of BIM concepts and tools
PRE-BIM
object-based
MODELLING
model-based
COLLABORATION
network-based
INTEGRATION
variable ending point
the ultimate goal of employing BIM concepts and tools to achieve Virtually Integrated Design, Construction and Operation (viDCO)
POST-BIM

Mandatory Information for all phases



INTEROPERABILITY

Towards Interopability...

- **Analyse and identify the needs :**

- Who ? (The Actors) and What (The Exchanges)

- **Deduce from that a Protocol :**

- BIM Protocol

- **Provide ourselves with the means**

- How ? → Tools and Formats

BIM Manager

- Receive and manage multiple subcontractor models.
- Coordinate all BIM Logistics (Contracts, Emails, File sharing, etc.)
- Create, maintain and analyze federated model mainly for coordination purposes.
- Review and document design and coordination conflicts.
- Run and analyze clash detection on federated model.
- Prepare and distribute clash reports to facilitate the coordination process.
- Schedule and facilitate coordination meetings along with project manager and/or superintendent.
- Write Meeting Minutes.
- Site inspection and liaising with trade contractors
- Meet with designers/owners as required to facilitate review of models as needed.
- Compile contract BIM close out documentation

BIM Manager : Is it a great job opportunity ?

YES, It is

BUT, In a few years this job will not exist anymore !

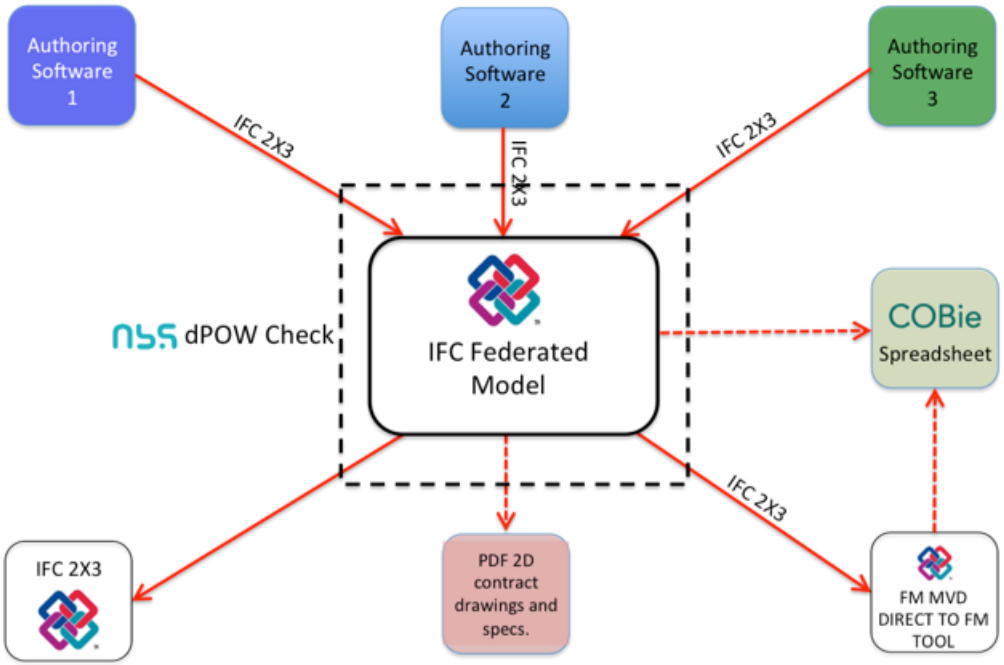
WHY ????

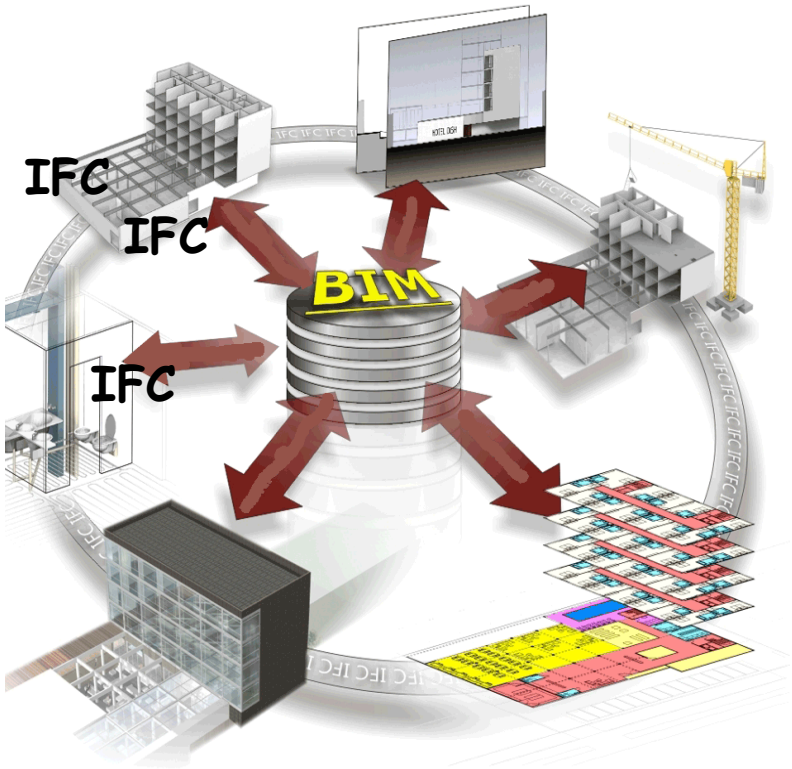
Do you know currently jobs called : Email Manager, or Internet Manager ?

IFC (Industry Foundation Classes)

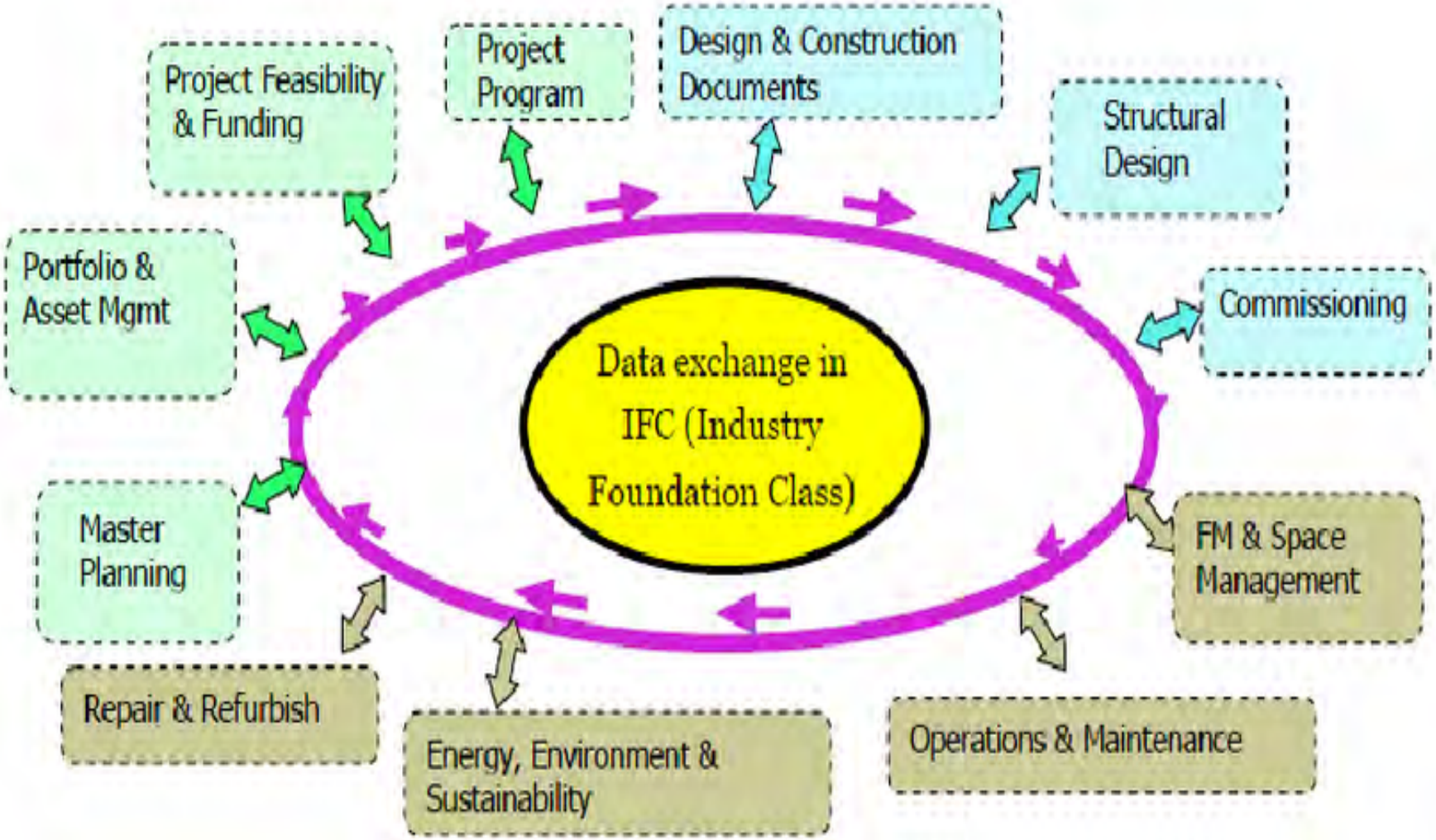
What is IFC and what do you need to know about it?

IFC is a global standard for data exchange in the building industries. IFC is both a common data model and an open file format. Building industry professionals can use IFC to share data regardless of what software application they use to get their job done. Similarly data from one phase of the building lifecycle can be utilised in a later stage without the need for data re entry, custom import interfaces or proprietary plugins. EXPORT IMPORT





IFC (Industry Foundation Classes)



THE TOOLS :

-

1) Softwares :

1-1) Modelling

1-2) Fields Analysis

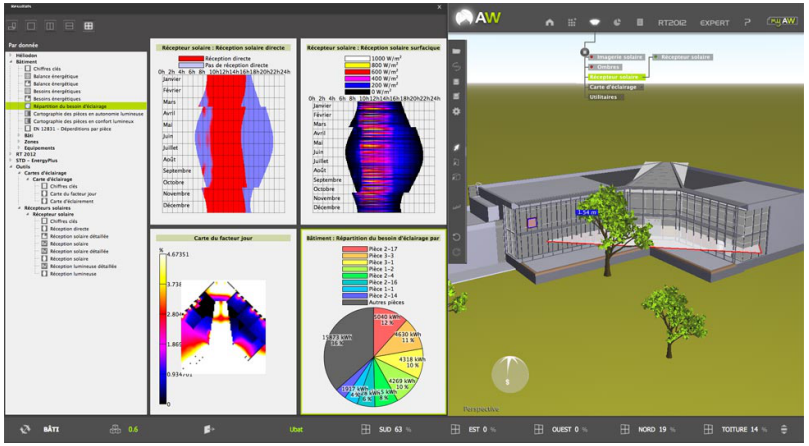
1-3) Overview (visualisation)

-

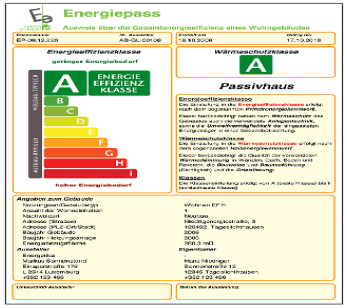
1-4) Collaboration (platform)

1-5) Management, Operating

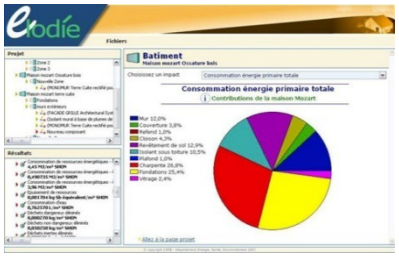
Design Modelling : Energy, Lighting, Acoustic, Costs… Industry softwares.



Archiwizard



ClimaWin : Energy



Elodie (Environment)

Dialux (Lighting)

DEVISOC (Costs)

2) The formats:

2-1) Exchange Formats :

- IFC
- gbxml

2-2) Delivering Formats :

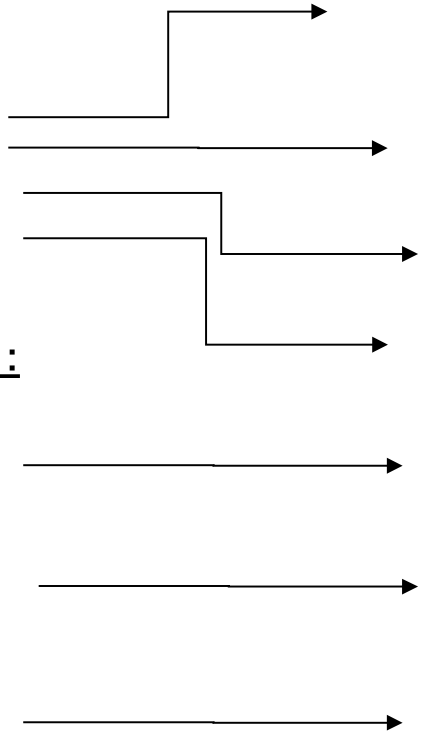
- COBie
- .xls
- .xlsx
- .csv

-

2-3) Annotations Format :

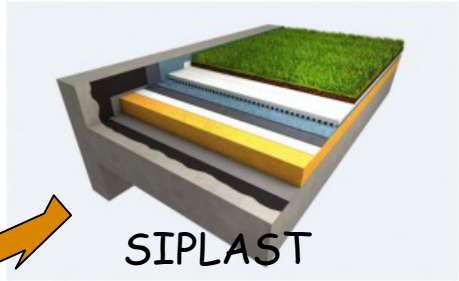
- BCF

-

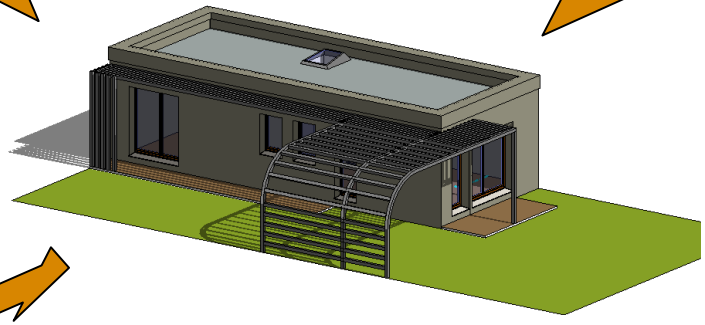


The model may be realised from BIM objects provided by the manufacturers thanks to parametric objects. You can find them on the industrial websites or in libraries (BIMobject, BIM Components, Polantis ….):

ALKERN



SIPLAST



LA TOULOUSAINE

VELUX

And Many More…

Pour en savoir plus

http://eduscol.education.fr/sti/seminaires/le-numerique-dans-les-formations-du-secteur-du-batiment-et-travaux-publics-btp

Fédération française du bâtiment :	www.batiportail.com/toutsurlebim.asp
Association BuildingSmart :	www.buildingsmart.org
Association Mediaconstru	http://www.mediaconstruct.fr/
Association AIMCC	www.aimcc.org
CSTB	www.cstb.fr
Base de données INIES :	www.inies.com
BOUYGUES CONSTRUCTION :	http://www.bimgeneration.com/
Village BIM	http://villagebim.typepad.com/

Malette BIM http://portail_sbtp_pro.ac-toulouse.fr/web/190-mallette-pedagogique-bim.php

Les familles (famille REVIT RFA) téléchargement d'objets

http://la-boutique-du-bim.blogspot.fr
http://www.polantis.info/le-bim-pour-les-nuls/

Integrated Project Delivery with BIM

Integrated project delivery (IPD) is the emerging standard for early collaboration and effective decision making in the building industry today. Incorporating a building information modeling (BIM) toolset into any aspect of the IPD process enables project teams to use information in an integrated environment, increasing efficiency and enabling new ways of working that inspire more creative and sustainable designs.

Keys to Integrated Project Delivery

- Involve all team members in design meetings, including contractors.
- Institute building information modeling.
- Facilitate collaboration.
- Set up contract mechanisms that enable open collaboration.
- Minimize paper-based processes, and collaborate digitally.
- Check for and manage interferences between trades, digitally.
- Create a culture of trust and sharing.
- Communicate design ideas using 3D visualization to keep everyone aligned.

Autodesk

PROJECT PHASES

The project team comes together at the earliest stage, improving accuracy of decisions. The rest of the process becomes more predictable, thus avoiding costly redesign work.

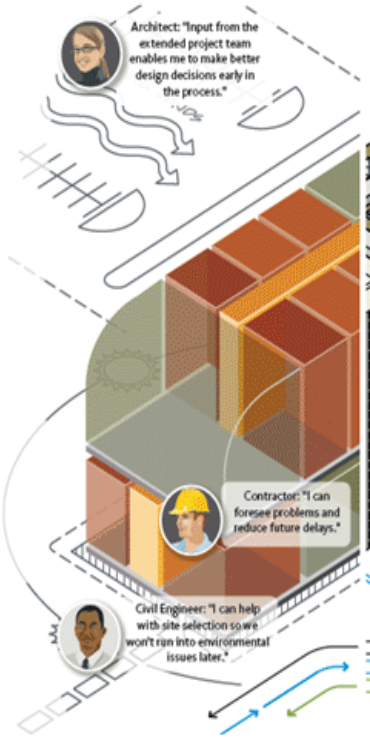
Collaboration between the architect, contractor, and engineers allows for better decision making, helping to improve quality and mitigate risk.

Precise virtual models are automatically part of the design, helping to reduce uncertainty in documents and interferences during construction.

Because of careful early planning, team members are able to use materials efficiently, creating less waste. Change orders are minimized, and no operational revenue is lost. Construction can be completed on schedule and on budget.

Owners can enjoy better quality assurance on their completed project and are provided with a complete virtual building for operational and renovation purposes.

CONCEPTUALIZATION



TOOLS

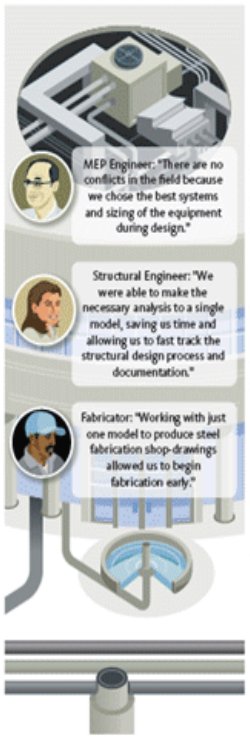
- Revit® Architecture
- Revit® Structure
- Revit® MEP
- AutoCAD® Civil 3D®
- Autodesk® 3ds Max® Design
- Autodesk® Maya®
- Autodesk® Inventor™
- Autodesk® Impression
- Autodesk Collaborative Project Management

DESIGN

TOOLS

- Revit® Architecture
- Revit® Structure
- Revit® MEP
- AutoCAD® Civil 3D®
- Autodesk® 3ds Max® Design
- Autodesk® Design Review
- Autodesk® NavisWorks®
- Autodesk® Quantity Takeoff
- Autodesk Collaborative Project Management

IMPLEMENTATION DOCS



TOOLS

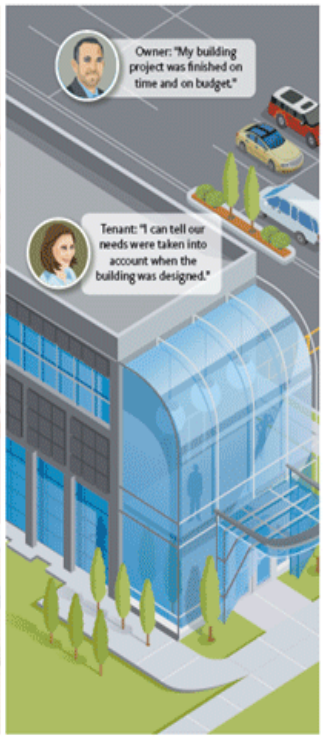
- Revit® Architecture
- Revit® Structure
- Revit® MEP
- AutoCAD® Civil 3D®
- Autodesk® Design Review
- Autodesk® NavisWorks®
- Autodesk® Quantity Takeoff
- Autodesk® Inventor™
- AutoCAD®
- Autodesk Collaborative Project Management

CONSTRUCTION

TOOLS

- Autodesk® NavisWorks®
- Revit® Architecture
- Revit® Structure
- Revit® MEP
- AutoCAD® Civil 3D®
- Autodesk® Inventor™
- Autodesk® Design Review
- Autodesk Collaborative Project Management

OWN / OPERATE



TOOLS

- Autodesk® FMDesktop™
- Autodesk® Design Review
- Autodesk Collaborative Project Management

XPLANATIONS™ by XPLANE®

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