The 2025 World Congress on
Advances in Structural Engineering and Mechanics (ASEM25)
BEXCO, Busan, Korea, August 11-14, 2025

Key Technologies and Applications of Shaft Equipment for Pumped Storage Power Stations

1) China Railway Engineering Equipment Co., Ltd.

ABSTRACT

With the continuous expansion of pumped storage power station construction in China, the construction of ultra-deep and large-diameter shafts faces challenges such as low efficiency, poor safety, and significant environmental impacts. This paper focuses on two core equipment technologies in shaft construction for pumped storage power stations—the reaming-type shaft boring machine and the large-diameter raise boring machine—systematically analyzing their key technological breakthroughs and engineering application outcomes. The study first reviews the innovative design of the reaming-type shaft boring machine, including the guided conical rock-cutting cutterhead, split-type combined bearing, propulsion system, and directional adjustment system. Next, it explores the technology of the large-diameter raise boring machine, emphasizing the one-pass reaming process and electric drive control system, which has enabled the construction of 7-meter-diameter shafts in hydropower projects. By comparing the applicable scenarios and performance characteristics of the two technologies, the study highlights their significant value in enhancing construction safety, improving project quality, and advancing the industry's mechanization transformation. The findings provide important technical references and practical examples for shaft construction in pumped storage power stations and similar underground projects in China.

REFERENCES