



Characterization of the building performance of post-World War II residential building

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ABSTRACT

This study aims to develop a database of Belgian residential buildings constructed between 1945 and 1990. This database was created using a survey sent to this particular type of dwelling. It will be used to characterize the energy consumption and impact of post-world war II buildings, and define the importance of the occupant and residents. This study describes the results and data obtained by the survey and analyzes the importance of building pathologies in this type of dwelling.

KEYWORDS

Belgian residential sector, Reference building, Energy use profiles, Building pathology, Energy performance.

PROBLEM

A significant part of the Belgian residential sector is composed of buildings that were constructed post-world war II, between 1945 and 1990, and usually have high energy consumption. Following a wish to reduce our impact and emission, this type of buildings represents a good choice for future renovation programs.

OBJECTIVE/HYPOTHESIS

- Characterize and understand the energy consumption and performance of post-world war II residential buildings.
- Characterize and determine the main building pathologies of the Belgian residential sector.
- Create and develop a database representing two archetypes.
- Collecting data regarding Belgian residential buildings from a survey.

AUDIENCE

Confederation construction in Belgium, Walloon, Flanders, Brussels-Capital region, Scientifics, Building owners.

RESEARCH QUESTION

- How to characterize the energy consumption of post-world war II buildings ?
- What are the building performance characteristics of post-world war II buildings in Belgium ?
- What are the occupancy type and profiles of these archetypes ?
- What are the main building pathologies found in this type of dwelling in Belgium ?

ORIGINALITY

- This type of study has not been done on these archetypes of buildings in Belgium.
- This study creates descriptive statistical descriptions of building envelopes and systems to predict future emissions and represents an important period in western Europe.
- This study presents the relationship between occupancy profile and energy use for these archetypes.

METHODOLOGY

The methodology is explained in the Fig. 1.

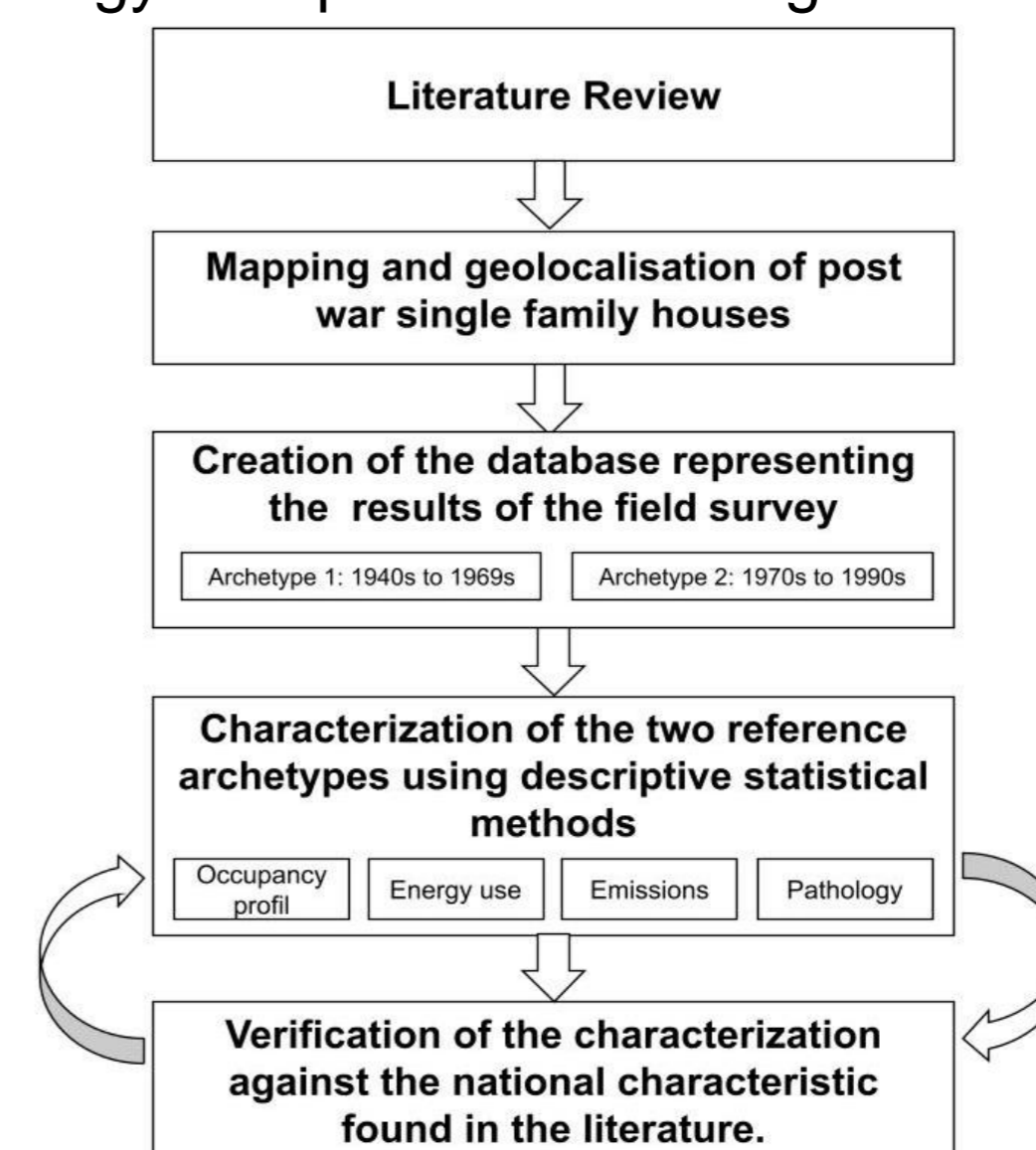


Fig. 1. Study conceptual framework

RESULTS

- Characterization and determination of the main building pathologies in the Belgian residential sector in Fig. 2.

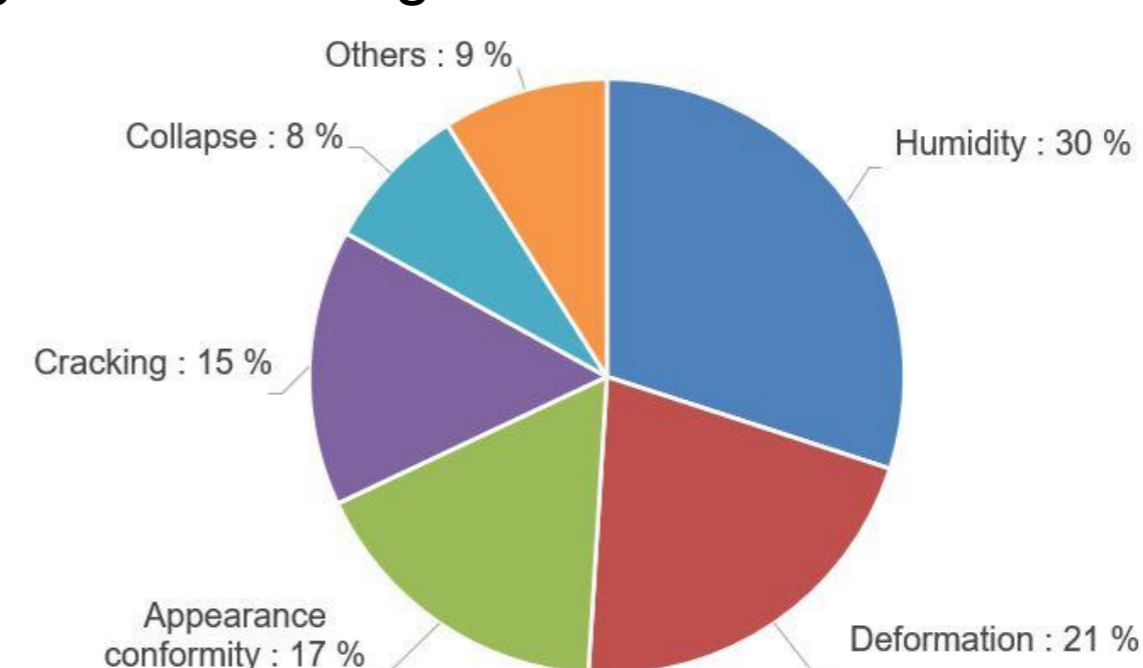


Fig. 2. Building pathologies of the Belgian residential sector

- Characterization of the heat losses for each archetypes in Fig. 3. and 4.

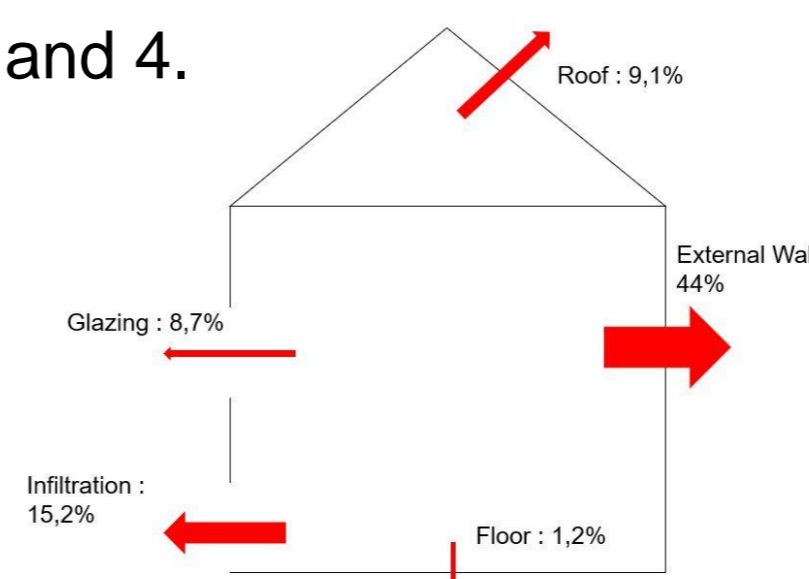


Fig. 3. Heat losses for archetype A

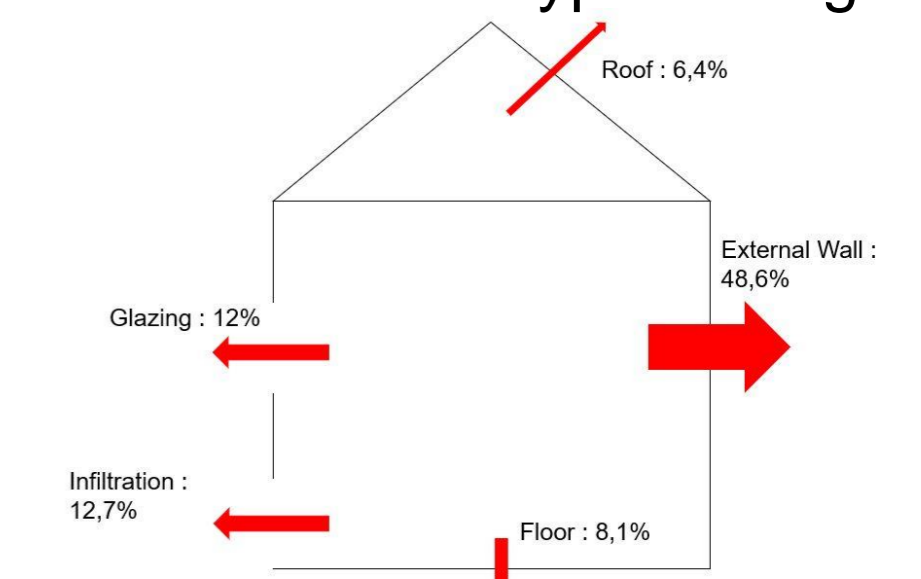


Fig. 4. Heat losses for archetype B

CONCLUSION

- This study demonstrates that the majority of these buildings have low energy performance with an EPB label of F or G.
- The residents are mostly people more than 60 years old, with an occupancy rate of one or two occupants.
- These types of buildings have a high renovation potential thanks to their characteristics.

RESSOURCES

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