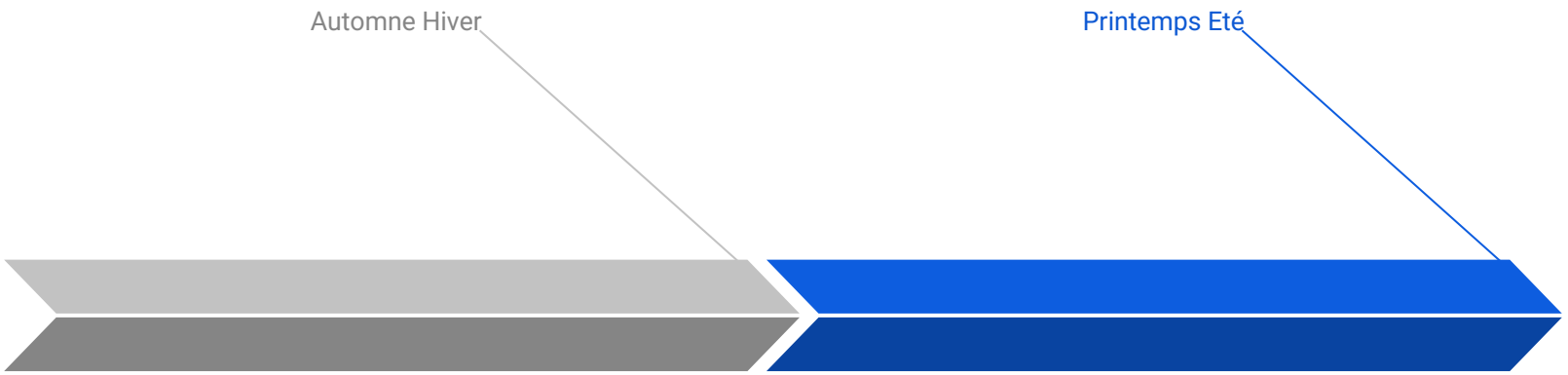
Enseignement BIM



AR-484
Cours d'introduction au BIM

Contenu
Théorie

AR-435
Unité d'enseignement BIM

Contenu
Travaux pratiques sous forme de projet

Prérequis
Avoir suivi le cours d'introduction

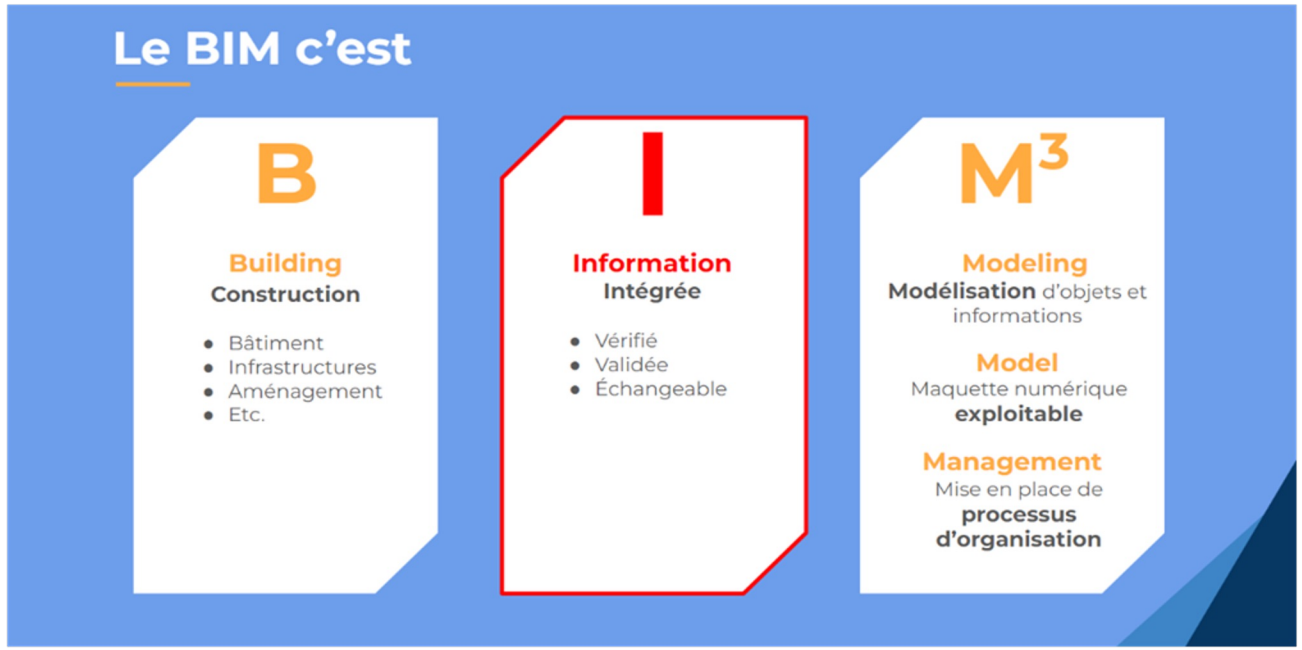
AR 484 Cours d’introduction au BIM

AR 484 Cours d’introduction au BIM

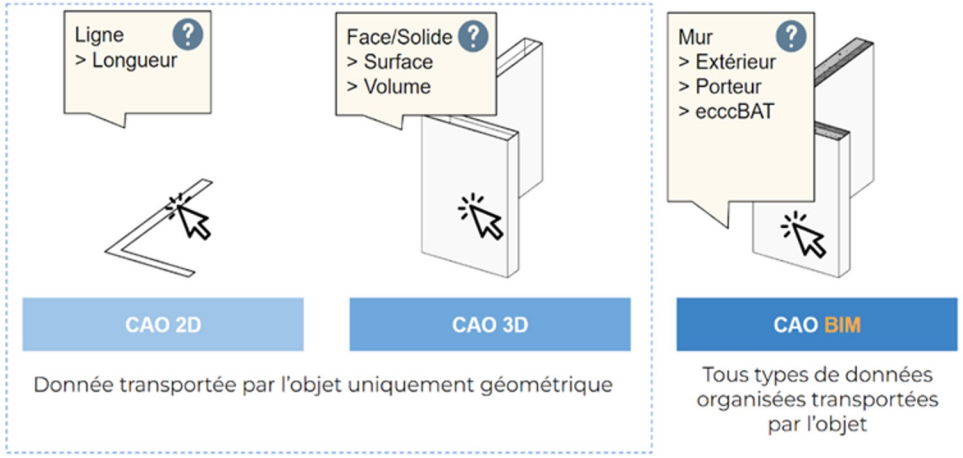
1

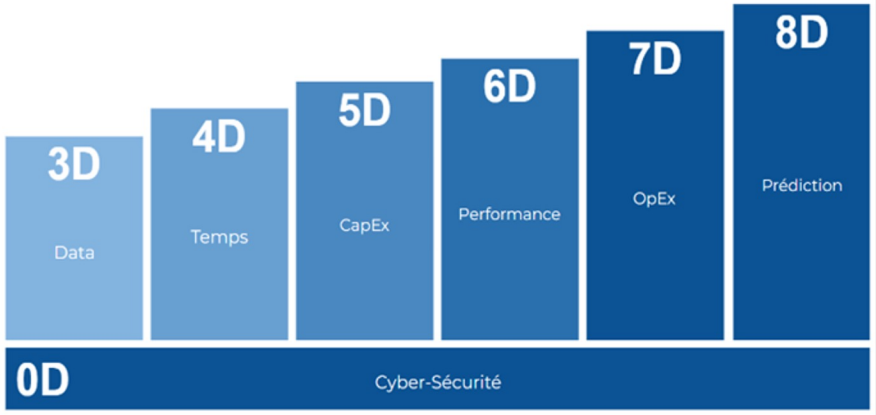
1. BIM – NOTIONS DE BASE

Définition du BIM



Dimensions BIM et Maturité





Normes et Organismes

buildingSMART International

BAUEN DIGITAL SCHWEIZ
BÂTIR DIGITAL SUISSE
COSTRUZIONE DIGITALE SVIZZERA
CONSTRUIR DIGITAL SVIZRA

AR 484 Cours d’introduction au BIM

1

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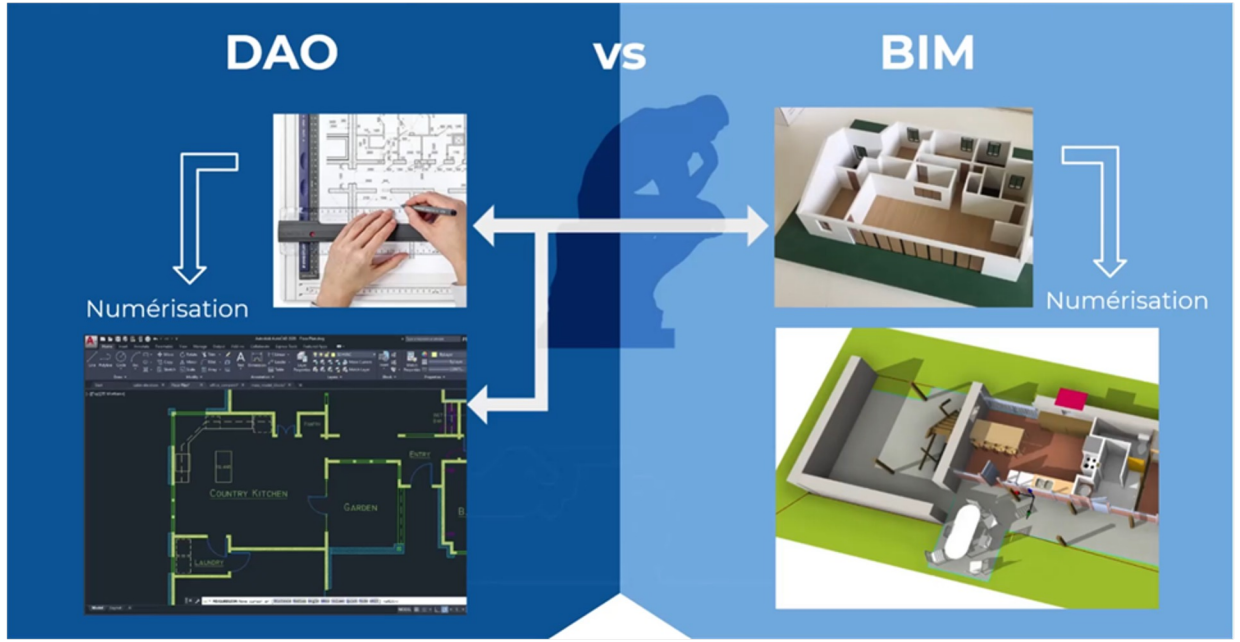
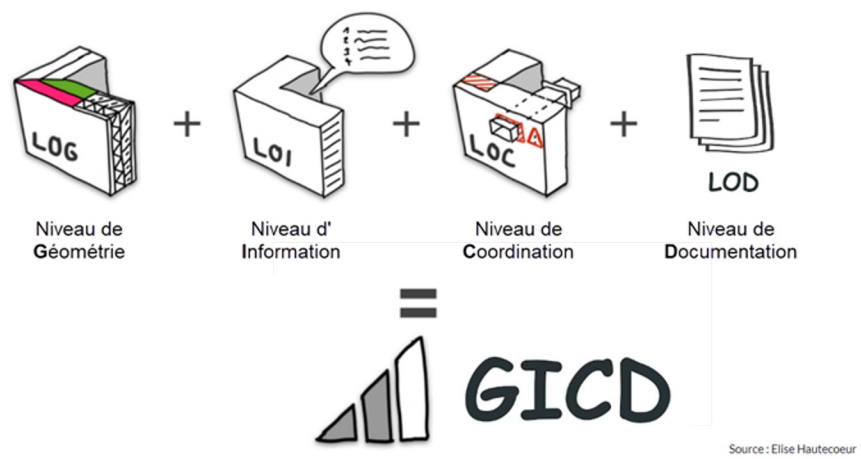
2. MODÉLISATION BIM

Evolution de la DAO vers le BIM



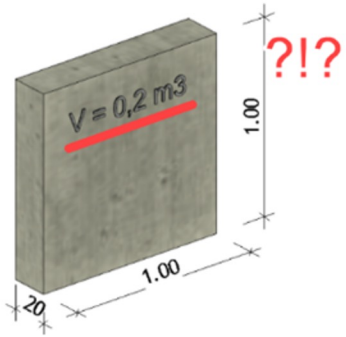
Usages BIM et niveaux de développement



Bonnes pratiques

Relevé de matériaux de mur

Famille	Type	Matériau: Nom	Matériau: Volume
Mur de base	Ext. Béton 200 mm	Béton coulé sur place - C25	0.80 m³



Cas d'usage

AR 484 Cours d’introduction au BIM

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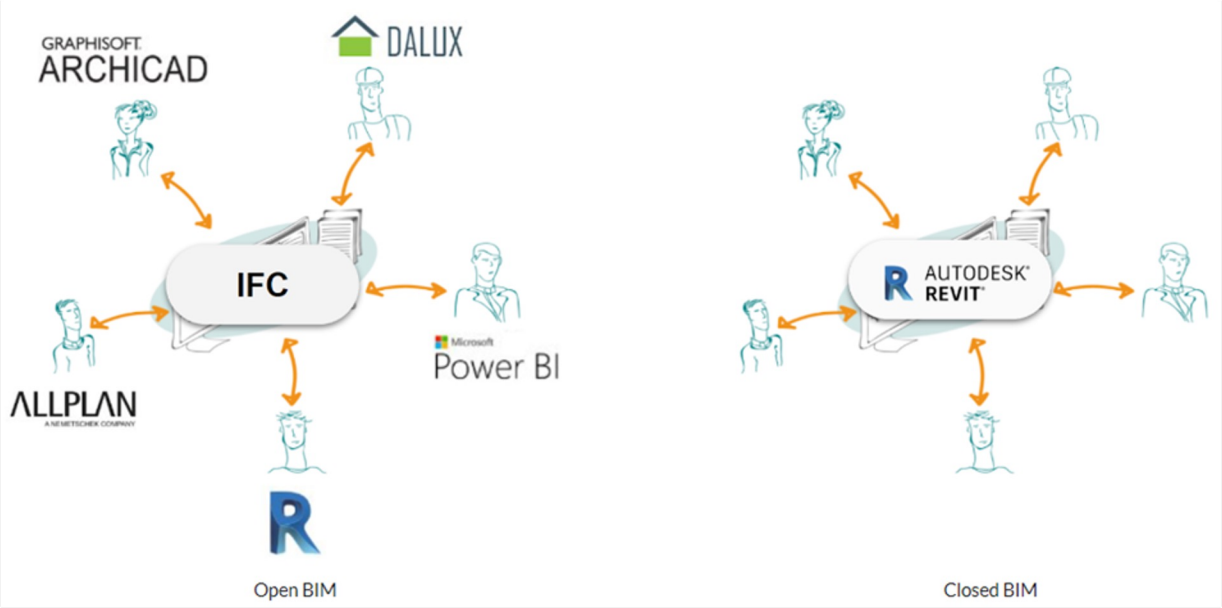
3. OPEN BIM

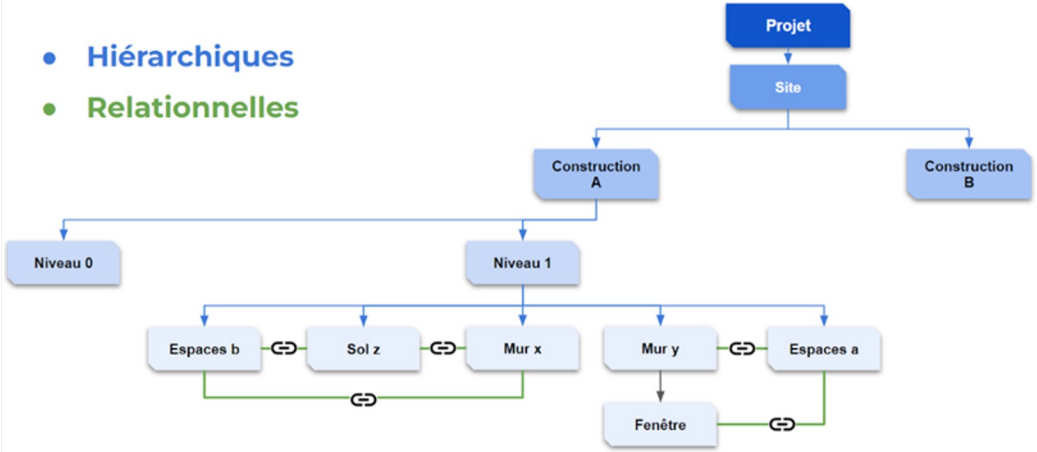
Open BIM vs Closed BIM



Le format IFC

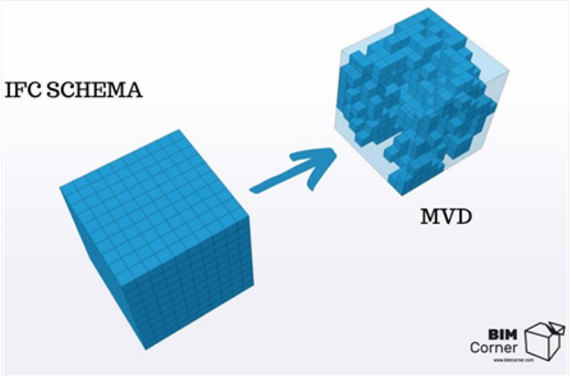
La base de donnée IFC

- Hiérarchiques
- Relationnelles



Schémas et MVD

Model **V**iew **D**efinition



AR 484 Cours d’introduction au BIM

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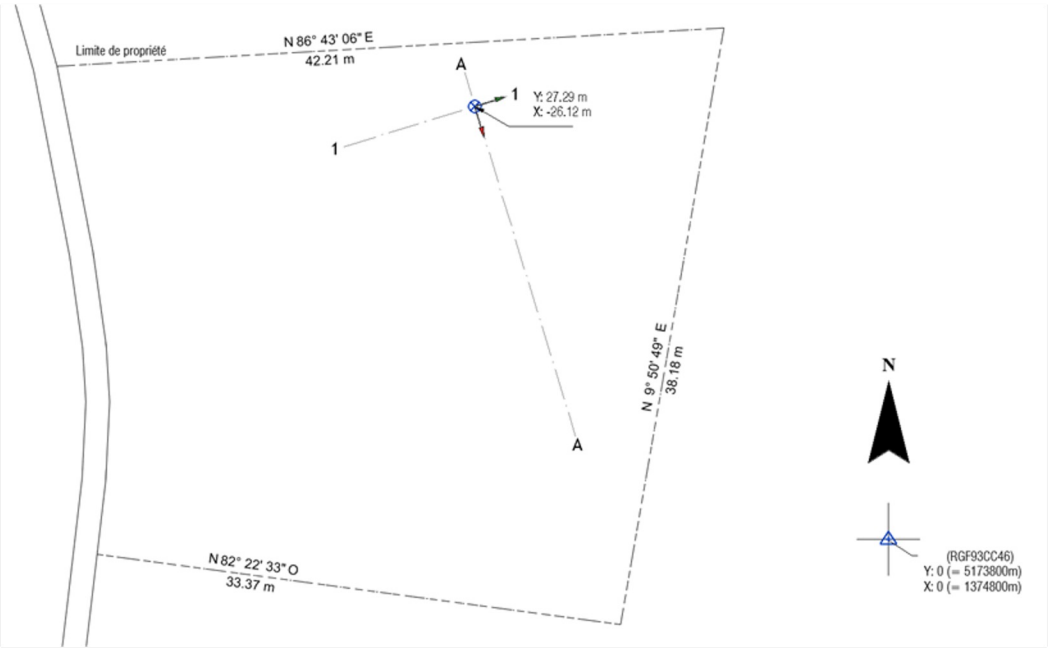
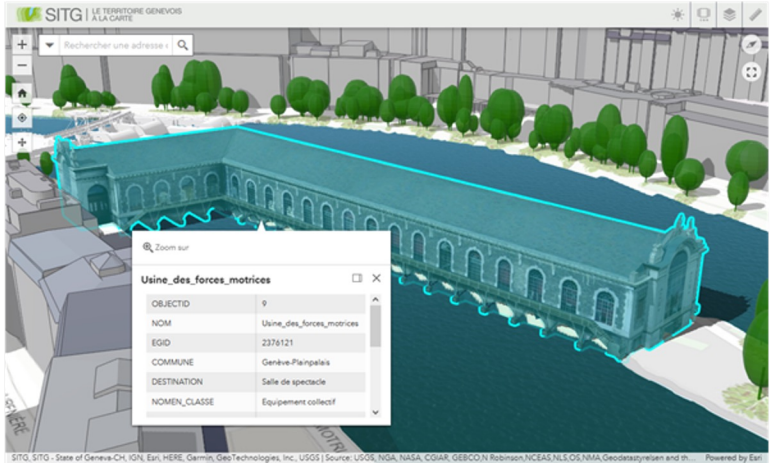
4. ACQUISITION DE DONNÉES

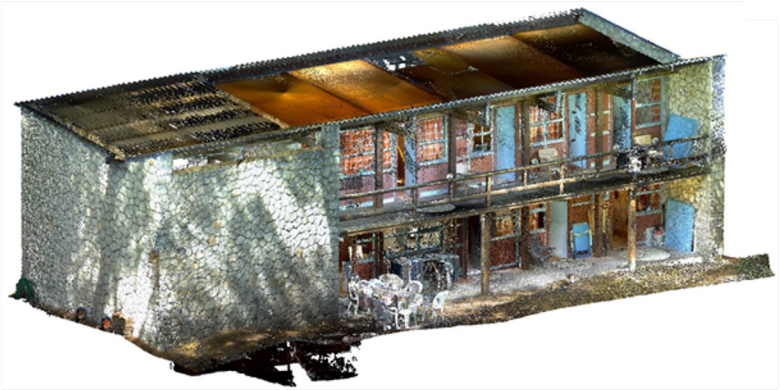
Géoréférencement et BIM



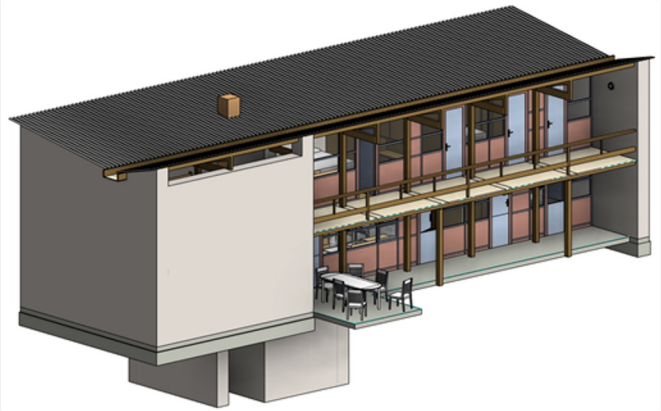
Exemple d'extraction SITG



Numérisation 3D



Intégration et modélisation



AR 484 Cours d’introduction au BIM

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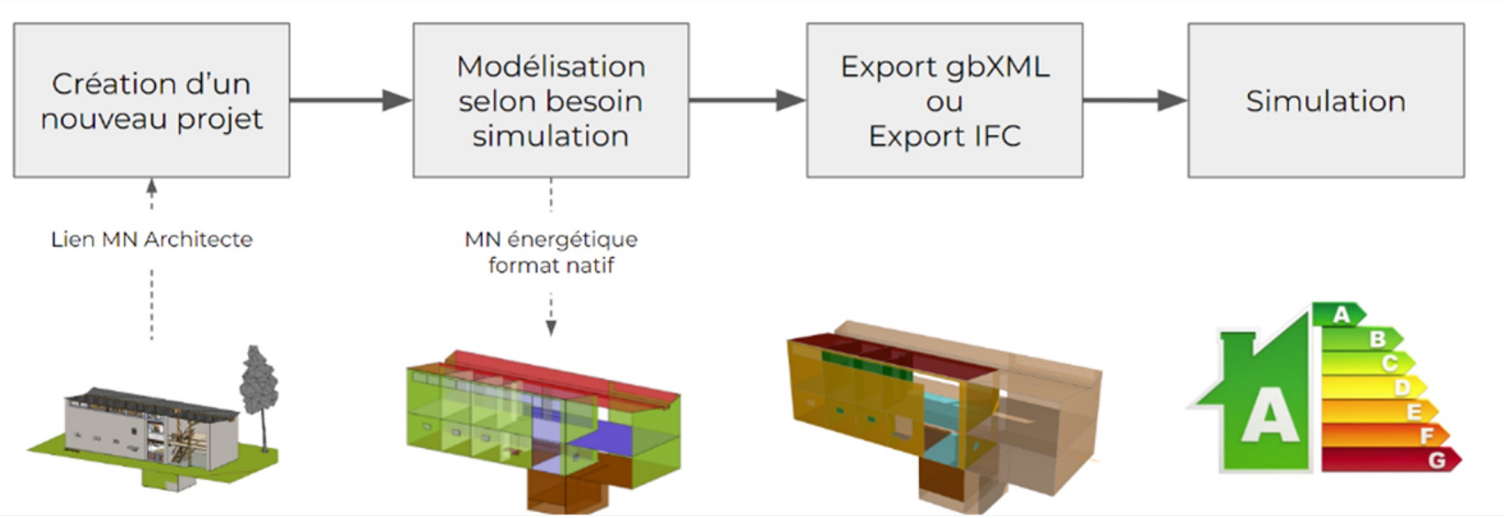
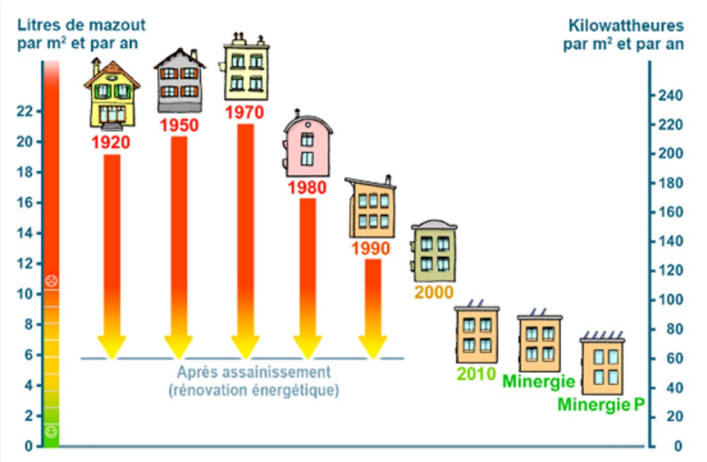
5. BEM: BUILDING ENERGY MODELING

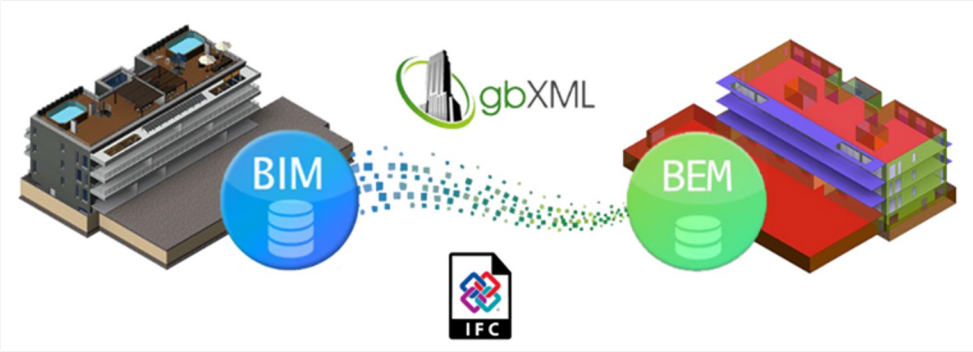
Processus de modélisation



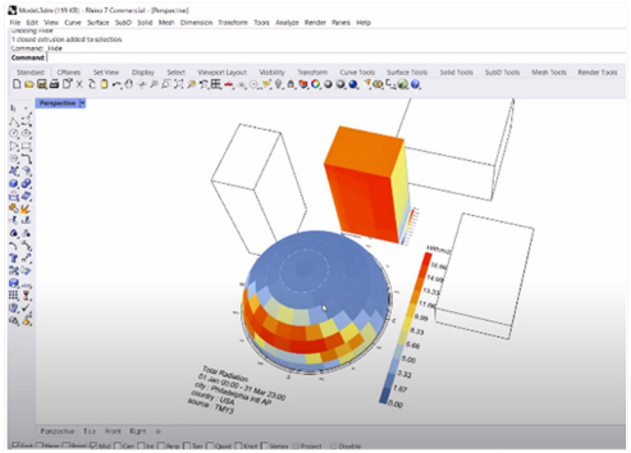
Contexte énergétique



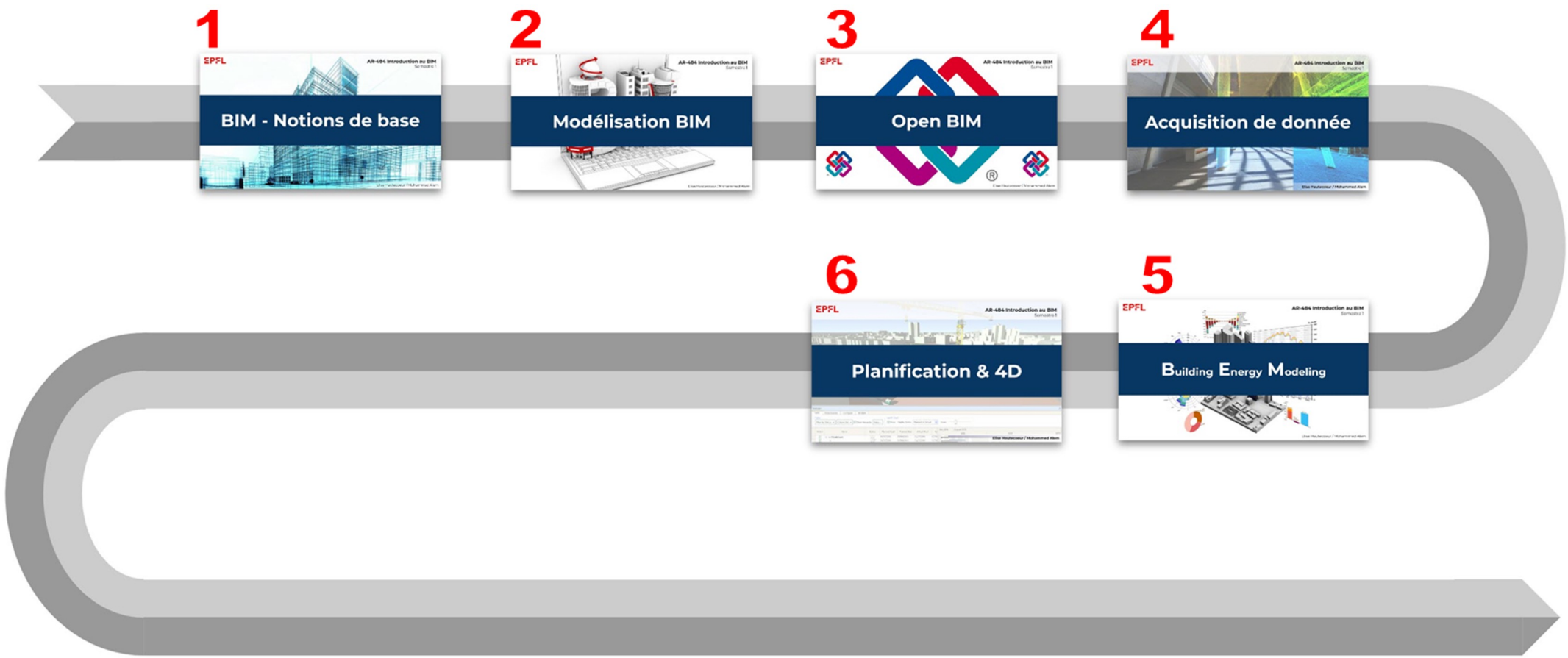
BIM vs BEM



Simulation



AR 484 Cours d'introduction au BIM

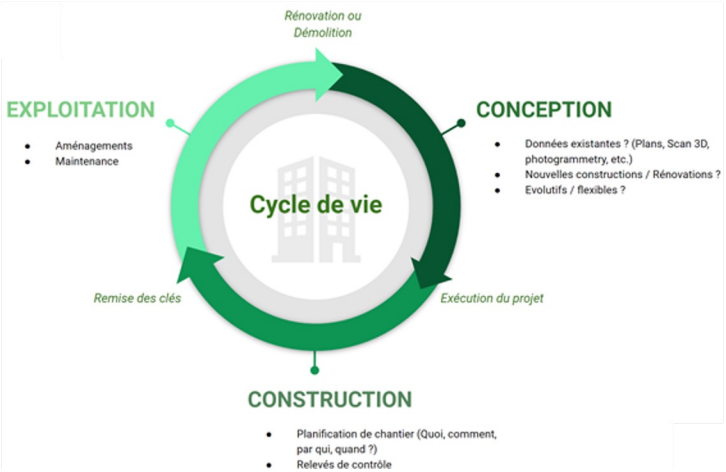


6. PLANIFICATION ET 4D

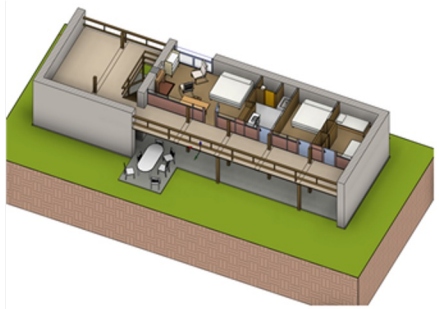
Maquette et planification

	Name	Start	Finish	3D Resources
1	Travaux de démolition	09:00 01.01.2024	17:00 26.02.2024	(186)
9	Travaux de gros-oeuvre dans la halle	09:00 29.01.2024	17:00 13.05.2024	(141)
19	Construction du quai du S-Bahn	09:00 13.05.2024	17:00 01.10.2024	(1055)
30	Construction de la rampe cyclable	09:00 30.09.2024	17:00 03.12.2024	(1907)
38	Construction des espaces intérieurs	09:00 02.12.2024	17:00 20.02.2025	(358)
43	Finitions et aménagements extérieurs	09:00 17.02.2025	17:00 18.03.2025	(145)

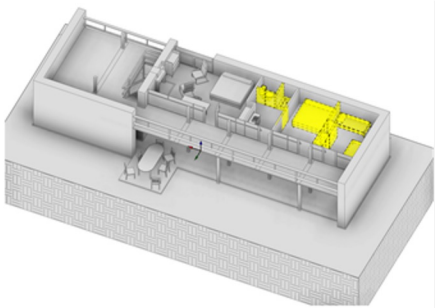
Maquette et cycle de vie



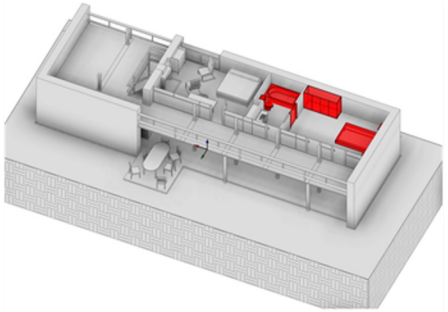
Maquette et état de phases



Projet avec seulement l'existant

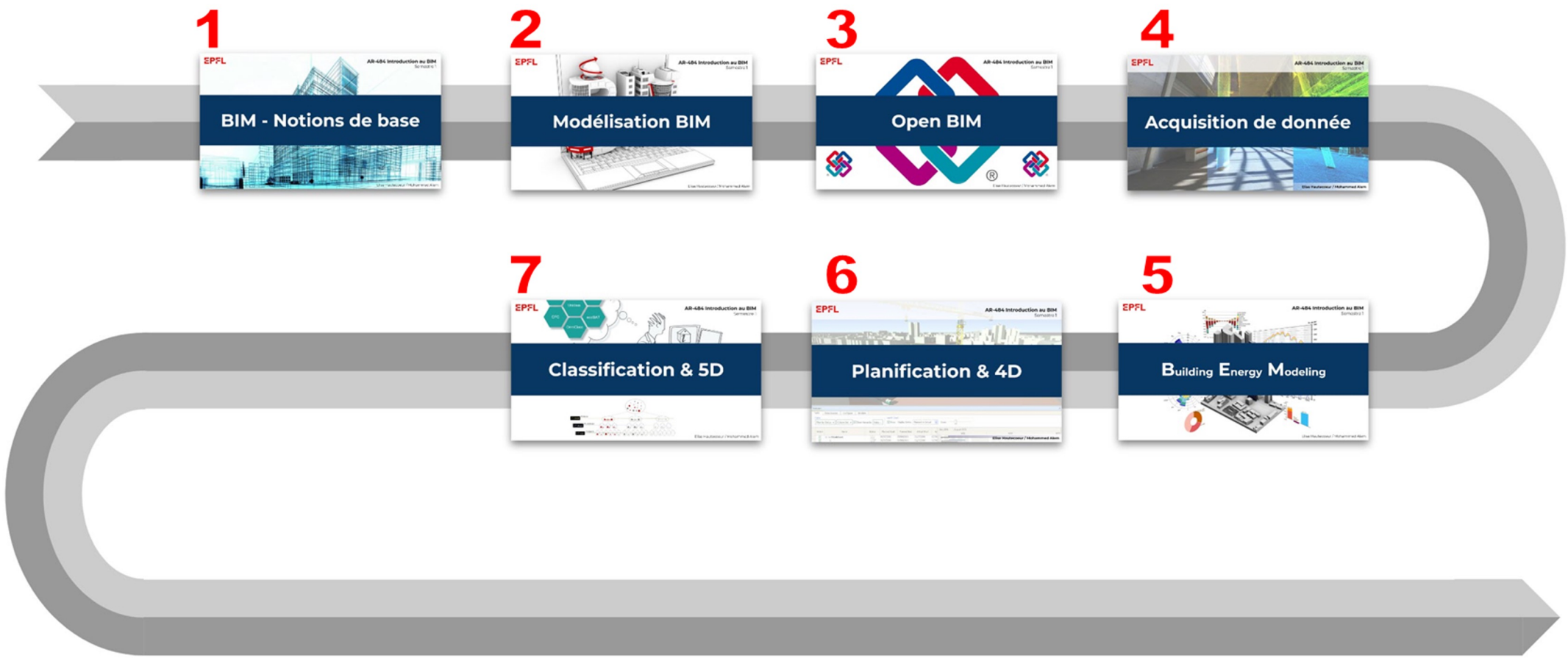


Projet de l'existant avec les éléments en démolition



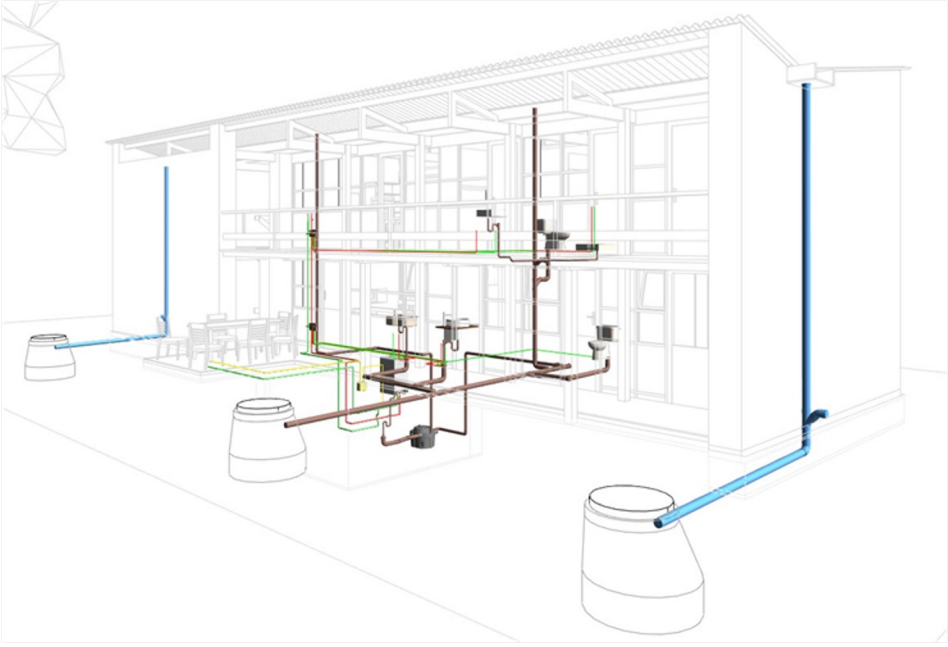
Projet projeté

AR 484 Cours d'introduction au BIM



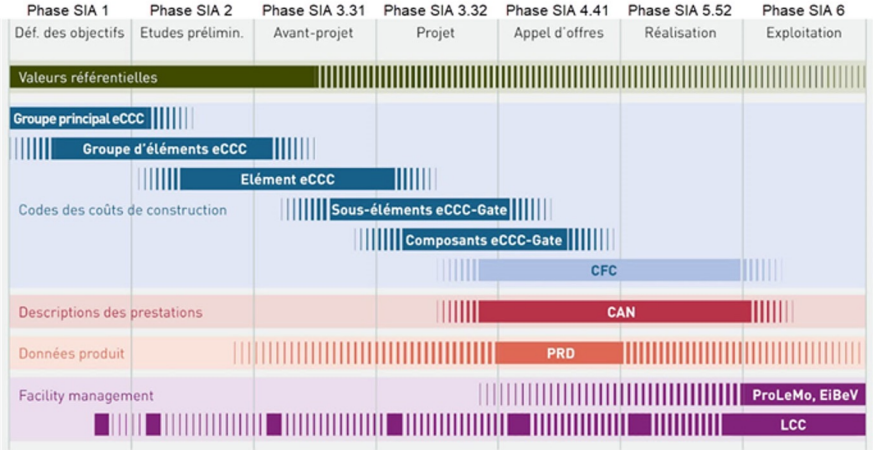
7. CLASSIFICATION ET 5D

Calcul des coûts et classification



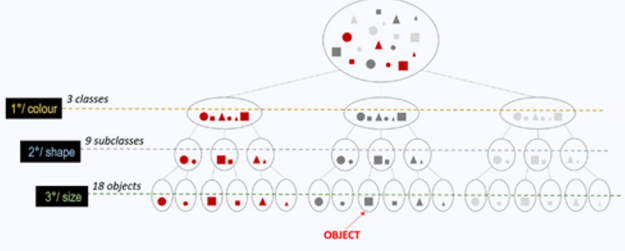
ecccBAT Canalisations sanitaires					
ecccBAT	Type	DN	Longueur (m)	Prix CHF/m	Total CHF
D_8.4 Conduites d'alimentation	PE-HD	30 mm	5.63	5.45	30.67
D_8.4 Conduites d'alimentation	Mepla	16 mm	71.70	0.08	5.74
D_8.4 Conduites d'alimentation	Mapress	16 mm	8.84	2.25	19.89
D_8.4 Conduites d'alimentation	Mapress	18 mm	9.22	2.75	25.37
D_8.4 Conduites d'alimentation	Mapress	20 mm	0.05	3.55	0.19
D_8.5 Conduites d'évacuation	PE	32 mm	0.94	5.00	4.68
D_8.5 Conduites d'évacuation	PE	40 mm	4.78	5.05	24.16
D_8.5 Conduites d'évacuation	PE	75 mm	16.50	7.60	125.37
D_8.5 Conduites d'évacuation	PE	100 mm	18.38	15.30	281.23
D_8.5 Conduites d'évacuation	PE	110 mm	16.16	15.30	247.26
D_8.6 Installations de distribution de gaz	PE-HD	25 mm	5.07	4.25	21.57
D_8.6 Installations de distribution de gaz	Mapress	18 mm	2.06	2.75	5.67
			159.34		791.81

Les différentes classifications Suisse



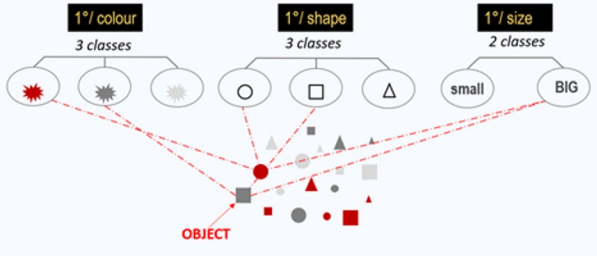
Définition d'une classification

Enumerative



1 classe subdiviser en plusieurs niveaux

A facettes



Combinaisons de classes (avec subdivisions possibles)

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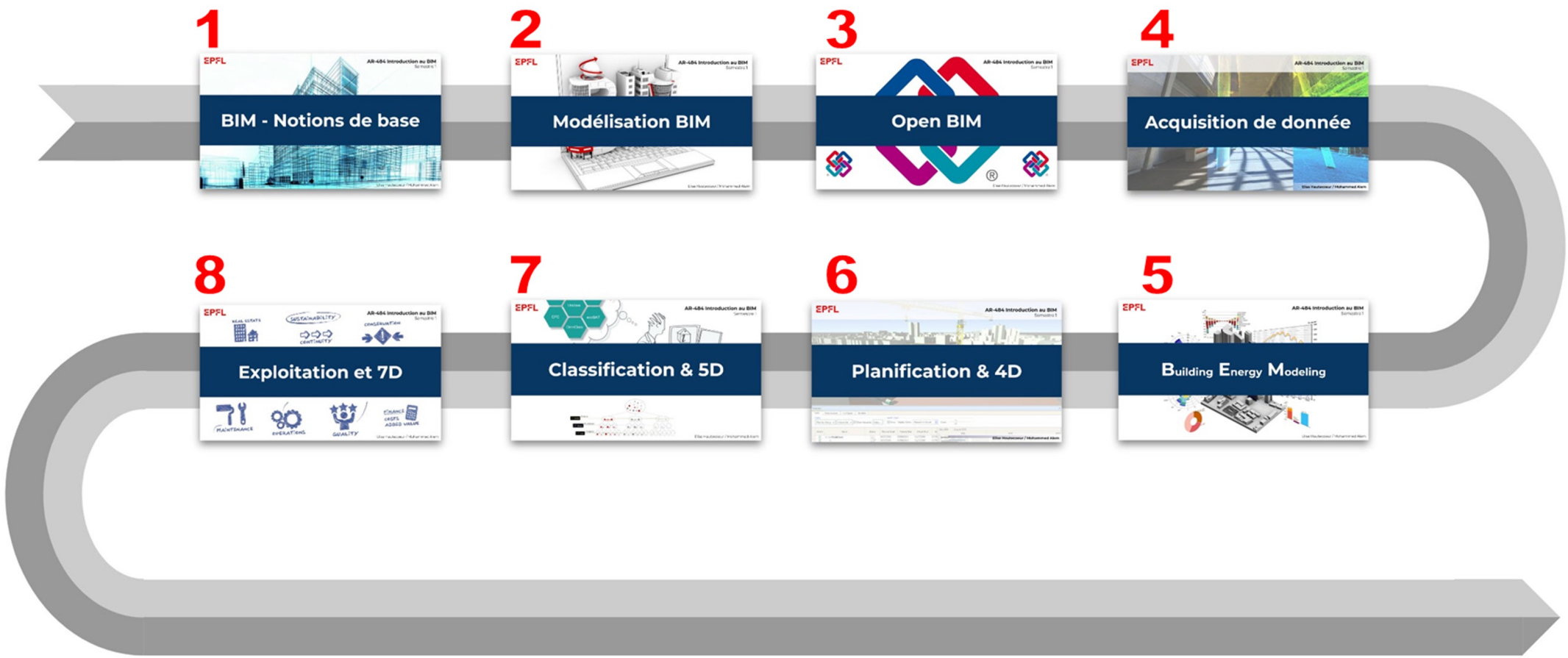
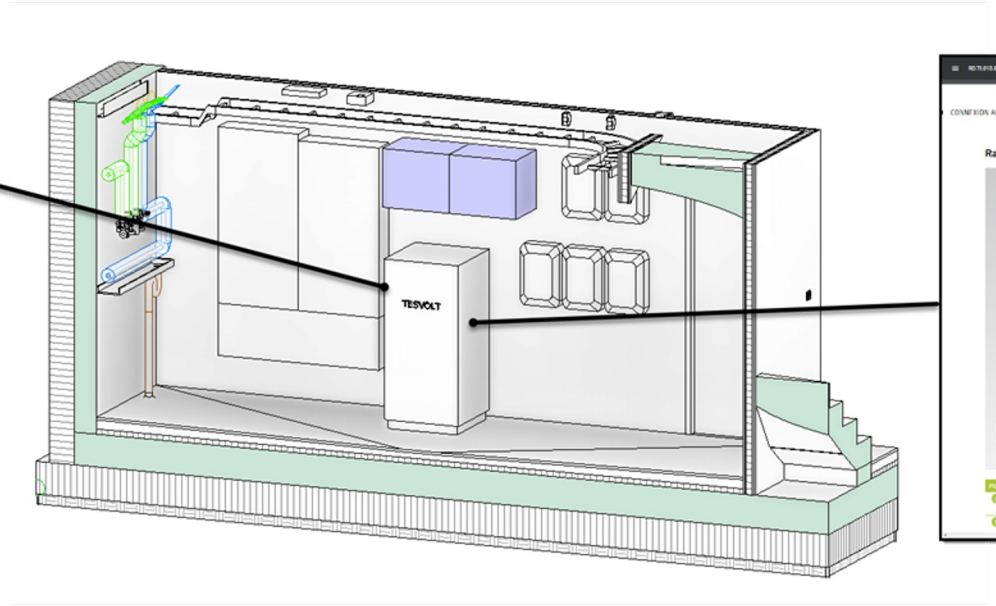


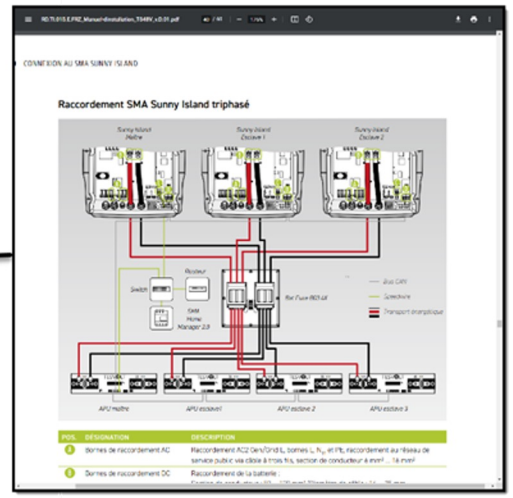
8. EXPLOITATION ET 7D

Gestion des installations et maintenance

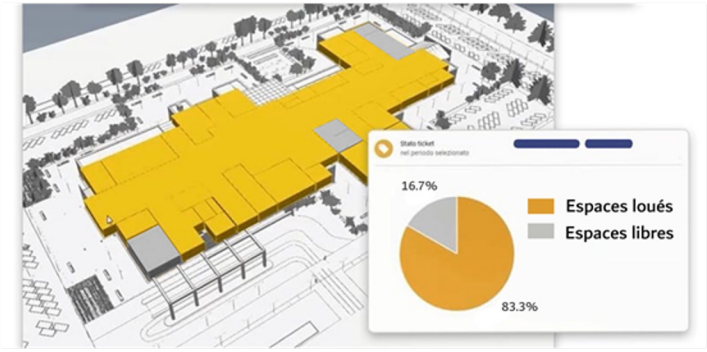
Tesvolt TS48

Action	Remarques	Date
Installation	-	24.03.2021
1er Maintenance	RAS	22.03.2022
2e Maintenance	A planifier	22.03.2023

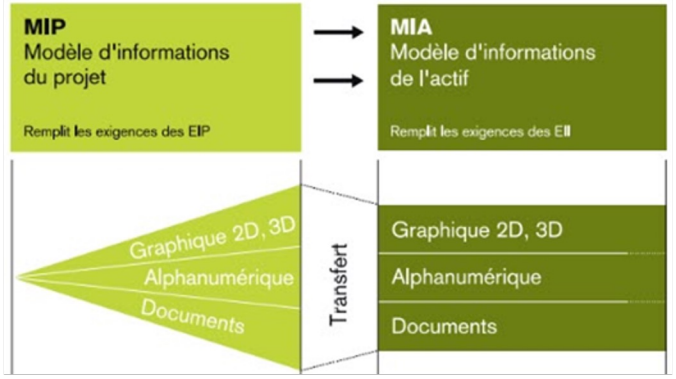




Gestion immobilière



Maquette de transfert



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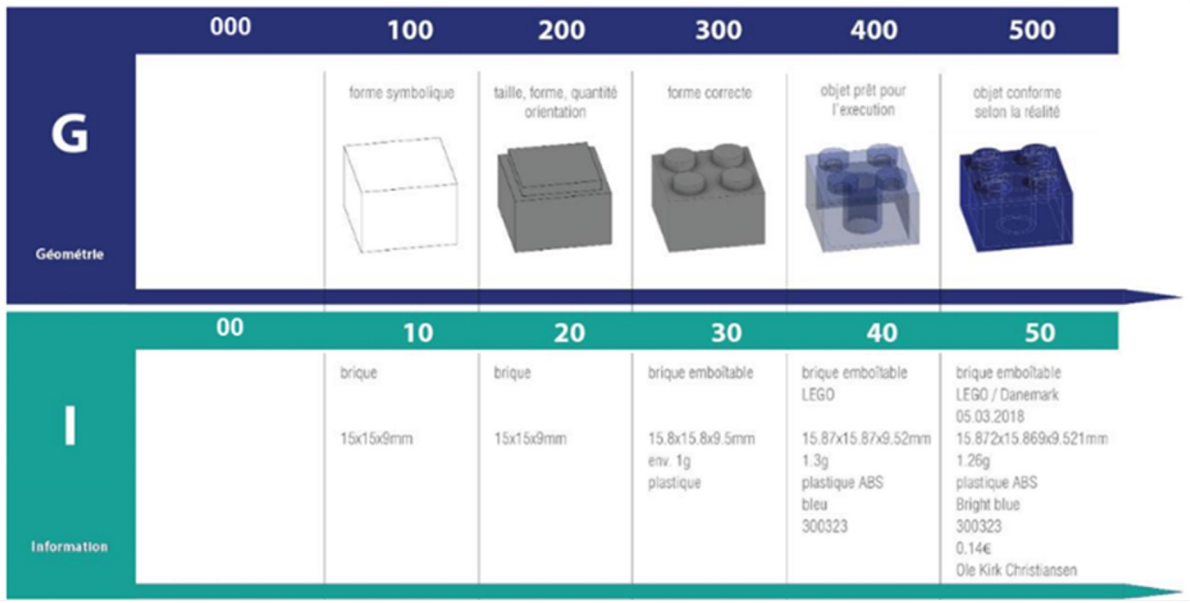
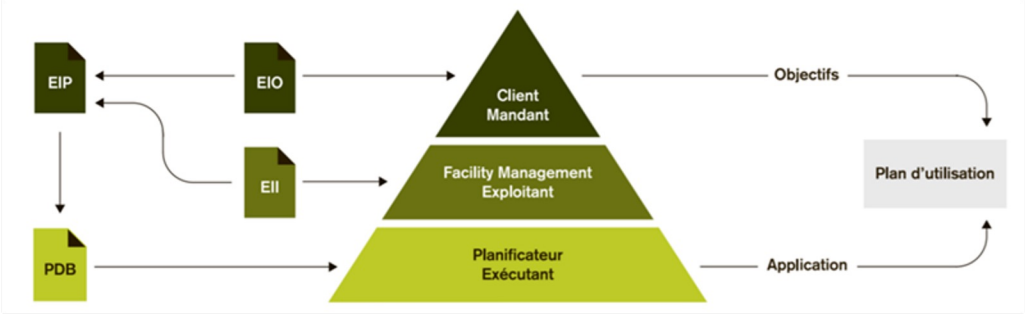
9. DÉPLOIEMENT BIM

Niveaux d'informations



Common Data Environment

Cycles des exigences d'information



EIP: Exigences d'informations projet

EIO: Exigences d'informations organisationnelles

EII: Exigences d'informations d'immeubles

PDB: Plan de développement BIM

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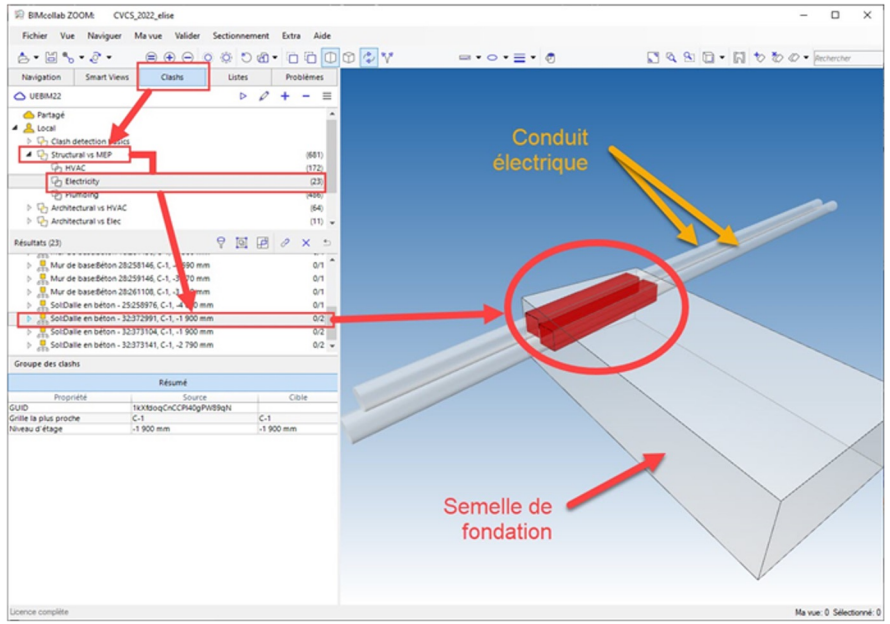
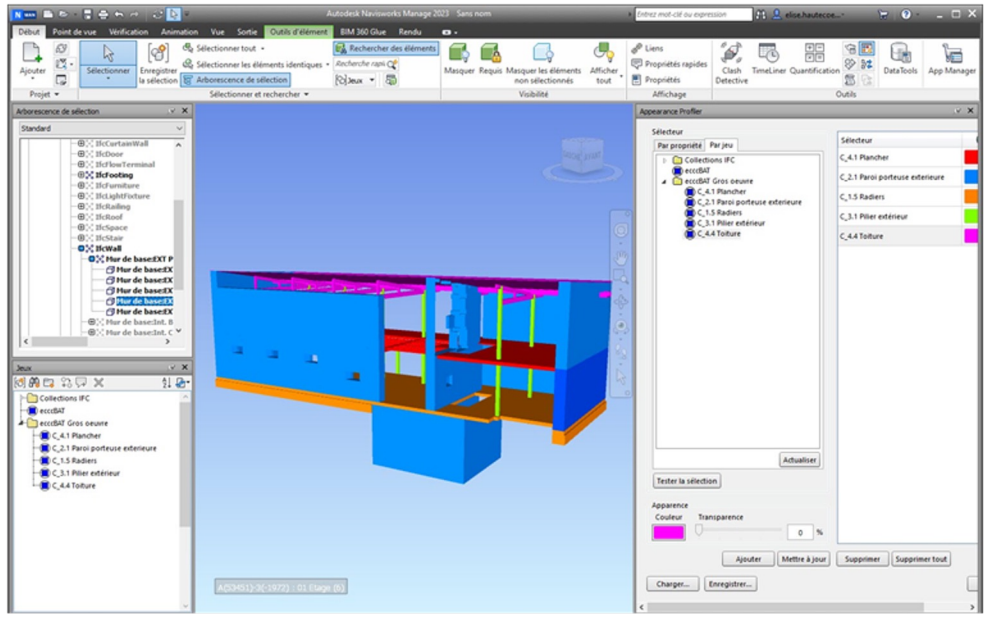
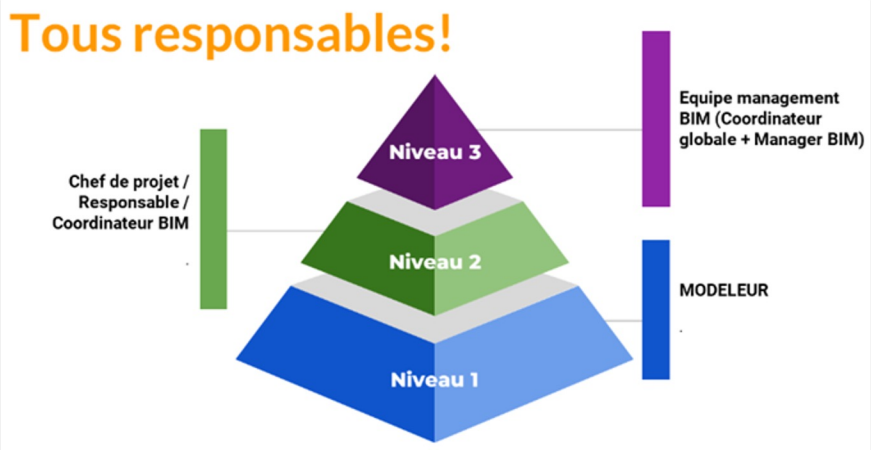
10. COORDINATION BIM

Détection de conflits et Contrôle de la données





Degrés de coordination



Bim Collaboration Format

Capture	N°	Titre	Modifié	Assigné à	Zone	Phase
	1	Material name parameter undefined	02-07-2021	Irwin Renfroe	BIM Model protocol	Undecided
	2	Structural elements - Wall - Beam, +10.500 mm	02-07-2021	Betty Gizzy	Main building	03. Construction phase
	3	Position of socket	02-07-2021	Irwin Renfroe	Main building	02. Engineering Phase
	4	Position of column	02-07-2021	Anne Johnson	Terrain	01. Design phase
	5	No ventilation in the auditorium	02-07-2021	Blake Green	Interior general	01. Design phase
	6	Active Ducts designed in elevator shaft	02-07-2021	Jane Holloway		02. Engineering Phase

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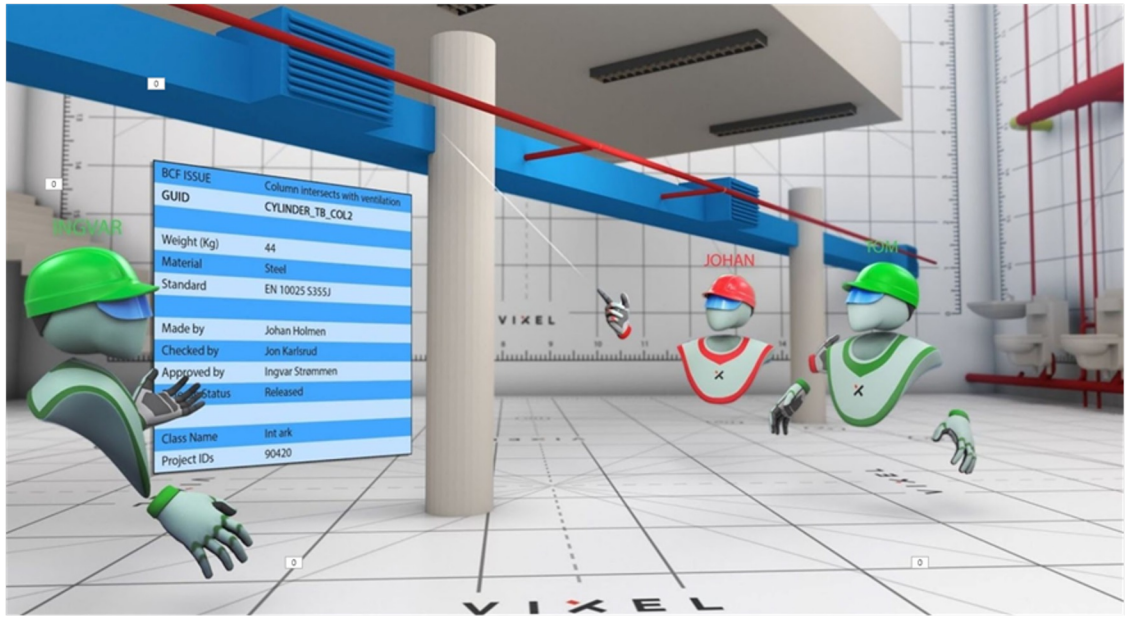
11. RÉALITÉ VIRTUELLE ET RÉALITÉ AUGMENTÉE

Réalité virtuelle collaborative



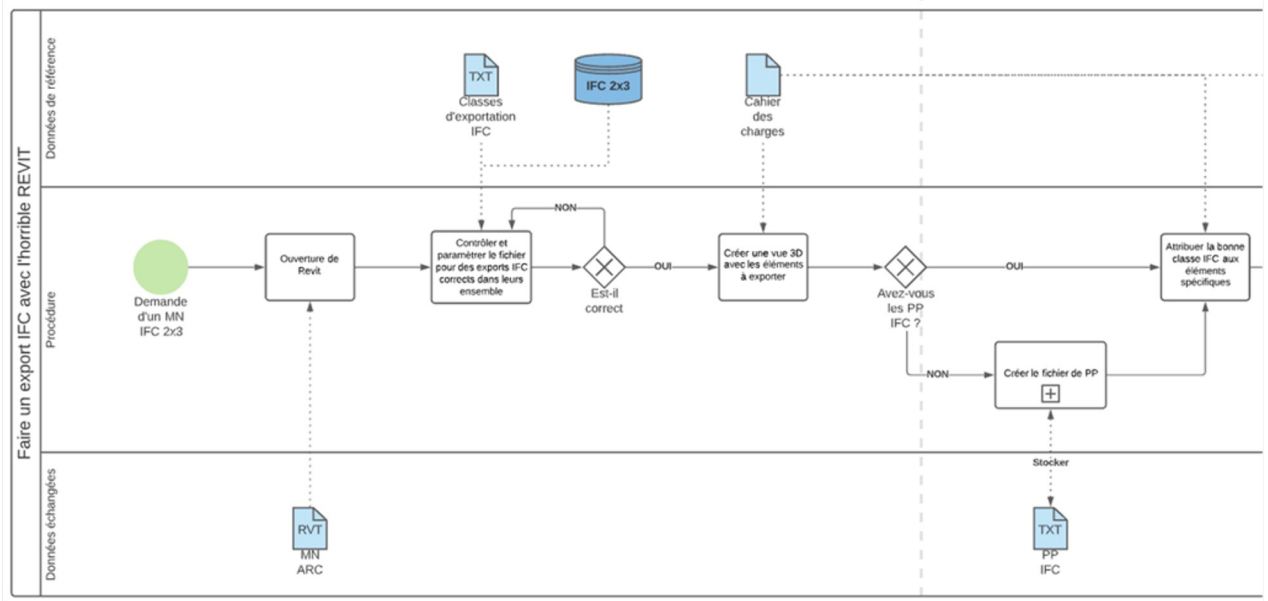
Réalité augmentée et maintenance

Technologie VR

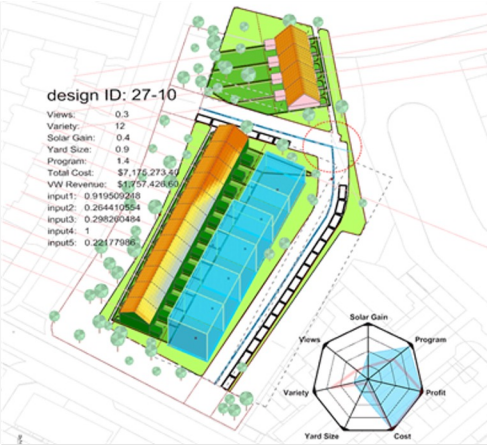
AR 484 Cours d'introduction au BIM

12. PROCESSUS ET R&D

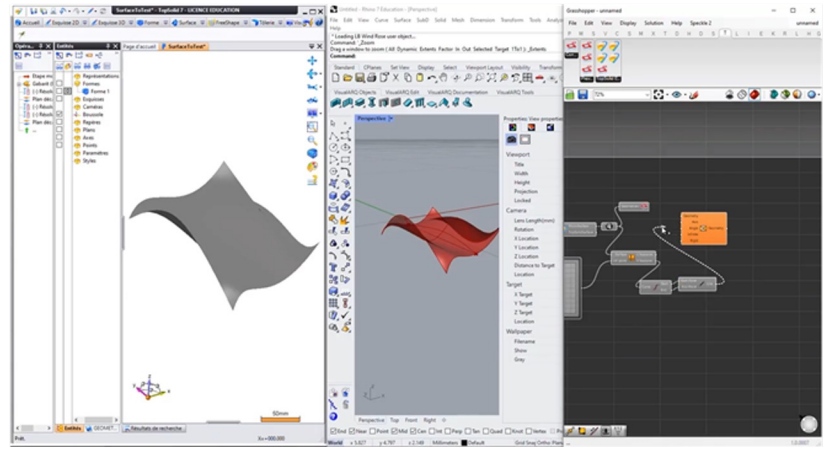
Exemple de modélisation de processus



Generative Design



Interopérabilité



Open Source

IFCopenshell.org

IFC.js - Three.js

BlenderBIM

Rhino.Inside.Revit

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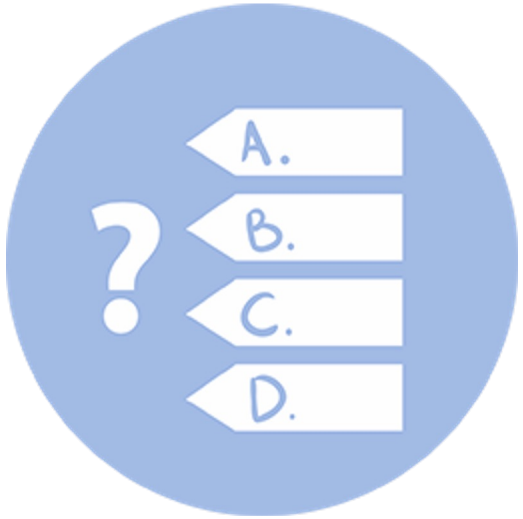
Evaluation par contrôle continu avec Quiz

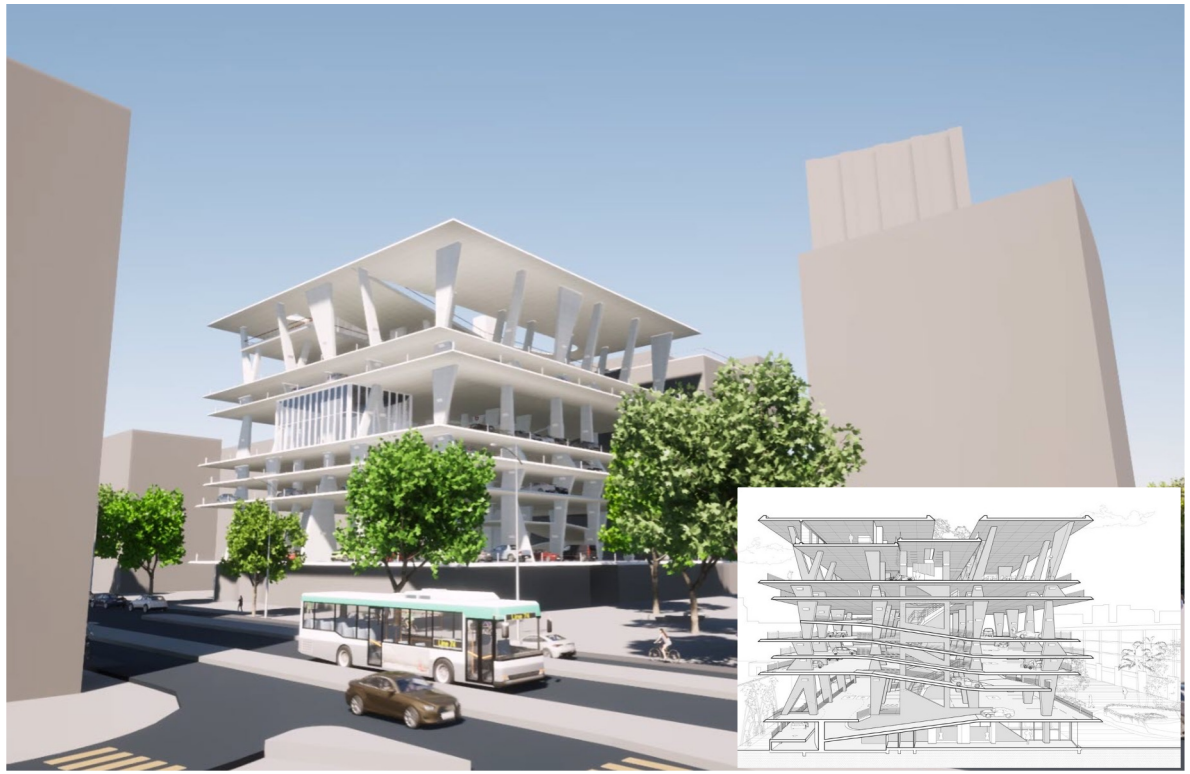
12 Modules



12 Quiz de
6 questions

AR 435 Unité d’enseignement BIM

Réhabilitation partielle d’un parking en logements



1111 Lincoln Road **Herzog et De Meuron**

Usages BIM imposés

- **Conception architecturale**
- **Conception structurelle**
- **Simulation structurelle**
- **Impact environnemental**
- **Simulation éclairage naturel**
- **Simulation thermique**
- **Calcul des coûts**
- **Revue de projet & Coordination 3D**
- **Médiatisation du projet**

OS
videoplayback_3
Elise Hautecoeur

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CONTEXTE

02:25
vimeo