



BACK-UP SYSTEMS

# SEPARATE SPACES TBM BACK-UP SYSTEMS

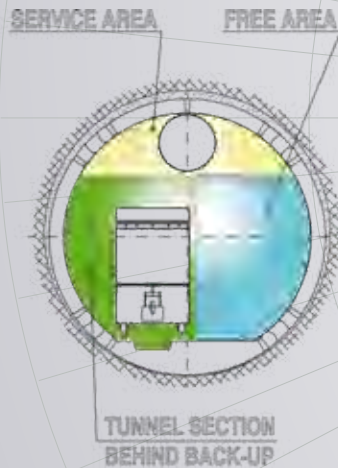
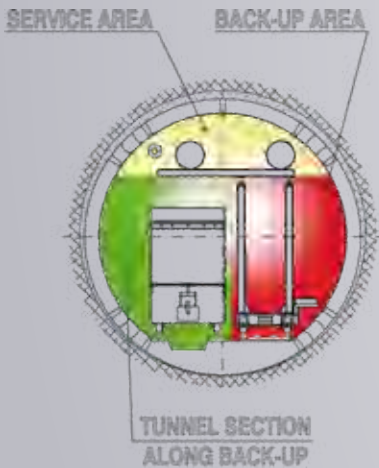
In 1999 SELI Tecnologie has invented the Separate Space Back-Up System (SSBU) for small and medium size diameter TBMs and it has contribute substantially to:

- improve the safety in the tunnels as well as in the Back-Up itself
- increase the productivity and boost up the efficiency of the boring plant/system, decreasing contemporary the manpower necessary to its proper working
- be able to work with muck cars or conveyor belts
- reduce times and costs of assembly and disassembly.

The innovative aspect of SSBU consists of the division of the tunnel section into different and separate spaces which are been designed/created respectively for:

- Back-Up
- service trains
- tunnel lines and services.

Along the tunnel there is a free area for the personnel transit and safety since service trains rail is placed sideways respect to the tunnel axis.





## HIGH PERFORMANCE BACK-UP SYSTEMS

The High Performance Back-Up Systems ( HPBUS ) are designed to achieve the highest production rates and have been used successfully by SELI Tecnologie to execute several projects during the last 20 years. More specifically, five HPBUS were manufactured in order to carry out more than 100 km long tunnels for the diversion of the Yellow River in China where TBM reached 100 m/day of peak production and 1000 m/month of average production.

This kind of Back-Up system has been figured out for tunnel of small/medium size diameter TBMs and represents a design solution that can replace SSBU systems.







## MODULAR BACK UP SYSTEMS FOR LARGE DIAMETER TBM

SELI Technologie under the guidance of its experience in the design and manufacture of Back-Ups for large diameter TBMs has conceived the "Modular Back-Up system" which is characterized by the following innovative aspects:

- each equipment is mounted on a separate frame and then placed on Back-up deck ( modular system ). This makes easier the operations of assembly and disassembly,
- all parts consist of bolted elements to simplify the dismounting and the transport to/from jobsite,
- all TBM auxiliary equipment (hydraulic power pack, electric cabinets and operator console, transformers, lubrication power pack, others) are placed right behind the TBM to make easier the connection and the proper operation,
- Back-Up operation is totally mechanised in all its main functions.