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The Development of Real-time Detection and Wireless Transmission System of Drilling Parameters in HDD Reaming Hole

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The Development of Real-time Detection and Wireless Transmission System of Drilling Parameters in HDD Reaming Hole

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ABSTRACT: In HDD construction, in order to solve the problem that the real working condition in the hole cannot be accurately grasped only by using surface sensors and instruments, it is necessary to directly detect drilling parameters such as bit torque, axial force and mud pressure. For this reason, an automatic detection system is developed, which has underground part to detect drilling parameters and finish the signal code modulation, and then transmit the signal to the surface receiving equipment in the form of wireless electromagnetic waves for demodulation. The new mechanical structure of the underground part provides the best environment for strain gauge and pressure sensors to detect bit torque, axial force and mud pressure while ensuring sufficient strength. In order to ensure the effective penetration of the formation, the transmission frequency and power of the electromagnetic wave are optimized through theoretical analysis and experimental demonstration, and measures are taken to reduce interference, so as to ensure the real-time and accurate acquisition of the real working condition of the underground bit.

Key words: HDD reaming; Drilling parameters; Real-time detection; Code modulation; Wireless transmission