



PROJETS D'INFRASTRUCTURE SOUTERRAINE DE MICROTUNNELS AU MAROC

HECTOR TRIGAL BARCENA ET FELIX RODRIGUEZ GARCIA, EUROHINCA MAROC



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TRENCHLESS MOROCCO 2026

Microtunnelling Underground Infrastructure Projects (Morocco)

“Eurohinca, your trustworthy partner for tunnelling works and sea outfalls”.



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EuroHinca Maroc, S.A.R.L.



TUNNELING



SEAOUTFALLS



PIPE JACKING



SEGMENTAL LINING



T.B.M's

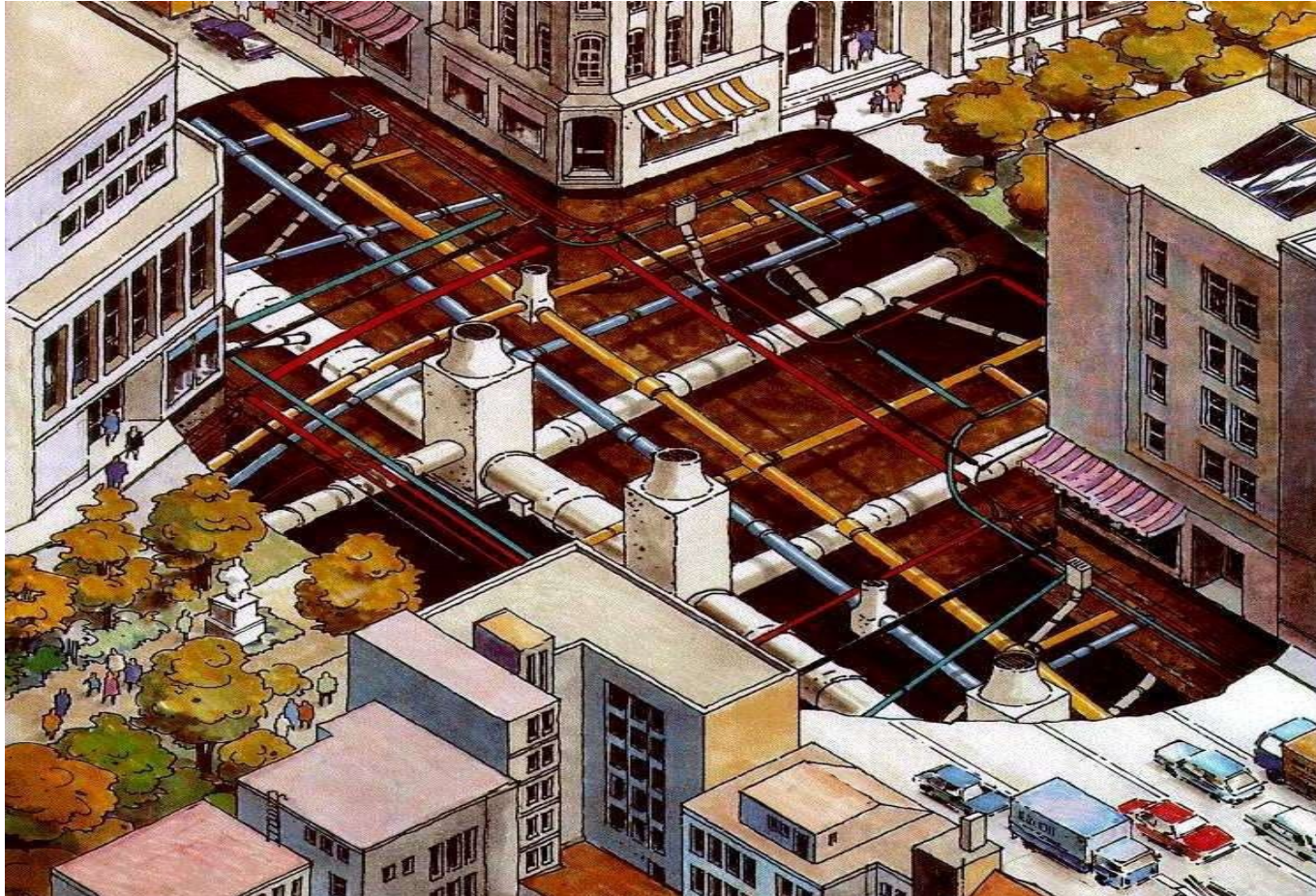


EXPERTISE



QUALITY RELIABLE

MICROTUNNELLING



- GROWING DEMAND FOR UNDERGROUND UTILITIES.
- LIMITATIONS OF OPEN-CUT EXCAVATION.
- TRENCHLESS TECHNOLOGIES AS EFFICIENT AND SUSTAINABLE ALTERNATIVES.
- PROVEN METHODS FOR ACCURACY, SAFETY AND MINIMAL SURFACE DISRUPTION.

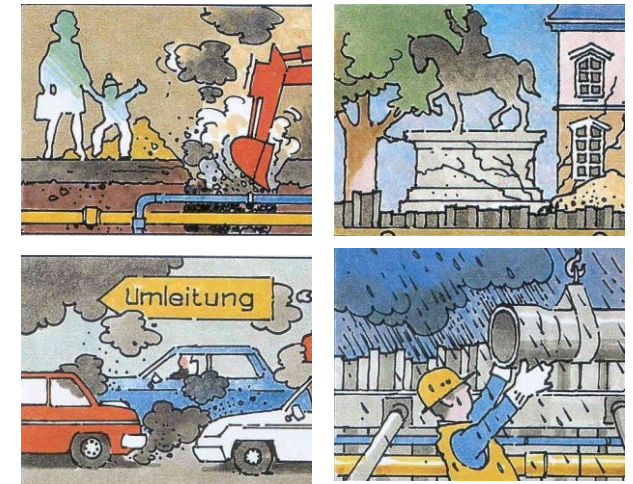
MICROTUNNELLING

- A TRENCHLESS CONSTRUCTION METHOD FOR INSTALLING UNDERGROUND PIPELINES WITH HIGH ACCURACY.
- REMOTE-CONTROLLED.
- ALLOWS CONSTRUCTION UNDER ROADS, RAILWAYS, WATER AND URBAN AREAS WITH MINIMAL SURFACE DISRUPTION.
- COMMONLY USED FOR GRAVITY SEWERS, WATER AND UTILITY PIPELINES.
- DIAMETER RANGE UP TO 4.8 m.

THREE SIMULTANEOUS ACTIVITIES: THRUST – EXCAVATION – REMOVAL

KEY ASPECTS:

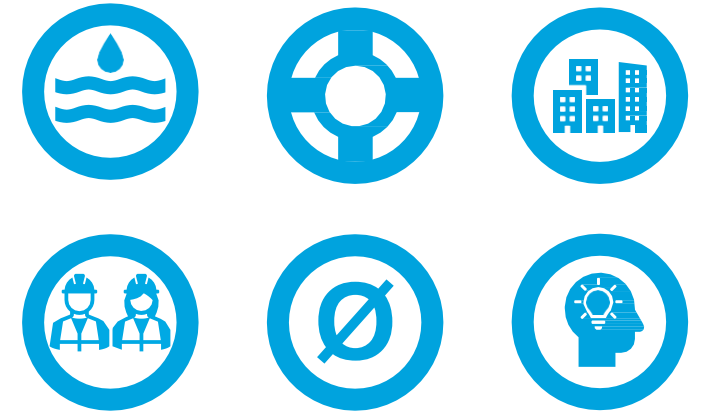
- HIGH INSTALLATION ACCURACY.
- MINIMAL SURFACE DISRUPTION, ideal for urban and environmentally sensitive areas.
- SUITABLE FOR CHALLENGING GROUND CONDITIONS, including high groundwater pressures.
- IMPROVED SAFETY, as no personnel are required at the tunnel face.



MICROTUNNELLING

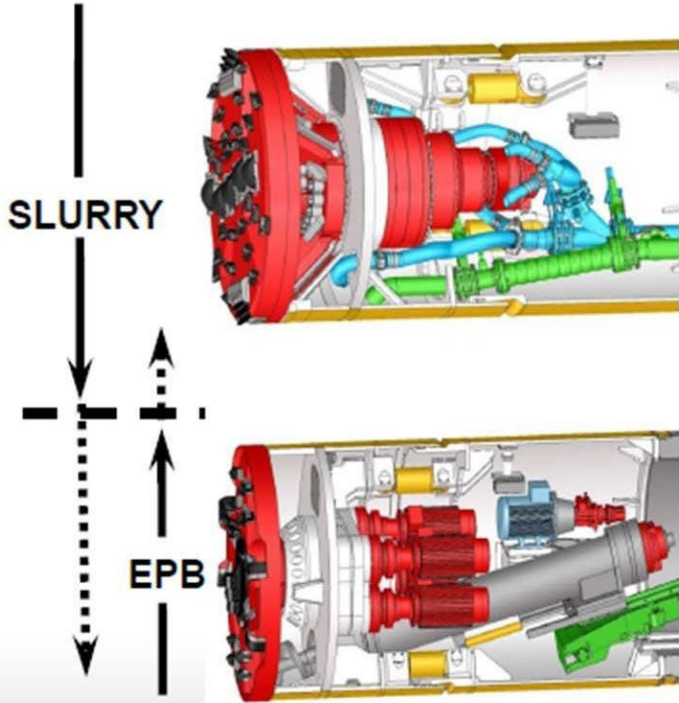
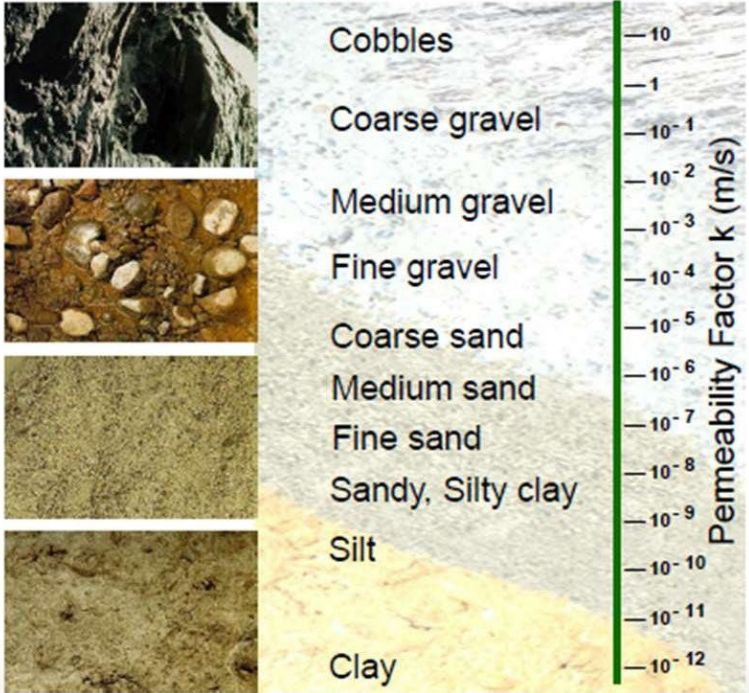
IMPORTANCE and INFLUENCE of GEOLOGICAL and HIDROGEOLOGICAL CONDITIONS:

- ALIGNMENT DESIGN.
- SELECTION of MICROTUNNELLING MACHINE.
- EXCAVATION FACE SUPPORT SYSTEM.
- CUTTERHEAD and CUTTING TOOLS SELECTION.
- REQUIREMENT for GROUND TREATMENT and STABILIZATION MEASURES.
- EXCAVATED MATERIAL TRANSPORT and REMOVAL SYSTEM.
- DESIGN of DRILLING FLUIDS.
- SLURRY TREATMENT and SOLID SEPARATION EQUIPMENT.
- ASSESMENT OF MINIMUM COVER, UPLIFT and BUOYANCY CONDITIONS.
- TYPE of TUNNEL LINING.



**THE CORRECT SELECTION and INTEGRATION of ABOVE PARAMETERS
is the KEY of SUCCESS**

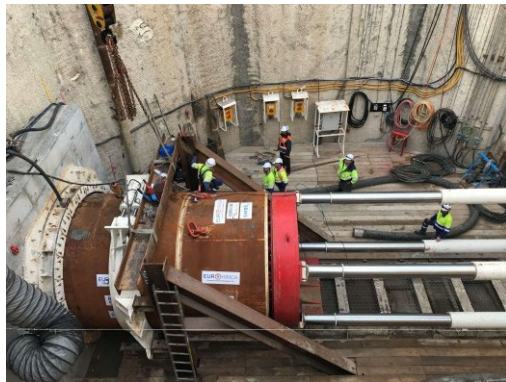
SLURRY and EPB MACHINES



MICROTUNNELLING MAIN EQUIPMENT

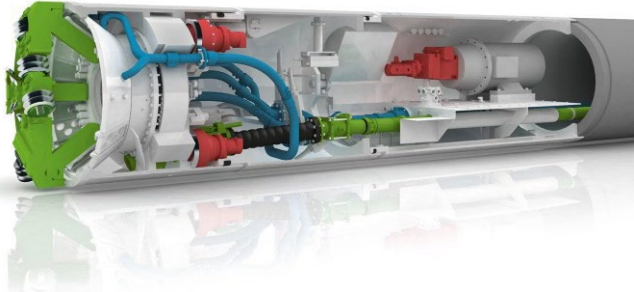
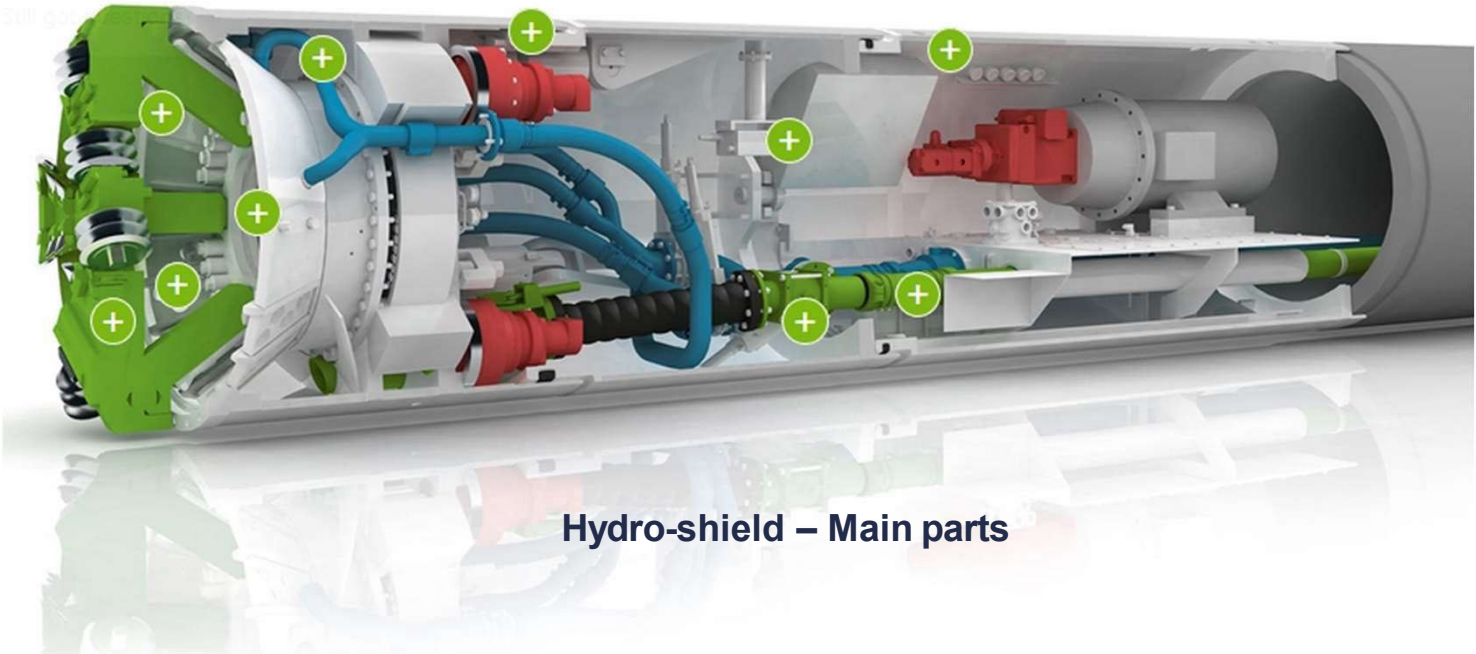
MAIN EQUIPMENT and COMPONENTS:

- MICROTUNNEL BORING MACHINE (MTBM).
- MAIN JACKING FRAME.
- SOLID CONTROL EQUIPMENT.
- DRILLING FLUIDS EQUIPMENT.
- GUIDANCE SYSTEM.
- TUNNEL LINING.

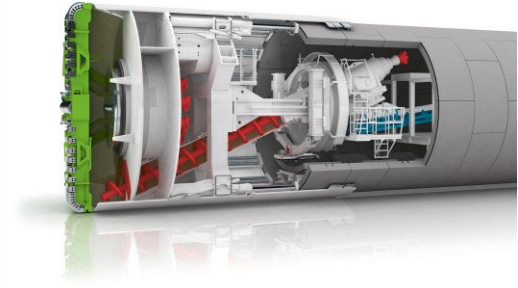


MICROTUNNELLING MAIN EQUIPMENT

MICROTUNNEL BORING MACHINE (MTMB)



Hydro-shield – RCJP lining

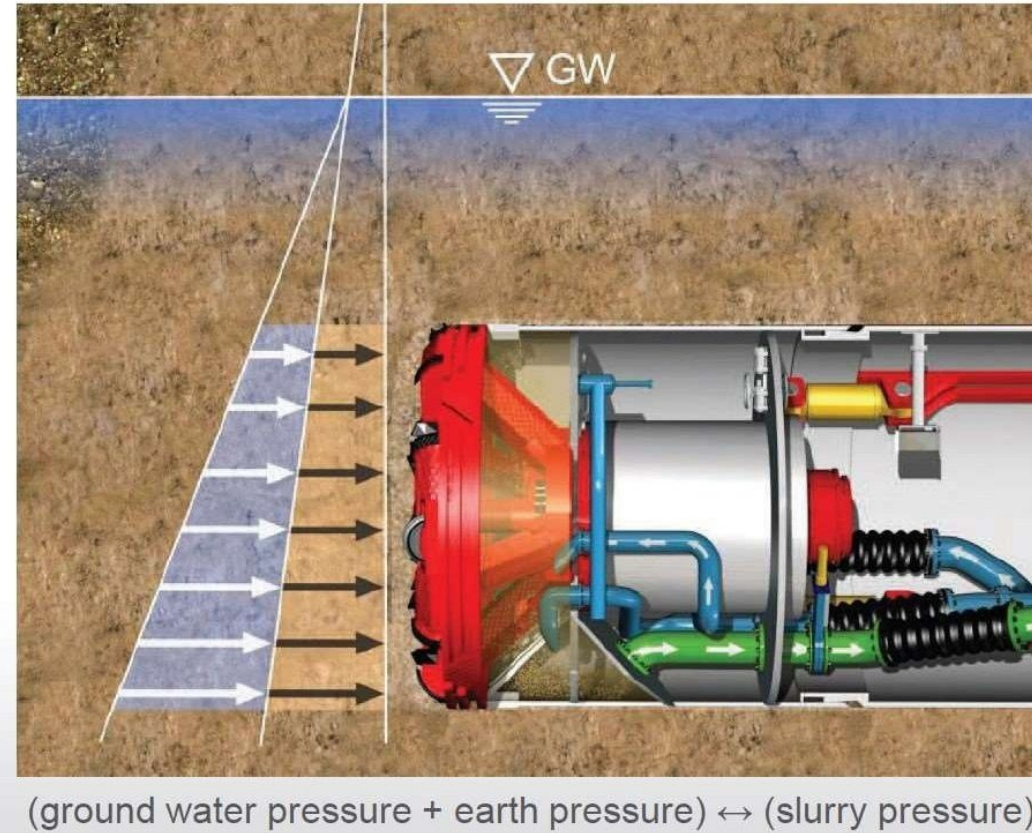


EPB – Segmental lining

MICROTUNNELLING MAIN EQUIPMENT

MICROTUNNEL BORING MACHINE (MTMB)

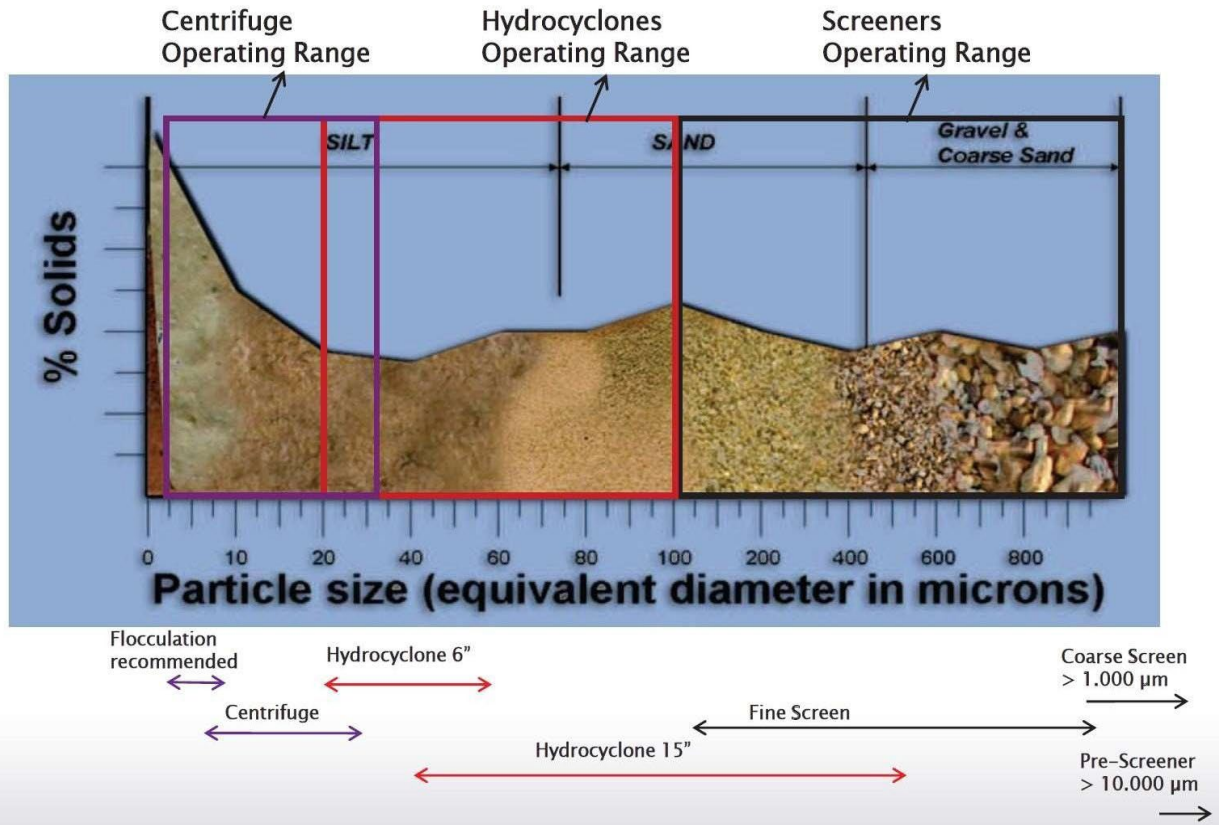
Operating principle – AVN's machines



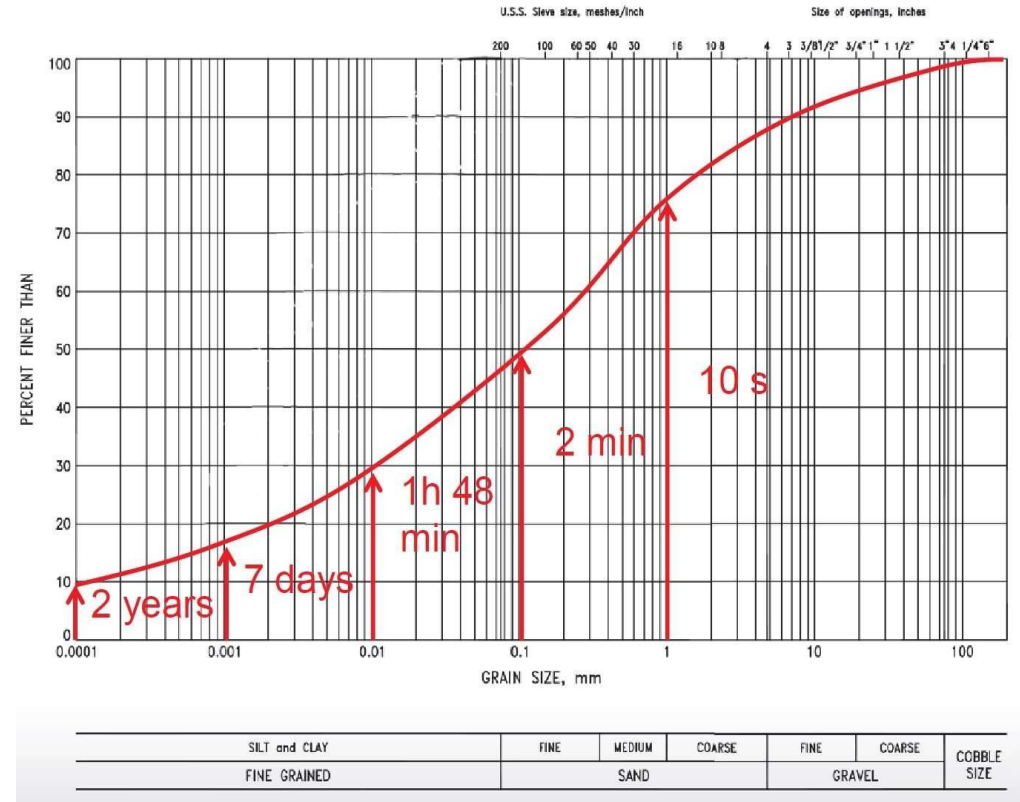
- EXCAVATION
- FACE SUPPORT
- REMOVAL
- THRUST
- LINING

MICROTUNNELLING MAIN EQUIPMENT

SOLID CONTROL EQUIPMENT



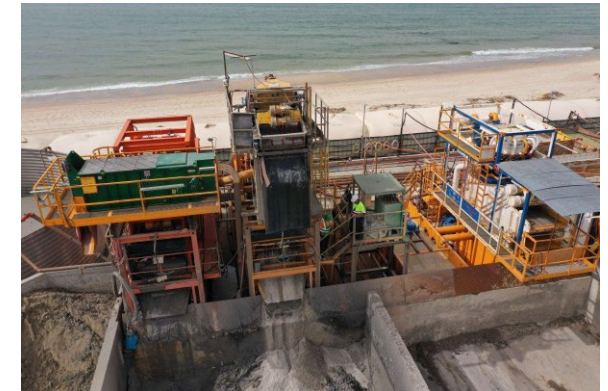
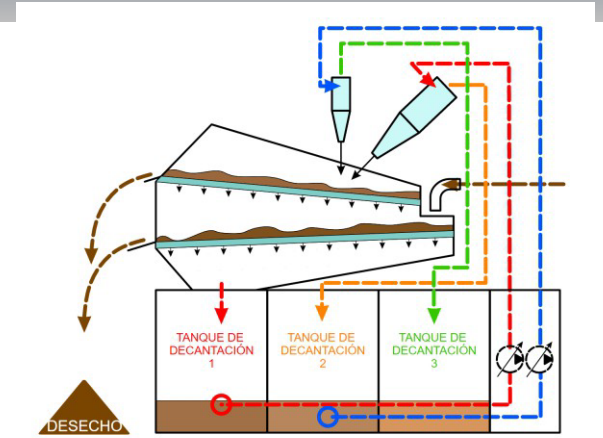
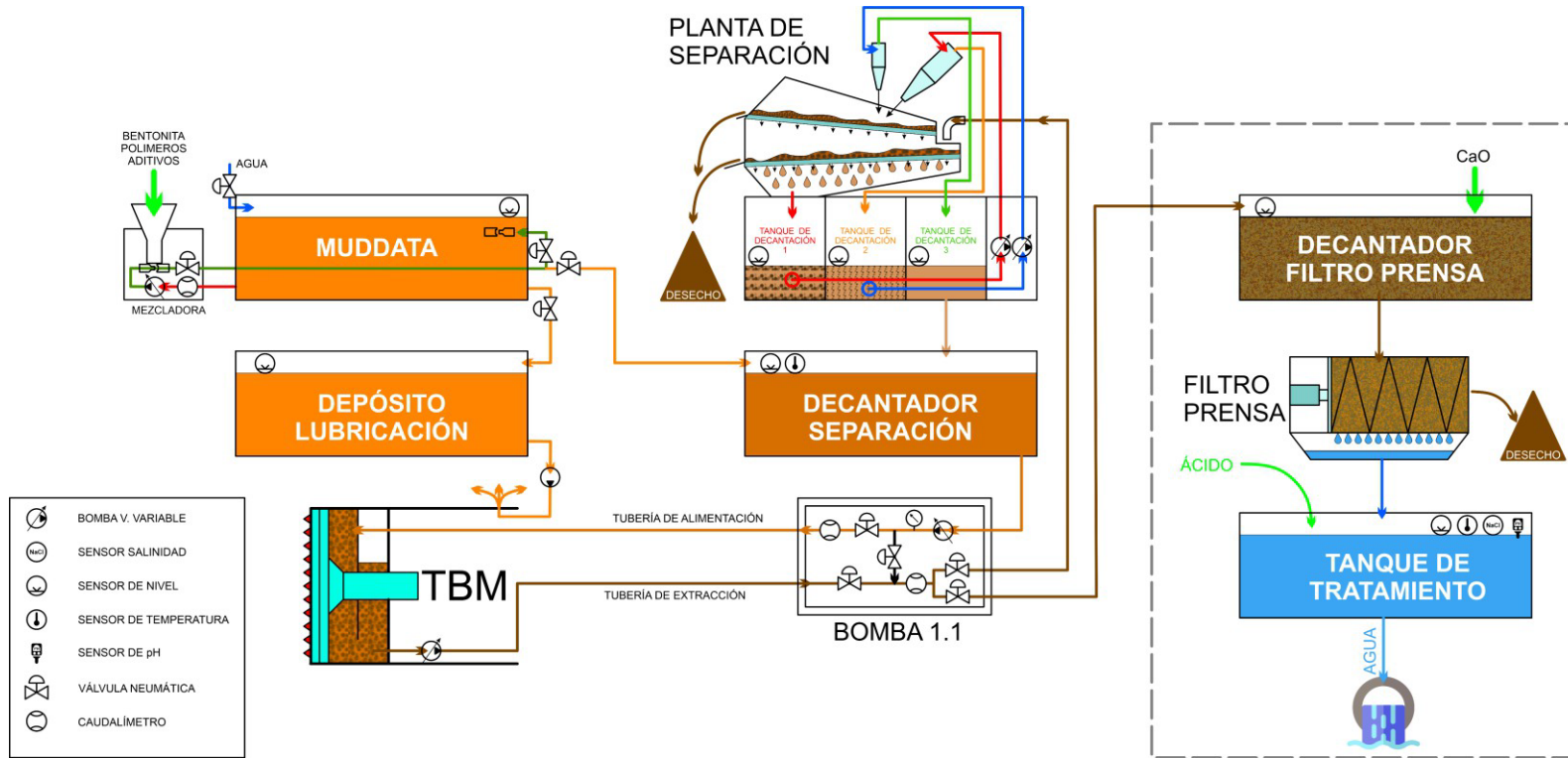
OPERATING RANGE vs. PARTICLE SIZE



PARTICLE SIZE vs. SETTLING TIME

MICROTUNNELLING MAIN EQUIPMENT

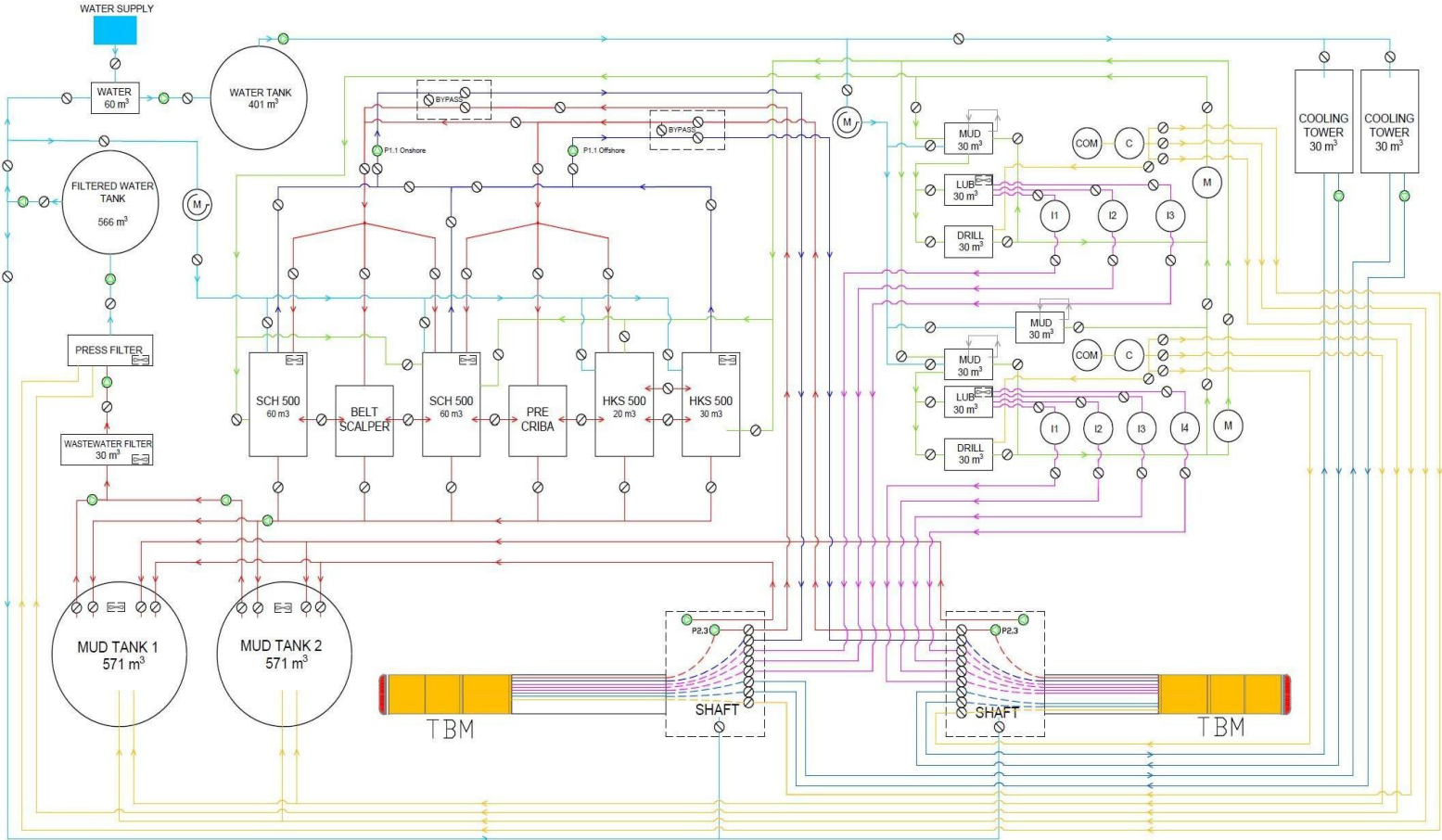
SOLID CONTROL EQUIPMENT



SOLID CONTROL EQUIPMENT

MICROTUNNELLING MAIN EQUIPMENT

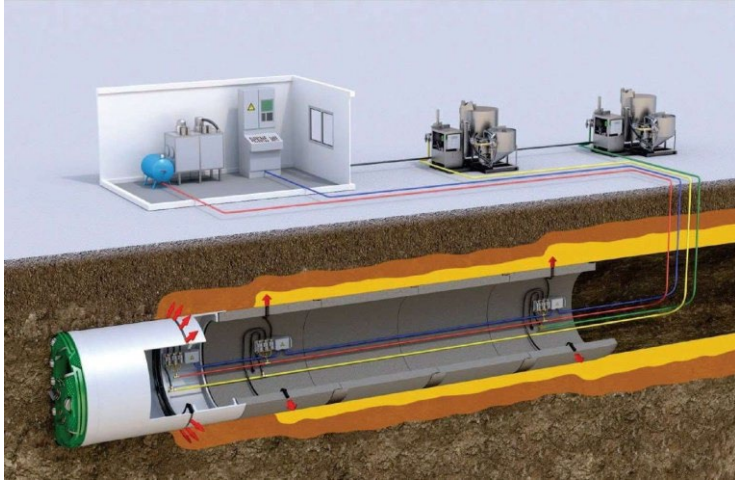
SOLID CONTROL EQUIPMENT



SOLID CONTROL & DRILLING FLUIDS FLOW CHART

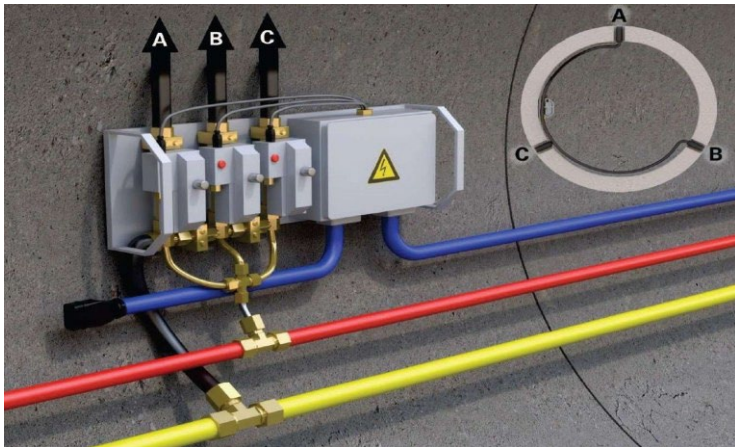
MICROTUNNELLING MAIN EQUIPMENT

DRILLING FLUIDS EQUIPMENT



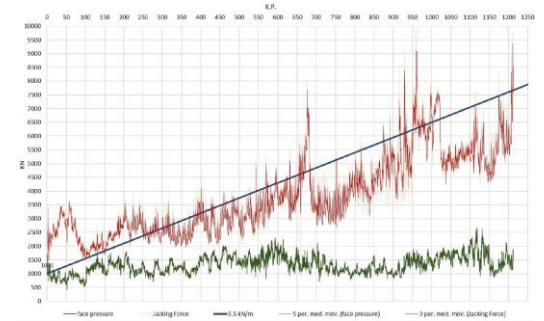
EXCAVATION FACE FLUIDS

- FACE SUPPORT and STABILITY
- CUTTINGS EXCAVATION and TRANSPORT
- ENCAPSULATION
- REDUCTION of TORQUE and WEAR
- COOLING of CUTTING TOOLS



LUBRICATION FLUIDS

- LUBRICATION
- REDUCTION of JACKING FORCES
- ANNULUS STABILIZATION
- SETTLEMENT and GROUND CONTROL



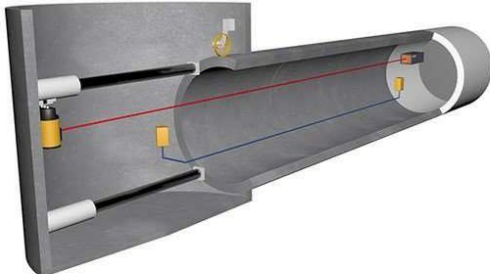
MICROTUNNELLING MAIN EQUIPMENT

GUIDANCE SYSTEM EQUIPMENT

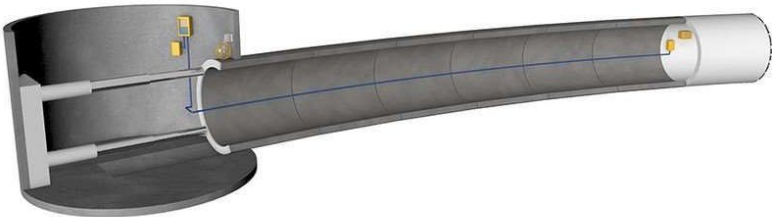
TUnIS Navigation MT^{Laser}



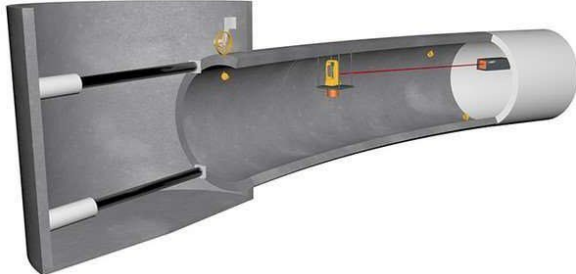
TUnIS Navigation MT^{HydroLevel}



TUnIS Navigation MT^{Gyro}



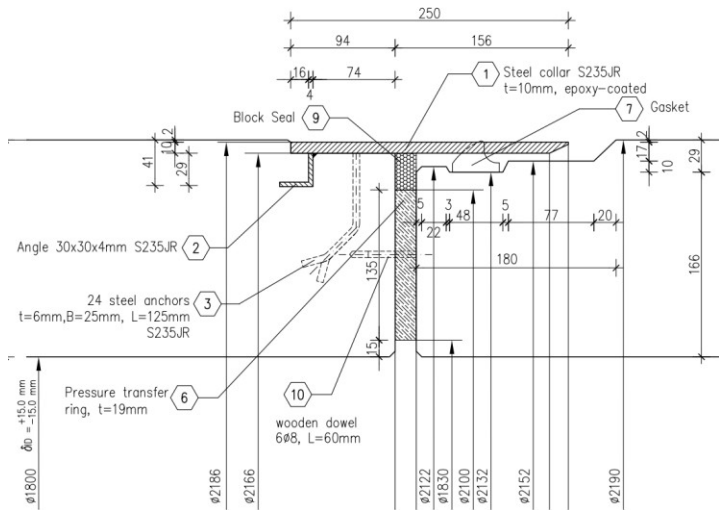
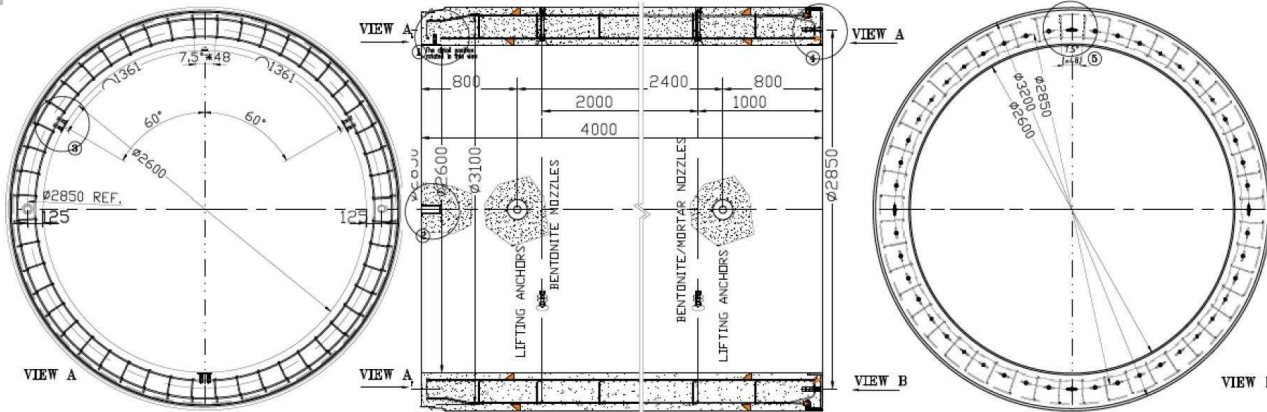
TUnIS Navigation MT^{LaserTotalstation}



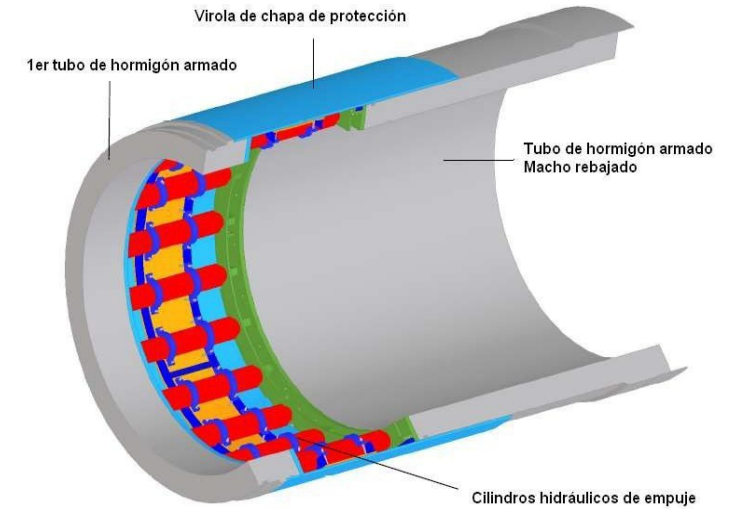
GUIDANCE SYSTEMS – TUnIS NAVIGATION (VMT)

MICROTUNNELLING MAIN EQUIPMENT

TUNNEL LINING

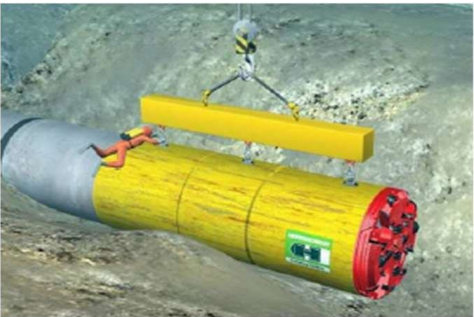
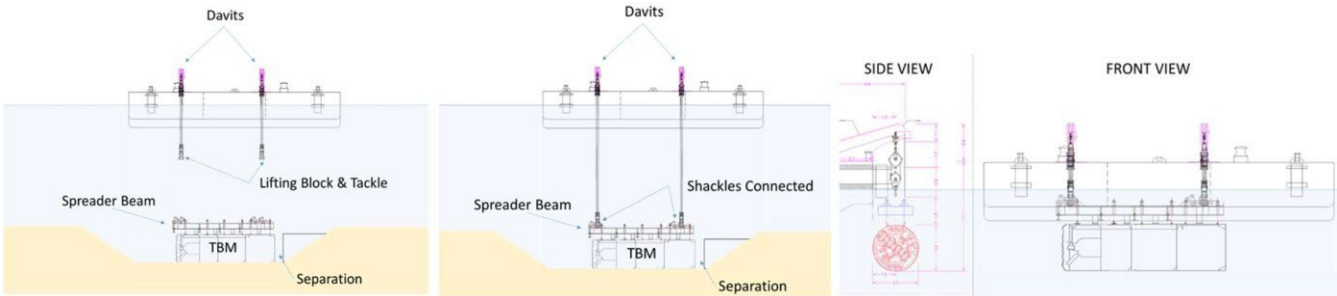


REINFORCED CONCRETE JACKING PIPE



SEA OUTFALLS

SEA OUTFALL EXECUTION – TBM RECOVERY CONCEPT



INFRASTRUCTURE PROJECTS

URBAN and DENSE AREAS



INFRASTRUCTURE PROJECTS

SEA OUTFALLS



PANDO TUNNEL – HYDROELECTRIC PROJECT (PANAMA)



Project Data:

- Owner : Electron Investment, S.A (EISA)
- Client : Electron Investment, S.A (EISA)
- Dates : 2014-2019

Geology:

- Lahar

Geometry:

- Drive: 2,900 m; $\varnothing_{int} = 3,000 \text{ mm}$; $\varnothing_{ext} = 3,500 \text{ mm}$

ENERGY POWER SECTOR



SOUTH OF TEXAS – TUXPAN, ALTAMIRA LANDFALL PROJECT (MEXICO)



Project Data:

- Owner : Comisión Federal de Electricidad
- Client : TC Energía
- Dates : 2017-2018

Geology:

- Clay and Sandy Clay

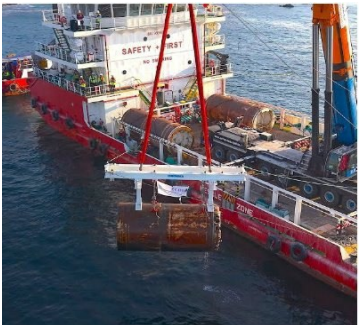
Geometry:

- Drive: 2,246 m; $\varnothing_{int} = 2,600$ mm ; $\varnothing_{ext} = 3,200$ mm

OIL & GAS INDUSTRY



FUENTE HÍDRICA COMPLEMENTARIA (CHILE)



Project Data:

- Owner : Doña Inés de Collahuasi Mining Company
- Client : ACCIONA
- Dates : 2024

Geology:

- Gabbro and andesite rock

Geometry:

- ONSHORE: 358 m; Øint = 2,000 mm; Øext = 2,500 mm
- OFFSHORE 268 m; Øint = 2,000 mm; Øext = 2,500 mm
- 196 m; Øint = 2,000 mm; Øext = 2,500 mm

MINING INDUSTRY



INTERCEPTOR COLLECTOR OF RAINWATER ARPO PROJECT (SPAIN)



Project Data:

- Owner : The Council of Pozuelo de Alarcon
- Client : ASCH - MARCO
- Dates : 2023-2025

Geology:

- Clay and Sandy Clay

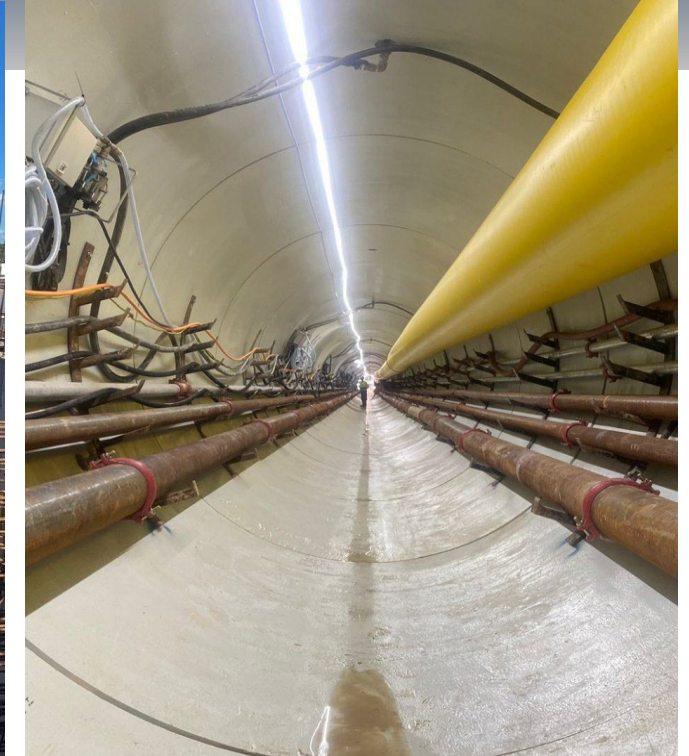
Geometry:

- UWT: 4,543 m; \varnothing_{int} = 4,500 mm ; \varnothing_{ext} = 5,200 mm

SEWAGE SYSTEMS



CASABLANCA – DESALINATION PLANT (MOROCCO)



Project Data:

- Owner : ONEE – Branche Eau
- Client : ACCIONA / Green of Africa
- Dates : 2025- ONGOING

Geology:

- Rock & Clay

Geometry:

- SWI: 1,833 m; \varnothing_{int} = 2,600 mm ; \varnothing_{ext} = 3,200 mm
- SWI: 1,850 m; \varnothing_{int} = 2,600 mm ; \varnothing_{ext} = 3,200 mm
- SWO: 1,706 m; \varnothing_{int} = 2,600 mm ; \varnothing_{ext} = 3,200 mm

DESALINATION PLANT

المكتب الوطني للكهرباء و الماء الصالح للشرب
Office National de l'Electricité et de l'Eau Potable

قطاع الماء
Branche Eau



SAFI NSWI – DESALINATION PLANT (MOROCCO)



Project Data:

- Owner : OCP GREEN WATER PROJECT
- Client : JESA
- Dates : 2025- ONGOING

Geology:

- Rock

Geometry:

- SWI 1: 858 m; $\varnothing_{int} = 2,600$ mm ; $\varnothing_{ext} = 3,200$ mm
- SWI 2: 842 m; $\varnothing_{int} = 2,600$ mm ; $\varnothing_{ext} = 3,200$ mm

DESALINATION PLANT



EURO@HINCA

Thank you!!