

Asset Level Modelling of RISKS In the Face of Climate Induced Extreme Events and ADAPTtation (RISKADAPT)

Workshop on "Risk Assessment of Structures under Climate Change"

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RISKADAPT in a nutshell

Duration: 36 months

Start date: 01/01/2023 | **End date:** 31/12/2025

Grant Agreement no: 101093939

Maximum grant amount: 2.533.536,00 EUR

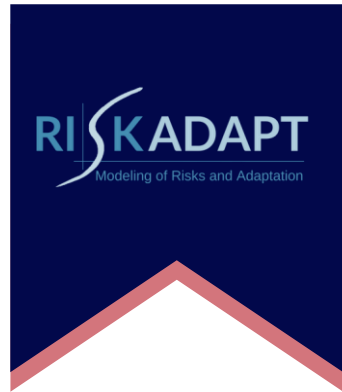
Topic: HORIZON-MISS-2021-CLIMA-02-03

No of partners: 18 | **No of countries:** 9



Aim and Objectives

Develop a novel, modular, interoperable, and user-friendly platform that supports systemic, risk-informed climate adaptation decisions at the asset level.



Several dimensions

It will integrate, for the first-time, structural, social, economic and environmental considerations to address assets' (not limited to RISKADAPT's pilots) adaptation needs.



Hazards / Assets

It will be expandable so as to accommodate additional hazards and/or assets.



Wide range of users

It will be customisable for and evaluated by a wide range of stakeholders (e.g. assets' owners and operators, engineers, local authorities, communities, policy makers, insurance companies etc.).



Reduces risk

Reduce the risk of structural disaster for critical infrastructures / assets in response to extreme weather events.



Enhances decision-making

Enhances decision-making – making towards climate change adaptation options.

Pilots description

Pilot 1: Polyfytos Road Bridge



Location

Bridge connecting the cities Kozani and Athens, Greece

Selection Reason

Excessive vertical deck deflections were reported.

Structure

Bridge Deck and Foundation

Hazards

Tendons Corrosion

Pilot 2: Energy Transmission Grids



Location

110 kV Kontiolahti - Uimaharju line, Finland

Selection Reason

Past events of transmission tower failures due to high winds combined with excessive ice/snow loads.

Structure

Steel Lattice Tower

Hazards

High Winds and Icing

Pilot 3: Cattinara Hospital Building



Location

Trieste, Italy

Selection Reason

Past high wind events of 130 to 150km/h.

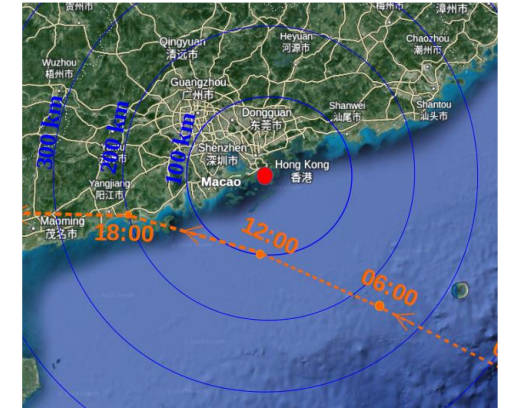
Structure

Structural Beam and Slab Components

Hazards

High Winds, Corrosion and Concrete Deterioration

Pilot 4: Hong Kong High Rise Building



Location

Hong Kong

Selection Reason

Multiple Glass Window Damage events in the past.

Structure

Glass Window Damage

Hazards

High Wind and Wind Driven Rain from Typhoons

RISKADAPT platform: data and processes

Climatological and meteorological data

Various climatic datasets (e.g. wind, ice, rain etc.) affecting the asset in both present and projected future scenarios.



Hydrological and hydraulic models data

Analysis of scouring parameters.



Assets BIM models

Each asset is modeled using BIM to represent its physical and functional characteristics (e.g. geometry, spatial relationships, materials etc).



Assets materials and adaptation options

Information on the specific materials used and adaptation options that could be applied in the asset's construction is captured, including properties, performance and degradation profiles.



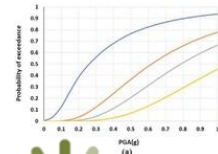
Explore / add new asset's materials degradation data

For each material or potential adaptation option, degradation models under selected climate scenarios are integrated in the platform. These models assess how the material's structural integrity deteriorates over time due to climatological stressors.



Asset risk assessment

Following the completion of the material degradation model, structural risk assessments over time in response to specific climate scenario could be performed.



The platform uses a probabilistic approach, allowing the PoF or/ P of the asset entering a damage state to be calculated based on degradation and hazard-related stresses.

LCA/LCC

Each adaption option will be evaluated under an LCA/LCC framework.



Engineering impact

Each damage state/probability of failure identified is matched with potential engineering impacts, enabling a comprehensive understanding of the asset's resilience.



Social impacts
Total risk assessment
Model Information System



RISKADAPT platform: functionalities and end-users (roles and access rights)

Explore existing / add new climatological data



Explore existing / add new data for asset's material' degradation



Explore existing / add new BIM models



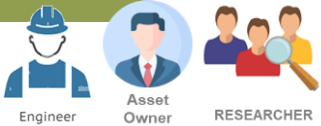
Explore / add new data for asset's probabilistic risk assessment



Explore / add new material / adaptation option



Explore / add new data for LCA/LCC



Explore / add new engineering impact data



Social impacts
Total risk assessment
Model Information System



Impact



Enhanced climate resilience

RISKADAPT helps communities and organizations better prepare for climate-related risks, such as icing and wind, by providing data-driven solutions that improve adaptive decision-making.



Multi-dimensional risk assessment

The project offers tools that integrate multi-dimensional data, enabling more accurate risk assessments and proactive responses to environmental threats.



Effective risk mitigation

By identifying high-risk structures, impacts (social, economic, environmental etc.) and proposing adaptation options, RISKADAPT reduces long-term financial and social losses from disasters, helping to allocate resources efficiently for risk management.



Enhanced decision-making for adaptation

RISKADAPT provides asset-level models that integrate climate change (CC) data, structural analysis, and social impacts, benefiting diverse sectors, including civil engineering, construction, and social impact assessment. This leads to more informed, actionable adaptation strategies across industries.



Economic, technological, and societal impacts

The project increases competitiveness in civil engineering and green construction sectors, enhances disaster risk reduction, and improves public climate awareness, contributing to market readiness and long-term resilience.

THANK YOU!

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