GULF TUNNELING

T: +974 4465 1401 ¦ F: +974 4467 0307

E: info@gulftunneling.com

W: www.gulftunneling.com

GULF TUNNELING

COMPANY PROFILE

الخليج للأنفاق
GULF TUNNELING

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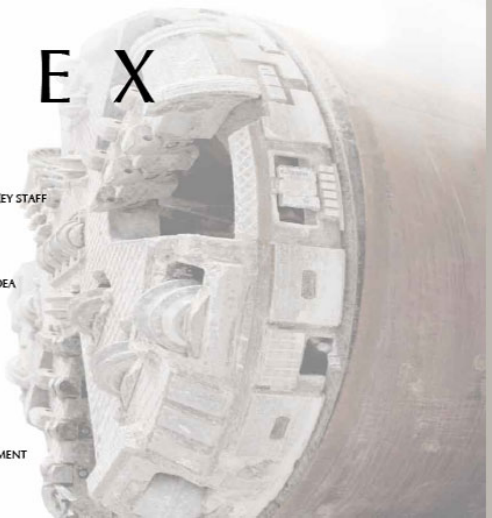
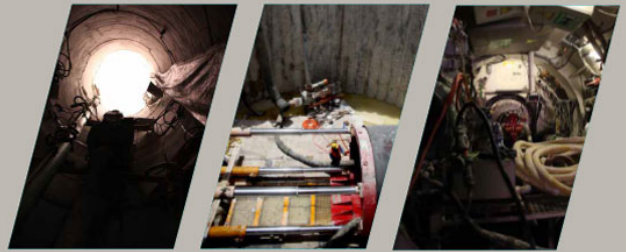


01 COMPANY PROFILE



GULF TUNNELING

Gulf Tunneling (GT) is an engineering firm that specializes in planning and executing complex boring & tunneling works. We are considered the biggest self-contained Micro-Tunneling company in the GCC. Our acquired technological & operational experience—coupled with the rapid growth of the region—allows us to partake in great infrastructure projects and developments throughout the State of Qatar, with over 45,000 meters of tunnel currently installed or ongoing.

Our underground installations have reached remarkable depths, on every type of ground condition, with pipe diameters reaching several meters. We have served government agencies, gas majors, private contractors, and private developers using our field-expertise and our fleet of equipment (including TBMs, separation plants, control containers, cranes, water tankers, and more). Our services include installation of all kinds of underground gravity and pressure pipelines for drainage, water mains, and utility tunnels.

Since inception in 2002, GT has become a leader in the field of Micro-Tunneling. Our technical & commercial team is multinational, comprised of professionals with project experience from around the world. HSE has always been a top priority: we have maintained a record of zero Loss-Time Incidents (LTI) in every project.

At Gulf Tunneling, our objective is excellence.

COMPLEX BORING & TUNNELING WORKS

"biggest self-contained Micro-Tunneling company in the Gulf"

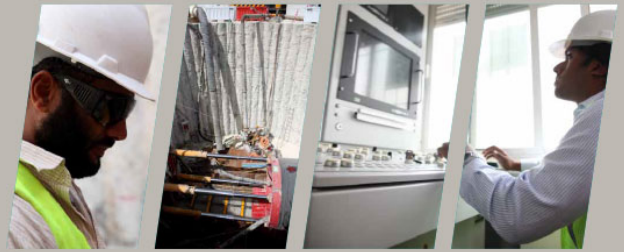
OVER 45,000 METERS OF TUNNEL CURRENTLY INSTALLED OR ONGOING

LIMITLESS SHAFT DEPTHS

MILLIMETER PRECISION

INJURY-FREE OPERATIONS

02 ORGANIZATION CHART & KEY STAFF



KEY PERSONNEL
Summary of Experience

MT IN-CHARGE
HOUSSAM RASSMY, BSc Eng.
- Experience in Tunneling & Boring Works: 16 years (GCC & Egypt)
- Employed by GT: 8 years.

OPERATIONS IN-CHARGE
NADER DAHAB, BSc Civil Eng.
- Experience in Construction: 17 years (GCC & Egypt)
- Experience in Tunneling & Boring Works: 15 years
- Employed by GT: 9 years.

MT OPERATION ENGINEERS
MOHAMMAD DAIDAMONY, BSc Communication & Electrical Engineering
- Experience in Tunneling & Boring Works: 7 years (GCC & Egypt)
- Employed by GT: 4 years

DAVID ABRAHAM, Diploma Electronics Eng.
- Experience in Tunneling & Boring Works: 12 years (GCC & India)
- Employed by GT: 3 years

HUSHAM IBRAHIM, BEng.
- Experience in Tunneling & Boring Works: 14 years (GCC, India, Africa)
- Employed by GT: 4 years

TAREK ABU LAILA, BSC Mech Eng.
- Experience in Tunneling & Boring Works: 12 years (GCC & Egypt)
- Employed by GT: 7 years

HDD OPERATORS
KAMBALATHAN M
- Experience as Directional Drilling Operator: 12 years (GCC & India)
- Employed by GT: 3 years

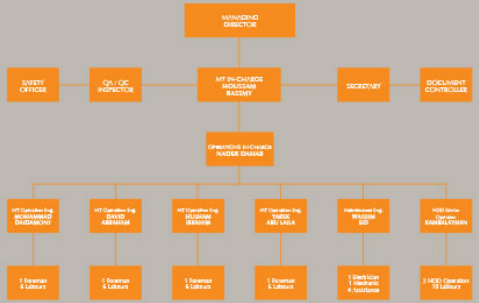
MANIVEL ELAVAZHGAN
- Experience as Directional Drilling Operator: 10 years (GCC)
- Employed by GT: 3 years

VENGADASMY MUTHURAJ
- Experience as Directional Drilling Operator: 11 years (GCC)
- Employed by GT: 2 years

MAINTENANCE ENGINEERS
WASSIM EID, BSc Mech Eng.
- Experience in Maintenance Works of Heavy Plant & Equipment: 10 years (GCC & Syria)
- Employed by GT: 1 year

HSE OFFICER
JIMOH KAZEEM ADEWALE
- Experience as Health, Safety, Environment Officer: 9 years (GCC & Africa)
- Employed by GT: 2 years

ORGANIZATION CHART



EXPERIENCED. PASSIONATE. QUALIFIED.

MicroTunneling In-Charge

HOUSSAM EL-DIN MOHAMED RASSMY

QUALIFICATIONS:
B.Sc. Eng.
Ain Shams University • Cairo 1989

CAREER SUMMARY:
Over 16 years' experience as a Tunneling Operating Engineer.

EMPLOYMENT RECORD:

2002 • Present — **Gulf Tunneling**
***Micro-Tunneling In Charge**, Doha, Qatar*
BP#1G - 18(3) Al Luqta Micro Tunnels & Ducts
Doha Express Way - D Ring Road Interchange

Civil Project 622/2	Tunnel	200m
Civil Project 624 & 625	Tunnel	1,800m
Civil Project 174/1	Tunnel	250m
Civil Project 622/1	Tunnel	280m
Civil Project 621	Tunnel	760m
Civil Project 394	Tunnel	3,500m
Industrial Area Sewerage • Phase 1		

1998 • 2002 — **Silver Coast Construction & Boring Co. LLC Millennium T&GM**
***Micro-Tunneling Operating Engineer**, Abu Dhabi, UAE*

Mirfaa Sewerage Scheme	Tunnel	4,000m
Abou Hassa Road Crossing	Tunnel	700m
Qurain Al Aish & Mirfaa	Tunnel	1,450m

1996 • 1998 — **Astraco Construction**
***Micro Tunneling Operating Engineer**, UAE*

Al Ain Water Distribution Network	Tunnel	3,300m
Water Distribution Network at Al Shabak	Tunnel	400m

1995 • 1996 — **Admak**
***Micro Tunneling Operating Engineer**, Bahrain*

Heeliah 1 & 2	Tunnel	820m
Samha Sewerage Scheme 503/1	Tunnel	970m

1994 • 1995 — **Behzad**
***Micro Tunneling Operating Engineer**, Bahrain*

050/98/31 66kV Transmission Dev.	Tunnel	900m

Operations In-Charge

NADER FADL MAAMOUN DAHAB

QUALIFICATIONS:
B.Eng. Civil Engineering
Zagazig University, Egypt - 1992

CAREER SUMMARY:
Over 16 years' experience as a Tunneling Operating Engineer.

EMPLOYMENT RECORD:

2006 - Present — **Gulf Tunneling**
***Operations In-Charge**, Doha, Qatar*
Supervision & execution of "Herrenknecht" micro-tunneling machine for AVN 600, AVN 800, AVN 1000, AVN 1200, AVN 1600, AVN 2000 and AVN 2400 BP#1G - 18(2) Al Luqta Micro Tunnels & Ducts

Doha Express Way - D Ring Road Interchange		2,745m
Civil Project 958	Tunnel	680m
Civil Project 622/2	Tunnel	200m
Civil Project 624 & 625	Tunnel	1,800m
Upgrading of West Bay & Gharaffa Water Station		44km

2001 - 2006 — **General Construction Co.**
***Senior Project Engineer**, Abu Dhabi, UAE*
Construction of Water line & Civil Work for 8,000 residential accommodations at Alshawamekh

1997 - 2001 — **Al Mashaa Drilling Est.**
***Assistant Project Manager**, Abu Dhabi, UAE*
Supervision & operation of "Herrenknecht" micro-tunneling machine for AVN 800, AVN 8008, AVN 1000, AVN 1200, AVN 1500

ADGS Contract No. 507/1	Tunnel	290LM
ADGS Contract No. 507/2	Tunnel	640LM
ADGS Contract No. WED/AD/208-206	Tunnel	1400m
ADGS Contract No. 142/18	Tunnel	500LM
ADGS Contract No. 142/18	Tunnel	440LM
ADGS Contract No. 404	Tunnel	826LM
ADGS Contract No. 814/4	Tunnel	700LM
ADGS Contract No. N-0226	Tunnel	200LM
ADGS Contract No. 142/18	Tunnel	900LM
ADGS Contract No. 718A	Tunnel	1,760m
ADGS Contract No. 815/5	Tunnel	790LM
ADGS Contract No. 981	Tunnel	920LM
ADGS Contract No. 408/1	Tunnel	800LM
ADGS Contract No. N-00-0202	Tunnel	900LM
ADGS Contract No. N-000-0172-Lot A	Tunnel	1,100m
ADGS Contract No. WED-44/89	Tunnel	2,180m
ADGS Contract No. 48/2 Dubai Municipality	Tunnel	1,480m

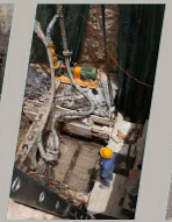
1995 - 1997 — **Cairo Water Consortium**
***Tunneling Engineer**, Cairo, Egypt*
Supervision & execution of shield machine (Lovat - Germany)
for 2,200 mm DIA with Tunnel 6,400m
Supervision & execution of Herrenknecht Micro-Tunneling machine for AVN 600

1994 - 1995 — **Cregter Cairo Utility Data Center**
***Civil Engineer**, Cairo, Egypt*

1993 - 1994 — **Mechanical Engineering Group Co.**
***Civil Engineer**, Cairo, Egypt*

03 EXPERIENCE






PROJECTS Horizontal Directional Drilling (HDD)

Project No.	Project Name	Client	Main Contractor	Diameter of Tunnel (mm)	Length of Tunnel (m)
BP#1G-18 (2)	QP Al Luqta Micro Tunnels and Ducts	Drainage Affairs, ASHGHAL	QBC	600	889
GTC 142/D/2006	Qatar Power Transmission System Expansion Phase V111/EHV Power cable	KAHARAMAA	QBC	700	640
TAC/LUS/101/09	Lusail Development Project Sewerage Treatment Works	Lusail Real Estate/Qatari Diar	QBC	200	108
GTC 276/2009	Existing Distribution Network	KAHARAMAA	Al Waha Contracting	200	182.5
GTC040	Design & Distribution of Traffic Diversion for Wakra Ras Abu Abboud Road Intersection	Road Affairs, ASHGHAL	QBC	160	96
GTC 177/2007	Head Works Construction at Airport/Old Salwa, Doha SW & Messaeed Town	KAHARAMAA	QBC	200	165
GTC 142/E/2006	Qatar Power Transmission System Expansion Phase V111/EHV Power Cable	KAHARAMAA	QBC	200	126.4

04 MICRO-TUNNELING
THE IDEA

MICRO-TUNNELING
As the name implies, micro-tunneling is the term for constructing small tunnels. These small diameter tunnels make it impossible to have an operator inside the actual machine. Instead, the micro-tunnel boring machine ("MTBM") must be operated remotely.

OPERATOR
The operator directs the machine remotely from the safety of a control room on the ground´s surface. The operator is given constant feedback about the machine location, orientation, and corresponding hydraulic devices via a computer console. Machines also have video cameras and laser guidance that give the operator more information. The operator controls the MTBM and the jacking frame with *millimeter* precision.

PIPE
In most micro-tunneling operations the pipe is inserted from the entrance and pushed behind the machine. This process is often called "Pipe Jacking". As the machine advances, more tunnel liner is pushed from the entrance; thus, the speed of the advancing machine is controlled by the speed at which the pipe is inserted.

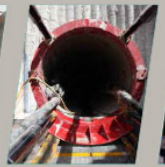
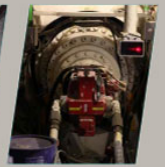
FRICTION
As the length of tunnel increases, the friction against the earth around the pipe also increases.

Two practices are used to minimize this friction. First, "over-cutting" gives a slight gap between the inner edge of the tunnel and the outer edge of the liner. This requires a cutter wheel with a diameter ½ inch (12mm) to 4 inches (100mm) larger than the outside diameter of the liner. Second, an economical and ecologically-friendly lubricant, often bentonite slurry, is injected into this gap.

In addition to the actual lubrication effect, the pressure of the lubricant also prevents the gap from collapsing.

LONGER TUNNELS
In addition to the jacking frame, smaller jacks, called "interjacks," may be inserted between sections of longer tunnel liners. These interjacks push the two sections of liner apart, while friction on the liner sections between the interjack and the tunnel entrance prevent the liner from sliding backwards. Therefore, the liner behind the interjack does not move, and the sections in front of it receive additional pushing force.



05 MT TECHNICAL DESCRIPTION

1. MICRO-TUNNELING
IN BRIEF

GT uses the world's most reliable Micro-Tunneling machine, Herrenknecht AVN type—complete with all equipment—to drive non man-entry tunnels, using pipe-jacking techniques in the trenchless concept of pipe works. This modern machine type now allows access to the working face from the jacking pit via a door just behind the cutting face. Obstacles such as sheet piles, steel girders, and boulders can now simply be removed. This new access also provides the ability to replace worn cutter rings, allowing tunneling in hard rock to be extended to retention lengths of over 500m.

This system is ideal for use in urban areas. Additional ground-improvement processes will be unnecessary (such as compressed air, ground treatment, or freezing), and the convenient size of the launching and reception shafts allow for:

- *Minimal disturbance to traffic*
- *Maximum possible conservation of protected landscape areas*
- *Compact containerized equipment design on the surface*

CREW

The Gulf Tunneling crew that is responsible for the Herrenknecht AVN machines operation and maintenance are:

- MT engineer/operator
- MT fitter & welder
- MT electrician
- 5-7 laborers

M/S Herrenknecht will provide direct technical assistance and/or presence on a need-to basis in the rare case of unforeseen difficulties during execution.

SYSTEM COMPONENTS

Micro-tunneling system components used on most projects include:

- *Micro-tunneling machine c/w cutting head*
- *Control container c/w power pack module*
- *Jacking frame*
- *Interjack stations*
- *Separation plant c/w tanks with fresh water storage capacity*
- *Mobile crane to set up the machine and to handle the pipes*
- *Bentonite pump and bentonite system*
- *Feed and slurry pumps*
- *Pipe rack to hold feed and slurry pipes*
- *Shaft feed and flexible slurry lines*
- *Launch seals*
- *Laser guidance system*
- *Generator with sufficient power output for all components' requirements*
- *Launch and reception shafts*
- *Jacking pipes 3 meters long*
- *Water supply*

KEY ADVANTAGES TO MICRO-TUNNELING/PIPE-JACKING

Micro-Tunneling and Pipe-Jacking is reliable and cost-effective. Key advantages include:

- *Minimal earth moving (only for launching & receiving shafts)*
- *Absence of ground-water lowering (thus preventing dangerous settlements of building foundations and road services)*
- *Optimal protection for people and nature*
- *Minimal effect to traffic and pedestrian mobility above ground*
- *Flexible driving alignment (i.e. curved or linear)*
- *All-weather construction (thus allowing for rapid completion and meeting deadlines)*
- *All ground-condition tunneling (including clay, silt, sand, gravel, and limestone)*

06 HDD

HORIZONTAL DIRECT DRILLING

Directional boring, commonly called horizontal directional drilling or "HDD," is a steerable trenchless method of installing underground pipes, conduits, and cables in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area. Directional boring is used when trenching or excavating is impractical.

Directional boring minimizes environmental disruption. It is suitable for a variety of soil conditions and jobs including road, landscape, and river crossings. Installation lengths up to 2,000m have been completed, and diameters up to 56" (1,200 mm) have been installed in shorter runs. Pipes can be made of materials such as PVC, polyethylene, ductile iron, and steel, as long as the pipes can be pulled through the drilled hole.

Directional boring is used for installing infrastructure such as:

- *telecommunications and power cable conduits*
- *water lines*
- *sewer lines*
- *gas lines*
- *oil lines*
- *product pipelines, and*
- *environmental remediation casings.*

It is used for crossing waterways, roadways, shore approaches, congested areas, environmentally sensitive areas, and areas where other methods are costlier.

HDD is used instead of other techniques to provide less traffic disruption, lower cost, deeper and/or longer installation, no access pit, shorter completion times, added directional capabilities, and overall environmental safety.

The technique has extensive use in urban areas for developing subsurface utilities as it avoids extensive open cut trenches. Uncontrolled drilling can lead to damages of existing utilities, however; so, the HDD method necessitates that the operator has complete information about the existing utilities so that he plans the whole alignment in a way that prevents any damage to them. Different government agencies have established legislation to ensure safe work execution and to authorize such work in urban environments. Different trenchless-technology promoting organizations have developed guidelines for this technique in order to standardize of the techniques.

07 EQUIPMENT

CONTROL CONTAINERS

SN	EQUIPMENT NO	MANUFACTURER	CAN BE USED WITH
1	M-699C	Herrenknecht	AVN600(M841M), ANN800B(M751M), AVN800A(M700M), AVN1200(M1098M)
2	M-1097C	Herrenknecht	AVN600(M841M), ANN800B(M751M), AVN800A(M700M), AVN1200(M1098M)
3	M-1086C	Herrenknecht	AVN600(M841M), ANN800B(M751M), AVN800A(M700M), AVN1200(M1098M)
4	M-1085C	Herrenknecht	AVN1600(M1210M), AVN2000(M1084), AVN2400(M1290M)
5	M-1252C	Herrenknecht	AVN1600(M1210M), AVN2000(M1084), AVN2400(M1290M)
6	M-1568C	Herrenknecht	AVN600(M841M) , ANN800B(M751M) , AVN800A(M700M) , AVN1200 (M1098M)
7	M-1570C	Herrenknecht	AVN600(M841M) , ANN800B(M751M) , AVN800A(M700M) , AVN1200 (M1098M)
8	M-1610C	Herrenknecht	AVN600(M841M) , ANN800B(M751M) , AVN800A(M700M) , AVN1200 (M1098M)

08 HEALTH, SAFETY, ENVIRONMENT

Our policy is simple – every Gulf Tunneling employee bears a responsibility towards HSE issues.

We actively involve each member to ensure accident prevention, risk management, and environmental safeguarding.

As we pursue OHSAS and ISO Certifications 9001 & 14001, we conduct our activities under an integrated system that pledges the following:

- Highest quality tunneling
- Continuous improvement in all occupational health and safety systems
- Minimization of environmental damage, especially pollution
- Control and reduction in use of energy and natural resources
- Optimization of latest technologies to diminish waste
- Strict compliance with all applicable laws, requirements, regulations, and provisions

Our proactive commitment to prevention has allowed Gulf Tunneling to maintain a record of no Loss Time Incidents (LTI) since inception.