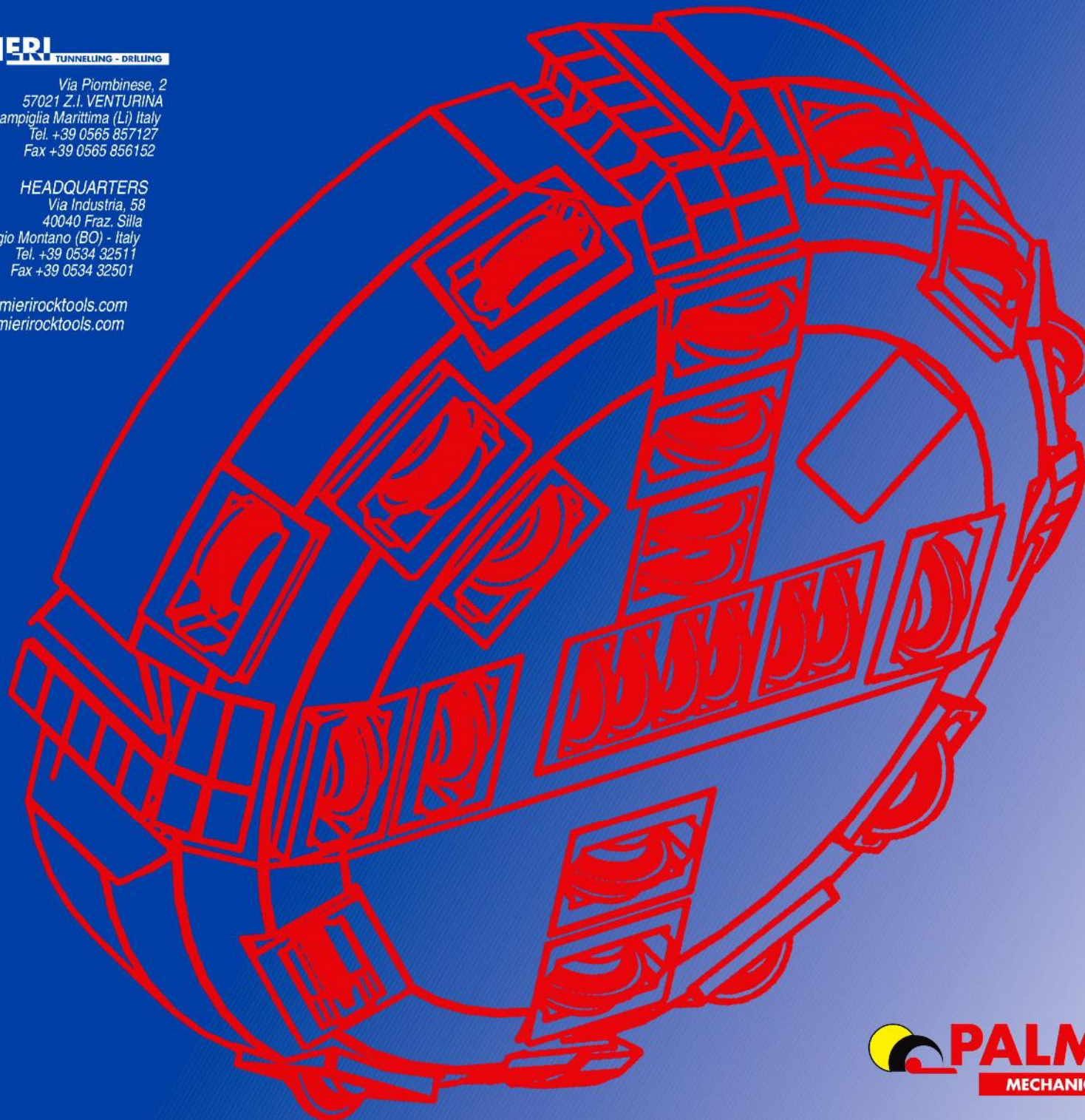


Via Piombinese, 2
57021 Z.I. VENTURINA
Campiglia Marittima (LI) Italy
Tel. +39 0565 857127
Fax +39 0565 856152

HEADQUARTERS

Via Industria, 58
40040 Fraz. Silla
Gaggio Montano (BO) - Italy
Tel. +39 0534 32511
Fax +39 0534 32501

www.palmierirocktools.com
info@palmierirocktools.com



TBM EQUIPMENT

MICROTUNNELLING

RAISE BORING

VERTICAL DRILLING

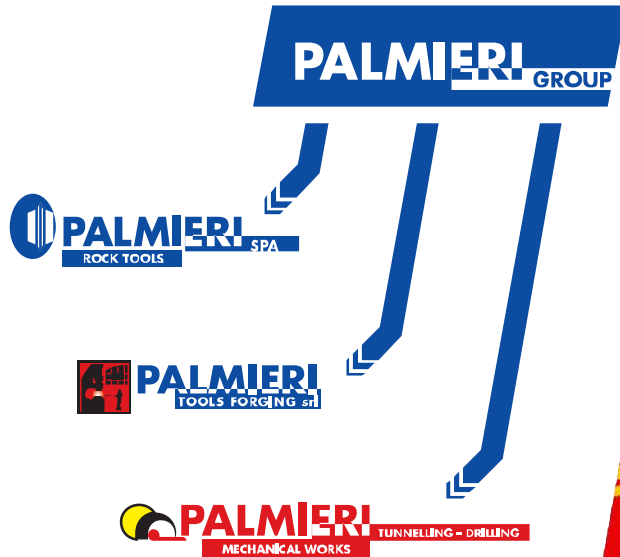
INTRODUCING PALMIERI TUNNELING DRILLING:



Palmieri Tunnelling and Drilling started to operate in 2005 as a company specializing in the design, manufacture and refurbishment of equipment for

mechanized tunnelling and drilling; its aim was to boost this specific business (already well established within Palmieri Group of companies)

thanks to a dedicated and very modern structured organization so to provide unparalleled levels of flexibility and competitiveness by taking advantage from the 360° knowledge in tunnelling and drilling technologies acquired by Palmieri Group in over 30 years of activities worldwide.



- ① Entrance
- ② Executive offices
- ③ Guest rooms
- ④ Workshop
- ⑤ Mechanical dept.
- ⑥ Sandblasting and painting
- ⑦ Assembly
- ⑧ Warehouse



THE COMPANY

Palmieri Tunnelling and Drilling was established in 2005 with one thing in mind; creating a dedicated company which could deliver concrete, fast and highly specialized answers to those clients operating in a difficult business such as the Tunnelling and Drilling markets, where the ability to adapt to market changes with innovation and rapidity is essential to be successful.

Thanks to the knowledge within the Palmieri Group and to the synergies with other Palmieri companies, Palmieri Tunnelling Drilling places itself on the market to respond to very demanding customers with highly sophisticated, innovative and very often non conventional solutions providing real advantages when compared to what competitors can offer.

Palmieri Tunnelling and Drilling can offer specifically dedicated structure and staff, with modern facilities and equipment so to be able focusing on this particular market segment thus providing fastest reaction times, from design to delivery of finished products, always bearing in mind client's requirements, needs and expectations.

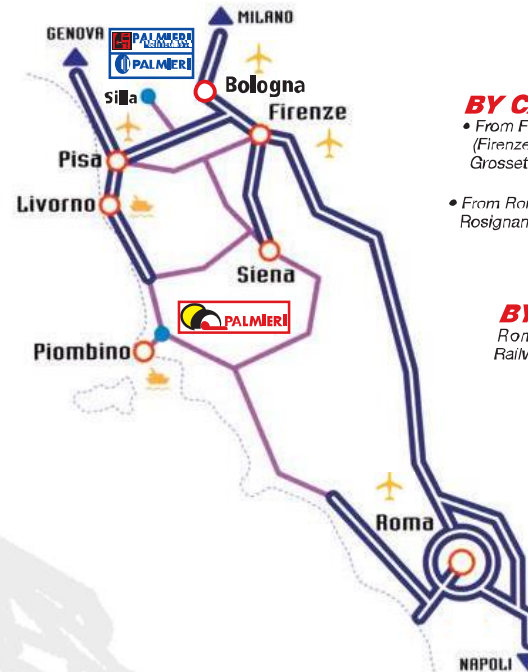
The company is strategically located in a well developed industrial area, very close to highway, railways and major ports and is equipped with very modern premises, some of which are no more than 6 year old, on a total area of 50.000 Sq.M. of which about 16.000 are covered.

All our premises are fitted with very modern and recent lifting and handling equipment as well as with newly acquired CNC machining units.



Large travelling column CNC boring mill with 40 ton rotating table 20000 x 3000 mm.

HOW TO REACH US



BY CAR

- From Florence: S.G.C (Strada di Grande Comunicazione) Fi-Pi-Li (Firenze-Pisa-Livorno) 12 Genova - Rosignano - S.G.C Rosignano Grosseto (Venturina exit)
- From Rome: A12 Roma - Civitavecchia - S.G.C Civitavecchia Rosignano (Venturina Exit)

BY TRAIN

Roma - Livorno Railway Line
Railway Station: Campiglia Marittima

BY SEA

Piombino Port - Leghorn (Livorno) Port

BY AIR

- International Airport "G. Galilei" - Pisa
- International Airport "A. Vespucci" - Firenze
- International Airport "L. Da Vinci" - Rome



SANDBLASTING

Palmieri Tunnelling Drilling is operating very modern Sand Blasting and Painting departments, recently completed; the main specifications are as follows:

- Track carrier trolleys: 120 m. long
- Total Building length: 770 Sq.m. (70 m. long, 11 m. wide)
- Sandblasting booth located inside the building (26 m. long, 8 m. wide, 6 m. high), specifically conceived for metal works sandblasting and equipped with automatic grit recovery and air filtration system.

• Painting booth adjacent to sandblasting, 26 m. long, can be splitted into smaller sections (i.e. 16 m. + 10 m., 6 m. wide, 6 m. high) fitted with integrated system for air ventilation and driers, internal temperature controls are automatically handled by burners adjustments controls - Delta 20°C.

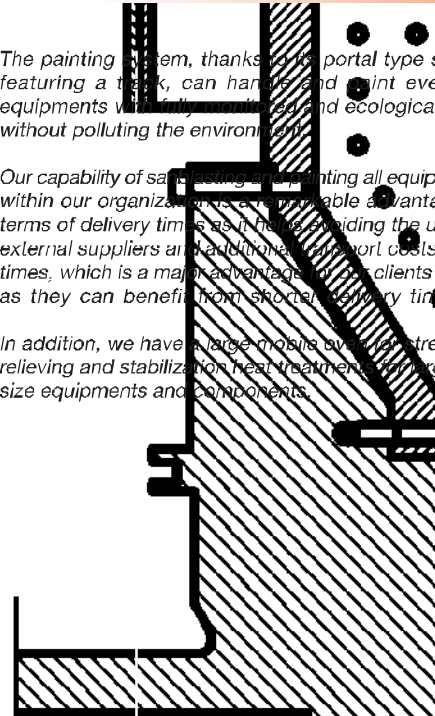


PAINTING

The painting system, thanks to its portal type structure featuring a track, can handle and paint even large equipments with fully controlled and ecological cycles without polluting the environment.

Our capability of sandblasting and painting all equipments within our organization is a remarkable advantage in terms of delivery times as it helps avoiding the use of external suppliers and additional transport costs and times, which is a major advantage for our clients too; as they can benefit from shorter delivery times.

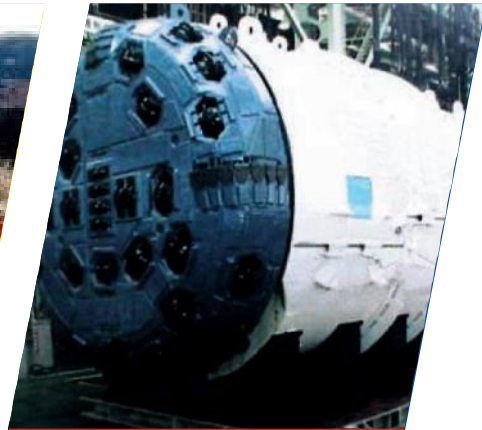
In addition, we have a large mobile oven for stress relieving and stabilization heat treatment for large size equipments and components.



TUNNEL EQUIPMENT



TBM BACK UP



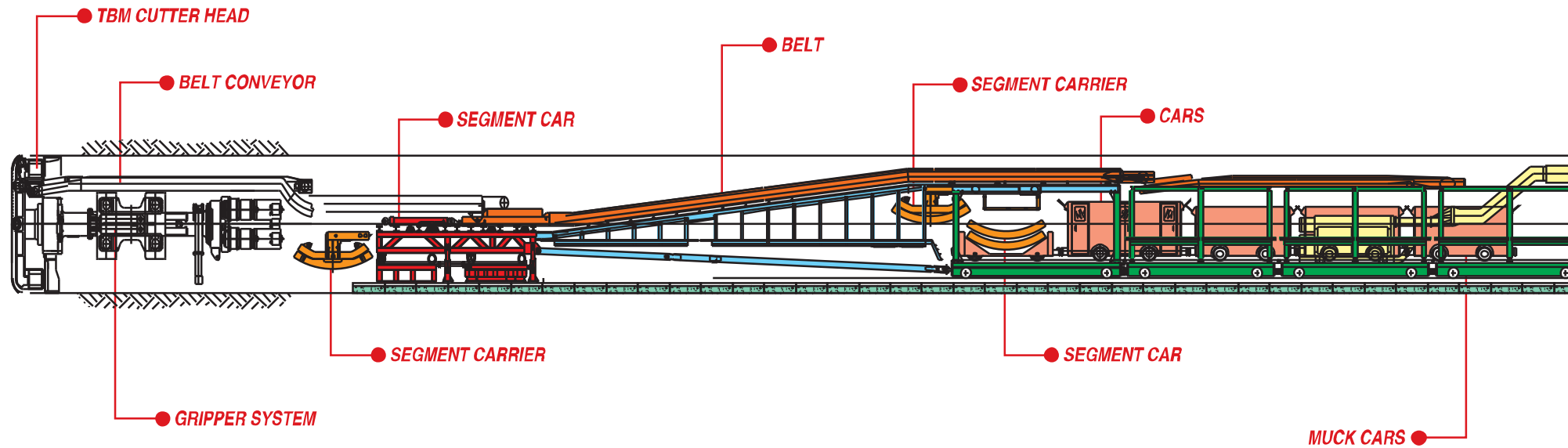
5000mm Ø SHIELD



PEA GRAVEL CAR



HOPPER BELT



TBM CUTTER HEADS

Palmieri Tunneling and Drilling can take advantage of the huge experience acquired by Palmieri Group companies even when it comes to Full-face tunnelling and boring machines cutterheads, no matter which size

or diameter, From refurbishment or alteration of existing cutterheads, to the design of a brand new head for an existing machine, from the smallest pipe-jacking sizes to large Railways tunnels, from Microtunnelling heads,

FROM \varnothing 4000mm UP TO \varnothing 15000mm

for soft or hard grounds, to medium to large size tunnelling diameters, either open head to slurry shield, EPB or Mixshield, Palmieri Tunneling and Drilling can deliver the most appropriate solution for each specific need with

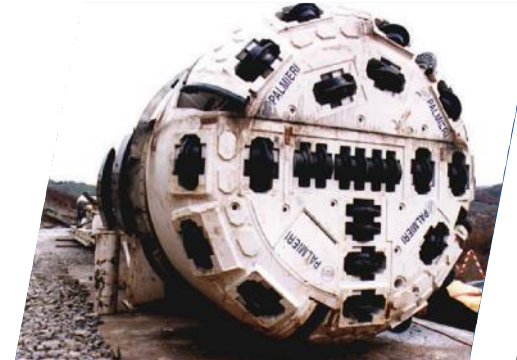
tailor-made designs and concepts based on an accurate evaluation of the given geology and of the equipment used for the job, making sure that clients will be provided with the most suitable solution available on the market,



TBM HEAD + SHIELD



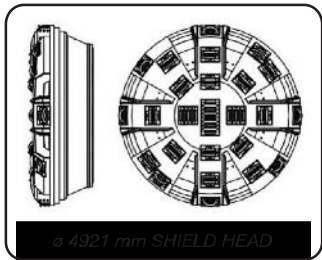
TBM HEAD SEGMENT



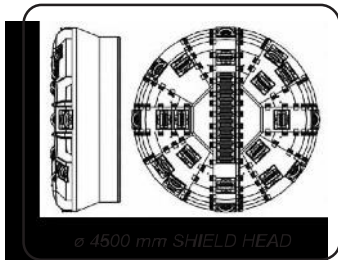
2-SECTION HEAD FOR OPEN TBM



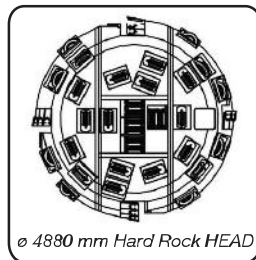
\varnothing 6980mm TBM HEAD



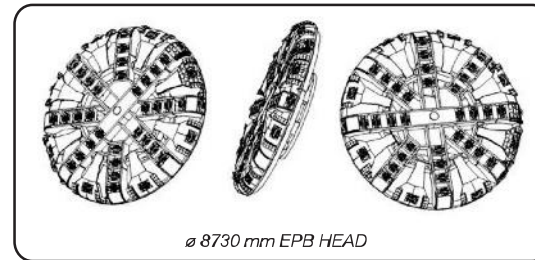
\varnothing 4921 mm SHIELD HEAD



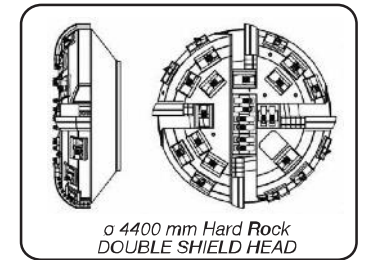
\varnothing 4500 mm SHIELD HEAD



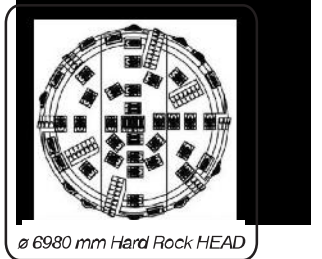
\varnothing 4880 mm Hard Rock HEAD



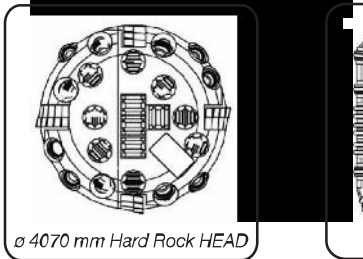
\varnothing 8730 mm EPB HEAD



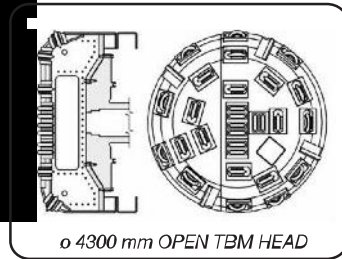
\varnothing 4400 mm Hard Rock DOUBLE SHIELD HEAD



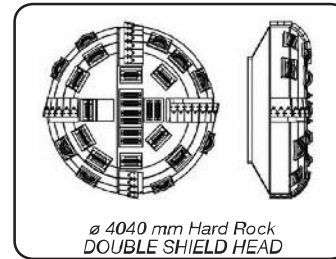
\varnothing 6980 mm Hard Rock HEAD



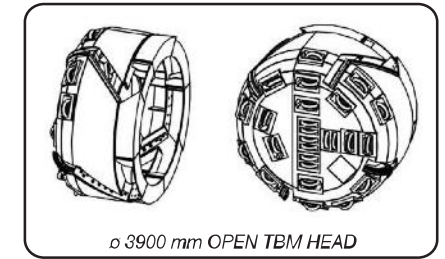
\varnothing 4070 mm Hard Rock HEAD



\varnothing 4300 mm OPEN TBM HEAD



\varnothing 4040 mm Hard Rock DOUBLE SHIELD HEAD



\varnothing 3900 mm OPEN TBM HEAD

BACK-UP SYSTEMS

As in the case of the Cutterhead, the Back-Up system is another "crucial" component of the Tunneling equipment; its correct design and engineering is essential to guarantee that the whole tunneling system

will deliver its best performances as predicted by the designers on paper. If a Back-Up system is not well designed or perfectly optimized, it can act as a sort of a "bottleneck" for the whole Tunnel Boring Equipment,



TBM BACK UP



thus limiting its potential performances in terms of advance rates, even significantly. Palmieri Tunneling and Drilling can conceive, design and engineer a very wide range of Back-Up systems, in many different

variants. We can design and manufacture sliding back ups, portal type back ups and many other types, all specifically conceived for the specifications of the Job and of the equipment which will be used.



SEGMENT FEEDER FOR OPEN TBM

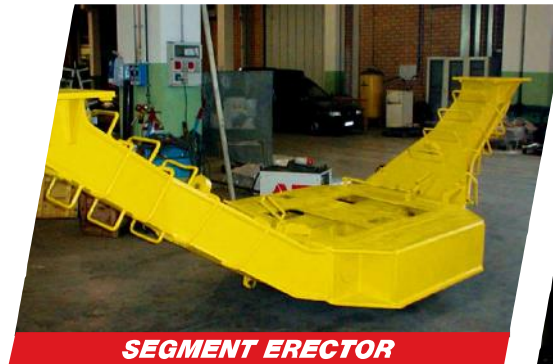
This working method can ensure that the Back Up system efficiency in evacuating the excavated materials will be at least as high as the Tunnel Boring Equipment efficiency in cutting in such a way not to limit tunneling advance rates and work progress.

SEGMENT HANDLING SYSTEMS AND AUXILIARY EQUIPMENT

Palmieri also specializes in the following products:

- Segment Lifting and Handling devices, suitable for virtually any existing type of segments and lining methods, for a very wide range of segment sizes helping to reduce

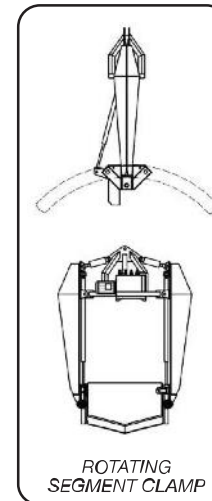
and optimize tunnel lining operations, either during segment transportation and laying. Tailor-made solutions can be designed and manufactured in cooperation with clients who can submit their own segment specifications,



SEGMENT ERECTOR



12 TON SEGMENT CLAMP



ROTATING SEGMENT CLAMP



SEGMENT CLAMP

ROLLING STOCK

Palmieri Tunneling and Drilling offers a comprehensive range of auxiliary equipments complementing Tunneling machines; also in this case, Palmieri's strength lies in its ability to customize its products in

such a way they can perfectly meet customer requirements. Palmieri Tunneling and Drilling is not offering generic or standard "pre-designed" solutions; in fact every single proposal is based on

AND MUCK HAULAGE PRODUCTS

data provided by client, duly taking into account every important aspect of the given job, such as, for instance, geology, tunneling equipment specifications, expected performances and so on.

According to Palmieri's long experience, this is the only way to make sure that jobs can be carried out in the fastest possible way and with the lowest possible cubic metre cost for the end user.



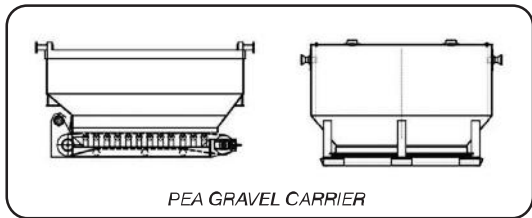
TUNNELING PEA GRAVEL CARRIER



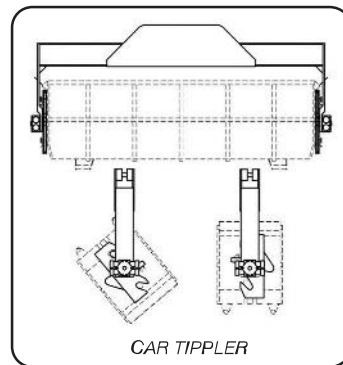
PEA GRAVEL CAR



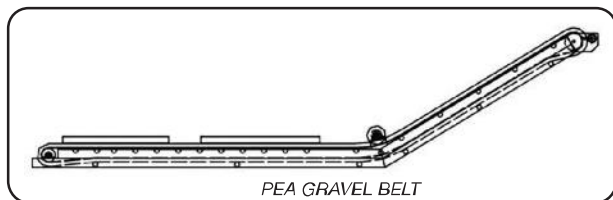
PEA GRAVEL CARRIERS TIPPLER



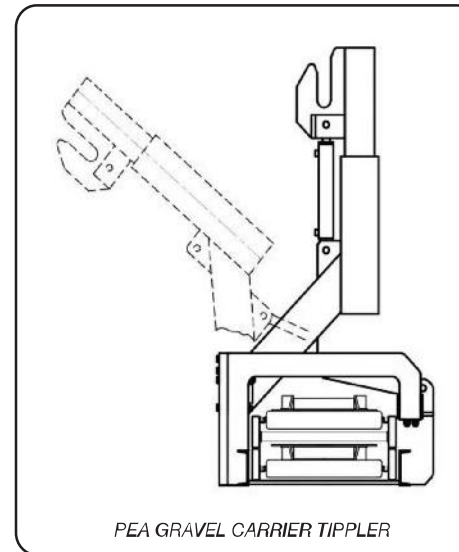
PEA GRAVEL CARRIER



CAR TIPPLER



PEA GRAVEL BELT



PEA GRAVEL CARRIER TIPPLER

BELT CONVEYORS

Our products are available as fully integrated solutions or as separate units for existing equipments (such as in the case of partial refurbishment of existing Tunneling Equipments to suit new job specifications

or of radical machine changes). Whatever the need, Palmieri can deliver the most suitable items in the industry without compromising on quality and performances.



SEGMENT ERECTOR



AND SEGMENT HANDLING SYSTEMS

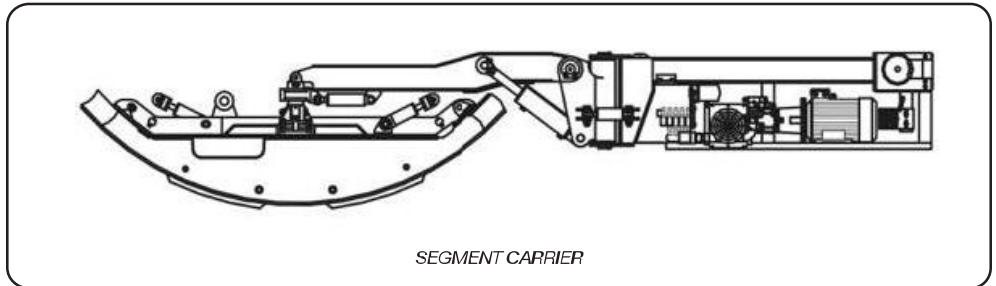
As for rolling stock and muck haulage products, Palmieri can offer the following array of products:

- Muck Cars, from 3 up to 20 cubic metres capacity, either fixed or tilting type.

- Mucking out integrated systems, belt type, conveyor or combined types.



SEGMENT CARRIER UNIT



SEGMENT CARRIER

SEGMENT HANDLING SYSTEMS AND

Screw conveyors as well as other specific products related to excavated materials removal.

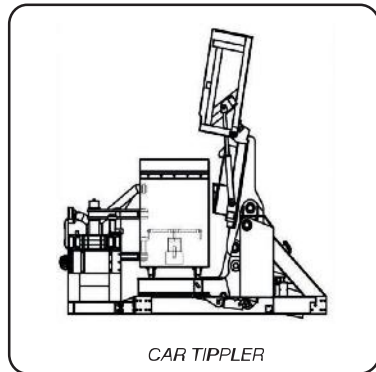
- Mixer Cars, Mortar Cars as well as any other type of Containers running on Tunnel tracks for virtually

any type of substances as needed during tunnelling operations.

- Pea Gravel as well as any other "Back Fill" materials cars and containers or tanks,



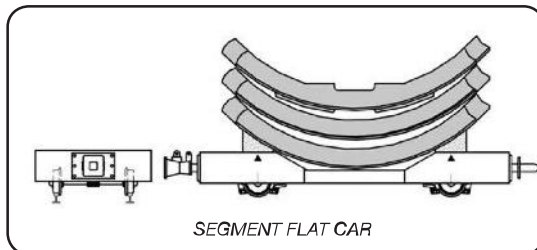
MUCK CAR TIPPLER



CAR TIPPLER



FLAT CARS



SEGMENT FLAT CAR

AUXILIARY EQUIPMENT

- Flat cars, personnel Cars and any other special custom-made vehicle running on Tunnel tracks to assist with handling and transportation of materials and equipment in the tunnel to support excavation

and auxiliary works and activities.

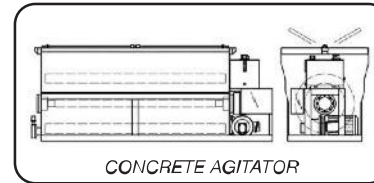
- An impressively wide range of rolling stocks, such as axles featuring high strength heat treated steel wheels, with or without braking and shock absorbing



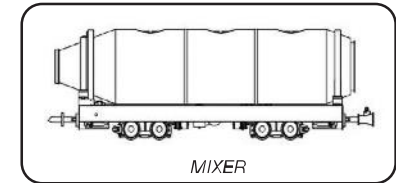
CONCRETE AGITATOR



MIXER



CONCRETE AGITATOR



MIXER



PEA GRAVEL CAR

MUCK CARS AND HAULAGE SYSTEMS

devices to suit any existing track gauge and existing equipment into the tunnel. Both standard and custom made sizes and gauges can be made available.

It goes without saying that the products as listed are just a portion of what Palmieri Tunnelling and Drilling can provide, and are to be intended as a sort of a general "Guide" to our Rolling Stock products; our



MUCK CAR



20 TON TBM DOLLY

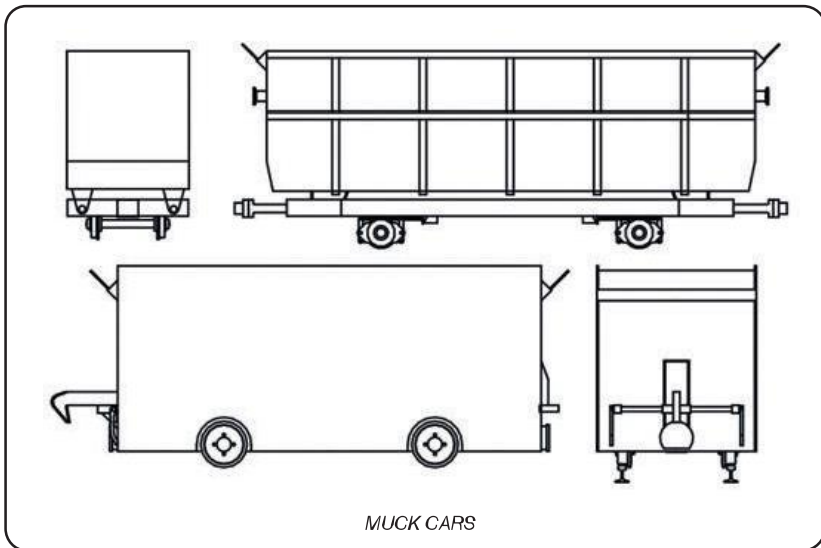
MUCK CARS AND HAULAGE SYSTEMS

flexibility allows us to consider and study, in cooperation of our clients' technicians, a much wider range of products, even of unconventional types, to assist and satisfy any possible need with innovative

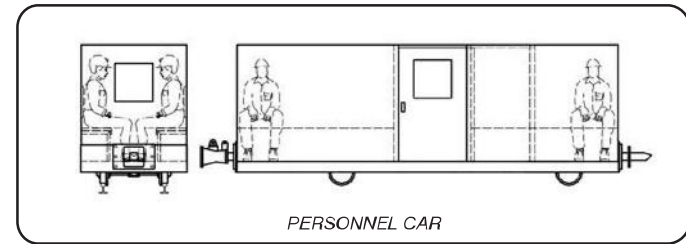
solutions and, as usual at Palmieri, with no compromises in quality and performances.



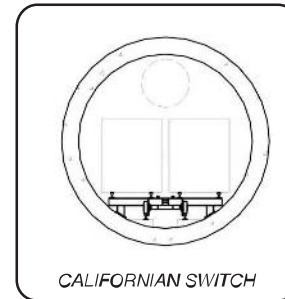
50 TON TBM DOLLY



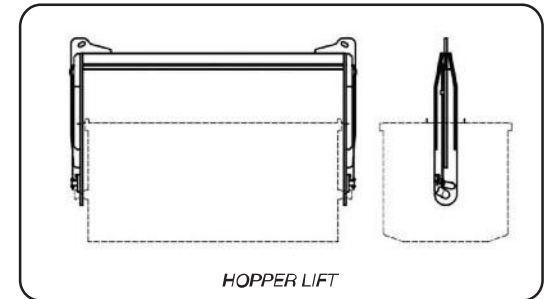
MUCK CARS



PERSONNEL CAR



CALIFORNIAN SWITCH



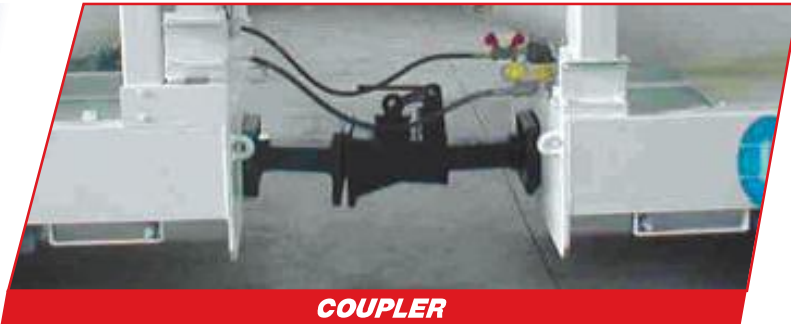
HOPPER LIFT

CARS AND CARS COUPLERS

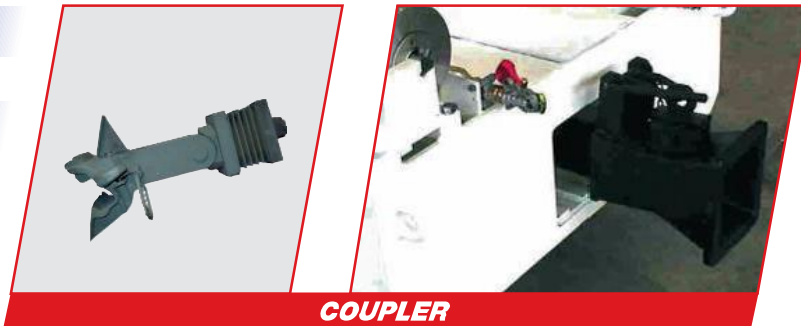
As seen in the previous pages of this same brochure, not only Palmieri Tunnelling Drilling can deliver an impressive range of vehicles running on tracks for virtually all tunnelling applications, but these same

products can be made available equipped with a very wide range of either "market standard" couplers (so to perfectly match with your existing equipments) or with special Palmieri design, custom-made couplers

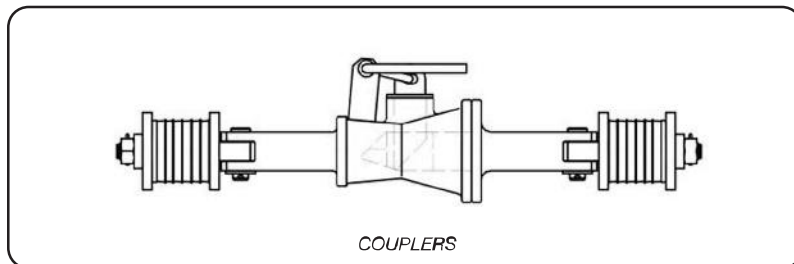
to meet your specific requests or to ensure top performances and safety in especially challenging operating conditions.



COUPLER



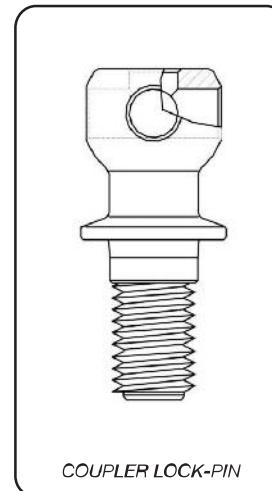
COUPLER



COUPLERS



**SAFETY BUFFER STOP UNIT
REMOTE CONTROLLED**



COUPLER LOCK-PIN



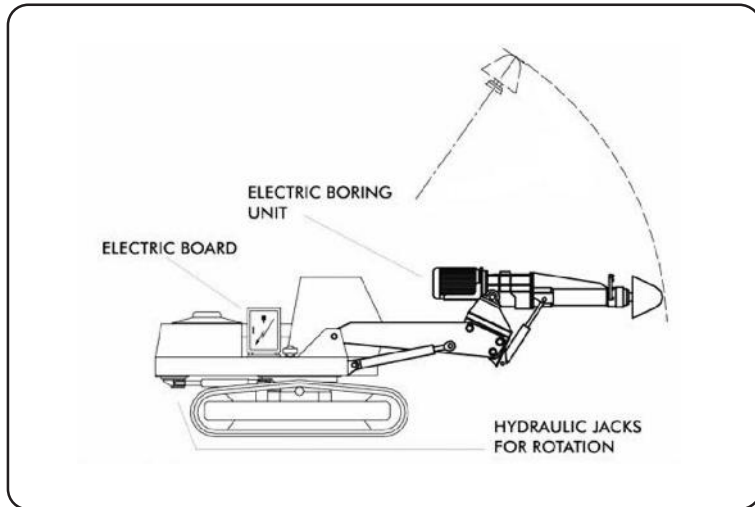
CUTTING BOOMS

Another very active and long established business at Palmieri Tunnelling and Drilling is the design and manufacture of cutting booms to be mounted within Tunneling shield or on excavators, Dating back to the

early seventies, Palmieri has manufactured a large number of equipments using the cutting boom, which is particularly useful for those low-budget jobs with limited boring distance and in presence of soft ground



TRI - 45 HYDRAULIC BOOM

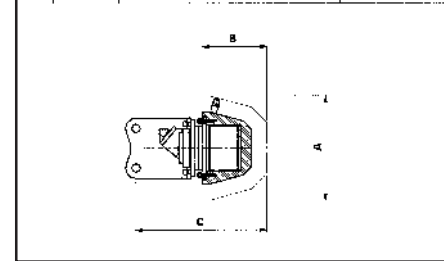


not requiring the use of more expensive and difficult to operate and assist full face tunnelling equipment. Even in this business, Palmieri can offer a very wide range of products from low to high power, which can

be mounted on both excavators and rolling stock (railway cars) equipment, depending on job specifications, geological conditions as well as client's budget.

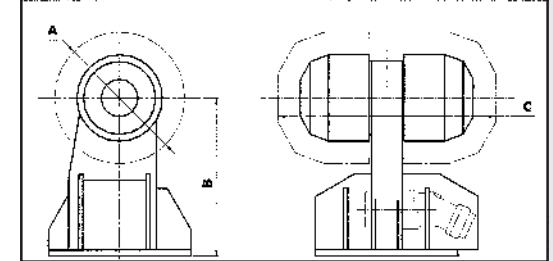
COMPACT HYDRAULIC POINT-ATTACK HEADS

MODEL	CUTTING HEAD REVOLUTION	WORKING OIL PRESSURE	WORKING OIL FLOW	WEIGHT Kg	CUTTING HEAD DIAMETER	CENTER DISTANCE	CUTTING HEAD WIDTH
					A	B	C
TRIC-20	60 rpm	220 bar	45-50 l/min	700	500 mm	270 mm	570 mm
TRIC-25	40 rpm	220 bar	45-50 l/min	850	670 mm	270 mm	580 mm
TRIC-25	20 rpm	180 bar	30-35 l/min	850	670 mm	270 mm	580 mm



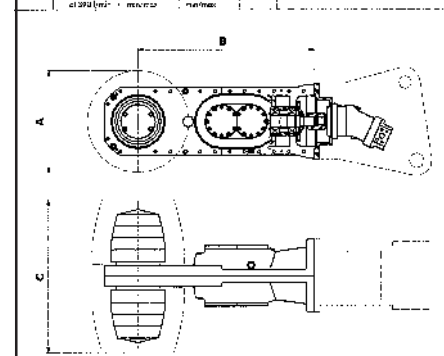
COMPACT HYDRAULIC RADIAL HEADS

MODEL	CUTTING HEAD REVOLUTION	WORKING OIL PRESSURE	WORKING OIL FLOW	WEIGHT Kg	CUTTING HEAD DIAMETER	CENTER DISTANCE	CUTTING HEAD WIDTH
					A	B	C
TRIC-15	150 rpm	170-160 bar	40-60 l/min	500	580 mm	480 mm	400 mm
TRIC-20	150 rpm	170-160 bar	60-75 l/min	530	580 mm	550 mm	260 mm
TRIC-45	55 rpm	120-250 bar	90-110 l/min	750	640 mm	730 mm	1000 mm
TRIC-110	58 rpm	120-250 bar	180-250 l/min	1500	790 mm	1100 mm	1200 mm



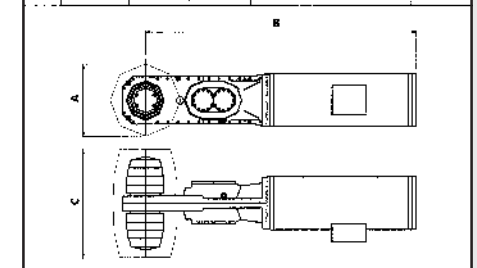
HYDRAULIC RADIAL HEADS

MODEL	CUTTING HEAD REVOLUTION	WORKING OIL PRESSURE	WORKING OIL FLOW	WEIGHT Kg	CUTTING HEAD DIAMETER	CENTER DISTANCE	CUTTING HEAD WIDTH
					A	B	C
TRIC-27	60 rpm	20-250 bar	70-90 l/min	860	540 mm	1090 mm	900 mm
TRIC-40	23 rpm	150-250 bar	150-180 l/min	850	540 mm	1090 mm	900 mm
TRIC-110	20 rpm	150-250 bar	180-250 l/min	1490	720 mm	1130 mm	1190 mm
TRIC-135	20 rpm	210-250 bar	270-390 l/min	1490	720 mm	1130 mm	1190 mm



ELECTRIC RADIAL HEADS

MODEL	POWER	CUTTING HEAD REVOLUTION	OPERATING VOLTAGE	WEIGHT Kg	CUTTING HEAD DIAMETER	CENTER DISTANCE	CUTTING HEAD WIDTH
					A	B	C
TRIC-27	37 kW	60 rpm	380-400 V	860	540 mm	1090 mm	900 mm
TRIC-45	45 kW	23 rpm	380-400 V	860	540 mm	1090 mm	900 mm
TRIC-110	110 kW	20 rpm	380-400 V	1490	720 mm	1130 mm	1190 mm



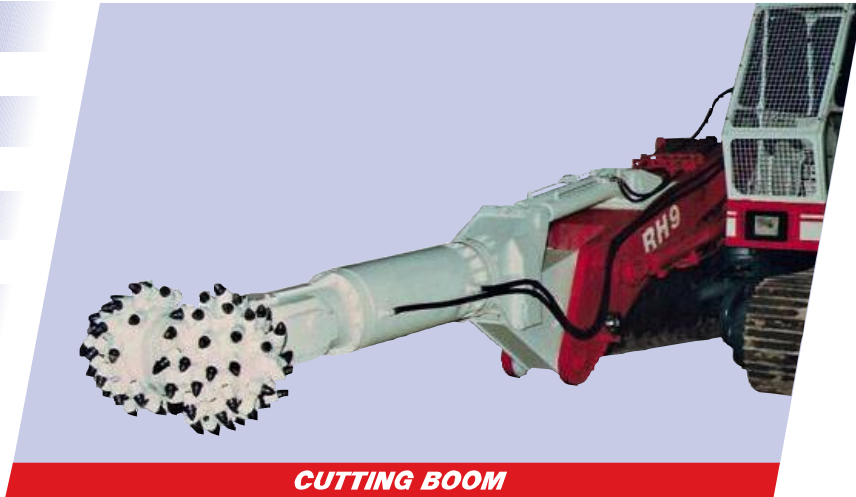
CUTTING BOOMS AND LOADERS

By assisting clients to make the right choice, we can guarantee that the adopted solution will fulfill customer requirements for simplicity, effectiveness and ownership costs.

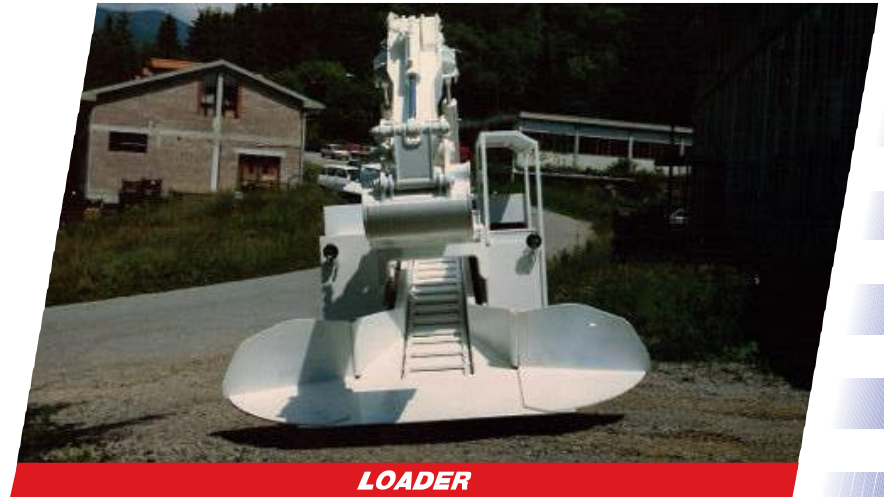
In addition, thanks to the synergies with the other companies within Palmieri's group, we can select the most suitable tool holders and tools for a given geology in such a way to guarantee the lowest cubic-/metre

cost as well as the constant availability of spare parts and components on the shelf so to make sure to successfully face any tools problems on site. Also available at Palmieri is a wide range of "Loading"

machines for the mining and construction field, as well as many other products types, not directly related to the full face tunnelling activities.



CUTTING BOOM



LOADER



POINT ATTACK BOOM



CUTTING BOOM UNIT FOR RAILWAY TUNNELS

ROLLING STOCK



MUCK CAR TIPPLER



MUCK CARS (1m³ to 15m³)

FLAT CARS



MIXER

PERSONNEL CARS

AGITATORS

CALIFORNIA SWITCH

AXLES

GAGE WHEELS RADIAL LOAD

600 from Ø 244 from Tons. 1,8

750

900

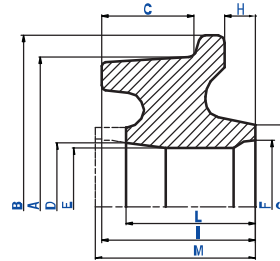
1000

1524 to Ø 468 to Tons. 40



COMPLETE SERIES AVAILABLE

WHEELS



SPECIFICATION

CODE	A	B	C	D	E	F	G	H	I	L	M	Weight (Kg)
5999.010.16	199,00	244,00	49,60	-	-	-	71,50	12,00	81,50	-	88,00	13,00
5999.004.16	256,00	312,00	76,50	89,00	83,00	-	145,00	20,00	126,50	114,50	-	35,00
5999.011.16	265,90	317,60	94,70	89,00	83,00	89,00	130,00	-	140,00	140,00	-	47,00
5999.012.85	298,50	338,00	59,70	-	-	-	100,00	17,00	96,80	88,80	-	24,00
5999.008.85	304,30	352,50	88,70	109,00	90,00	-	142,00	20,00	140,50	117,50	-	49,50
5999.001.85	354,50	410,00	107,20	144,00	129,00	155,00	189,00	43,50	189,50	165,00	-	76,50
5999.009.85	359,30	422,40	101,90	180,00	125,00	178,00	198,60	38,00	175,50	163,50	-	88,00
5999.006.85	361,60	417,00	96,40	94,00	74,00	94,00	131,00	-	134,50	134,50	-	66,00
5999.007.85	390,30	460,00	98,70	164,00	135,00	164,00	224,00	7,00	141,00	-	143,00	85,00
5999.013.85	399,50	429,50	52,10	144,00	123,00	144,00	199,00	33,00	106,00	-	139,00	50,50
5999.005.16	403,40	451,00	80,30	175,00	156,00	186,00	215,00	45,00	154,00	-	164,00	78,00
5999.002.85	404,00	454,00	80,00	120,00	94,00	145,00	198,00	38,00	148,00	-	158,00	84,00
5999.015.85	404,00	455,00	80,00	154,00	130,00	168,00	198,00	38,00	148,00	-	158,00	79,50
5999.003.85	404,80	454,00	80,50	154,00	127,00	164,00	218,00	38,00	148,50	-	159,50	95,00
5999.014.85	406,20	468,00	97,80	-	-	-	124,00	-	135,00	135,00	-	85,00
5999.018.85	410,50	468,00	119,50	106,00	100,00	125,00	168,00	-20,00	137,00	107,00	-	-
5999.016.85	415,20	455,90	97,00	99,00	84,00	99,00	150,00	3,50	125,50	-	130,00	82,60
5999.017.85	487,90	449,10	75,80	74,00	66,00	74,00	120,00	1,50	107,00	104,00	-	-

FORGED STEEL

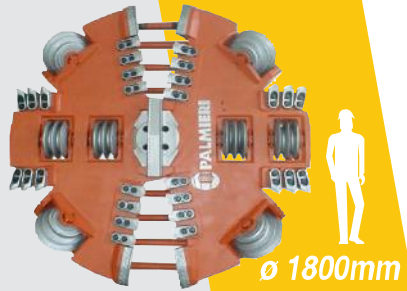
The above chart shows technical and dimensional specifications of our standard range of untreated wheels. Induction hardened versions of all our wheels are available upon client's request for higher life and added strenght; as well as any non-standard sized and shaped wheels which can also be built-to-order.

MICROTUNNELLING AND

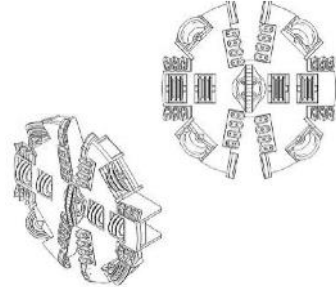
Palmieri Tunnelling and Drilling can take advantage of the huge experience acquired by Palmieri Group companies even when it comes to microtunnelling, pipejacking and Horizontal boring machines cutterheads, no matter which

size or diameter. From refurbishment or alteration of existing cutterheads, to the design of a brand new head for existing machines, Palmieri Tunnelling and Drilling can deliver the most appropriate solutions for each specific

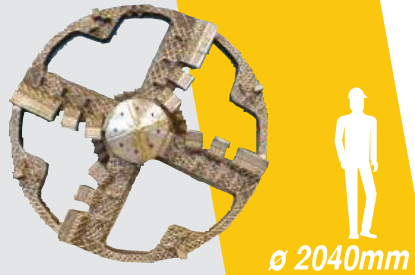
MIXED GROUND HEAD



ø 1800mm



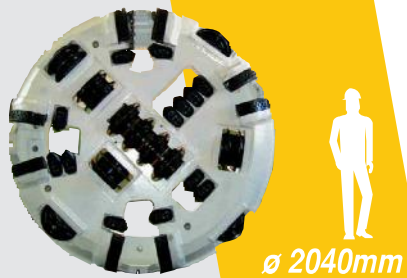
SOFT GROUND HEAD



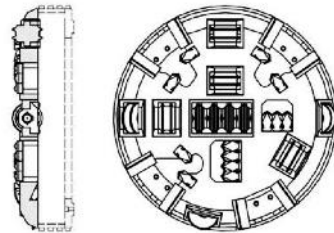
ø 2040mm



MIXED GROUND HEAD



ø 2040mm



DRILLING HEADS

need with tailor-made designs and concepts based on an accurate evaluation of the geology and of the equipment used for the job, making sure that clients will be provided with the most suitable solution available on the market.

Palmieri Tunnelling and Drilling accuracy in the study of the cutting spaces combined with a careful selection of the most appropriate roller cutters and scraper tools, makes every small tunnelling machine cutterhead a unique

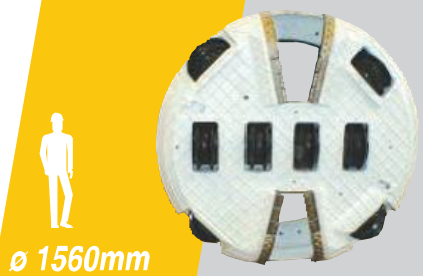
SOFT/MIXED GROUND HEAD



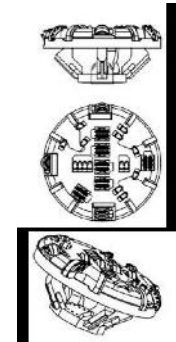
ø 2210mm



ROCK HEAD



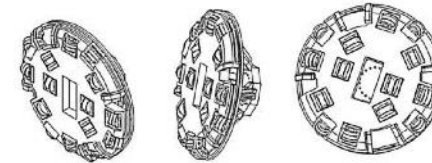
ø 1560mm



ROCK HEAD



ø 3060mm



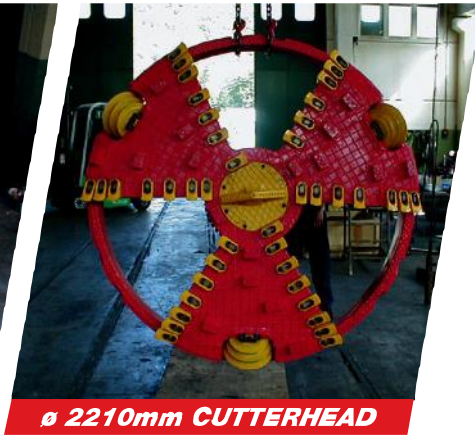
MICROTUNNELLING

solution which is specifically conceived for a given job specifications in such a way client can get the most out of their tunnelling equipment without compromises of any kind. Our TBM cutterheads can come in different types, either for soft or mixed ground geologies or for very

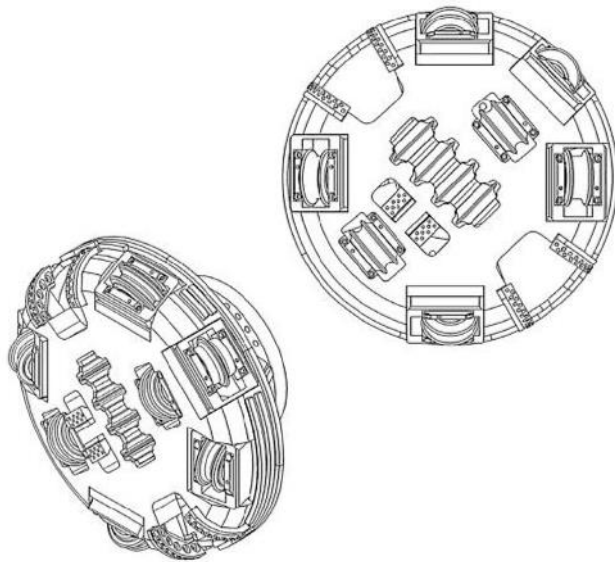
compact and massive rock grounds; no matter which type is chosen, with Palmieri cutterheads end users can make sure that the job will be finished on time at the lowest possible cubic metre cost within the industry. But there's more; our deep knowledge of this business allows



ø 3060mm CUTTERHEAD



ø 2210mm CUTTERHEAD



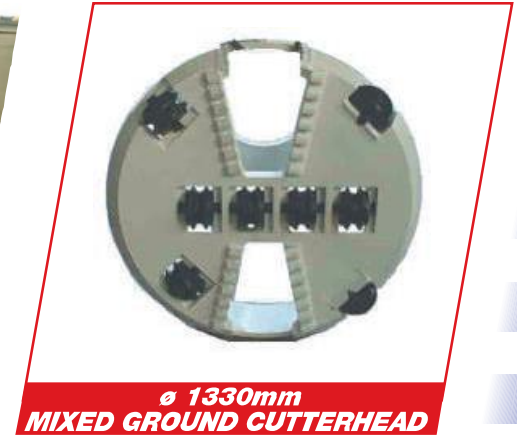
AND DRILLING HEADS

us to be active beyond the mere design and manufacture of Cutterheads; Palmieri can in fact refurbish and alter, even radically, any existing microtunnelling or large tunnelling equipment to new job specifications or, should the client need a brand new equipment, can design and

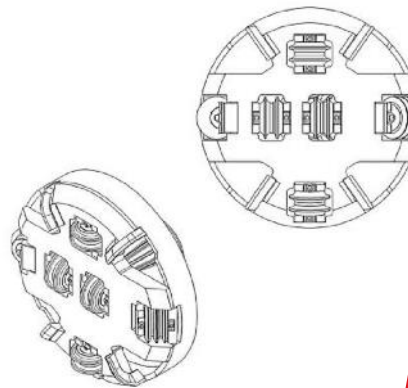
manufacture a totally new "custom made" product to make sure that performances and expectations are met.



ø 2040mm
MIXED GROUND CUTTERHEAD



ø 1330mm
MIXED GROUND CUTTERHEAD



CUTTERHEAD AND UPSIZE KIT

OPEN SHIELD

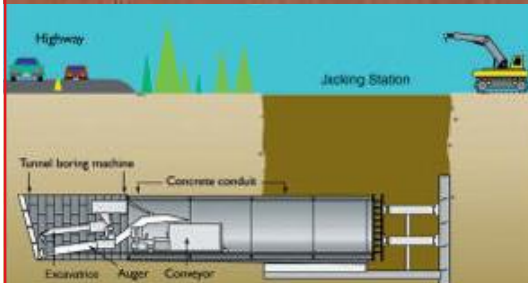
FROM \varnothing 1530mm UP TO \varnothing 3600mm (BORING)

Besides ordinary and conventional Microtunnelling units equipped with soft or hard rock grounds heads, we can offer pipejacking machines and ancillaries equipments, such as jacking stations (Either Main or

intermediate types), as well as "Open Shield" machines in a very wide range of sizes; such cost efficient and easy-to-operate machines can be equipped with interchangeable cutting booms fitted with hammer,

radial cutting heads or excavator buckets so to perfectly adapt to the geology to be encountered. These low budget products can help smaller companies to be active and competitive by adopting

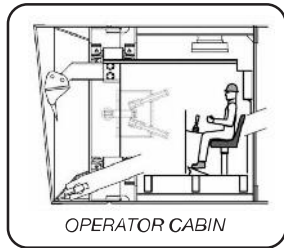
mechanized tunnelling/boring solutions even for those small jobs which would not justify the financial efforts as required for a more expensive full face equipment.



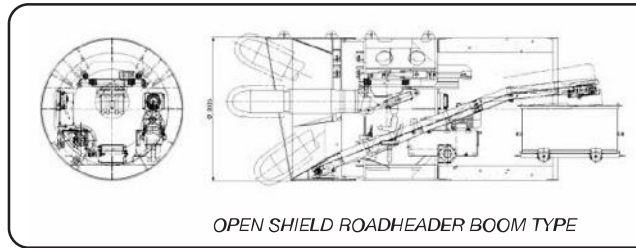
OPEN SHIELD OPERATION



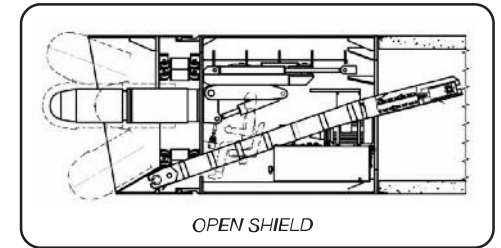
PIPE-JACKING



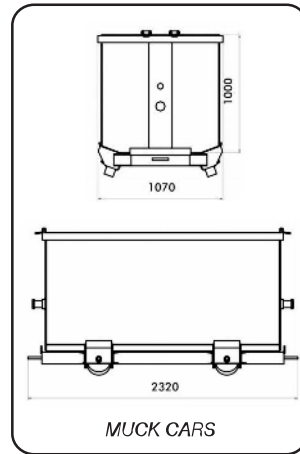
OPERATOR CABIN



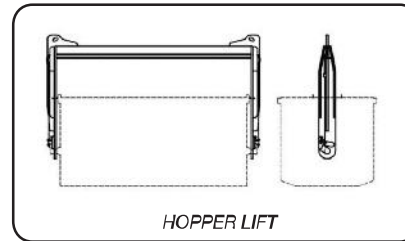
OPEN SHIELD ROADHEADER BOOM TYPE



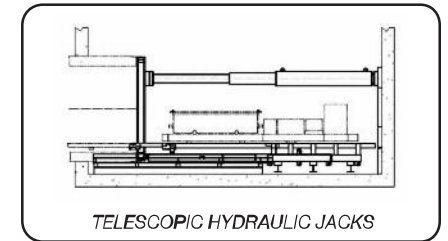
OPEN SHIELD



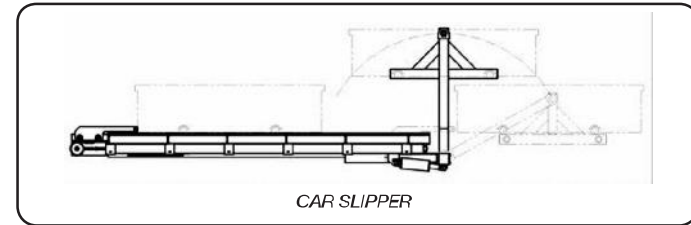
MUCK CARS



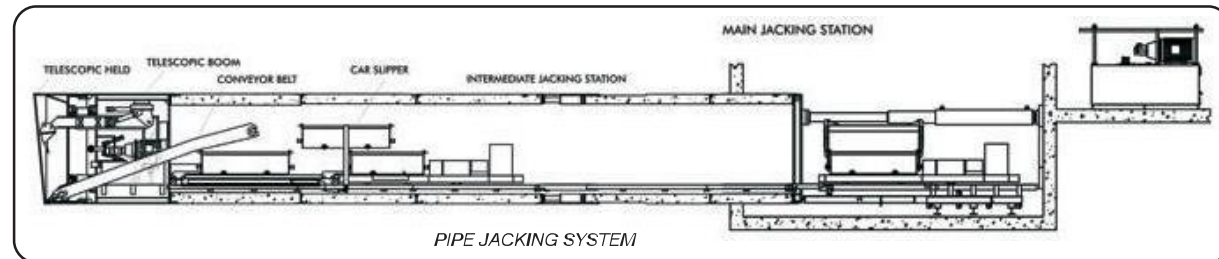
HOPPER LIFT



TELESCOPIC HYDRAULIC JACKS



CAR SLIPPER



PIPE JACKING SYSTEM

OPEN SHIELDS

During the latest years, Palmieri has been very active in the "Auger Machines" business, as commonly used for horizontal drilling of small diameters for pipes and services installation. Such machines, usually mucking out by mean of screw conveyors, are extremely simple

and easy to operate and assist; they are very versatile and particularly suitable for short distance drilling. Even in this business Palmieri proved to be an innovation leader, by adopting special and unconventional solutions for cutting heads which were

never seen before in this industry. Thanks to its long activity in the Tunnel Boring Cutterheads field, Palmieri first started to adopt special swinging / retractable roller cutter housings allowing the cutterhead to be retracted while keeping the casing in place as well as

especially conceived roller cutters for these particular applications. As a result, the most of our clients showed their appreciation for such an innovative approach and are regularly using palmieri products for their Auger drilling needs.



OPEN SHIELD MACHINE POWER UNIT



OPEN SHIELD OPERATOR'S CONTROL PANEL



MAIN JACKING UNIT



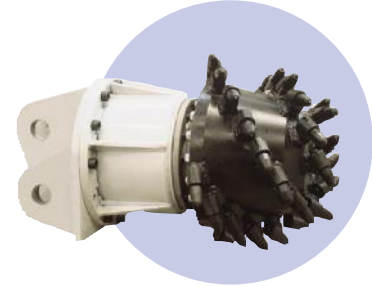
EXCAVATOR TYPE OPEN SHIELD



BUCKET ESCAVATOR WITH TOOLS



Ø 3035mm CUTTER HEAD TYPE OPEN SHIELD

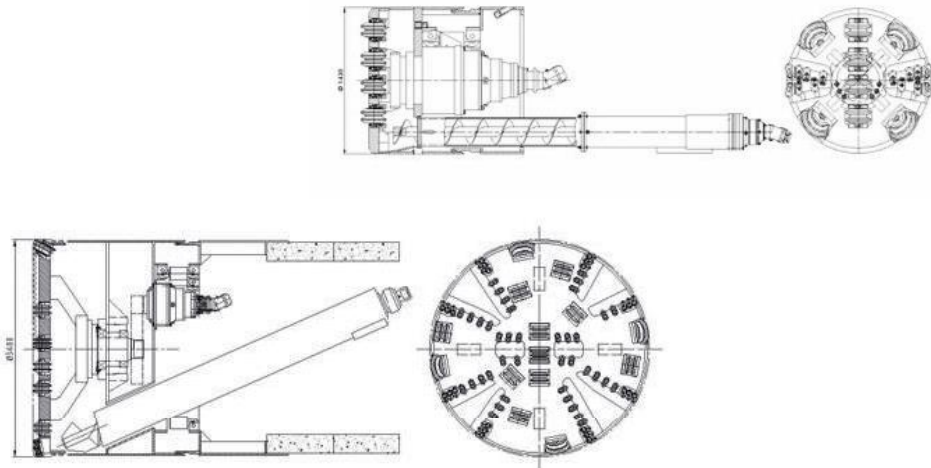
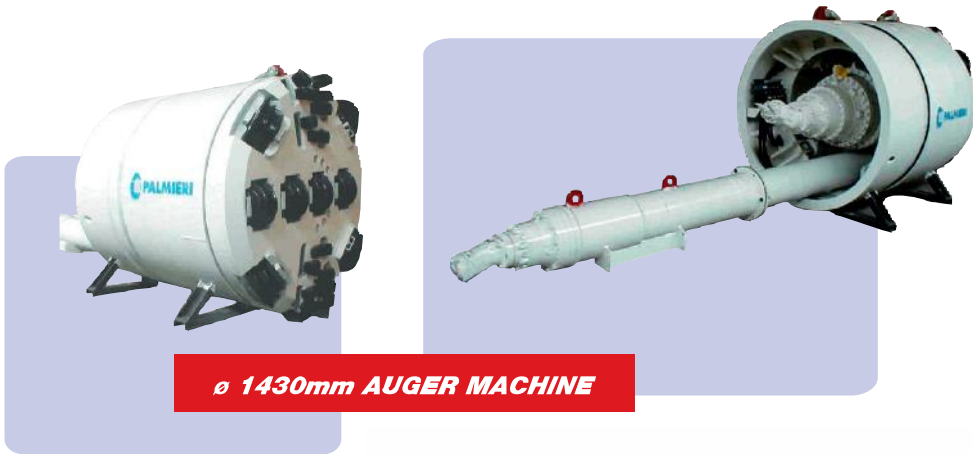


CUTTER BIT WITH HOLDERS AND PICKS

EPB MACHINES AND HEADS

Another important business at Palmieri is the so called "EPB" (Earth Pressure Balance) machine business; these are a specific category of Tunneling machines adopting a special cutting method in which an especially designed and flat shaped cutterhead is excavating in synergy with the tunneling front which needs to be controlled and supported during excavation. Palmieri is of course very active in this business too, by designing and manufacturing both

special EPB cutterheads, EPB machine components and parts, as well as a range of auxiliary equipment specifically designed and conceived for this challenging branch of tunneling business. It goes without saying that even in this business, Palmieri can offer innovative and competitively priced solutions which are hard to find elsewhere, since most of our competitors can only offer "standardized" solutions which are quite often far from being very effective.



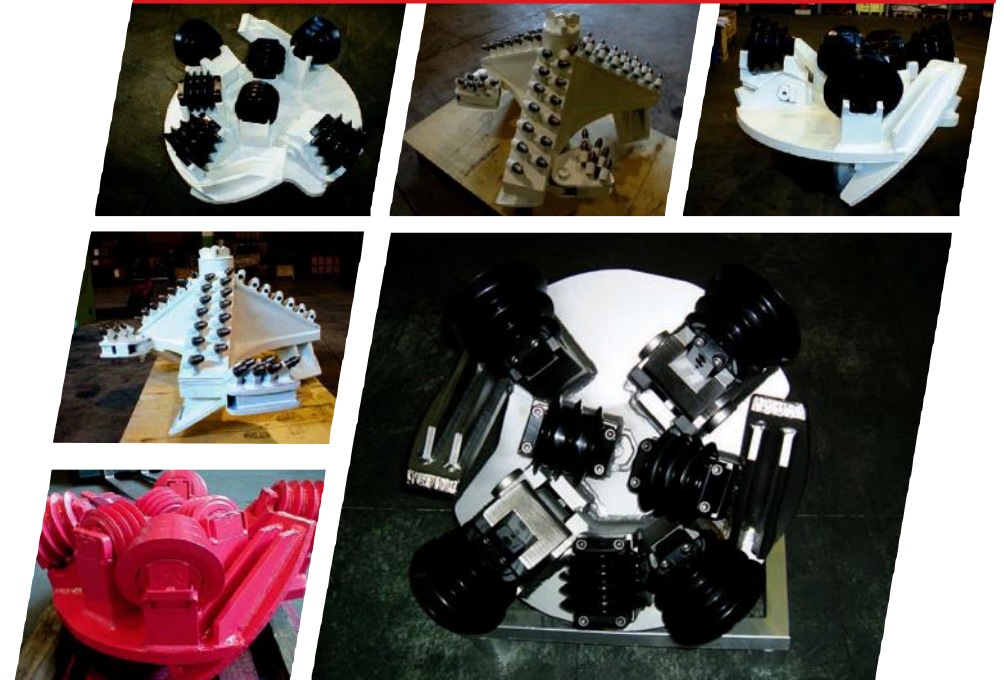
RETRACTABLE HEADS FOR AUGER MACHINES

Until recently, contractors faced with hard rock applications for their auger boring machines have been left with little choice for the selection of a hard rock cutting head. Worse still, once the selection was nominated, it was impossible to change the cutting head for varying ground conditions or to replace cutters before completing a run. If a cutting head failed for any reason before reaching its target, operators could either sink a recovery shaft or remove the casing. Often, neither of those recovery options is available because of physical constraints, obstacles on the surface or prohibitive contract specifications. The only expanding type cutter heads previously available for auger boring operations were those with wing cutters employing drag teeth or rock picks. Such cutting tools are not designed to take on hard rock, particularly over any

significant distance. In response to the outcry from its customers Palmieri SpA has just introduced a new line of retracting hard rock cutting heads. The Palmieri retractable head is equipped with floating gage cutters that enable the head to be retracted while keeping the casing in place. The unique quality of the retractable head series from Palmieri is seen with two of the four cutters at the gage position. These two multiple disc cutters are floating. This means they are affixed to the head in a movable housing, allowing for the head to be retracted back through the pipe.

Palmieri manufacture retractable heads in the range of 760mm (30 in.) to 1.9m (75 in.) in diameter. These heads can be adapted to fit any type of auger machine and they are built to meet the challenge of any type of rock.

RETRACTABLE HEADS



HORIZONTAL AND VERTICAL DRILLING

Cutterheads and integrated cutting systems

The core business of Palmieri Tunneling and Drilling is the design and manufacture of Cutterheads or, to be more accurate, of integrated cutting systems for any kind of Tunnel Boring, Drilling and mechanized

excavation in general, from horizontal TBM boring to vertical drilling, either raise boring or blind boring types.



RBM STEM



RBM HEAD + STEM

FROM Ø 660mm UP TO Ø 5000mm (BORING)

Raise Boring Heads

In over 30 years of activity, Palmieri's group accumulated a remarkable know-how when it comes to designing, engineering and manufacturing Raise Boring Cutterheads, as commonly used for vertical

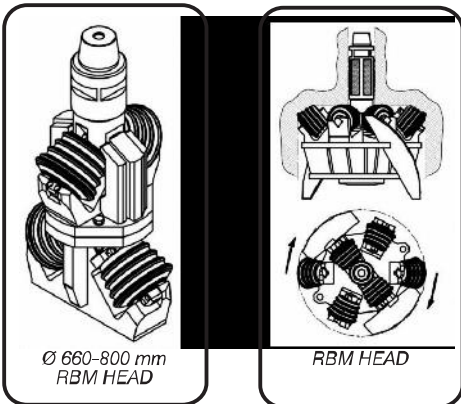
or horizontal drilling operations on hard geological formations such as granite, quartzite as well as any other high strength materials. By analysing the geological specifications of the ground and the type of RBM equipment to be used,



**Ø 1800mm
RBM HEAD**

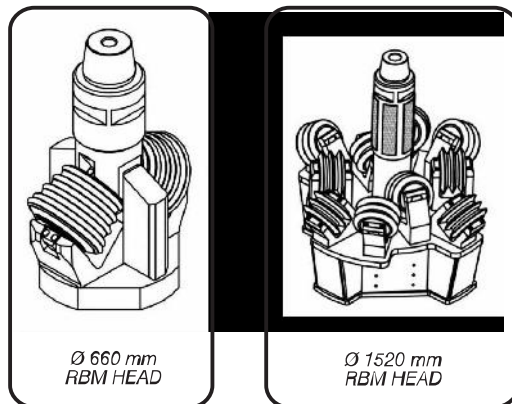


**Ø 1600mm
HORIZONTAL BORING HEAD**



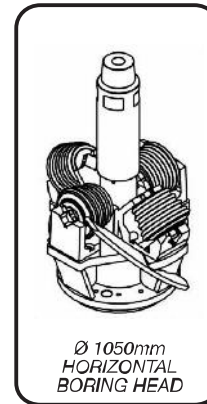
**Ø 660-800 mm
RBM HEAD**

RBM HEAD

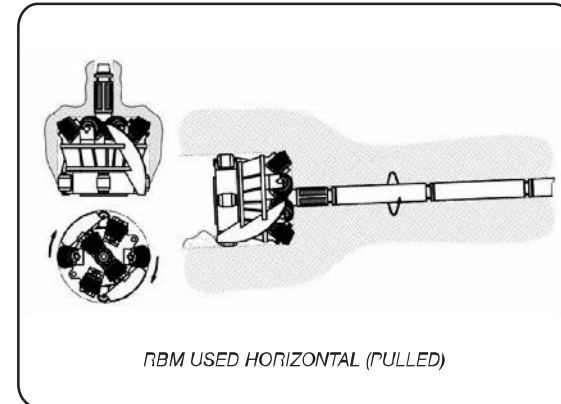


**Ø 660 mm
RBM HEAD**

**Ø 1520 mm
RBM HEAD**



**Ø 1050mm
HORIZONTAL
BORING HEAD**



RBM USED HORIZONTAL (PULLED)

VERTICAL DRILLING AND RCD HEADS

we can design the most appropriate cutterhead configuration by selecting the most suitable roller cutters and cutting spacings so to ensure that the highest cutting speeds combined with the lowest cost per cubic metre can be achieved, without compromises.

Reverse Circulation Heads

Even in the RCD (Reverse Circulation Drilling) field, Palmieri's know-how is a major advantage over our competitors who are very often proposing extremely generic and "all-purpose" solutions which can hardly

FROM Ø 1500mm UP TO Ø 6000mm

comply with specific clients requests. Whatever the needs in terms of geology to excavate and technology to be used, Palmieri is able to offer the most advanced and specific solution for the benefit of the client, both by taking advantage of its long established experience

and by accepting new technical challenges in the view of the highest possible tunnelling and boring performances for the given jobs.



Ø 1388mm RCD HEAD



Ø 2600mm RCD HEAD



Ø 4250mm DRILLING HEAD SHAFT

