



The general principle of the shield is based on a cylindrical steel assembly pushed forward on the axis of the tunnel while at the same time excavating the soil.

The steel assembly secures the excavated void until the preliminary or final tunnel lining is built.

The shield has to withstand the pressure of the surrounding ground and, if present, prevent the ingress of groundwater.

The stabilization of the tunnel face can be done by various means :

- natural face support
- mechanical face support
- compressed air face support
- slurry face support
- earth-pressure balance face support



Besides the specific way of supporting the tunnel periphery and face, the specific method of ground excavation is also an important characteristic of shield machines.

These machines advance and get the thrust on the cutterhead by pushing with jacks against the precast concrete segments that are automatically put in place by the machine. This is done in a differentiated sequence: after having completed the whole stroke, the TBM stops excavating and places the segments. Once a whole ring is placed, the jacks push against the ring and a new stroke is initiated.