

BIM as data

A few strict requirements that establish
IFC as a basis for third-party workflows

About me and Skiplum

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BIM coordinator and developer at
Skiplum AS



Educated at NTNU, Trondheim

BSc in Civil and Environmental
Engineering, Department of Civil and
Environmental Engineering

Based in Buenos Aires, Argentina

BIM consultant operating in Oslo and the surrounding area.

BIM management

Maps the needs of the project,
writes the BIM execution plan
(BEP) and often runs the
project CDE.

BIM coordination

Model checking, data analysis,
1:1 support and onboarding,
IFC in particular. Issue
handling with BCF.

Reality capture

Scanning and preparation for
scan-to-BIM in early phases,
including delivery of scan2bim
models.

Tools and apps

Building our own tools and
solutions, for ourselves and
our clients. Some are public.

Projects also in Trondheim, Innlandet and other parts of the country.

skiplum.com · new website under development, replacing skiplum.no

Know who is going to use BIM for what

BIM is the basis for the whole project:

Design and tendering

Procurement and
production

HSE

O&M and analysis

Exchange with third
parties

For each user: which information, at what
quality, and when?

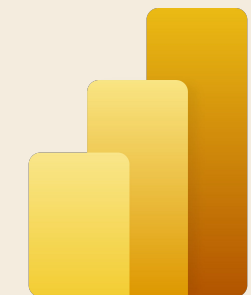
BIM2Share

reduzer

FDV_{web}
by CuroTech



Propely



Geometry without information is risk

Without information

Risk you cannot control

“Hard to say ...”

“I will have to find that out, but it will probably take a few days.”

“We can add it, but it costs this late in the project.”

“I do not trust the model, so I used something else.”

With information

Errors can be identified, verified and documented

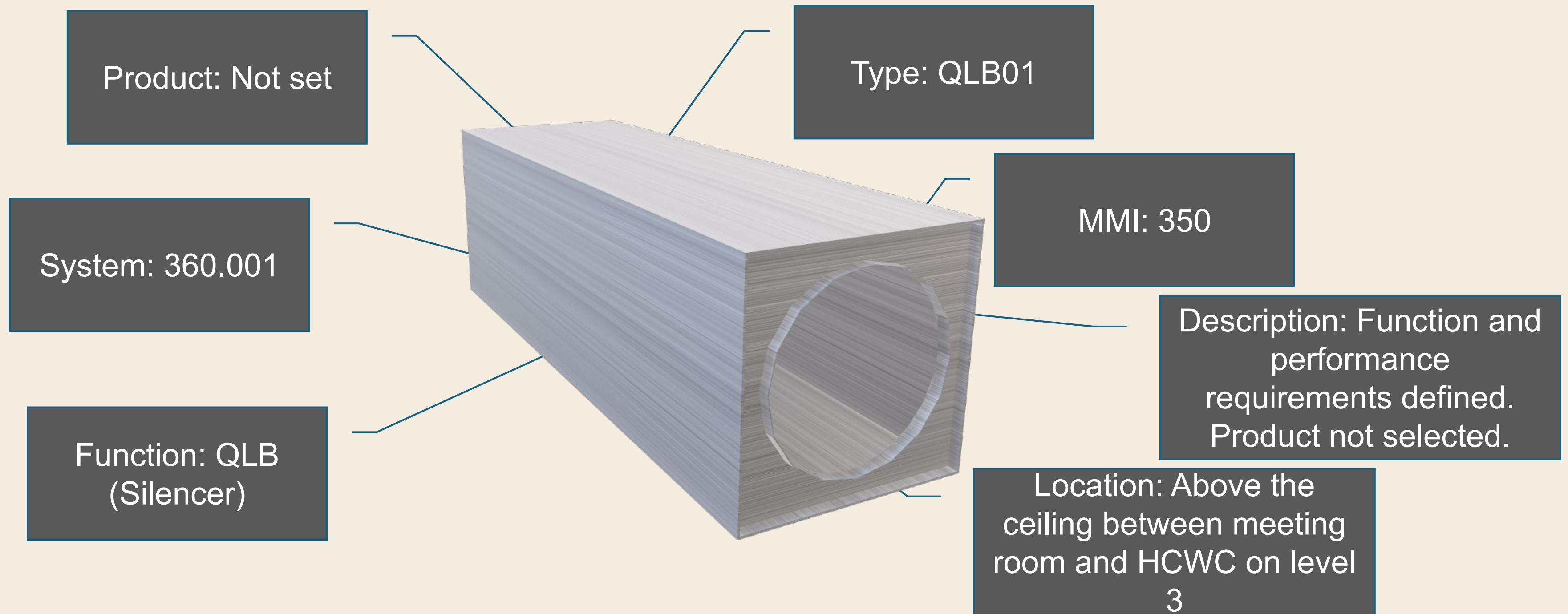
“This wall is registered on level 4, but it sits on level 7.”

“This column is marked non-load-bearing. That cannot be right?”

“The floor is listed as carpet, but we settled on tiles in the last meeting.”

“How many doors do I need to buy for construction phase 1?”

Context is information put into a system



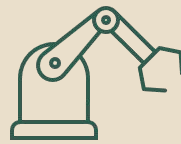
Quality-assured BIM makes the building worth more

A building with quality-assured BIM, ready for third-party integration, is worth more than one without.



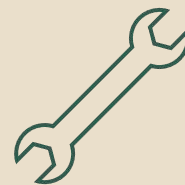
Refurbishment

You know what is there



Automation

Machine-readable data



O&M

Ready for operation from day one



LCA

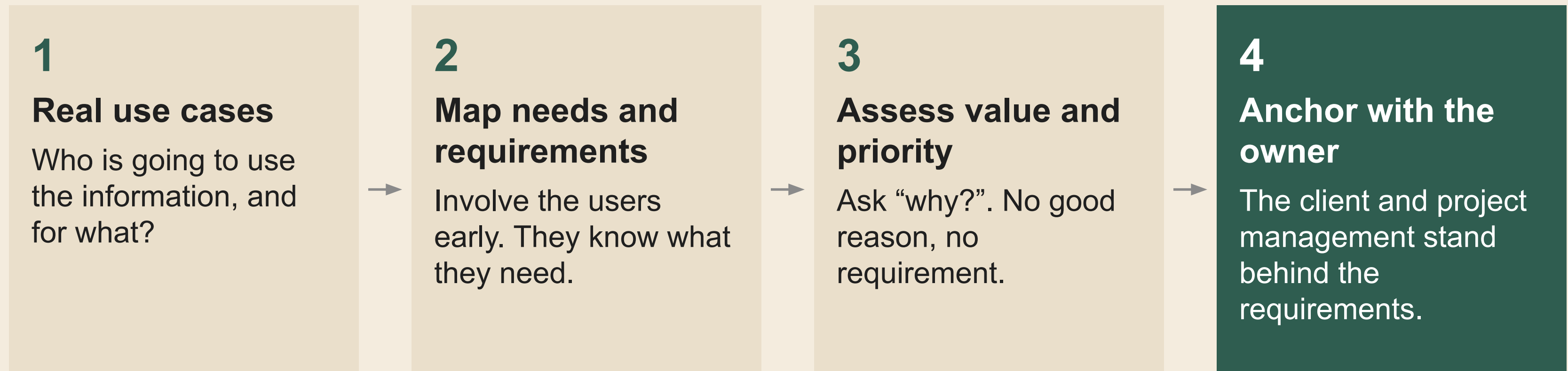
Greenhouse gas from quantities



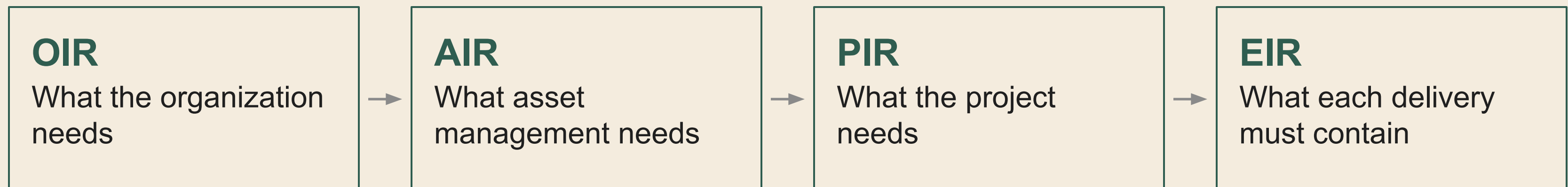
AI

Structured data to learn from, and for AI to operate with.

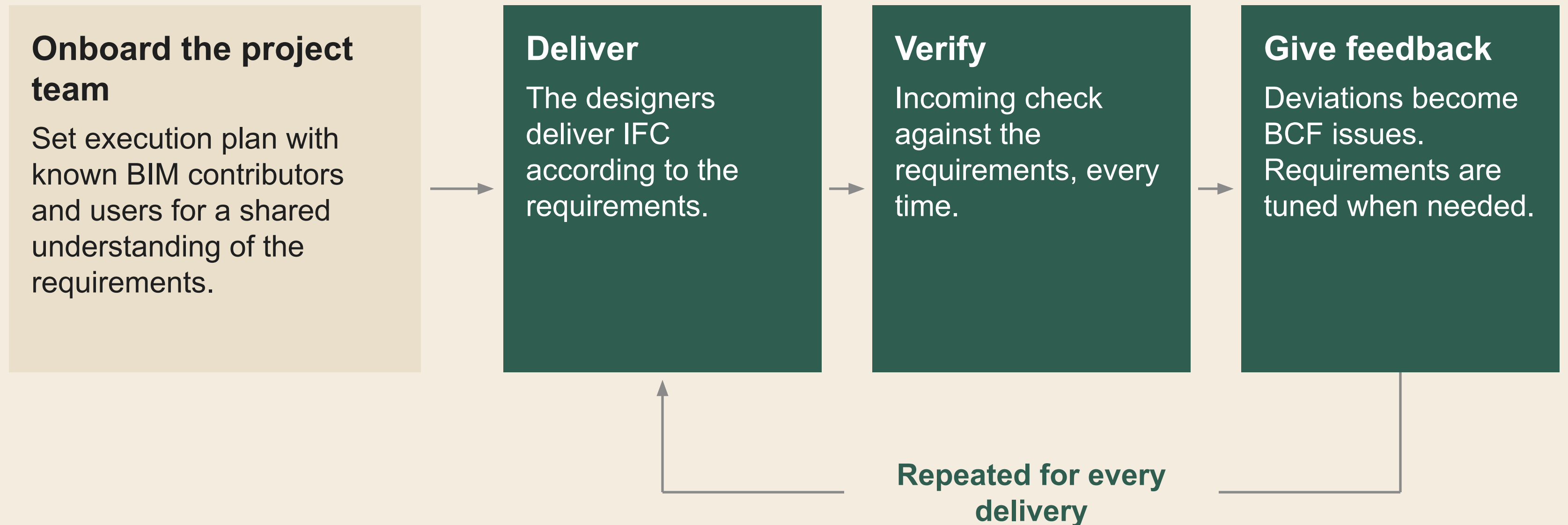
Requirements start from real use cases



The same logic as the information requirements in ISO 19650:



Anchored requirements give backing in the follow-up



The requirements are anchored, so the team has backing to spend time meeting them. Every iteration makes the next delivery and the next project better.

No need to reinvent the wheel

01

Type ID

What the object is

02

System assignment

Which system a type belongs to

03

Function

What the type is meant to do

04

Material/Product

What the type is made of

05

Process Status

MMI to express maturity - we also use this for phasing.

06

Ownership

Who is responsible

07

Quantities

How much there is

90%

of the use cases are covered by these requirements

We also have to eat our veggies... the model structure has to be right too

01

Hierarchy

Project › Site › Building › Storey › Insertion point

02

Zone or room

Where in the building the object sits

03

Georeferencing

The model sits in the right place in the world

04

Correct IfcEntity

IfcWall, IfcBeam and so on. Quantity take-off depends on whether IFC sees it as a wall, floor, slab or handrail.

Type properties

Apply to every occurrence of a type

Type ID

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Every object in BIM must have a type

The occurrences inherit the same properties as the type.

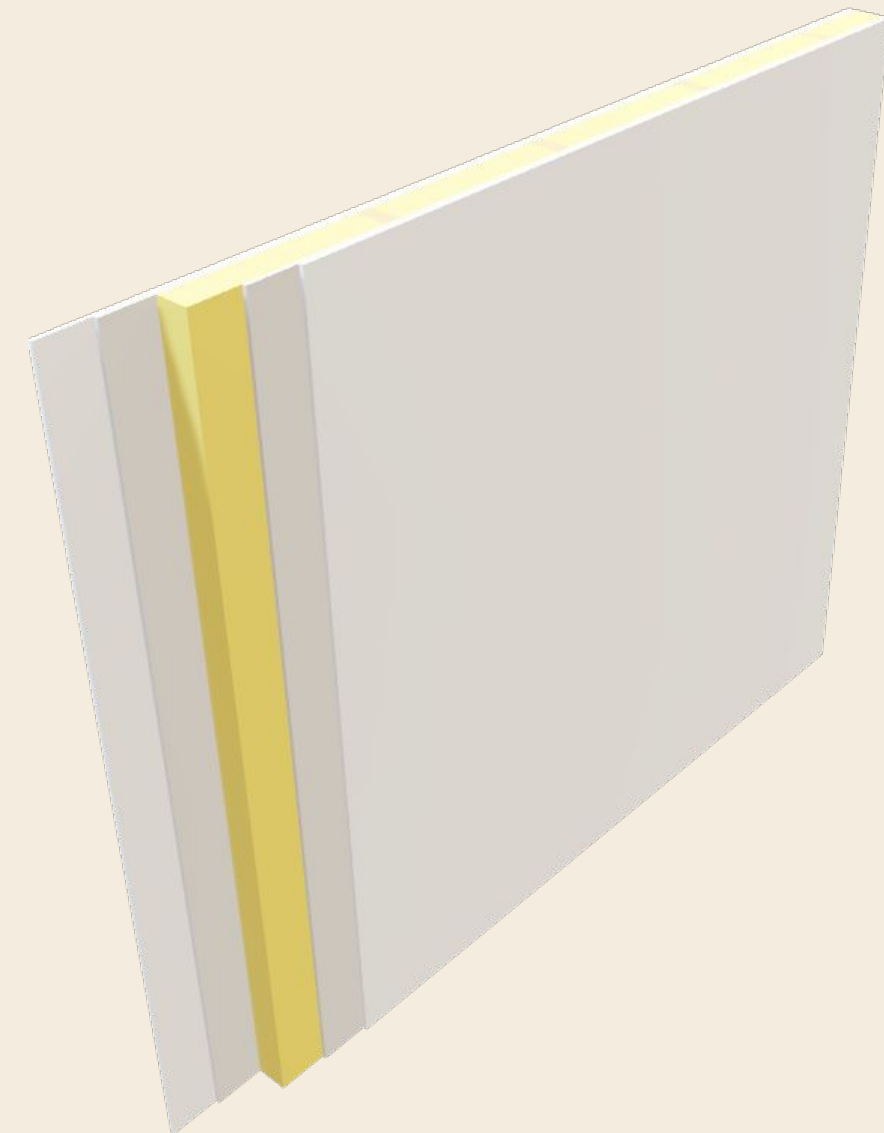
IV-ST-01

Properties that are the same for every occurrence:

System code 242

Function AVD

Material 4 × 12.5 mm gypsum board, 100 mm steel studs/mineral wool



The occurrences inherit the type and carry their own values

Every occurrence has its own ID, MMI and quantity.

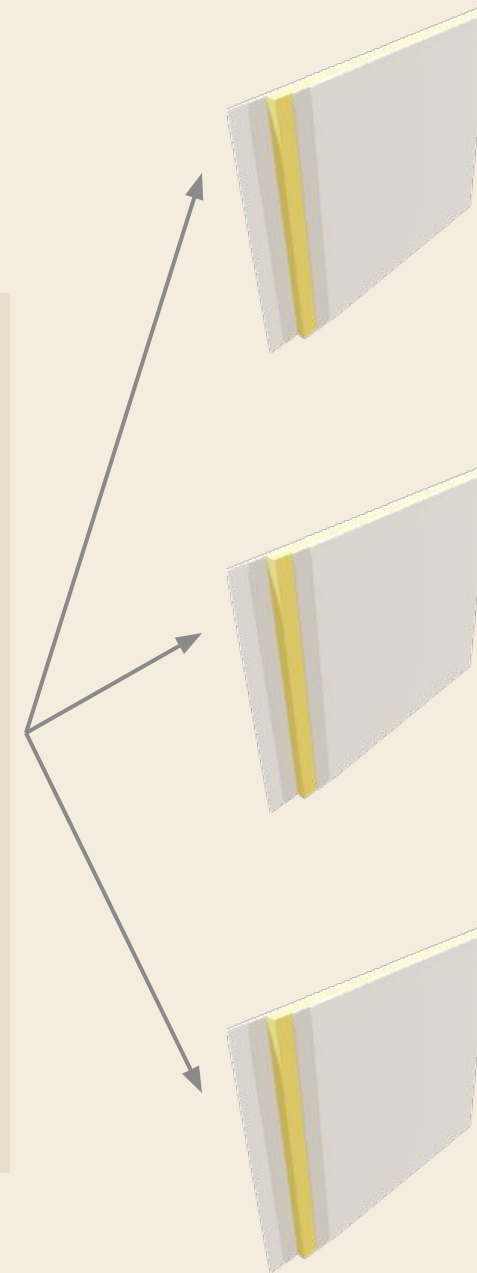
IV-ST-01

Properties that are the same for every occurrence:

System code 242

Function AVD

Material 4 × 12.5 mm gypsum board, 100 mm steel studs/mineral wool



IV-ST-01-01

MMI 100 · Copy object: No
Quantity 10 m²

IV-ST-01-02

MMI 200 · Copy object: Yes
Quantity 8 m²

IV-ST-01-03

MMI 350 · Copy object: No
Quantity 23 m²

System assignment

01

Type ID

What the object is

02

System assignment

Which system a type belongs to

03

Function

What the type is meant to do

04

Material/Product

What the type is made of

05

Process Status

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Who is responsible

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Quantities

How much there is

90%

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Every type has one system assignment

The system code comes from the NS 3451 table of building elements. It gives the type context:

01

Unambiguous
system assignment

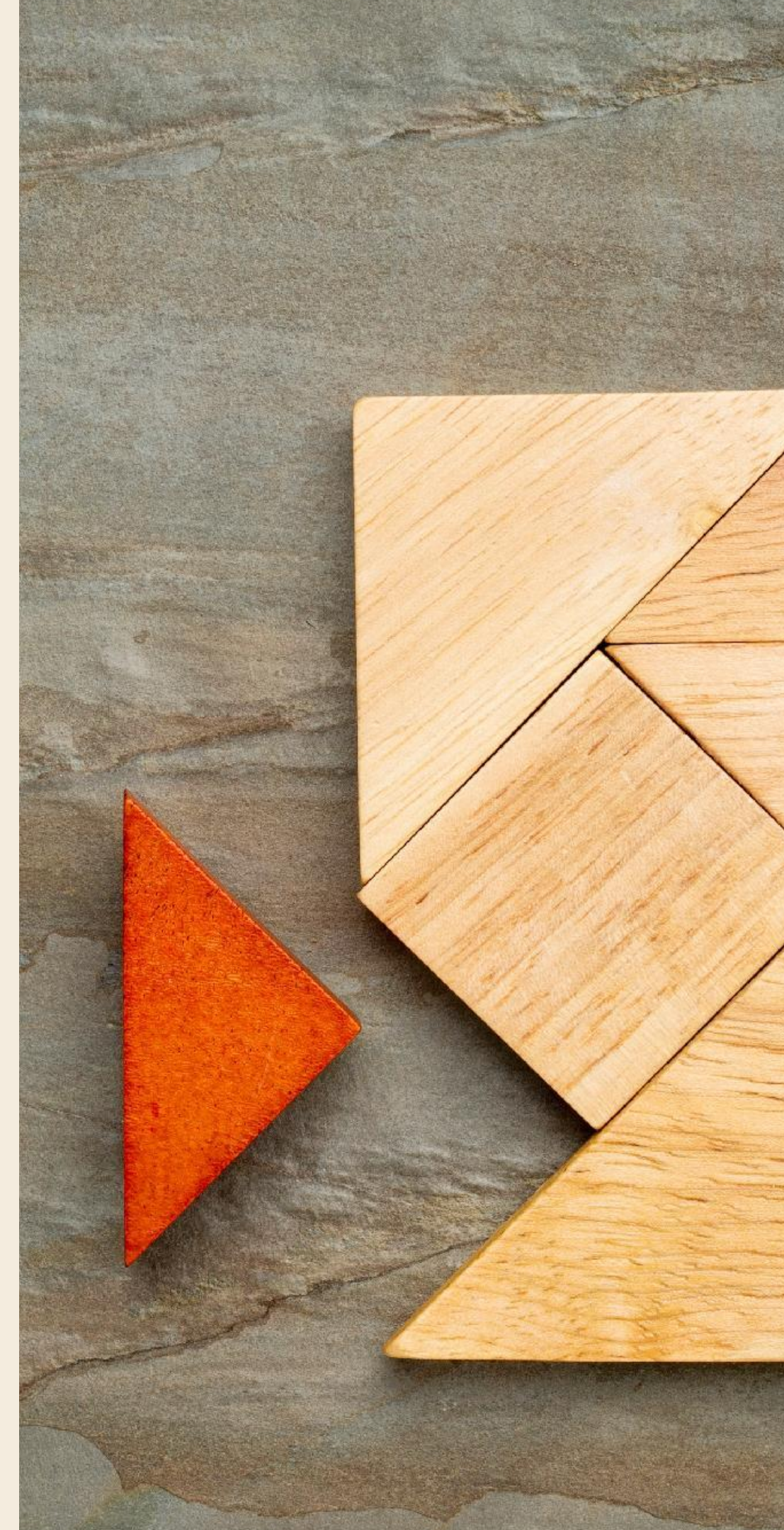
02

Grouping
and filtering

03

Integration
with third parties

Reduzer needs the code to run its analysis.



Function

01

Type ID

What the object is

02

System assignment

Which system a type
belongs to

03

Function

What the type is
meant to do

04

Material/Product

What the type is
made of

05

Process Status

MMI to express
maturity - we also
use this for phasing.

06

Ownership

Who is responsible

07

Quantities

How much there is

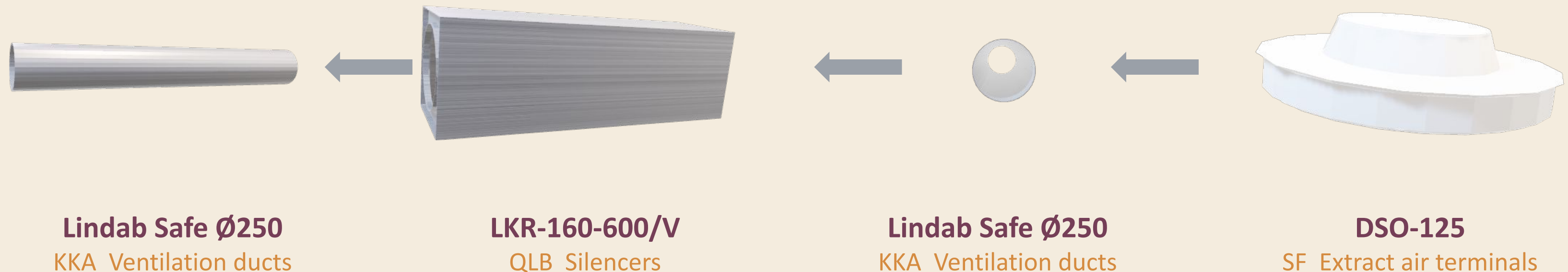
90%

of the use cases are
covered by these
requirements

A type has a function

The component code from NS 3457-8 gives the type a specific job in the system.

System 360.02 Extract air



Material/Product and Quantities

01

Type ID

What the object is

02

System assignment

Which system a type belongs to

03

Function

What the type is meant to do

04

Material/Product

What the type is made of

05

Process Status

MMI to express maturity - we also use this for phasing.

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Quantities

How much there is

90%

of the use cases are covered by these requirements

The model gives quantities for the wall type, not for the materials

From the model we only get quantities for the whole wall type:

IV-ST-01

Field	Value
Type ID	
Volume	444 m ³
Area	2,964 m ²
Length	927 m
Count	305



Gypsum boards

?



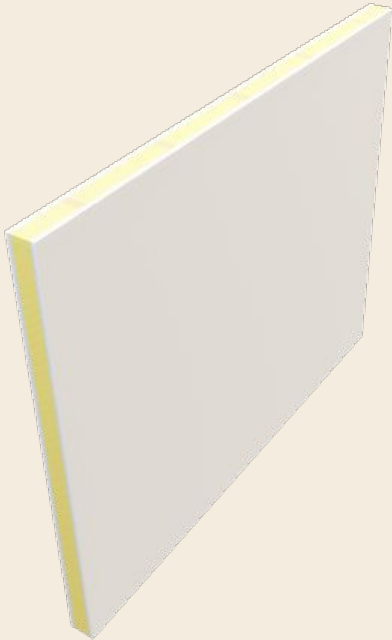
Steel studs

?



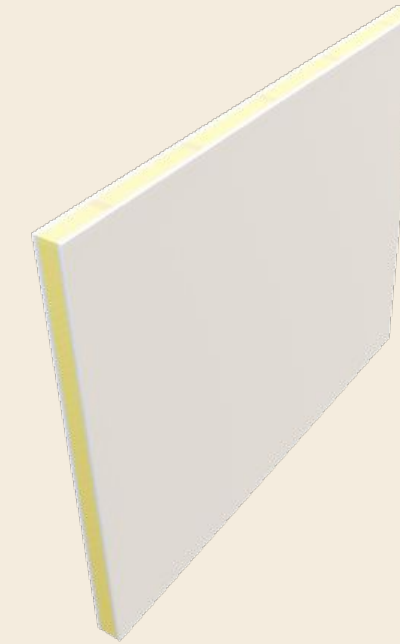
Mineral wool

?



The layer build-up gives the quantity for each material

A coefficient per material and unit of the type turns the wall quantity into material quantities.



IV-ST-01

2 × 12.5 mm gypsum board

100 mm steel studs / mineral wool

2 × 12.5 mm gypsum board



Gypsum boards
4 × 12.5 mm



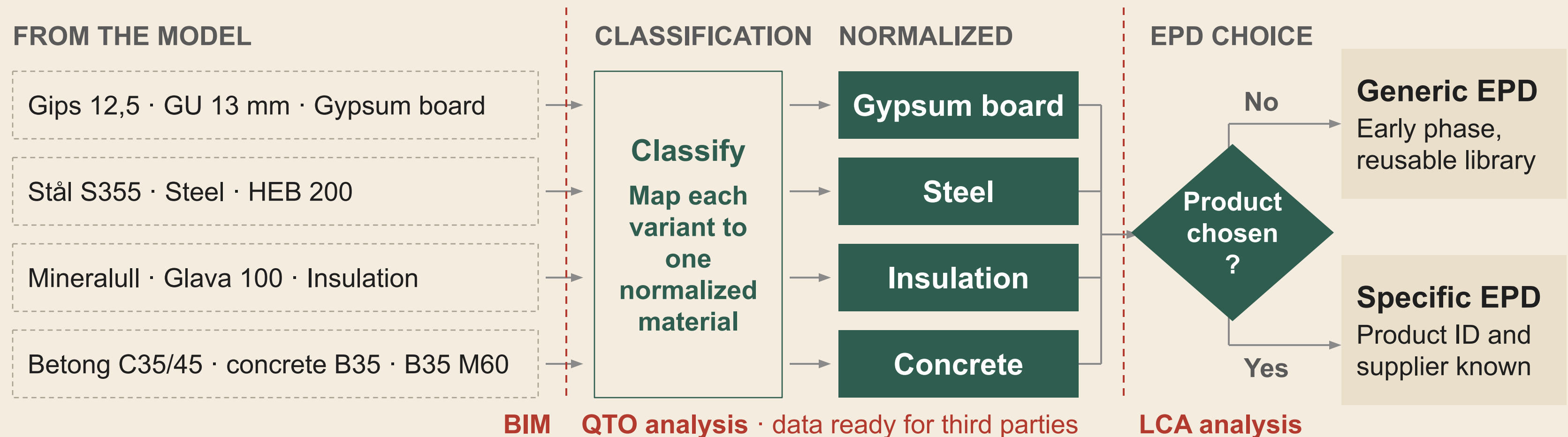
Steel studs
100 mm



Mineral wool
100 mm

Normalization makes a system out of chaos

The same material can turn up in 17 spellings and variants. In early phases we normalize against generic materials and EPD/benchmarks.



Material and EPD banks are where the mapping and the needs come in. The LCA consultant builds them up with generic data in early phases, and with specific products once these are chosen. The data can be fed into BIM and give weight to the quantity take-off.

Massing types are estimated from materials, count types are counted as products

Something you build is estimated from its materials. Something you unbox and install is counted and linked to a product.

Massing types · estimate and build	Count types · unbox and install
EXAMPLES Flooring, boarding, insulation, studs, membranes	EXAMPLES Toilets, smoke alarms, air terminals
QUANTITY FROM Geometry and layer build-up: m², m³, thickness	QUANTITY FROM Number of instances
MATERIAL DATA FROM Each material, linked to a generic or specific EPD	MATERIAL DATA FROM A product or generic benchmark that declares the object's bill of materials

Override: when the weight of a massing instance is already known as data, it replaces the estimate.

The tricky part

01

Analysis

What do we actually have in the model?

02

Mapping

Connecting types to materials and quantities

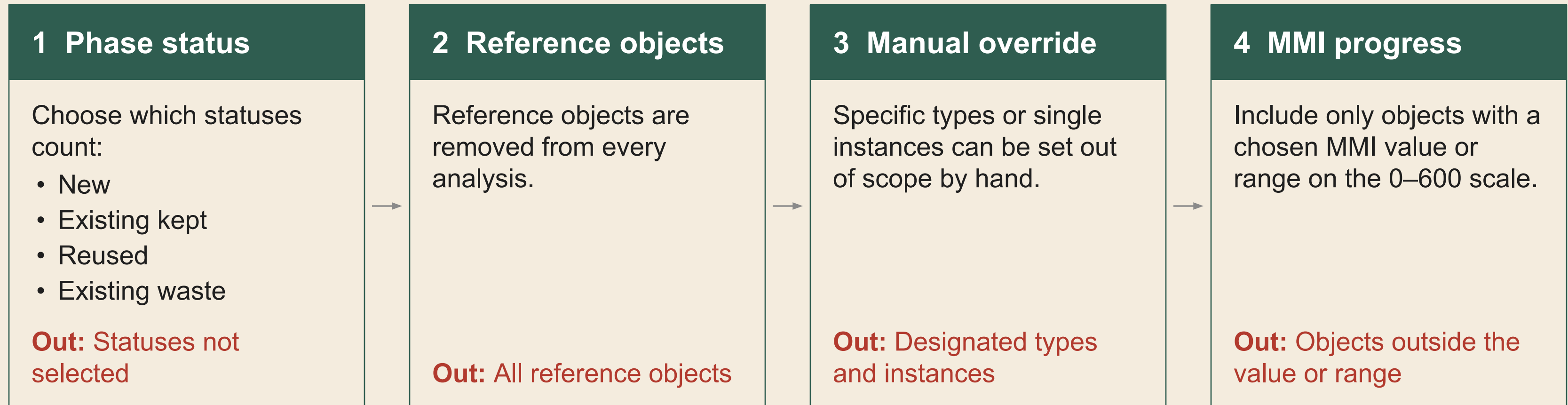
03

Long coffee breaks

When the model is complete chaos and nobody answers email..

Scope filters decide which objects are counted

Four filters run on the model before classification. An object must pass all four to be counted.



Only objects that pass all four filters go on to classification, normalization and EPD choice.

WallStandardCase - ARK - 5 underlaglag ✓ Sammensatt objekt - ok
Volum 444 m³ · Areal 2 964 m² · Lengde 927 m · Antal 305

	Verdi	Meq
Type / navn	IV-ST-01	-
Diskret / sammensatt	Sammensatt (%)	Sammensatt (Herc) ▾
Komponenterhet	modell: m ²	m ² ▾
NS 3451	-	2 bygning ▾ 2/ Innervegger ▾ 212 Ikke bærende innervegger ▾
Normalisert	-	✓ Sammensatt objekt - ok
Ignorer (QTO)	-	☐
Telleobjekt	-	☐ tell sum stik (ingen m ²)
Flagg	-	☐ flagg for gjennomgang
Kommentar	-	Gips + stålender + mineralull b... kommentar...

Type

Lead unit for the
total quantity

System code

Menge i QTO — rå 444 m³ · lead 2 964 m²

Materiale	Norm.	Koeff.	Mengde	Volum
24x_INNERVEGGER_Byggeplater_Gipsplate Habit Skrufast 13 mm	Gipsplate	0,025 m ² /m ²	74,1 m ²	74,1 m ³
24x_INNERVEGGER_Byggeplater_Gipsplate_12,5 mm (Standard) - G55 - Gjenbruk	Gipsplate	0,025 m ² /m ²	74,1 m ²	74,1 m ³
Mineralull	Mineralull	0,07 m ² /m ²	207 m ²	207 m ³
Stål	Stål	2,5 kg/m ²	7 409 kg	0,944 m ³

Σ mappt 357 m² av rå 444 m² (80%) resten hulrom/udtaltjert (normalt)Materiellsammensetning · 3 materiallag — like slått sammen · per m² · 1 = splitt materiale!

2x 24x_INNERVEGGER_Byggeplater_Gipsplate Habit Skrufast 13 mm 12,5 mm 7 typer

2x 24x_INNERVEGGER_Byggeplater_Gipsplate_12,5 mm (Standard) - G55 - Gjenbruk 12,5 mm 6 typer

24x_INNERVEGGER_Stenderprofiler_Stål_100 mm Stålstender med min. 100 mm mineralull 100 mm 3 typer splittet

Mineralull

Stål

legg til undermateriale

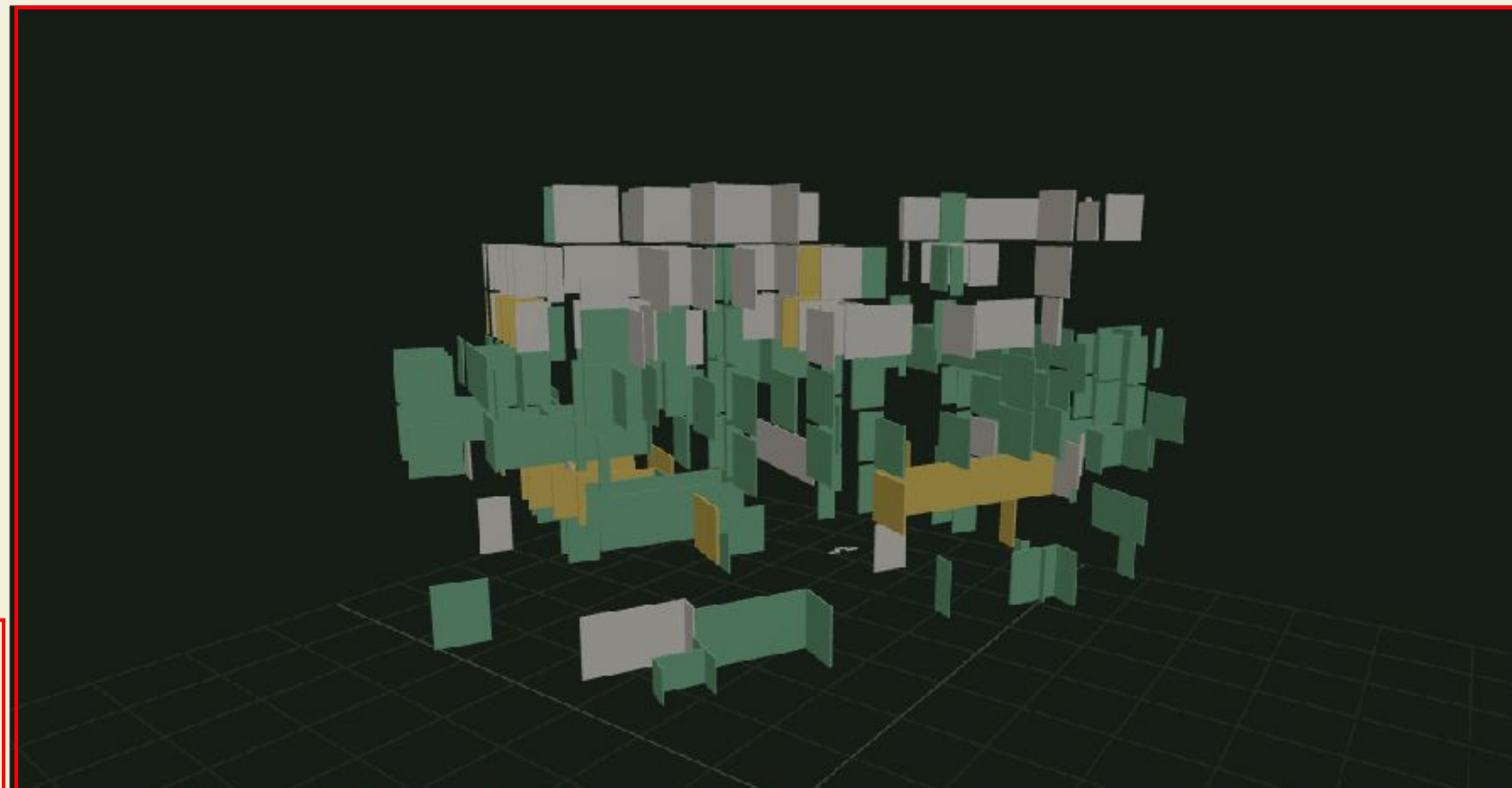
Legg til materialer — eksisterende materialer på typen som mengde (per m²); brukes når modellen mangler lagdeling

Ingen materialer lagt til ennå.

legg til materiale

0,025	m ²	Gipsplate valls.mnd
0,025	m ²	Gipsplate
telles via underlagene!		
0,07	m ²	
2,5	kg	

Materials

The layer's share
of the total
quantity

Per forekomst	Alle forekomster	Modell	MMI	300 Ny	700 Bk	800 Ombruk	900 Riv	uten MMI	alle 315	315 forekomster plassert i rommet
315 instans(er) med 315										
status	versjon	GUID	etasje	MMI	m ²	netto	fratrekk	grunn	vekt (kg)	
✓ unik	V2	1BxGLXCKLB80uqpld2Qevh	Plan 01	300	1	1				
✓ unik	V2	1P4NFDT6nBxZm7dduoUo	Plan 01	300	0,346	0,346				
✓ unik	V2	1MM4H114KXKX7B4dduqM4	Plan 01	300	3,1	3,1				
✓ unik	V2	1P4NFDT6nBxZm7dduoUo	Plan 01	uten MMI	3,2	3,2				
✓ unik	V2	1NDGSPN1FcpQULqDeBvIk	Plan 01	uten MMI	0,012	0,012				
✓ unik	V2	1NU6aPNC1FcpQULqDeBvCs	Plan 01	uten MMI	0,004	0,004				
✓ unik	V2	1NDGSPN1FcpQULqDeBvqT	Plan 01	uten MMI	0,006	0,006				
✓ unik	V2	1NDGSPN1FcpQULqDeBvR	Plan 01	uten MMI	0,011	0,011				
✓ unik	V2	1NU6aPNC1FcpQULqDeBvCs	Plan 01	uten MMI	0,006	0,006				
✓ unik	V2	1NDGSPN1FcpQULqDeBvCs	Plan 01	uten MMI	0,012	0,012				
✓ unik	V2	1P4NFDT6nBxZm7dduoUo	Plan 01	700	0,47	0,47				
✓ unik	V2	1K5v8S6zF8R37Mqyd2rAS	Plan 01	300	2,2	2,2				
✓ unik	V2	2Dn2BUL3P729U4KTBbA4x	Plan 01	300	0,391	0,391				

Occurrence of the
type

Logg — Type: IV-ST-01

Historikk Kommentarer

2025-07-10 17:40
type — komponentenhet m², NS3451: 3212025-07-10 10:40
type — komponentenhet m², NS3451: 321, flagget2025-07-10 17:40
type — komponentenhet m², NS3451: 3212025-07-10 10:40
type — komponentenhet m², NS3451: 321, flagget2025-07-10 10:40
type — komponentenhet m², NS3451: 3212025-07-10 10:40
type — komponentenhet m², NS3451: 321, flagget2025-07-10 10:40
type — komponentenhet m², NS3451: 3212025-07-10 17:40
type — komponentenhet m², NS3451: 321, tellt objekt2025-07-10 10:40
type — komponentenhet m², NS3451: 3212025-07-10 10:40
type — komponentenhet m², NS3451: 321, tellt objekt2025-07-10 17:40
type — komponentenhet m², NS3451: 3212025-07-10 10:39
type — komponentenhet m², NS3451: 322025-07-10 10:39
type — komponentenhet m², NS3451: 32025-06-10 15:54
type — komponentenhet m²

Check of the configured quantities against total volume, should be equal or less, never more

Quantity coefficient and quantities per material of this type

Mengde i QTO — rå 444 m³ · lead 2 964 m²

Materiale

_24x_INNERVEGGER_Byggeplater_Gipsplate Habito_Skruefast_13 mm
_24x_INNERVEGGER_Byggeplater_Gipsplate_12,5 mm (Standard) - G55 - Gjenbruk
Mineralull
Stål

Σ mappet 357 m³ av rå 444 m³ (80%) — resten hulrom/udetaljert (normalt)

Norm.	Koeff.	Mengde	Volum
Gipsplate	0,025 m ³ /m ²	74,1 m ³	74,1 m ³
Gipsplate	0,025 m ³ /m ²	74,1 m ³	74,1 m ³
Mineralull	0,07 m ³ /m ²	207 m ³	207 m ³
Stål	2,5 kg/m ²	7 409 kg	0,944 m ³

Materialsammensetning · 3 materiallag — like slått sammen · per m2 ·  = splitt materialet

2x _24x_INNERVEGGER_Byggeplater_Gipsplate Habito_Skruefast_13 mm 12.5 mm  7 typer 

2x _24x_INNERVEGGER_Byggeplater_Gipsplate_12,5 mm (Standard) - G55 - Gjenbruk 12.5 mm  6 typer 

_24x_INNERVEGGER_Stenderprofiler_Stål_100 mm_Stålstender med min. 070 mm mineralull 100 mm  3 typer  splittet

Mineralull

Stål

+ legg til undermateriale

Legg til materialer — ekstra materialer på typen som mengde (per m2); brukes når modellen mangler lagdeling

Ingen materialer lagt til ennå.

+ legg til materiale

0.025

m³

Gipsplate walls.md

Gipsplate



0.025

m³

Gipsplate walls.md

Gipsplate



telles via underlagene ↓



0.07

m³



2.5

kg



The layer's share of the total quantity

Occurrence properties

Apply to the occurrence only, independent of the type

Process status

01

Type ID

What the object is

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Which system a type belongs to

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What the type is meant to do

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Material/Product

What the type is made of

05

Process Status

MMI to express maturity - we also use this for phasing.

06

Ownership

Who is responsible

07

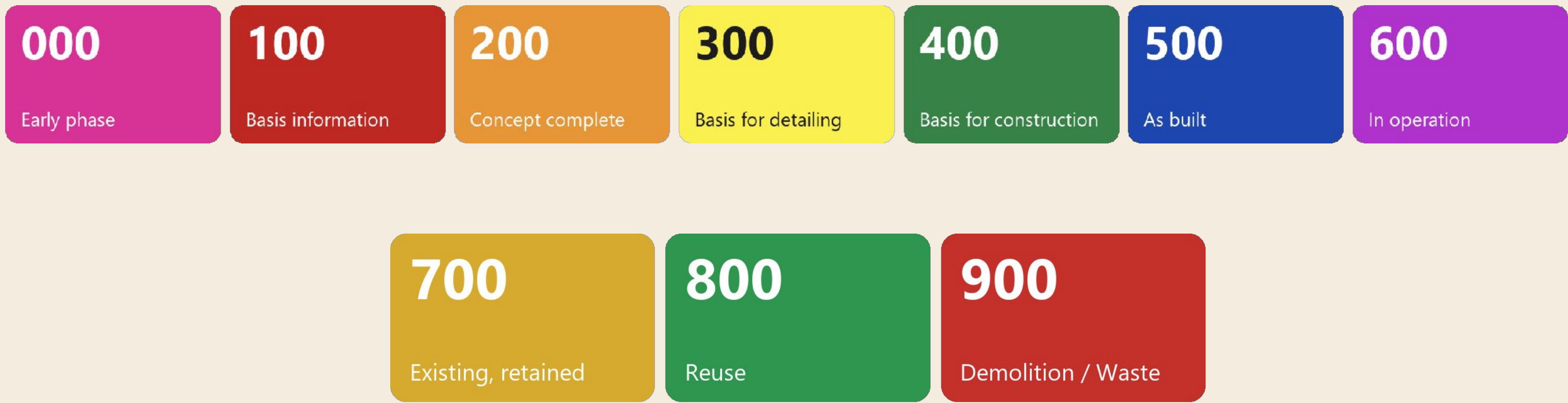
Quantities

How much there is

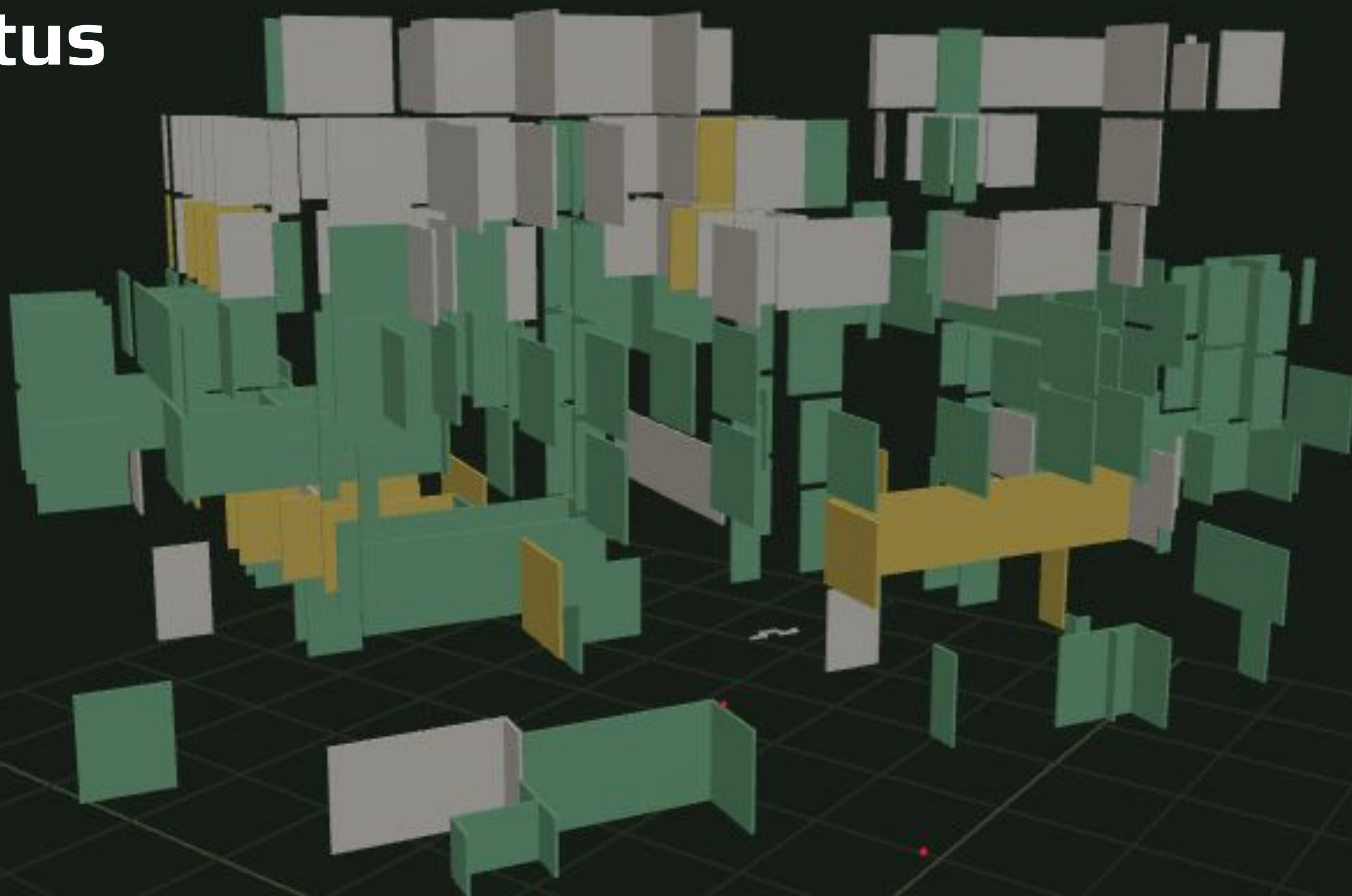
90%

of the use cases are covered by these requirements

Status



Status



Status



700

Existing, retained

800

Reuse

900

Demolition / Waste

Ownership

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Quantities

How much there is

90%

of the use cases are covered by these requirements

Ownership



Every object has one owner

When two disciplines both show the same column, it is counted twice in quantities and in LCA.

Seven strict requirements make IFC a basis for third-party workflows

01 Type ID

02 System assignment

03 Function

04 Material/Product

05 Status

06 Ownership

07 Quantities

Result

IFC becomes a data foundation that enables most other workflows.

Precondition

The requirements are anchored with the owner, and every delivery goes through an incoming check and feedback.