USING WATER-RESISTANT MATERIALS

HAZARD

RAINFALL AND FLOODS

COASTAL DYNAMICS

IMPLEMENTATION STEP

CONSTRUCTION

RENOVATION

AREA OF ACTION

BASEMENT

GROUND FLOOR

COST

€ € €

low medium high

LEVEL OF SKILL

medium

It is not always possible to raise the building to keep it out of the water. In many cases, when floods or coastal flooding occur, water comes into contact with the building's exterior envelope and interior spaces. To limit water damage, it's advisable to use water-resistant cladding materials. These materials can be used on new or existing buildings, and are in line with the Avoid, Resist and Make Way strategies.

IMPACTS

Water-resistant materials can **limit the damage caused by water**, thereby reducing the cost and time required to get a building back into use. After a flood, particularly when water has penetrated the building, it's often necessary to carry out major renovation work on the lower floors and replace badly damaged joinery, flooring, insulation and furniture.

These materials are particularly appropriate when the building is likely to be exposed to floods deeper than 1 m lasting over 48 hours.

INSTALLATION GUIDE

In order to preserve **interior spaces**, and particularly the lower floors, we recommend selecting water-resistant materials for:

- **Interior joinery**: opt for PVC, aluminium or steel joinery for doors, patio-doors and windows.

- **Floors**: reinforced concrete floors are preferable to e.g. wooden floors that are vulnerable to water.

- **Floor coverings**: choose a water-resistant covering or one that can be easily removed.

- **Partition walls**: metal stud walls are the best option, while honeycomb and wood should be avoided.

- **Thermal and acoustic insulation**: use water-resistant insulation such as expanded polystyrene. For health reasons, however, it's generally advisable to replace insulation after a flood.

For the **outer envelope of** the building, we recommend: **waterproofing the walls** (from the inside for above-ground areas and from the outside for below-ground areas) using, for example, a plaster-based coating or water-repellent mortar; sealing the pipes; and choosing water-resistant materials for external joinery.

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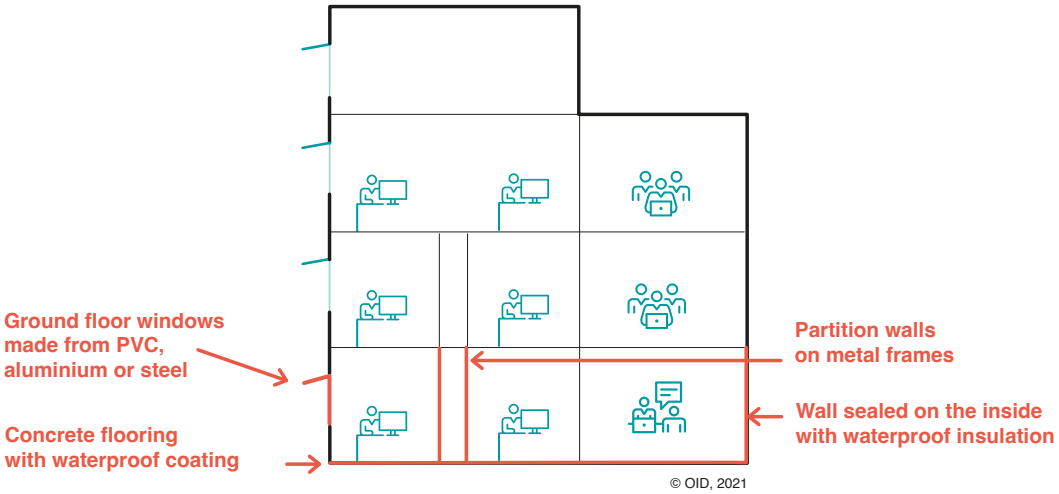
INSTALLATION OF WATER-RESISTANT MATERIALS ON THE GROUND FLOOR OF A BUILDING



WEAK POINTS AND STRONG POINTS

- Water-resistant materials are less suitable for buildings located by the sea. Although they protect against water damage, they **are ineffective against saltwater**, which corrodes buildings. Any cladding affected by salt therefore needs to be replaced almost systematically.
- Regular checks are recommended to ensure that the water-resistant properties remain effective over time.

MALADAPTATION

Maladaptation can result from the following:

Neglect of adaptation measures and strategies

Used alone, water-resistant materials are insufficient. They need to be coupled with other measures and strategies to adapt to flooding and coastal dynamics. In fact, even when water-resistant materials are used, major damage is likely to occur if water infiltrates the building. The best strategy is therefore "avoid, resist or give way to water", and in particular to avoid water by raising the building for installing anti-water devices to prevent water entering, or a combination of the three approaches.

Deterioration due to damp

Some water-resistant materials are less permeable to water vapour, which can lead to damp and condensation problems inside the building. What's more, if moisture manages to get between the waterproof material and the surface of the building, it can become trapped, causing rot and long-term deterioration. Proper air ventilation is therefore crucial.

Exceeding material capacities

If water-resistant materials are not selected with future climate scenarios in mind, buildings turn out to be inadequately protected. Future flooding and coastal flooding could exceed the capacity of these materials, resulting in considerable damage.

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MONITORING INDICATORS

MONITOR MY ACTIONS FOR CLIMATE CHANGE ADAPTATION

+/− : Quantitative indicator ★ : Qualitative indicator

INDICATORS OF MEANS	INTERPRETATION
+/− Percentage of interior joinery for PVC/aluminium/steel doors/ windows on ground and first floors (%)	To be maximised
+/− Percentage of metal-stud walls on ground and first floors (%)	To be maximised
+/− Percentage of water-resistant thermal/acoustic insulation on ground and first floors (%)	To be maximised
+/− Percentage of walls waterproofed from the inside on the ground and first floors (%)	To be maximised
+/− Percentage of walls with external waterproofing for underground parts (%)	To be maximised
+/− Percentage of pipes sealed below first floor (%)	To be maximised

INDICATORS OF RESULTS	INTERPRETATION
+/− Percentage of materials damaged in the event of flood/ coastal flooding (%)	To be minimised
+/− Cost of returning the building to normal after a flood/coastal flooding (€)	To be minimised
+/− Time required to return the building to normal after a flood/ coastal flooding (hours)	To be minimised

FIND OUT MORE

Agence Qualité Construction (*AQC*) (2022), *Construction en zones inondables – Conception et adaptation*

Centre Européen de Prévention du Risque d'Inondation (*CEPRI*) (2010), *Le bâtiment face à l'inondation – Diagnostiquer et réduire sa vulnérabilité*

CEPRI - Centre Européen de Prévention du Risque d'Inondation (2009), *Un logement " zéro dommage " face au risque inondation est-il possible ?*

Cerema, Grenoble Alpes Métropole (2023), *Guide métropolitain de l'aménagement résilient en zone inondable constructible (Metropolitan guide to resilient development in buildable flood zones)*

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