LIMITING THE WIND LOAD ON EQUIPMENT

HAZARD

STORMS AND STRONG WINDS

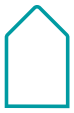
IMPLEMENTATION STEP

CONSTRUCTION

RENOVATION

BUILDING IN OPERATION

AREA OF ACTION



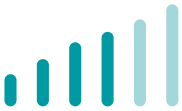
ENVELOPE

COST

€ € €

low **medium** high

LEVEL OF SKILL



medium

When a building is located in an area exposed to high winds, the building's equipment (roofs, gutters, external joinery, fences, photovoltaic panels, etc.) can be damaged or even blown off during storms. To avoid this, it's important to ensure that the equipment on the building and in the surrounding area is capable of withstanding wind pressure and does not represent a threat to the integrity of the building or the safety of its occupants. If this equipment is not strong enough, work may be required to reinforce it, move it elsewhere, or even remove it altogether.

IMPACTS

Limiting the extent to which equipment is exposed to the wind limits the often considerable damage suffered by buildings in the event of storms: part of the roof blowing off, gutters collapsing, water infiltrating, etc. Buildings protected in this way can **continue to perform all or part of their functions** (accommodation, offices, etc.), limiting the economic loss incurred by long delays before returning to normal.

This action also helps to **protect the building's occupants and street users**, who may be at risk if installations blow off or collapse.

INSTALLATION GUIDE

A number of measures can be taken to limit the wind load on equipment, based in particular on the results of an airflow study:

- **Position equipment correctly**: limit the wind load on the roof, in particular by avoiding long roof overhangs and by ensuring a sufficient slope. Similarly, it is advisable to install equipment like aerials and satellite dishes away from the wind, e.g. avoid putting them on chimneys.

- **Opt for aerodynamic shapes**: when designing the building and selecting the equipment, preference should be given to shapes that limit wind resistance, such as curves.

- **Regularly check the condition of the equipment and secure it properly**: this involves regularly walking around the building to make sure that all equipment is in good condition and properly secured. If this is not the case, and when new equipment is installed, it's important to fix it securely.

- **Secure the building's removable equipment before a storm**: by keeping track of weather forecasts, it's possible to anticipate high winds and bring non-fixed equipment (removable solar protections, etc.) inside the building. It's also advisable to develop a strategy and procedures for securing equipment, and to appoint a person responsible for carrying out this strategy.

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Building damaged by a storm (Edinburgh, Great Britain)

WEAK POINTS AND STRONG POINTS

⊕ In France, the design and pitch of a roof and the materials used are regulated by numerous local standards (e.g. local urban plans) and national norms (e.g. NV 65 rules), for either safety or aesthetic reasons.

⊕ To ensure maximum protection against the human and material damage caused by storms, limiting the wind load on equipment should be part of a wider strategy to combat high winds, which requires:

- keeping up to date with the risk of storms on platforms such as Météo France;
- making occupants aware of the risks , the emergency systems available and the appropriate behaviour;
- drawing up a plan for the safe storage of lightweight, valuable and dangerous goods (vehicles, toxic materials, etc.).

! MALADAPTATION

The Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC), published in 2013, observes the likelihood that storm tracks in the southern hemisphere will shift slightly towards the South Pole. As a result, it's imperative that the design and use of equipment in this region take this development into account. The example of Reunion Island illustrates this point well. The Reunion 2016-2023 Multiannual Energy Programme (PPE) sets particularly ambitious development targets for photovoltaic energy. These include the development of small-scale rooftop projects (from private individuals to large industrial and commercial rooftops), as well as photovoltaic shading systems for car parks. However, **greater attention will need to be paid to fixing photovoltaic panels**, as they could be exposed to more frequent and violent winds.

On the other hand, the IPCC is not very confident about the projected evolution of storm tracks in the northern hemisphere. This high level of uncertainty is confirmed at the level of mainland France, since current studies do not reveal any significant future trends in the risk of storm-related high winds by 2050 or 2100. In this context of uncertainty, **the current design of equipment, based on standards of resistance to past winds and ignoring the possibility of more powerful winds**, could lead to the failure of reinforcement systems during more intense storms. In addition, reinforcement measures may not be adequate to deal with unforeseen circumstances such as changes in storm tracks or the specific impacts of climate change at local level.

MONITORING INDICATORS

ESSENTIAL RECOMMENDATIONS WORTH THINKING ABOUT

- IMPLEMENT A STRATEGY AND PROCEDURES FOR SECURING EQUIPMENT
- APPOINT A PERSON TO BE RESPONSIBLE FOR THIS STRATEGY

MONITOR MY ACTIONS FOR CLIMATE CHANGE ADAPTATION

+/– : Quantitative indicator ★ : Qualitative indicator

INDICATORS OF MEANS	INTERPRETATION
+/– Percentage of building equipment (roofs, gutters, external joinery, fencing, photovoltaic panels, etc.) highly exposed to wind (%)	To be minimised
★ Date of last roof maintenance	This maintenance must have taken place within the last 12 months
+/– Percentage of essential recommendations followed (%)	The maximum number of recommendations must be implemented
+/– Percentage of people trained on equipment safety procedures during storms (%)	To be maximised

INDICATORS OF RESULTS	INTERPRETATION
+/– Percentage of building equipment damaged or blown off during storms (%)	To be minimised

CONCEPT / DEFINITION

- A **wind** is generally considered to be **violent**, and therefore dangerous, when its mean inland wind speed reaches 80 km/h with gusts of 100 km/h. However, this threshold varies from region to region, and is for example higher for coastal areas and the south-east of France. On land, a storm is defined as a low-pressure system generating gusts in excess of 90 km/h (*Météo-France*, 2023).

REGULATION / CRITERIA

- It's essential **to maintain your roof regularly, at least once or twice a year.** Maintenance should be carried out just after winter, once the spring has started. When doing so, it's a good idea to check for any damage caused by sub-zero temperatures, frost and snow. During the autumn, any vegetation that has accumulated should be removed (Matmut, 2021).

FIND OUT MORE

Assurance Prévention (2020), *Comment réagir en cas de tempête ou de cyclone?*

Axa (2022), *Comment prévenir et limiter les dégâts d'une tempête?*

Futura-Sciences (2018), *Cyclones - Prevention et secours*

MétéoFrance (2020), *Tempêtes et changement climatique*

Observatoire National sur les Effets du Réchauffement Climatique (ONERC) (2018), *Les évènements météorologiques extrêmes dans un contexte de changement climatique*

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