

## Winter road maintenance

# Technical guide "Storage of winter de-icing materials: management and capacity"

This guide, which will be published by Cerema shortly, replaces the 1992 document on the same subject. It takes a very detailed look at all the parameters to be taken into consideration when creating a storage centre or improving an existing centre.

The content is based on the findings of the work group and the collective experience gained by the various highways operators over the years. Finally, it belongs to a series of documents that are used to manage and improve the purchasing and usage processes of road de-icing materials.

### Context

Consumption of de-icing materials has increased significantly over the last four decades in order to meet growing road transport needs (extension of the networks, demand for high service levels, etc.).

Between 200,000 and 2,000,000 tonnes of road de-icing materials (essentially NaCl) are sold in France every year.

These costs are necessary, because de-icing materials are essential to maintaining the viability of the highway networks in the winter. NaCl is heavy, expensive and not very ecological, but it remains the most efficient solution. The goal is to provide driving conditions that are acceptable to users, to protect their safety and to maintain the traffic and, consequently, economic activity.



NaCl crystals

The entire life cycle of the de-icing materials (from production, through purchasing and transportation, to storage) generates direct and less perceptible indirect environmental costs (the impact of the product on its environment: water, flora and fauna, infrastructures, etc.) and their production and storage are a source of grey energy.

↳ **The increase in the length of roads, successive reorganisations and environmental considerations have sometimes resulted in unsuitable storage capacities in the centres and a distribution throughout France that is not necessarily optimised for a given network.**



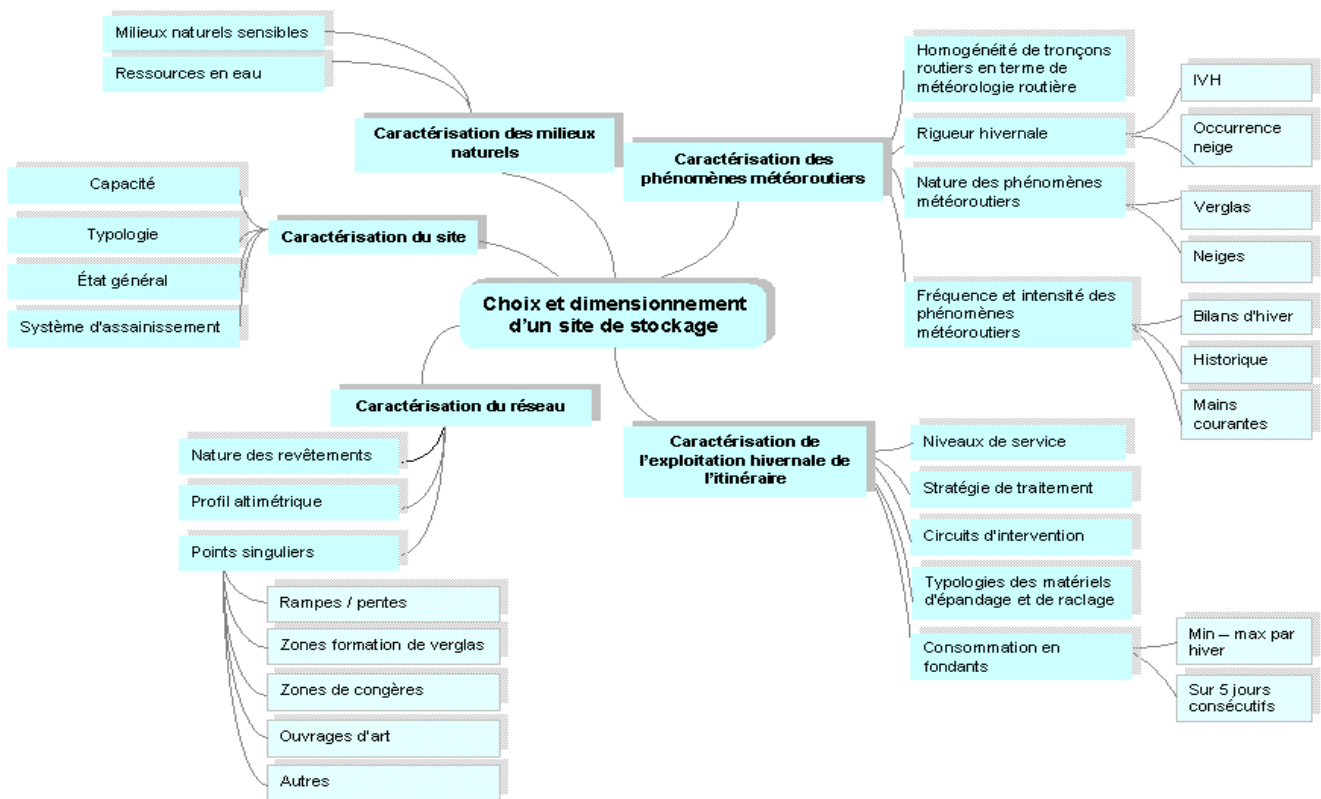
Shelter with a mobile cover

## Storage: the needs, rules and restrictions

Just like any construction, these storage centres must obey the local urban planning rules and take factors related to their location, accessibility, the sensitivity of the ecosystem, the presence of residential dwellings, etc. into consideration. **The choice of the location and storage capacity are important points.** The location **must optimise the circuits**, while the capacity must **be adapted to the types of situations** that are identified on the basis of the history and service levels and, therefore, the **foreseeable consumption**.

Some relatively simple principles apply to the creation of a storage facility:

- ✦ Take the time to analyse: in comparison with the cost of building a storage centre, spending a few days analysing the project represents an insignificant cost, in view of the lifespan of the storage centre (several decades).
- ✦ Involve all the users: from the salt suppliers who have to unload their trucks, to the secretary of the operations centre, who will voice an opinion on the position of the offices.
- ✦ Include the creation of a new storage centre, or the rehabilitation of an existing one, in a global de-icing materials management strategy (analysis of all the storage centres, multi-criteria analyses, etc).
- ✦ Select a location that satisfies operational criteria (accessible, minimal distances) and environmental and urban planning criteria.
- ✦ Take the characteristics of the product itself into consideration. Most of the products are to be diluted in water, and some of them are hygroscopic, even if anti-caking additives are used most of the time.
- ✦ Minimise accidental spillages into the environment right from the design phase (gully grids, presence of water, etc.). Strategies for the reuse of the de-icing materials should also be proposed, by recovering the platform water in salt water generators.
- ✦ Analyse the possible types of constructions and compare the carbon balances.



These principles must be applied when creating a new storage facility.

(a very clear flow chart taken from this guide).

The construction of a public or private storage facility for road de-icing materials represents a long-term commitment for the local authorities. This technical guide is an essential tool to build a project, conduct analyses and define the best solutions.