Sinking shafts below the ground water level can be a difficult process especially in unstable heterogeneous soils or inner city applications where the ground water management is difficult and the risk of settlements is high. Working under groundwater and being able to excavate and line the shafts in a parallel process, the VSM helps to improve the overall project performance.

Reference projects such as the Ballard Siphon Project in Seattle and the Ala Moana Force Main Project in Honolulu have been proving the benefits of using the Vertical Shaft Sinking Machine (VSM) to sink launch and reception shafts for microtunnelling machines.

In Seattle, a shaft of 30 ft. inner diameter has been sunken to a depth of approx. 147 ft.. and in Honolulu a launch and a reception shaft with an inner diameter of 33 ft. are currently under construction. The first shaft has been finished to a depth of 118 ft. The shafts are constructed with cast-in-place lining using glass fibre reinforcement bars for an easy launch of the microtunnelling machine.

The paper will illustrate and describe the VSM technology, features and its benefits in the mentioned projects and compares the technology to conventional shaft sinking. Moreover, the paper shows further development on the technology, optimizing the VSM to be used in microtunnelling projects that require a minimum foot print, fast job site assembly and minimized effect on the surrounding soil.