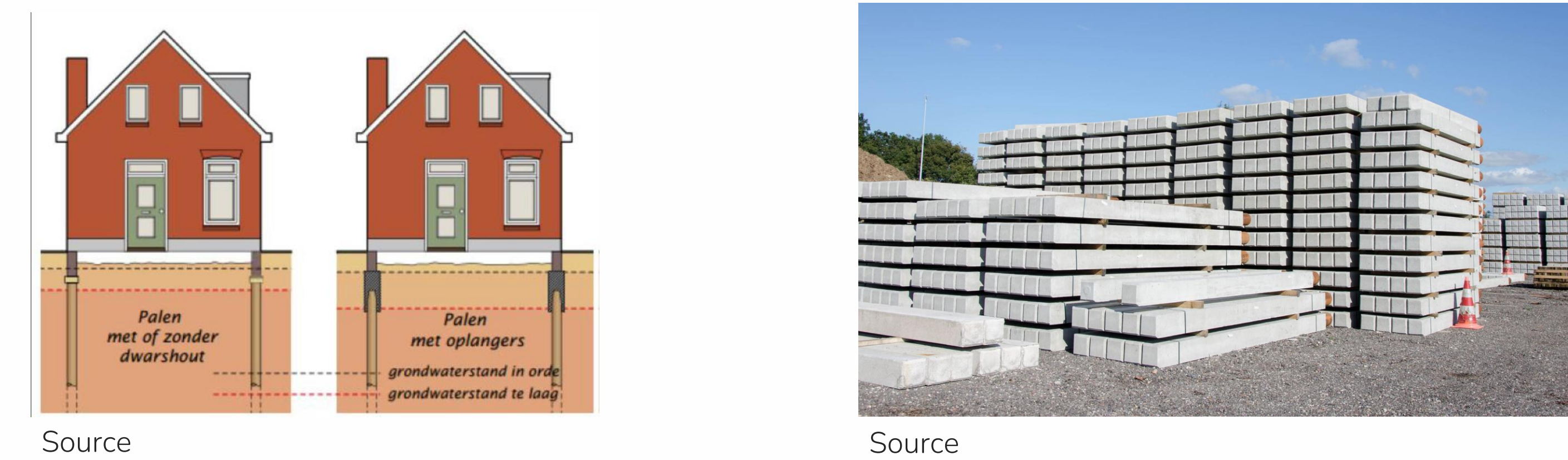


Sustainable Foundations: Biobased Upright Extensions for Dutch Soft Soils

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Graduation project building engineering
Biobased building foundations (BBF)

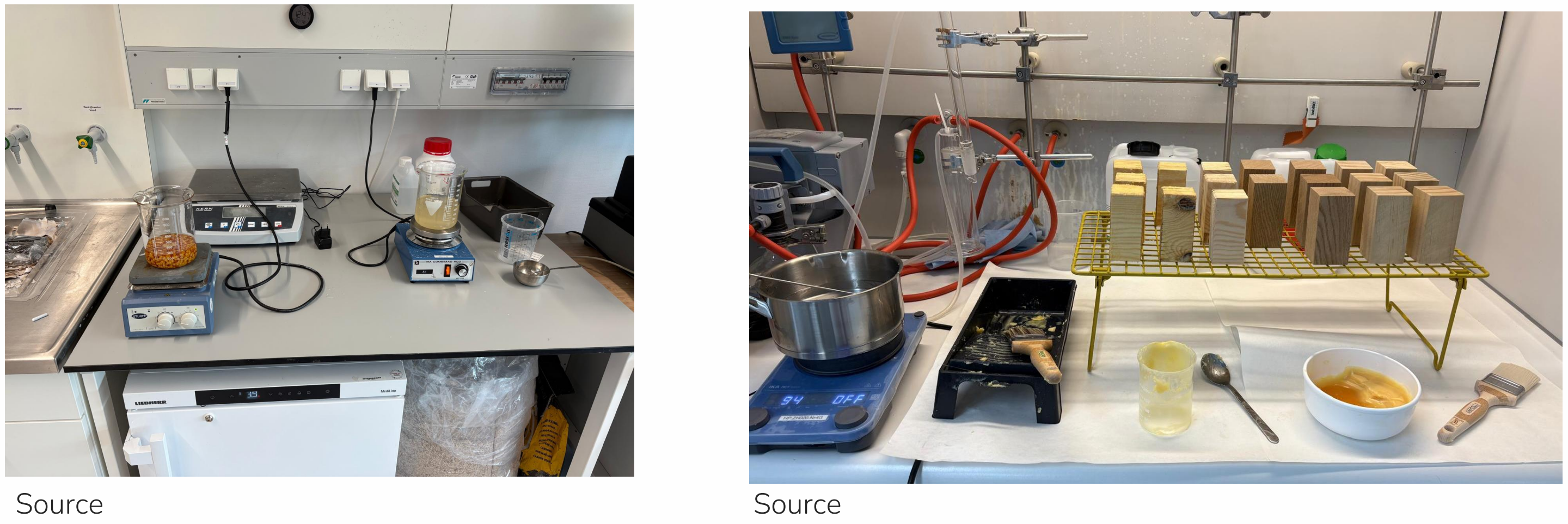
Introduction

Concrete pile extensions are widely used in Dutch foundations but have a high environmental impact. This project explores biobased alternatives, focusing on modified wood. The aim is to evaluate their technical performance and durability in wet soil conditions. By replacing concrete with renewable materials, this research supports the transition to more sustainable and circular construction practices.



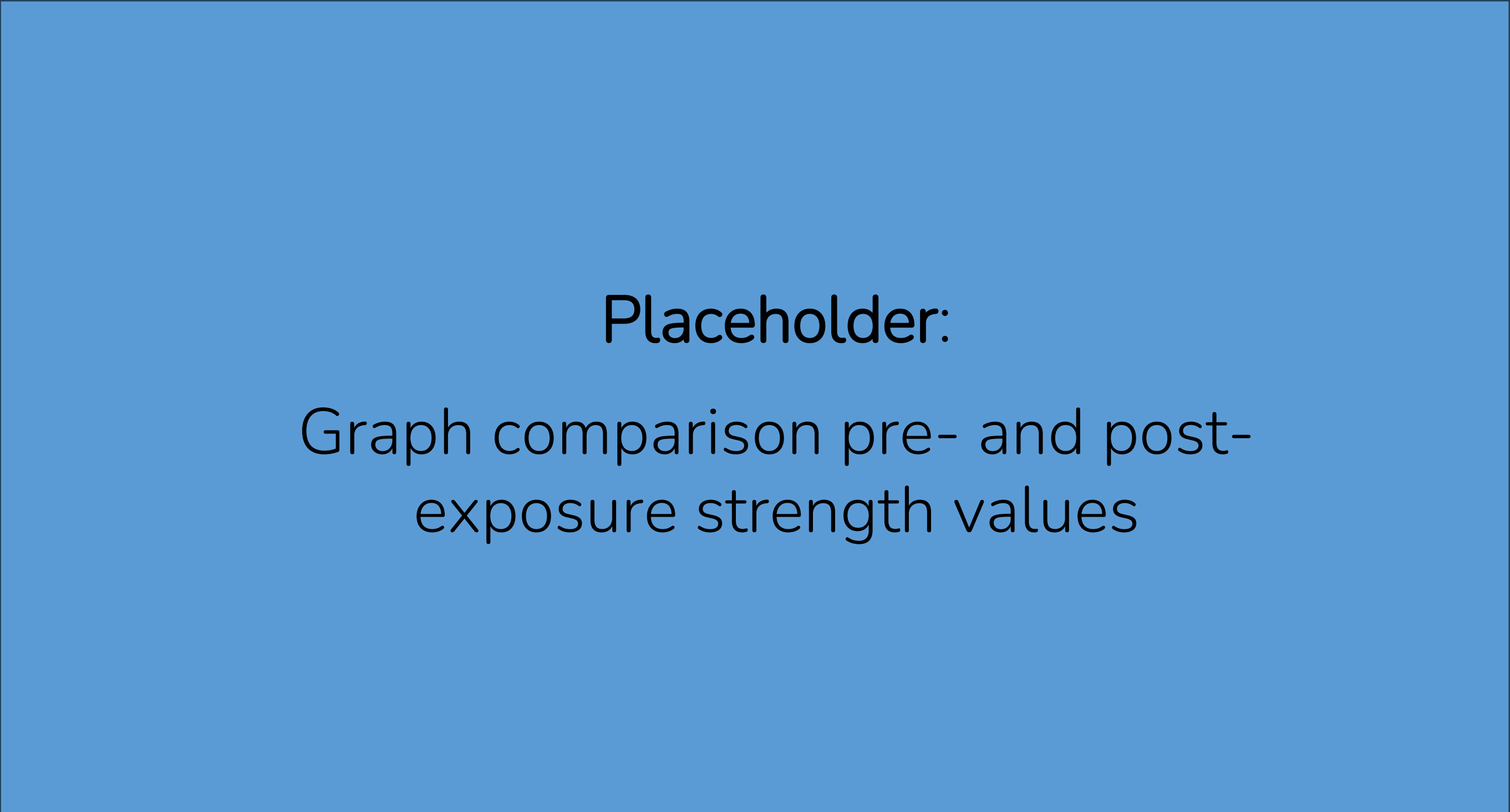
Method

The research starts with a benchmark of conventional concrete pile extensions to define technical requirements. Three biobased materials: **Accoya**, **oak**, and **LVL**, were selected for testing. Two natural coatings, **chitosan** and a **linseed-beeswax** mixture, were applied. Samples were exposed to **wet-dry cycles** and **fungi-rich** soil to simulate degradation. Mechanical strength was tested before and after exposure. **Structural calculations** focused on the critical connection between the timber pile and the biobased extension, to evaluate overall performance.



Expected outcomes

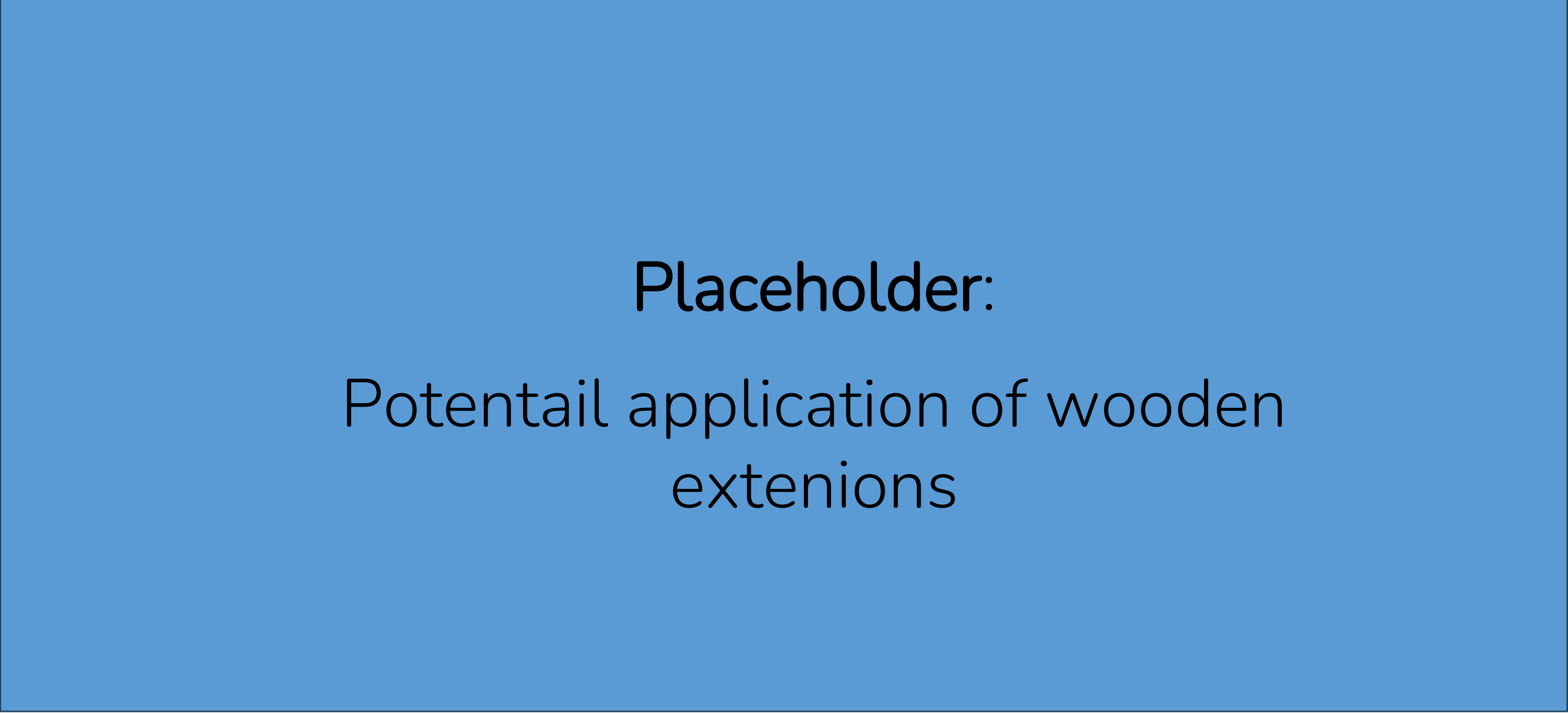
Preliminary expectations suggest that biobased materials such as Accoya, oak, and LVL can achieve sufficient compressive strength and but with help from biobased coatings also moisture resistance. Chitosan and linseed-beeswax treatments are expected to significantly reduce biological degradation. Final results will be presented in comparison to control standard.



Graphs and tables need captions. Add a legend if needed. Sometimes figures need adjusted colors, font types, font sizes, or level of detail just to present them clearly on a poster.

Relevance

The outcomes of this study aim to support the implementation of sustainable and circular materials in deep foundations. If proven technically feasible, these solutions may reduce CO₂ emissions and align with Dutch climate goals for the built environment.



Source

Conclusion

The final conclusions will be based on lab test results and structural assessment of the timber-extension interface. These will help determine the feasibility of biobased extensions in real-world construction.

1. Leal, M. A. Always state the literature you refered to for your research. p.95. 2023
2. Leal, M. A. If you are not the owner of pictures clearly state the source. p.102. 2023