Back electromotive force (back EMF) is a phenomenon observed in DC motors when they are rotating. It is generated due to the motion of the armature coil within the magnetic field produced by the stator magnets. This back EMF opposes the applied voltage and affects the operation of the motor in several ways:

1. **Counteracting Voltage:** The back EMF generated in the motor opposes the applied voltage, effectively reducing the net voltage across the armature coil. This opposition to the applied voltage is in accordance with Lenz's law, which states that the direction of the induced electromotive force opposes the change in magnetic flux that produces it.
2. **Current Limitation:** As the motor speeds up, the back EMF increases, which effectively limits the armature current. This phenomenon is beneficial as it prevents excessive current from flowing through the motor windings, thereby protecting the motor from damage due to overheating.
3. **Torque Production:** The back EMF affects the torque produced by the motor. At startup, when the motor is stationary, the back EMF is low, allowing a higher current to flow through the armature windings, which produces a higher starting torque. As the motor speeds up and the back EMF increases, the armature current decreases, reducing the torque.
4. **Speed Regulation:** The back EMF contributes to the speed regulation of the motor. As the load on the motor increases, causing the speed to decrease, the back EMF decreases as well, allowing more current to flow through the armature windings, which helps maintain the motor's speed.
5. **Efficiency:** The presence of back EMF improves the overall efficiency of the motor by reducing power losses due to heat generated by excessive current flow.

In summary, the back electromotive force in a DC motor plays a crucial role in regulating current, limiting speed, and ensuring efficient operation. It is an inherent characteristic of DC motors and is essential for their proper functioning.