Statistical Analysis on Belgian Building Defects

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1 Introduction

Since insurance companies, law offices and expertise bureaus are appointed to deal with damage claims, they have access to an immense amount of information about building defects in the Belgian construction industry. However, the existing information is not fully used to prevent similar mistakes since there is no harmonized data collection, no classification, no structure and no consent in processing the data.

In different countries, initiatives have been taken to create databases on building pathologies. These initiatives can be extended to an international level. For example, the CIB (International Council for Research and Innovation in Building and Construction), a worldwide network concerned with the exchange of information, learns from past and current building pathologies.

Statistical analysis of these data may reveal unidentified patterns and provide insights on the dominant failures in terms of building component, type of damage, cause, time of occurrence, geographical location, building exposure, cost, and the like. The insights derived from the analysis can provide a series of lessons on the critical aspects in order to minimize building defects. As a consequence, the quality of the buildings can be enhanced, like better durability, longer service life, lower life cycle cost, lower waste production, and higher sustainability.

2 Methodology

The analysis presented in this paper was based on the database of the largest Belgian insurance company in the building industry (containing 27 074 documented cases between 1991 and 2019), representing the larger share of architects and engineering offices in that field.

A statistical investigation to discover significant correlations and differences is performed using three tests: Spearman correlation, Χ² and Kruskal-Wallis. The focus is on the detection of correlations, trends and differences for the level of occurrence, cost and time.

3 Conclusions

The database analyzed comprises four main types of damage related to building defects: moisture problems, stability, cracking and residential nuisance. It was concluded that moisture problems account for about half of the building defects. Water infiltration remains the prominent claim, even though the number of damage claims evolves over time. It must be noted that there are some inconsistencies regarding the categorization of the cases, which makes it unclear how certain cases should be categorized. The subcategories, for instance, contain labels
Some types of damage are more complex than others. Stability is more complex since these cases are less classified as amicable settlements without the appointment of experts.

Most problems occur before the final acceptance. We can notice that each type of damage occurs at different times. Moisture problems, cracking and residential nuisance occur later in time, compared to stability problems. Within the cases considering stability, especially collapses or damage arising at the foundations are the ones to occur earlier than the other.

For damages occurring at the end of the ten-year liability, there is a tight timeframe for lodging the complaint. Therefore, if necessary, the complaint is classified as judicial, but if it can be easily solved, it is classified as amicable settlement without appointment of experts.

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