

Spray-applied waterproofing membranes: effective solution for safe and durable tunnel linings?

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Abstract. What is the perfect tunnel lining? Cost efficient, easy and fast to build with acceptable environmental impact? How to construct a watertight and safe tunnel lining? Would it be possible to apply a waterproofing system directly onto the rock face just after the tunnel face opening? This might be the system of the future enabling all concrete applied to the rock face to remain permanent. For now though, we would like to focus on an optimisation and examination of currently available technologies and materials, such as tunnel linings with the use of spray-applied waterproofing membranes. In this paper, the failure mechanisms of a tunnel lining with a spray-applied waterproofing membrane are described, the behaviour of spray-applied waterproofing membrane under various conditions (dry, moist, wet) is challenged and the possibilities of interface numerical modelling are presented. Tunnel lining design is mainly dependent on the geological and hydrological conditions in the considered area. The application of tunnel linings with spray-applied waterproofing membrane in both hard rock and soft ground tunnelling, are studied.