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RESEARCH BRIEF

AUGUST 2025

DEVELOPING TEMPLATES FOR SALT SHED DESIGN AND CONSTRUCTION

RESULTS SUMMARY

Design guidance for a salt storage structure highlights areas to consider when planning to build a shed. A spreadsheet tool calculates the footprint for three types of structures based on salt storage needs.

PROJECT DETAILS

Project Title: Salt Shed Design Template

Project Number: CR20-06

Project Cost: $124,989

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Need for Research

Salt is a key material that winter maintenance managers use as a deicer to make roads safer during winter weather events. Properly storing roadway salt in a strategically located facility is important for ensuring efficient and effective use and preventing water and soil contamination.

In this project, design features and location were presented for agencies to consult when planning to build a new salt shed structure.

Objectives and Methodology

This project's primary goal was to develop guidance for state and local transportation agencies to use when designing and building a salt shed. A literature review examined strategies to minimize chloride-contaminated water runoff, maximize operations through geographic and site location selection and optimize salt storage facility design. A national survey collected information about current salt storage structure practices from state and local agencies to identify best practices for salt shed designs.

Investigators incorporated information from the literature review and survey to develop a spreadsheet tool that provides guidance on the appropriate sizing of a structure based on storage needs. They also created a detailed checklist of steps that are a part of the design and construction process.

Results

The results from the literature highlighted a number of important design considerations, including the need to adequately address drainage surrounding salt storage structures, determine how salt will be loaded into the structure and identify whether trucks will be loaded inside or outside of the facility. The literature also noted a need for a tool to calculate salt storage facility size requirements based on the amount of salt that will be stored.

CONTINUED

Salt storage facility design must consider operational efficiency, salt storage needs and environmental compliance.

Survey findings highlighted two factors for consideration in the design process: purpose of the building (which may include salt storage, a loading facility, area for prewashing trucks, and brine making and storage) and maintenance requirements.

The results from the literature and survey produced key areas to consider during salt storage structure design, including sizing and footprint of the facility, site selection, environmental factors and structure type. These topics were then used to develop a detailed checklist of design considerations.

For example, when planning the sizing and footprint of a structure, three key factors should be considered: sufficient storage that incorporates future growth in lane miles, method for loading salt into the facility (conveyor system or front-end loader) and the impact of climate change on future salt requirements. During site selection, a location should be chosen that maximizes benefits such as optimizing routes and minimizing the number of miles that trucks travel to obtain additional salt.

Environmental factors to consider during design planning include strategies to prevent chloride contamination in salt shed operations, such as storing salt in a covered facility, proper siting of the facility to avoid water flowing in or out of salt piles, and loading trucks under a roof and on impermeable pads with proper drainage protection to address inevitable salt spills.

The guidance presents three types of salt storage structures: domes, elongated domes and sheds. The choice of structure will depend on factors such as the volume of salt to be stored, the site layout, environmental issues on and around the site, and available project expenditures.

In addition to these topics, agencies should also consider operational requirements, maintenance needs, service area and desired construction timeline.

Implementation and Benefits

Agencies that regularly administer road salt to treat roads during winter weather events will benefit from this guidance for constructing a salt storage structure. Municipalities that have not constructed or previously operated a salt storage structure will find the information particularly useful.

Future efforts to enhance this guidance could include incorporating detailed, scalable design drawings that agencies could use in the planning process.

"The report and accompanying checklist and spreadsheet tool offer useful, high-level guidance especially to agencies beginning the planning process for an initial salt storage site in their municipalities."

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