On the Economic Evaluation of Restoration Activities of Modern Monuments of Cultural Heritage with Piezoresistive Nanocomposites

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Poster ID
3166

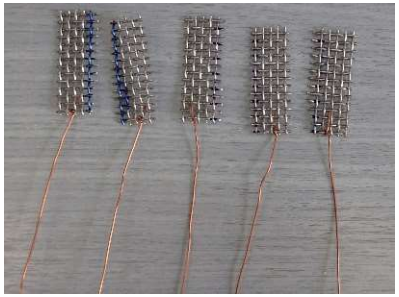
38th Danubia-Adria Symposium on Advances in Experimental Mechanics, 20-23 September 2022, Poros Island, Greece

European Union
European Social Fund
EPAnEK 2014-2020 OPERATIONAL PROGRAMME COMPETITIVENESS ENTREPRENEURSHIP INNOVATION
ΕΣΠΑ 2014-2020 Partnership Agreement 2014 - 2020

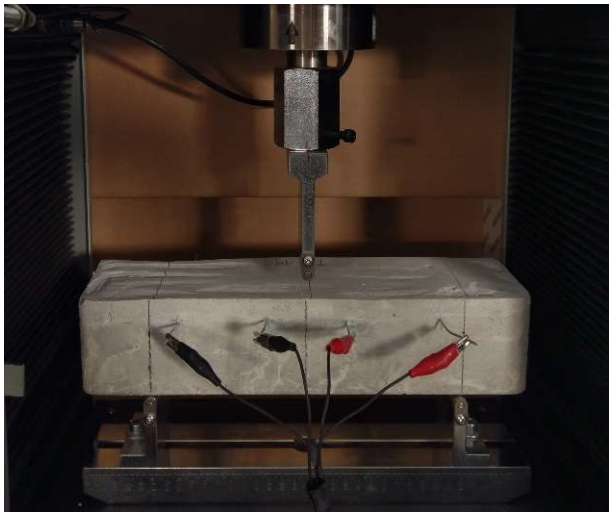
Introduction

Lime based restoration mortars with multi-walled carbon nanotubes (MWCNTs) exhibit:

- Elevated strength
- Piezo-electric properties
- Sensing properties



- Damage observance in Traditional / Historic structures
- Preventive care/maintenance



Methodology

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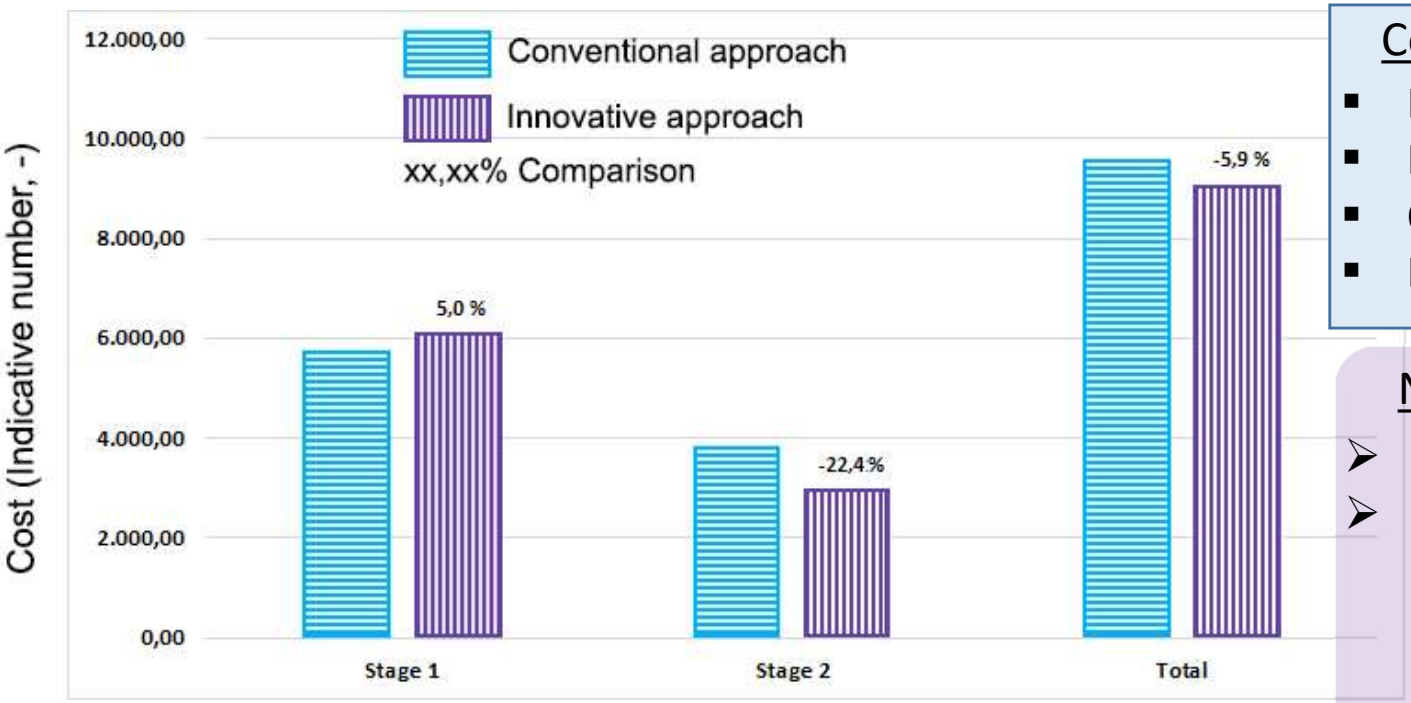
Economic evaluation Conventional vs Nano-reinforced restoration approach with Activity Based Costing (ABC)

- Modern costing system
- Offers info for decision-making
- Provides understanding of cause & effect between costs / activities needs

- Traditional restoration approach modeled for cost analysis.
- Results respectively compared to the proposed Nano-reinforced material.
- Costing per different process stages was compared for the two approaches.

Flow Diagram

Results



Conventional restoration:

- Lower application costs
- No remote data
- On site Inspection only
- Larger sqm^2 retreatment after 25y

Nano-reinforced restoration:

- Low costs for 25 years' service life
- Remote data:
  - ✓ On demand
  - ✓ Continuous
  - ✓ No cost
- Knowledge of restoration treatment preservation state at any time.
- Risk-benefit gains

Conclusions

Innovative restoration approach pros & cons:

- Increased application cost compared to the traditional approach.
- Service life economic benefits related to monitoring / sensing ability.
- Allows preservation state observance remotely, at any time with no cost.

Acknowledgements

Thank you for Your Attention!

This research is funded by the e-Infrastructure “Interregional Digital Transformation for Culture and Tourism in Aegean Archipelagos” {Code Number MIS 5047046}, which is implemented within the framework of the “Regional Excellence” Action of the Operational Program “Competitiveness, Entrepreneurship and Innovation”. The action is co-funded by the European Regional Development Fund (ERDF) and the Greek State [Partnership Agreement 2014- 2020].