Tank materials: past and present

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Applying materials to vessel walls (wooden casks, amphorae, etc.) to make them waterproof is of course not a new endeavour – applying pitch (derived from tree resins) to vessels is described in ancient texts. In 19th-century France, vats tended to be used for fermentation in regions where wine would later be aged in barrels (e.g. Bordeaux, Burgundy), but vats would be used for fermentation in other regions where the same vessels would need to double as short-term storage vessels (e.g. Langhe). While tanks were no doubt waxed in many countries, the frequency of mentions, suggests that this practice was more common in Australia. Paraffin wax together with some beeswax was melted and sprayed onto the tank surface. It was left to harden and was applied with a smooth finish. The next year cellar hands would scrape back all the old wax and repeat the process. It was a massive job.

Different coatings (‘enamels’)

Many different coatings were sold to the beverage sector for lining porous vessels. They are marketed as ‘enamels’, but they are not glass enamel. ‘Enamels’ are made from a black bituminous liquid made from a secret formula.

Emaillit and Munkadur

Steel tanks with an Emaillit phenol-based hot-cured lining were used for pressure fermentation tanks. These tanks controlled fermentation speed using pressure, instead of just by cooling. While expensive, these tanks delivered a massive quality improvement – a game changer – for wineries and the beverage industry. Problems with tank lining

Lining wooden, cement and steel tanks can be labour intensive and involve time spent in confined spaces. There can also be issues with the lining materials being damaged and metals leaching into the wine or microbial growth in wood and cement.

Reinforced concrete tanks

Reinforced concrete allowed relatively cheap construction of winery tanks in shapes that maximised the use of space. The final surface is made from layers of cement paste (no aggregate) to give a smooth finish.

Wooden vats or tuns

In 19th-century France, vats tended to be used for fermentation in regions where wine would later be aged in barrels (e.g. Bordeaux, Burgundy), but the same vessels would need to double as short-term storage vessels (e.g. Langhe). Also, while tanks were no doubt waxed in many countries, the frequency of mentions suggests that this practice was more common in Australia.

Artisanal cement

Cement tanks have become chic. The materials are often similar to those used in the past. Historical methods of surface treatment (e.g. tarsitic acid washes) are often being used again instead of the epoxy lining that had become typical for most modern cement tanks. The tanks are available in new shapes, no longer based around space optimisation – allowing better access for use, cleaning, etc.

Waxing tanks – an Australian approach?

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Manual cleaning and sulfuring

Cleaning vats was not for the claustrophobic. Sulfuring was a common operation. It was the process of removing excess yeast from the tanks and the wine. This was done by trying to burn the yeast to death. While tanks were no doubt waxed in many countries, the frequency of mentions suggests that this practice was more common in Australia.

Problems with tank lining

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Silicate treatment of cement

Silicates react with the calcium hydroxide in the cement to create a sealing layer of calcium silicate hydrate crystals. A similar technique is now often used for polished cement floors.

Wooden vats (Cuves en bois)

Wooden tanks are a traditional option for winemakers in regions where wine would later be aged in barrels (e.g. Bordeaux, Burgundy). They are still found today in some places and used for continuous and also bulk white wines. Heading down a large Australian winery (Berri Winery) in South Australia. Open fermenters at Berri Winery, c. 1951

Steel

Steel is a better conductor of heat than cement and metal tanks have thinner walls. This is particularly if water is run over them.

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Metal tanks and cheap water cooling for fermentation

Metal is a better conductor of heat than cement and metal tanks have thinner walls. This is useful during fermentation to dissipate heat, particularly if water is run over them.

Stainless steel – a game changer

For winery tanks and equipment, stainless steel is now the material of choice. The need for lining vessels – and the associated labour, health and safety issues – is eliminated. Stainless steel was one of the most important technical advances in wine production in the 20th century.