AMANAC CLUSTER

AMANAC WORKSHOP

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WHAT KIND OF BUILT ENVIRONMENT FOR FUTURE GENERATIONS?

ReSHEALience

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Rethinking coastal defence & green-energy **S**ervice infrastructures through en**H**anc**E**d-dur**A**bi**L**ity high-performance cement-based materials

endurcrete

DACOMAT

RESHEALIENCE
Ultra High Durability Concrete

The projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760639 (EnDurCrete), 760824 (ReSHEALience) and 761072 (DACOMAT)

For a sustainable development: WHY?

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Most of the Planet is water (70%) but only 5% economy develops in it
Land is saturated and energy demands are increasing

We have to make efforts to achieve **structures at sea** that are:

1) Lasting, 2) Efficient / practical, 3) Economically viable

ReSHEALience project tries to go in that direction, by proposing pilots with a high TRL, but have a triple function: **1) Complete R&D with monitoring, 2) Allowing industries to move towards the practical use of the new materials, 3) Show citizens and stakeholders that this is a reality**

GOAL: Development of **U**ltra **H**igh **D**urability **C**oncretes (**UHDCs**) & methodology for Durability Assessment-based Design (**DAD**) of constructions to improve durability & predict their **long-term performance** under **E**xtremely **A**ggressive **E**xposure (**EAE**)

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NMBP-06-2017 challenge for ReSHEALience

Durability: key criterion for materials and environments. Longer performing materials

UHDCs to ensure a longer performance:
1) incorporation of durability-enhancing **functionalities**
2) **DAD concepts** exploiting the UHDC long-term properties

Reduce overall life cost: Production, installation, use and recycling.

Product innovation (UHDC) + ***process innovation***: size-optimized and lower-weight elements, smaller quantities of raw materials and reduction of installation costs.

Typical **applications** requiring excellent **long-term durability**

Constructions in:
XS: coastal/harbour & off-shore environment
XA: tanks for geothermal fluids & mud for green energy plants

Innovative products which have no demonstrated long term performance.

UHDCs to demonstrate superior durability in real service conditions, including **micro-cracked state** and combined presence of mechanical and environmental actions.

Durability evaluation:
Theoretically and in **Real** installation conditions

Six pilots built in real EAE conditions: **demonstration of "on-site"** performance & efficiency of the functionalities and **monitored** using advanced sensors

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Objectives

► **GO1:**Increase the durability of concrete, decrease maintenance & reduce consumption of resources, through an innovative & sustainable material: **Ultra High Durability Concrete (UHDC)**

►**GO2**: Quantify & predict the **durability** **of UHDC structures** in service conditions subjected to **Extremely Aggressive Exposures**

►**GO3**: Validate the capacity of the UHDCs & new developments in **6 pilots (TRL6-TRL7)**

The specific objectives *of this project are proposed in different levels:*

MATERIAL	STRUCTURAL	RESILIENCE	COSTS	ACCURACY	BUSINESS PLANS	IMPACT
100%	30%	30%	50%	75%	8	300
of improvement in un-cracked state	of improvement in cracked state	of increase of service life	of reduction of maintenance costs	of accuracy of the modelling	One per industrial partner	subscribers per year to the newsletter

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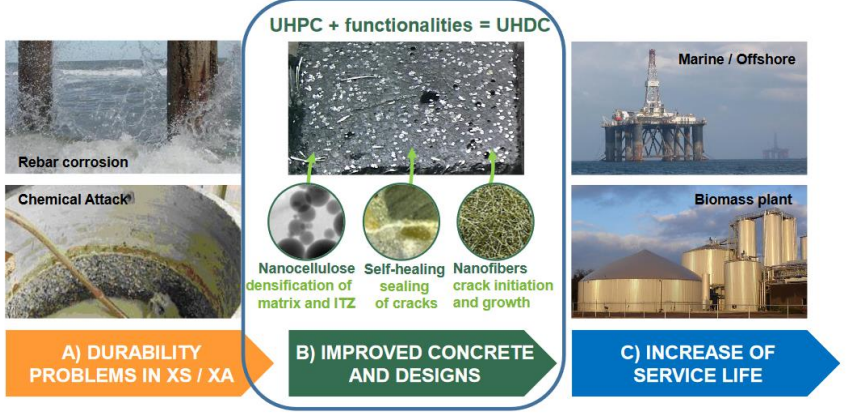
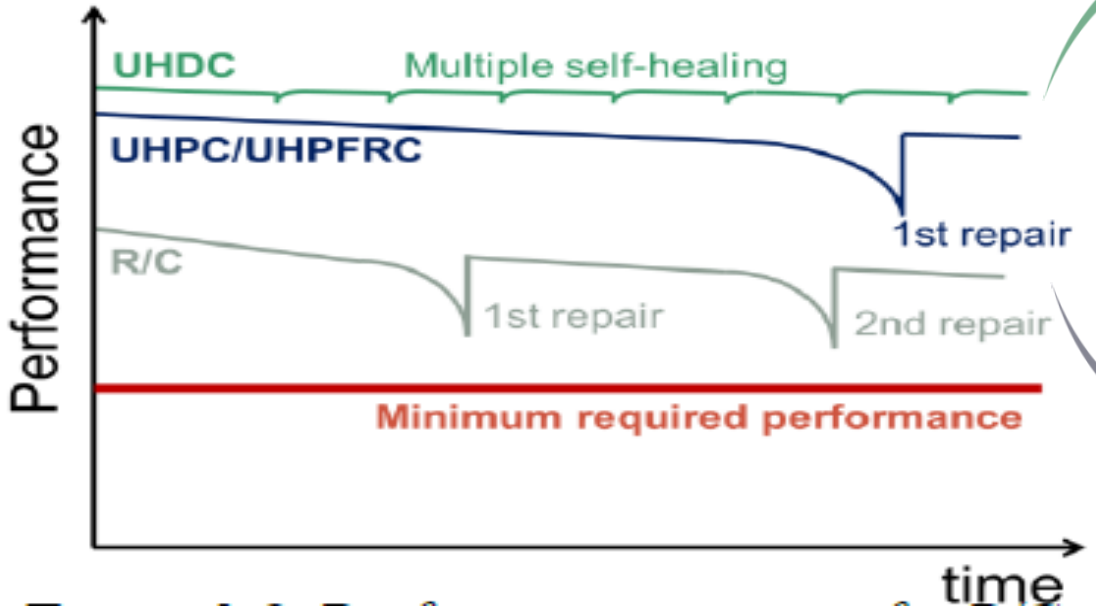
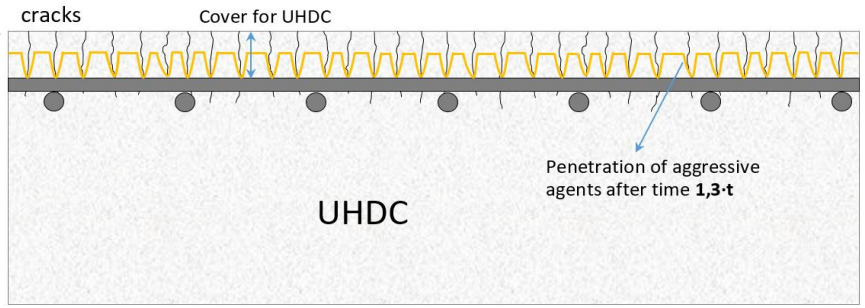
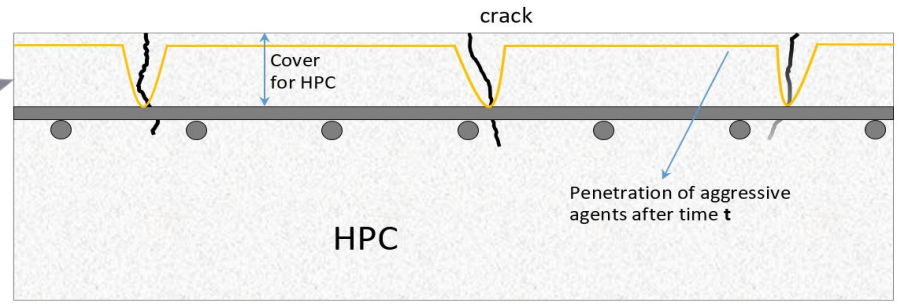
ReSHEALience key technologies:



- Improve concretes and designs: UHPC+functionalities = **UHDC**
- UHDCs for rebar corrosion and chemical attack
- Verification of durability in real site under mechanical and environmental actions







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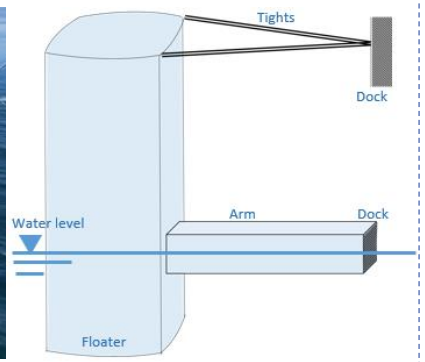
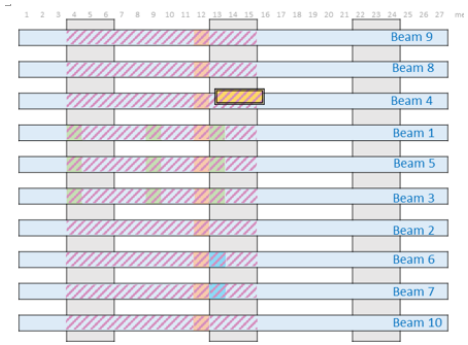
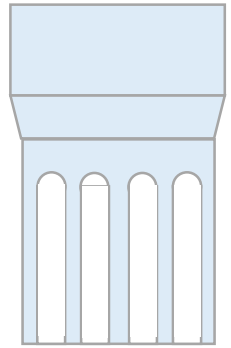
Demostrators



XS: Off-shore platform **TRL 6**

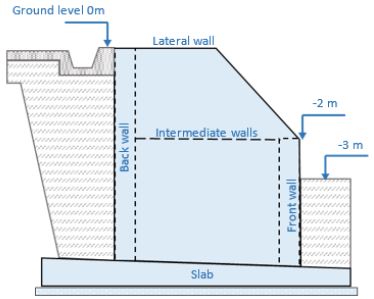


XS: Shellfish raft **TRL 7**



XS: Water tower retrofitting **TRL 7**

XA: Water basin **TRL 6**



XA: Mud basin **TRL 7**

XS: Breakwater **TRL 6**

Two strategic sectors:

Blue Growth: Offshore energy, aquaculture and coastal protection.

Green Growth: Geothermal power plants & Retrofitting of existing structures

NDT MONITORING: External/embedded sensors

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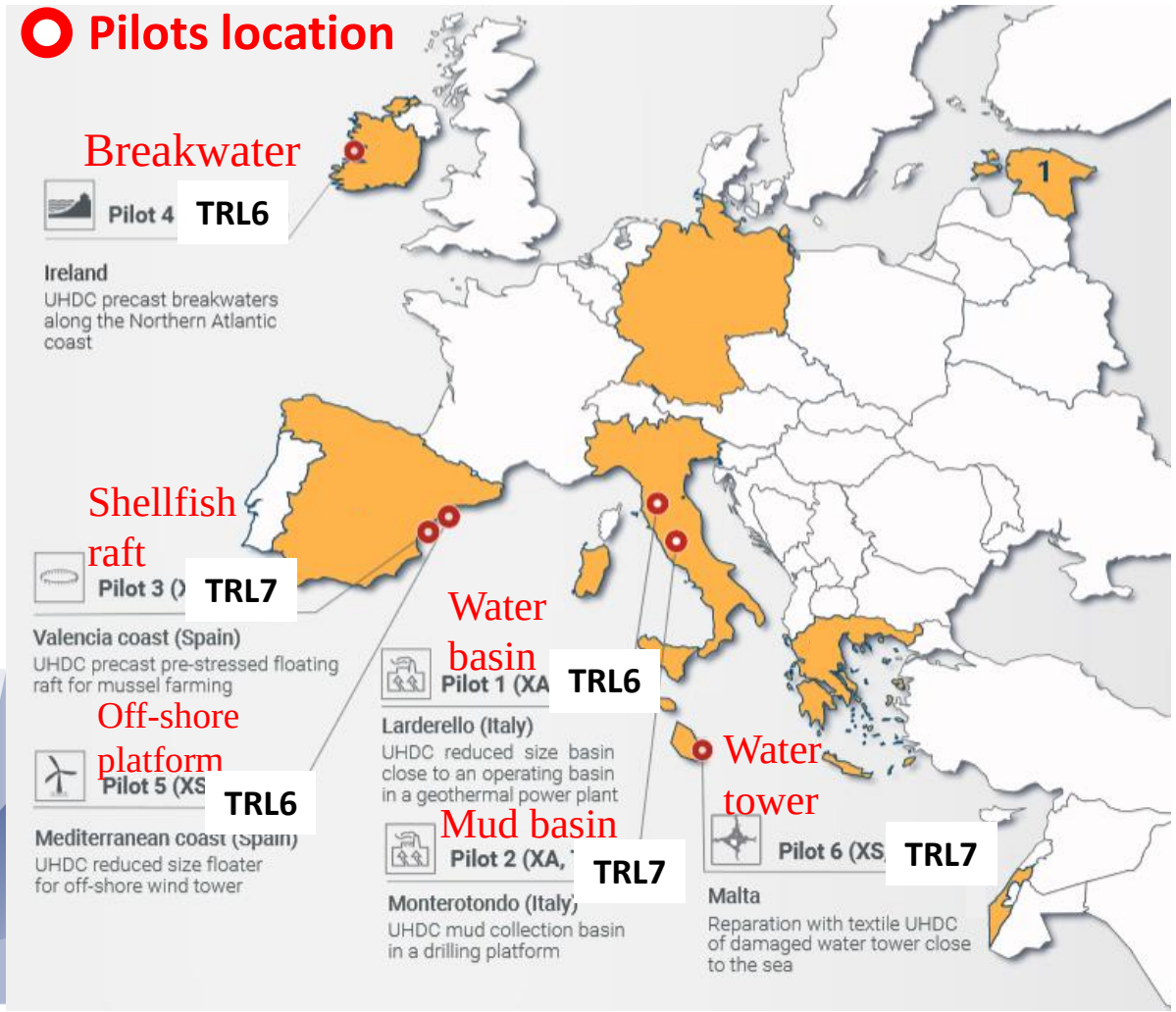
PREFFOR

Pilots location



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