Manual BIM-LCA workflow

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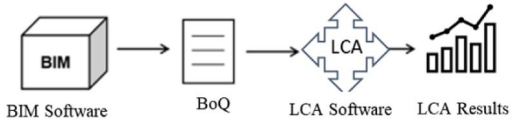
Design Computation

BRG

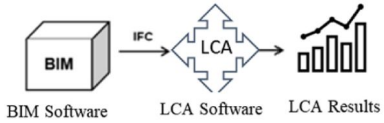
ETH zürich

cea

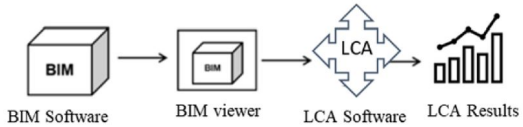
TYPE 1: export of BIM environment quantity list to other LCA tools



TYPE 2: export to LCA tools using the IFC format

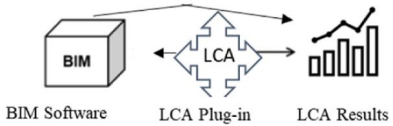


TYPE 3: BIM data are processed in a BIM viewer before being sent to LCA tools



TYPE 4: use of plugins in BIM software, e.g.: Tally

TYPE 5: development of tools in the BIM environment. In this case, the information is added to the BIM model.



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Circular Engineering for Architecture

Manual matching task

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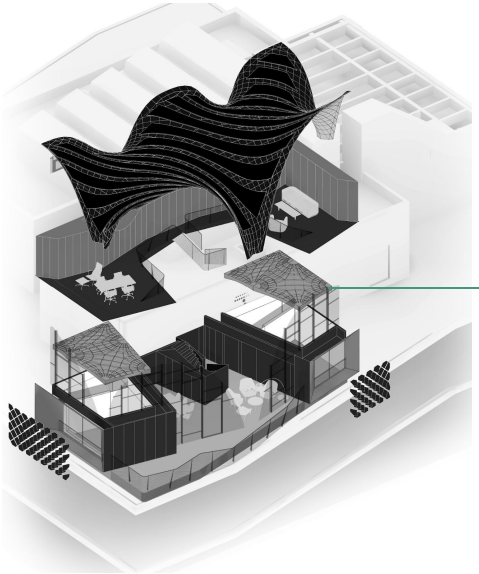
Circular Engineering
for Architecture



BIM data
Material name
Component type
Layer name
….

Material

Emissions database
kgCO2eq per m3

Group task https://tinyurl.com/sbe2025zurich

- Try to find 0-3 matches for BIM materials/elements on Ökobaudat
  - The method is up to you - ifc model, Google, existing knowledge, etc.
  - Please progress downwards from row 2 and finish as many as you can
- Document
  - Match name (or “none” if no match)
  - Brief justification
  - Confidence level (1-very low, 2-low, 3-medium, 4-high, 5-very high)

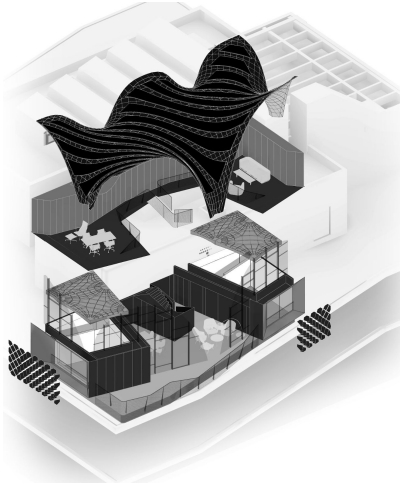
Columns A-O: BIM data

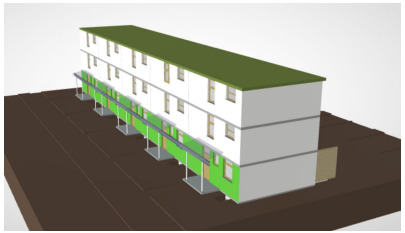
Columns P-X: to be filled in

	A	B	C	D	O	P	Q	R	X
1	Id	model	name	english_name	Volume [m^3]	match1_name	match1_justification	match1_confidence	match3_confidence
2	1hOSvn6df7F8_	Duplex	Floor:Residential - Wood Joist wit	Floor:Residential - Wood Joist with Subflooring:144800	1.125354				
3	2WGIh0xUz90vp	KIT_Smil	1OG-Balkon-1-1	1st floor balcony 1-1	0.087				
4	2p6mMpo0jBHO	HiLo	TU DF 1 - Pfostenstock Falztüre:[	TU DF 1 - Post frame rebated door: DL - 900 x 2130	0.10707				
5	0foM5uUXf3UBf	HiLo	Pfosten rechteckig:Forster 60 x 9(	Rectangular post: Forster 60 x 90 - Post only: 2355404	0.00275				
6	1o7gVYtKXE5gH	HiLo	Basic Wall:3-Schichtplatte 27mm	Basic Wall: 3-layer board 27mm - formwork panel: 355523	0.0513				
7	3WYMOXWhn9⁴	HiLo	Basic Wall:Holzfassade hinterlüfte	Basic Wall: Ventilated wooden facade: 1105047	0.372633				
8	1GYJkCWSXDP	HiLo	Bleche Fassade_V6:Bleche Fass	Sheet metal facade_V6: Sheet metal facade_V6:4910201	0.06457				
9	3YjB$irNvB$vE1	HiLo	Basic Wall:Holzbau_Archisonic_V	Basic Wall:Timber Construction_Archisonic_Prefabricated	0.016185				
10	2OBrcmyk58Nu	Duplex	Floor:Finish Floor - Wood:169093	Floor:Finish Floor - Wood:169093	0.352674				
11	0P4ZzpAg98fhj_	HiLo	Basic Wall:BSP 140 - 5s:1686981	Basic Wall:BSP 140 - 5s:1686981	1.13687				
12	0kqm0N1Tf3Zw	KIT_Smil	EG-A-1-1	EG-A-1-1	2.6364				
13	3PSzbSor5Dzeh	HiLo	Basic Wall:Wärmedämmung_Sler	Basic Wall: Thermal insulation_Slentex 70:687731	0.15822				
14	0YWQUbZyv37F	HiLo	Basic Wall:Wärmedämmung_Min	Basic Wall:Thermal insulation_Mineral wool_130:1839774	0.22159				
15	0ZBO6J2ib94O	LTU	Stiffener:Stiffener:1094120	Stiffener:Stiffener:1094120	0.00023				
16	0mZKsgvRH1M	HiLo	Floor:3-Schichtplatte 40mm:5206(	Floor: 3-layer board 40mm: 5206093	0.02178				

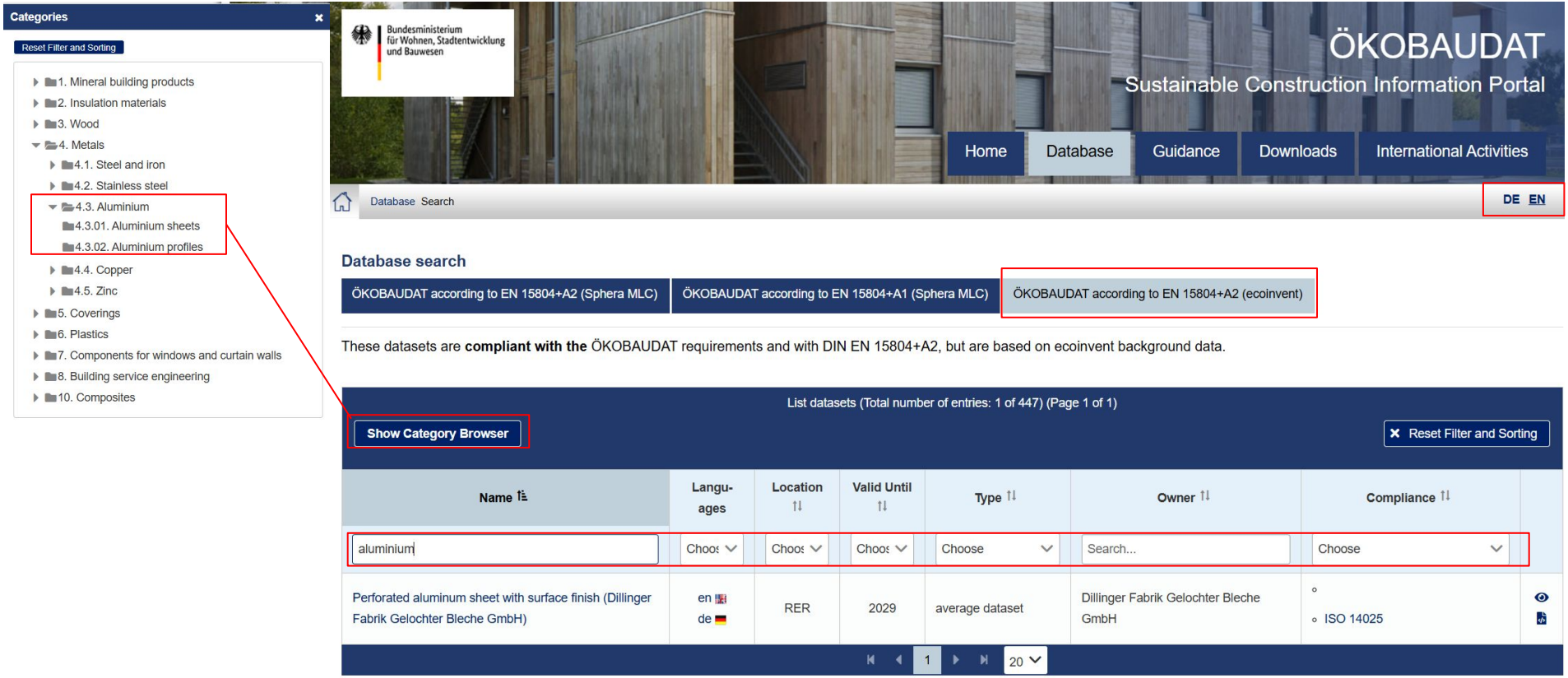
BIM data in the spreadsheet

- Elements from four open-source BIM models
  - HiLo
  - KIT_SmileyWest
  - Duplex
  - LTU
- Extracted data
  - Id
  - model
  - Name (German)
  - english_name
  - Data Structure
  - Type
  - ObjectType
  - Material Descriptor
  - Load-Bearing
  - External
  - Layer Number
  - Layer Thickness [m]
  - Length [m]
  - Largest Surface Area [m^2]
  - Volume [m^3]





Ökobaudat data



Groups

Group	First name	Last name	Organization
1	Martin	Röck	RISE Labs - KU Leuven
1	Anika	Häberlein	Unit of Construction Management and Tunnelling
1	Alice Titus	Bakera	EPFL
1	Lukas	Vögeli	Chair of Architecture and Regenerative Materials,
2	Bonu	Azizova	Technische Universität Berlin
2	Xinyuan	Zhang	Politecnico di Milano
2	Alexandra	Weniger	RWTH Aachen University
2	Cheng-Tai	Yang	National Taiwan University
3	Salwa	Belhadi	Magnel-Vandepitte Laboratory
3	Dragos	Ghioca	ETH Zurich
3	Sara	A. Sharbaf	NTNU
3	Yazan Nidal Hasan	Zayed	Aarhus University
4	Thanyatorn	Khumpairoj	Tokyo Metropolitan University
4	Kristopher	Price	The University of Bath
4	Amirhosein	Moshari	Lund University
4	Elias	Kufeld	RWTH Aachen
5	Asmaa	Benzidane	École nationale des ponts et chaussées (ENPC)
5	Natasha	Balwit-Cheung	University of Cambridge
5	Jingxian	Ye	Formerly at Smart Living Lab, ENAC, EPFL
5	Loïs	Lozach	ETHZ

Discussion

- What kind of information did you use for the matching?
- Were you able to find suitable matches, and was it easy or hard?
- How would you usually carry out this task?