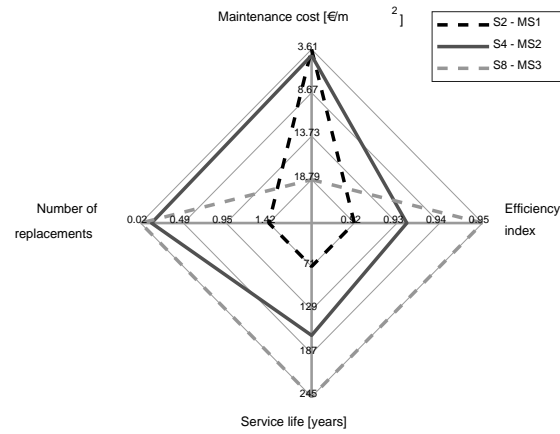


BESTMaintenance_LowerRisks - Buildings' Envelope SLP-based Maintenance: reducing the risks and costs for owners (PTDC/ECI-CON/29286/2017, 2018-2022)



Partners: CERIS/IST

CERIS Principal Investigator: A. Silva

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Funding: FCT

Total budget: 236.289€ CERIS: 236.289€

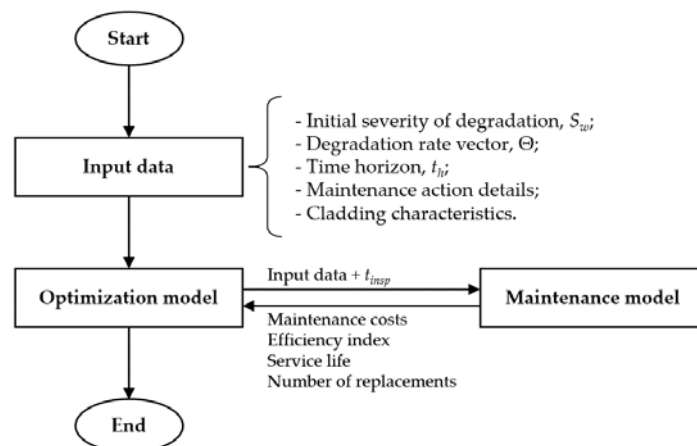
Period: 01/10/2018-31/03/2022

Summary description: the main objectives of this project are the: i) implementation of a user-friendly software to support the management of the maintenance activities in buildings - for each element of the envelope (wall claddings, roofs and window framing) a maintenance module is proposed, with an adjusted schedule (based on the component's service life), the adequate maintenance activities (with actions flowcharts) and the related costs; ii) definition of insurance policy models, with different risks premiums, according to the owners' characteristics and the risk of failure of the various elements of the envelope considered.

CERIS participation: proposes a tool for designing maintenance plans based on service life prediction models, applied to the buildings' envelope, which, due to their higher incidence of anomalies, have a significant weight in maintenance costs. This tool will be applied in the scope of the Insurance companies that, currently, intentionally exclude the buildings' envelope of their policies, since they lack reliable information about the risks and degradation models, and are unable to estimate the probabilities of intervention and corresponding costs.

Output: the project intends to deliver: i) definition of maintenance strategies based on the service life of the elements; ii) application of stochastic models, to evaluate the risk of failure of the elements over time and according to their characteristics; iii) probabilistic economic models of maintenance management over the building's life cycle; iv) design of insurance policy models, evaluating different risk premiums based on the owners and the insured object characteristics.

Illustrations:



Flowchart of the main interactions within the different models of the multi-objective optimization problem

Indicators: one book edition; 21 articles published; 11 papers in international conferences; 2 papers in national conferences; one ongoing PhD Thesis - Ilídio Dias (with FCT scholarship); 2 MSc dissertations; 14 research reports.

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1. Ferreira, C.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Definition of maintenance plans for the elements of building envelope during their service life" (in Portuguese), CERIS 06/**2019** report, Task 1, April 2019, IST.
2. Ferreira, C.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Definitions and nomenclature relating to the maintenance of Buildings", CERIS 07/**2019** report, Task 1, April 2019, IST.
3. Ferreira, C.; Silva, A.; Brito, J. de; **Flores-Colen, I.**: "Modeling the degradation of natural stone claddings, using Petri Nets" (in Portuguese) CERIS, DTC 17/**2019** report, Task 1, June 2019, IST.
4. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: " Modeling the influence of maintenance actions for adherent ceramic tiles, using Petri Nets" (in Portuguese), CERIS DTC 30/**2019** report, Task 1, October 2019, IST.
5. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of current render maintenance actions, using Petri Nets" (in Portuguese), CERIS DTC 31/**2019** report, Task 1, November 2019, IST.
6. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions on the facing concrete surfaces, using Petri Nets" (in Portuguese), CERIS DTC 42/**2019** report, Task 1, December 2019, IST.
7. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions for paint coatings, using Petri Nets" (in Portuguese), CERIS DTC 04/**2020** report, Task 1, January 2020, IST.
8. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions on ETICS, using Petri Nets" (in Portuguese), CERIS DTC 10/**2020** report, March 2020, IST.
9. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions on wooden window frames, using Petri Nets" (in Portuguese), CERIS DTC 12/**2020** report, Task 1, April 2020, IST.
10. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions on aluminum frames, using Petri Nets" (in Portuguese), CERIS DTC 13/**2020**, Task 1, April 2020, IST.
11. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Modeling the influence of maintenance actions on pitched roofs, using Petri Nets" (in Portuguese), CERIS DTC 14/**2020**, Task 1, April 2020, IST.
12. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Addendum to the definition of maintenance plans for the elements of buildings envelope during their service life", CERIS DTC 15/**2020**, Task 1, April 2020.
13. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: "Synthesis and comparative analysis of maintenance plans developed for building envelope elements" (in Portuguese), CERIS DTC 17/**2020**, Task 2, July 2020, IST.
14. Ferreira, C.; Dias, I.; Silva, A.; **Flores-Colen, I.**; Brito, J. de: " Analysis of sensitivity to the cost of means of access and general recommendations of maintenance strategies to be implemented on different buildings envelope elements" (in Portuguese), CERIS DTC 26/**2020**, Task 2, August 2020, IST.