

Adaptable skin systems

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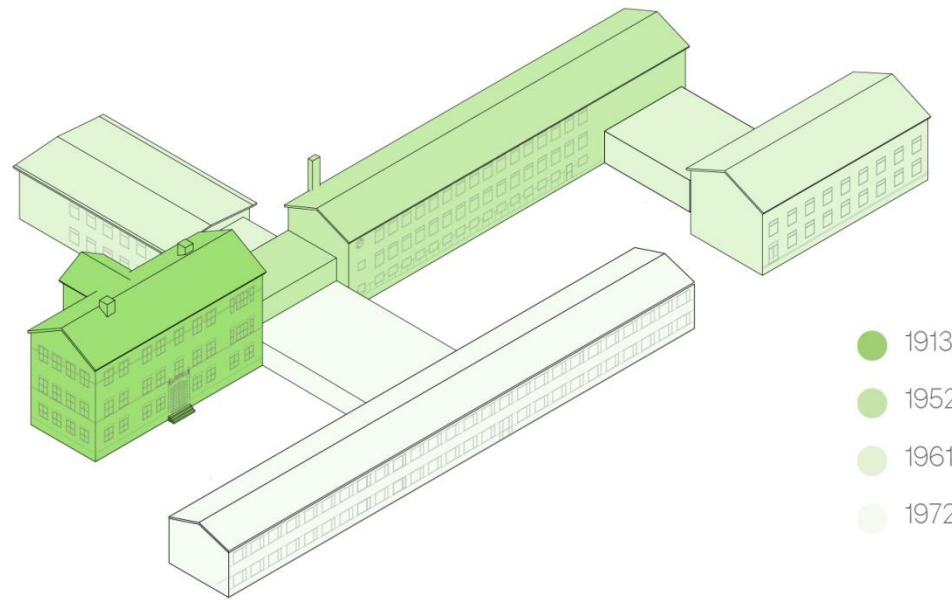
Adaptable skin systems



Buildings are continuously changing.



Snäckeback school changes



- 1913
- 1952
- 1961
- 1972

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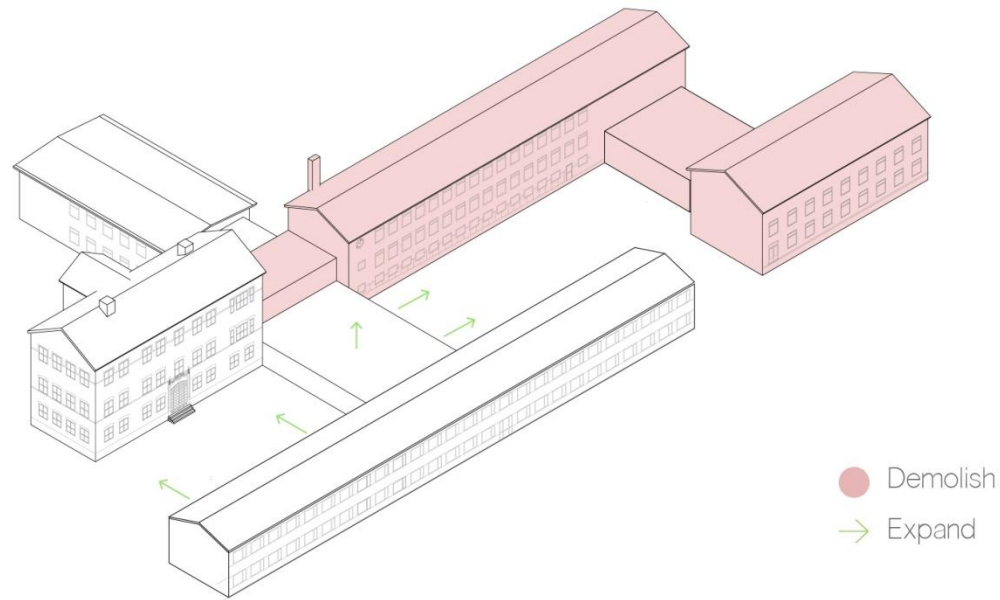


05-07 February 2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642384.

Snäckeback school changes



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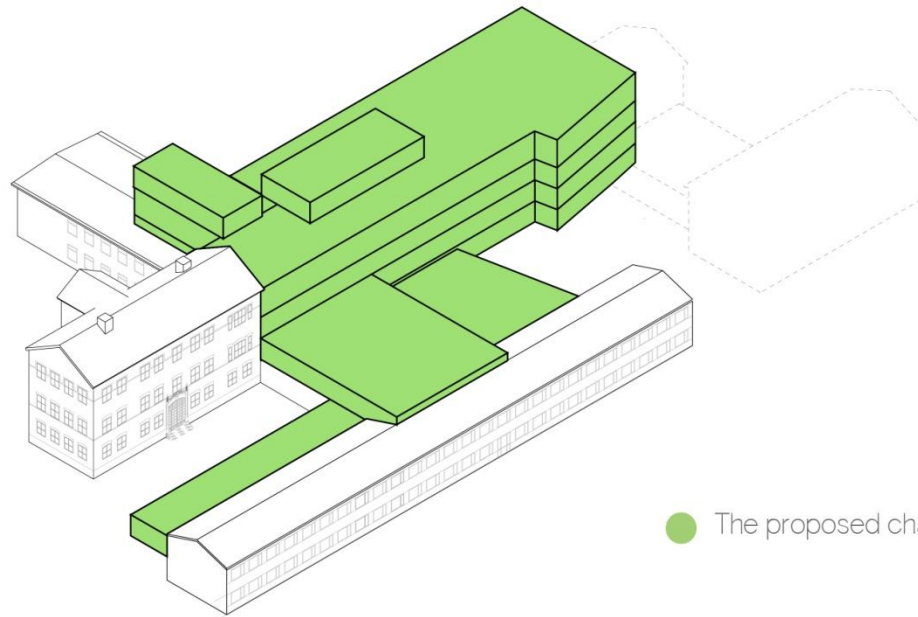


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Snäckeback school changes



● The proposed changes by the city



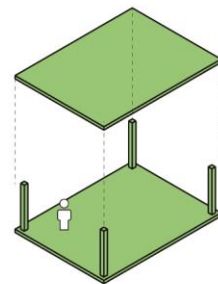
Adaptability

“The capacity of a building to accommodate effectively the evolving demands of its context, thus maximizing value through life”

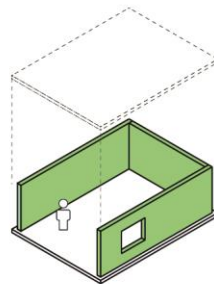
Source: Schmidt III R, Eguchi T, Austin S and Gibb A, *What is the meaning of adaptability in the building industry?*



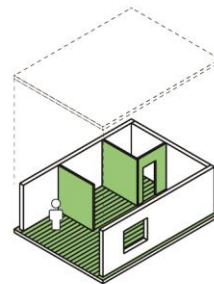
Buildings as systems



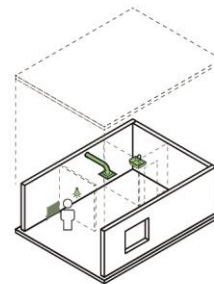
1. Structural system



2. Skin system



3. Space plan system



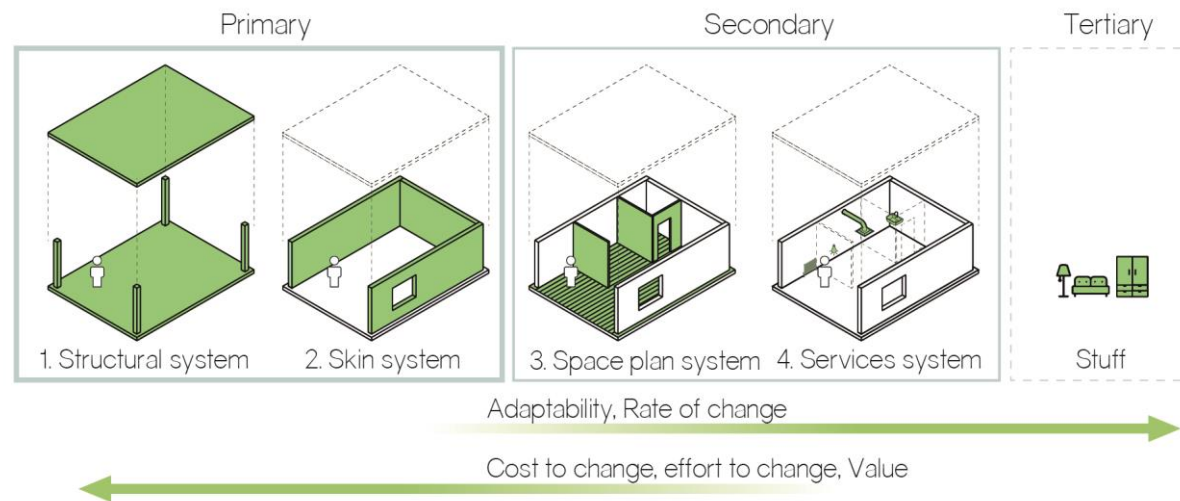
4. Services system



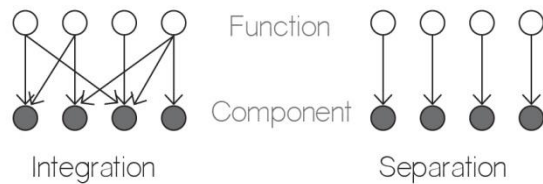
Stuff



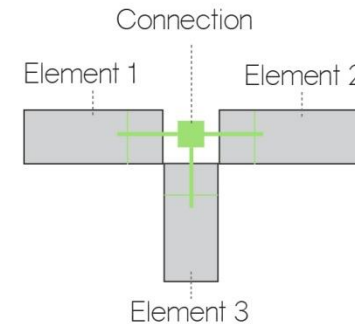
Adaptability and building systems



Design for Disassembly



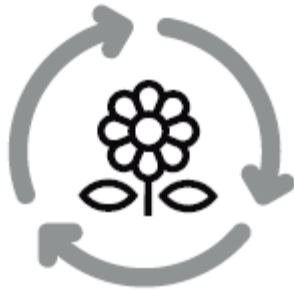
Separation vs. integration
of functions.



Flexible connection
by Durmisevic, 2006.

Waste hierarchy

Cradle to cradle: The two metabolisms

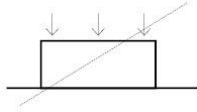


Biosphere metabolisms



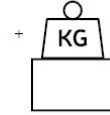
Technosphere metabolisms

Design strategies



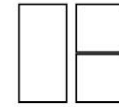
Systems Separation

Separate the structure system from the skin system;
Avoid load-bearing walls.



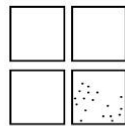
Oversize structural elements

Allow for expansion, and to earn future value of the materials when reclaimed.



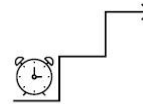
Standardisation & Modularity

Design to standard dimensions to reduce materials waste and increase reuse possibilities.



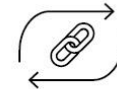
Select reusable, recyclable materials

Materials that can be integrated into the technosphere or biosphere metabolisms.



Hierarchy of lifespans

Take in consideration the rate of change and materials expected lifespans



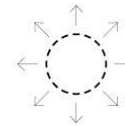
Accessible & reversible connections

That does not need customized tools for easy separation of the different layers.



Avoid materials damage

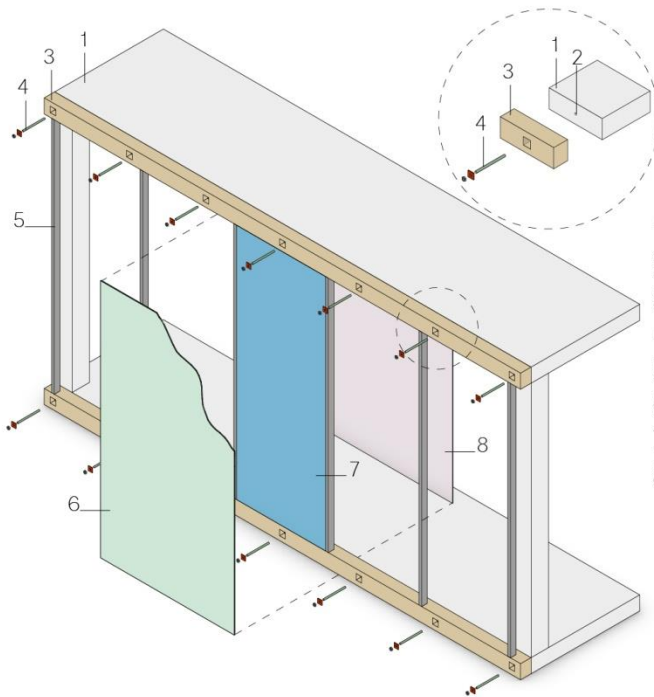
Replacement or modification of shorter life elements does not affect or damage those of greater durability.



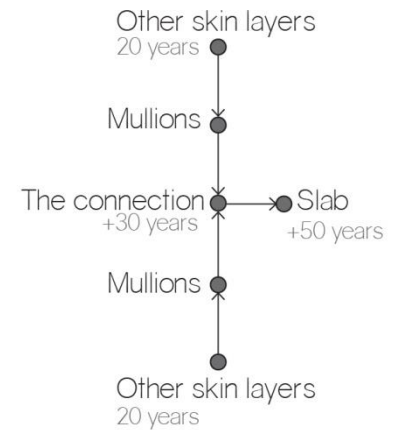
Open possibilities

Design in a way to create more possibilities to correspond to the unexpected future needs.

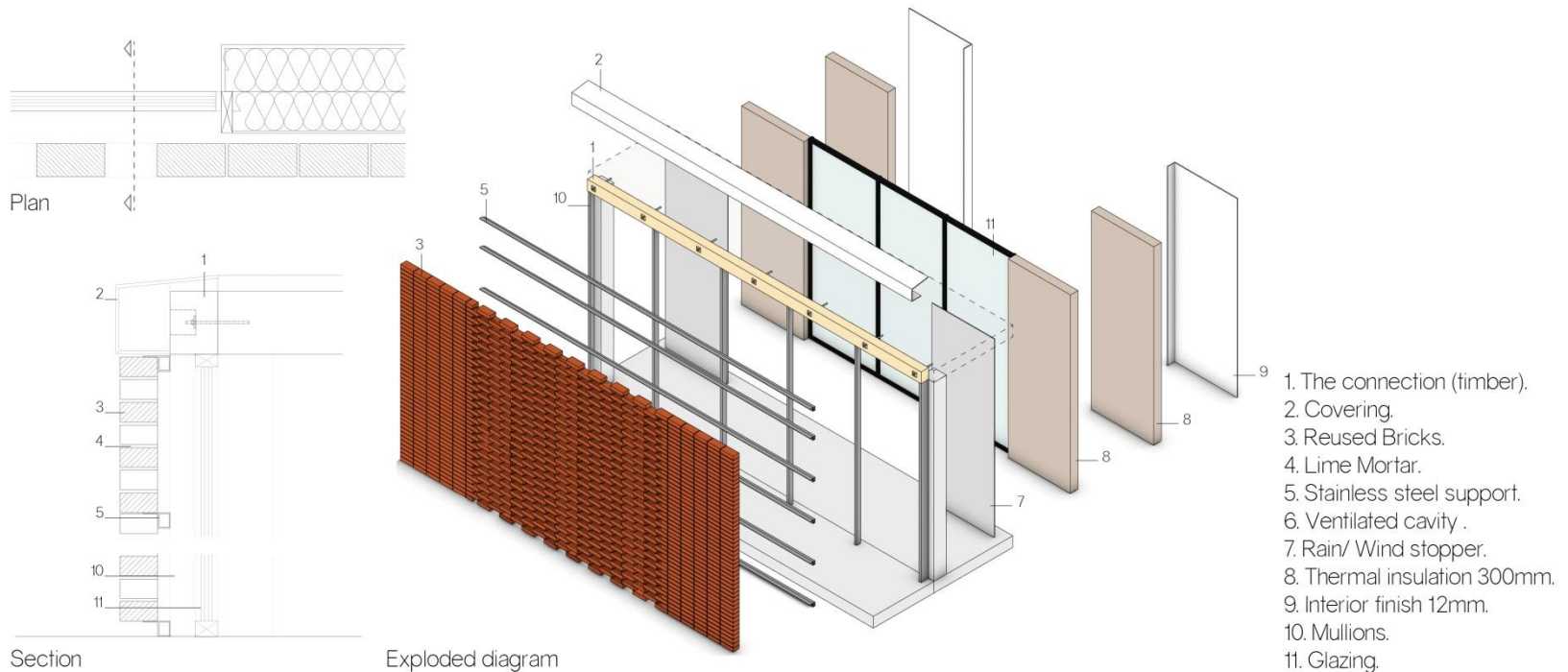
'The connection'



1. The slab (Primary structure).
2. Built-in hole in the slab.
3. The connection (timber).
4. Stainless steel bolt and nut.
5. Mullions (skin structure).
6. Exterior layer of the skin(Add-on).
7. Interior layer of the skin(Add-on).
8. Middle layer of the skin (Fill-in).

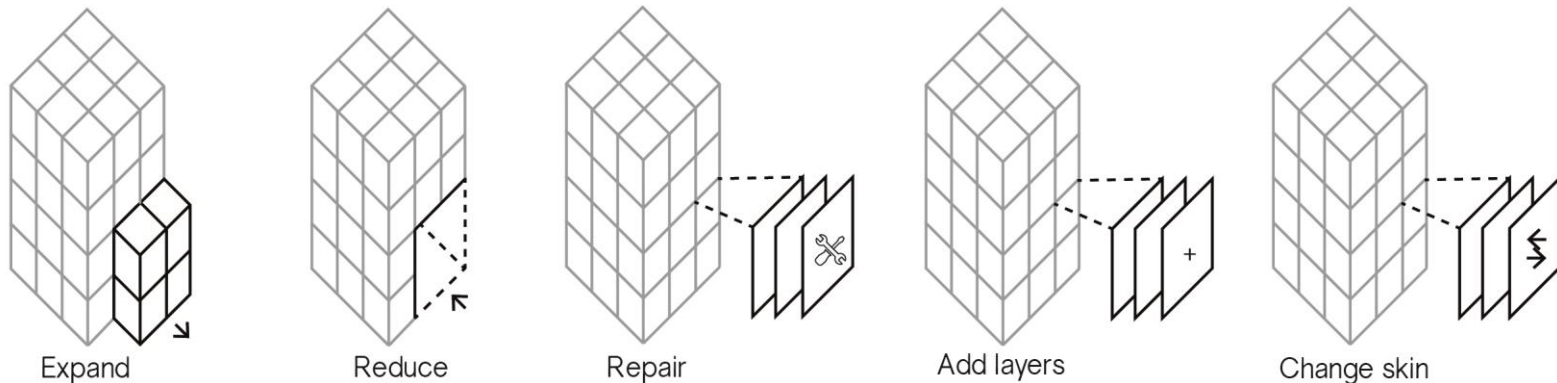


The bricks skin



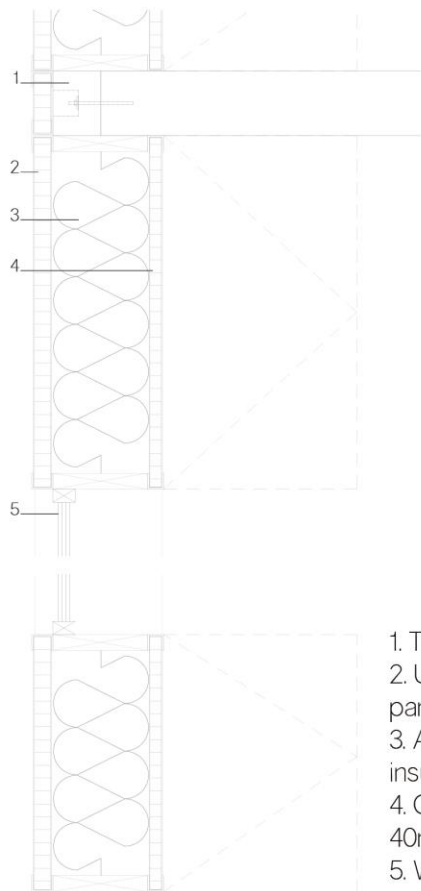
'The connection' - benefits and limitations

- Adaptability
- Preserving the materials value.



- Limit the design to cubic forms
- Thermal bridges.

Further explorations: Variable U-Value skins



1. The connection (timber).
2. Uncolored polycarbonate panels 55mm.
3. Air gap can be filled with thermal insulation 300mm.
4. Colored polycarbonate panels 40mm(openable).
5. Window.



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Further explorations: Variable U-Value skins



Conclusions

- Adaptability brings benefits on the short-term for maintenance or adjustments, or at the end of service facilitating the disassembly and materials reclamation.
- Separate the systems and consider the rate of change, the hierarchy of assembly and the components interdependencies to increase adaptability.
- Setting the project's goals regarding handling the materials at the end of service is important during the design phase as it affects the configurations design.
- The separation of the skin layers highlighted the possibility to achieve variable U-value skins by altering the insulation layer.
- Standardisation and modularity facilitate building components reuse, but they could limit the freedom of the design leading into monotonous buildings.

