Conservation of the royal warship Vasa evaluated

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The royal warship Vasa sank in Stockholm on her maiden voyage in 1628.
Credit: Photo: Karolina Kristensson/SMM

The conservation of the royal warship Vasa, which sank in Stockholm on her maiden voyage in 1628 and was raised in 1961, has provided a unique insight into how large waterlogged wooden archaeological relics can be preserved for the future, reveals an evaluation of the conservation programme by a researcher at the University of Gothenburg, Sweden.

"I hope that the importance of the conservation of the Vasa will be recognised and provide inspiration and guidance for other attempts to stabilise the dimensions of waterlogged archaeological timber. As conservation projects of this kind are not carried out all the time, my thesis is a way of preserving experience," says Birgitta Hafors from the Department of Conservation at the University of Gothenburg.

After spending her entire career as a chemist working on the conservation of the Vasa, the now retired Hafors has evaluated the conservation programmes using polyethylene glycol (PEG) that was chosen for the vessel's hull and loose wooden items. At the age of 75, she is now presenting a doctoral thesis on the treatment developed for the warship and used from 1962 until January 1979.

The evaluation focuses particularly on the ability of PEG to prevent or reduce shrinkage during the drying-out of waterlogged archaeological timber, with special emphasis on the oak of the Vasa.

"It turned out that there was often shrinkage during the actual treatment, especially when timber was treated in baths of the preservative solution. This phenomenon is due to water molecules migrating out of the waterlogged timber and into the preservative solution more quickly than the PEG molecules move the other way."

TEMPERATURE IMPORTANT

In her research, Hafors conducted experiments to find the ideal temperatures and concentrations of the preservative solution to prevent waterlogged wood from shrinking during the actual preservative treatment.

"I soon realised that temperature-raising programmes were unsuitable, as they increased the tendency for water molecules to leave the timber. For the conservation of wood from the Vasa in baths, therefore, a stable temperature was chosen, namely 60°C.

"An increase in the concentration of PEG in the preservative solution also caused water molecules to migrate from the timber into the solution. This could be countered by increasing the concentration more slowly."

It also emerged that polyglycols with a lower average molecular weight were less inclined to draw water molecules out of the timber. With all of the polyglycols investigated, the lower the molecular weight, the more effectively they prevented shrinkage of the Vasa's oak. A modified preservative solution for spraying onto the hull was therefore introduced in the early 1970s.

MULTIDISCIPLINARY COLLABORATION

Birgitta Hafors conducted her research as part of the Vasa Museum's conservation operation, which is a multidisciplinary collaboration between the science and arts faculties at the University of Gothenburg.

The conservation of the Vasa is a case study. The experiments have been performed to provide guidance for the future conservation of the Vasa remains, but the results are probably also relevant for other relics in a similar condition. Each individual species of timber needs to be tested in relation to the preservative solution – oak, pine and lime in the case of the Vasa.

The thesis has been successfully defended.

Provided by University of Gothenburg