

Cogging and crawling are two phenomena associated with induction motors.

1. **Cogging:** This refers to the tendency of an induction motor to exhibit notches or detents in its torque-speed characteristics. These notches occur due to the interaction between the permanent magnets in the rotor and the stator's magnetic field. Cogging can result in an uneven or jerky rotation of the motor shaft, particularly at low speeds. It's often undesirable, especially in applications where smooth operation is essential, like in certain types of machinery or robotics.
2. **Crawling:** Crawling, also known as low-speed instability, is another phenomenon observed in induction motors. It occurs when the motor runs at very low speeds, typically below 20% of its synchronous speed. In this range, the motor may experience a reduction in efficiency and develop an uneven or jerky motion, similar to cogging. This phenomenon is primarily caused by the stator slots and rotor slots' magnetic interactions, leading to variations in torque production along the motor's rotation.

Both cogging and crawling can be mitigated through various techniques such as optimizing the motor design, using special rotor designs, or implementing control strategies in the motor drive system.