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IHC Hydrohammer®

Pile driving equipment



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Pile driving equipment

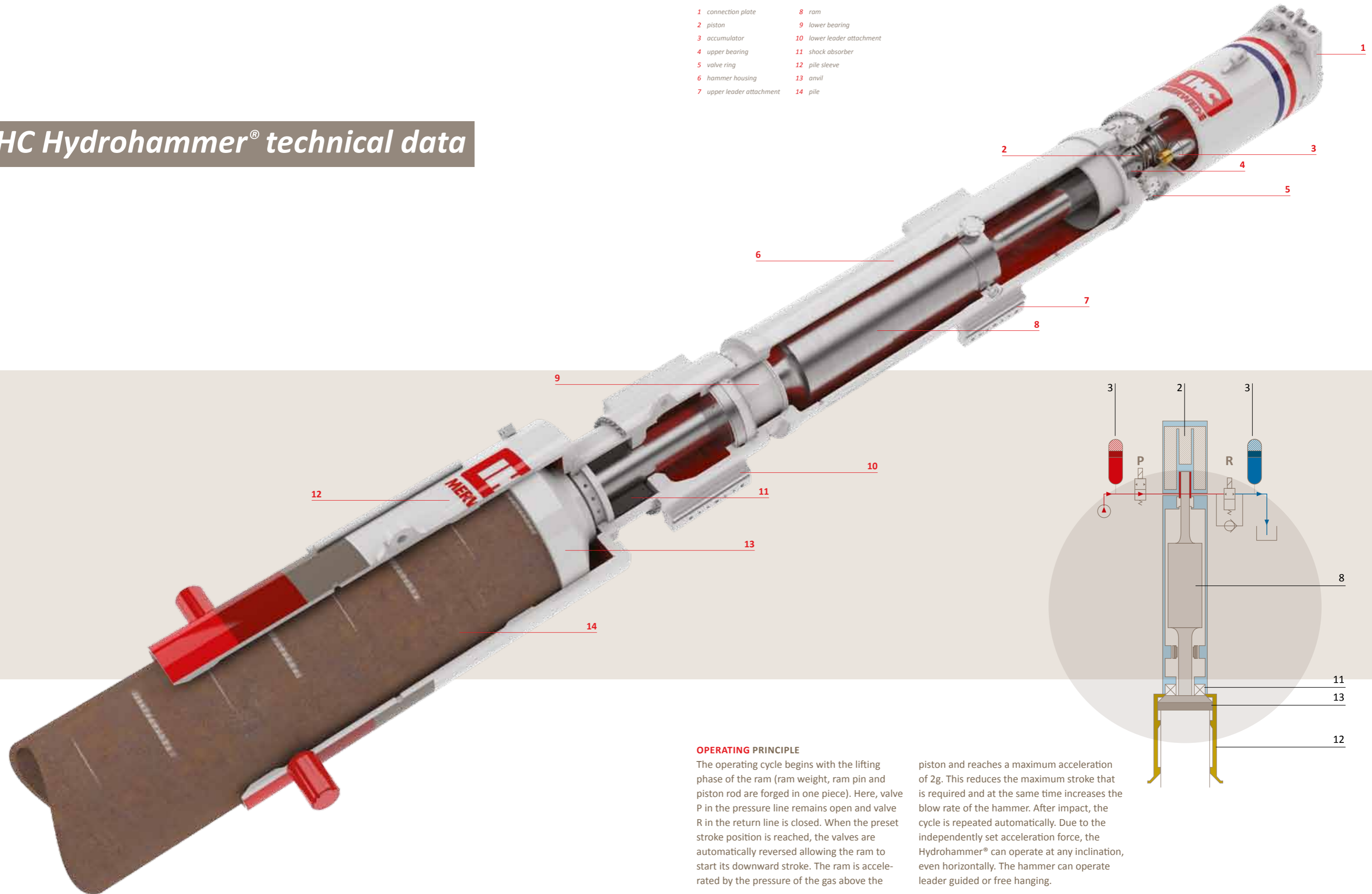
Hurricanes, rising sea levels, earthquakes, extreme temperatures and land reclamation result in foundations facing increasingly stringent requirements. More complex problems demand a great deal from pile driving equipment. That is why we continually adapt our Hydrohammers® to changing demands. This keeps them one step ahead. Hydrohammers® from IHC Hydrohammer® are often used for foundation building activities for container terminals, bridges, viaducts and jetty and mooring posts. Recently, interest has primarily increased with regard to the hammer rock breaker combination for the dredging industry.

Due to urbanisation there are more buildings, less space and there is more environmental legislation. Larger, higher and unconventional structures require more complex foundations. Pile driving locations are often hard to reach in inner city areas. Tunnelling is used more often, even tunnels running underneath tunnels, in order to lessen the burden on the above-ground environment. Noise pollution guidelines have been tightened. There are an increasing number of challenges. It is in IHC Hydrohammer's® nature to test the limits. That is what makes the impossible possible. You can build on that!

*IHC Hydrohammer®
Boundary breaking. Any time. Any how. Anywhere.*

IHC Hydrohammer® technical data

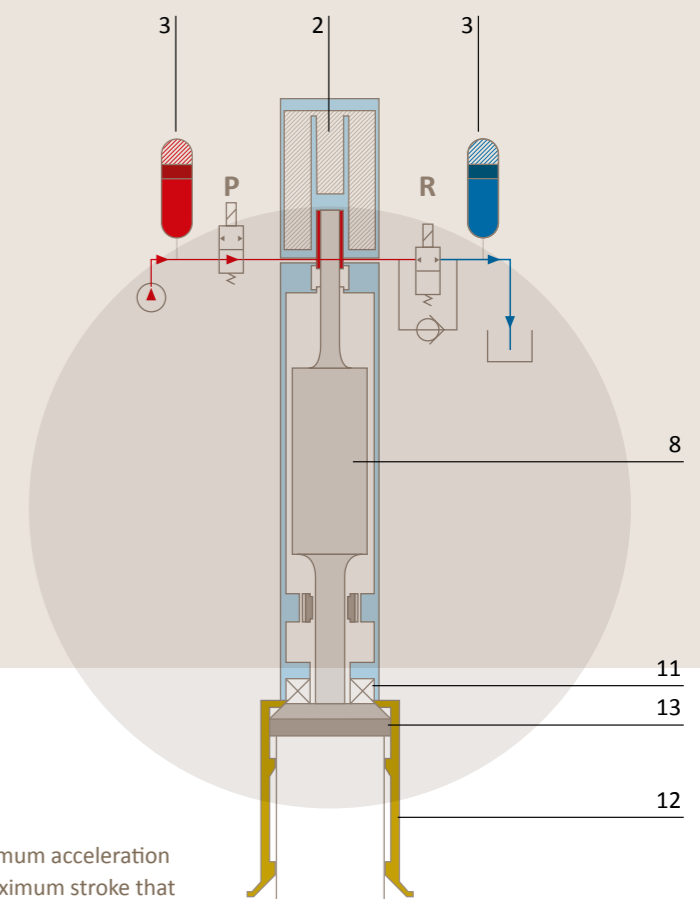
- | | |
|---------------------------|----------------------------|
| 1 connection plate | 8 ram |
| 2 piston | 9 lower bearing |
| 3 accumulator | 10 lower leader attachment |
| 4 upper bearing | 11 shock absorber |
| 5 valve ring | 12 pile sleeve |
| 6 hammer housing | 13 anvil |
| 7 upper leader attachment | 14 pile |



OPERATING PRINCIPLE

The operating cycle begins with the lifting phase of the ram (ram weight, ram pin and piston rod are forged in one piece). Here, valve P in the pressure line remains open and valve R in the return line is closed. When the preset stroke position is reached, the valves are automatically reversed allowing the ram to start its downward stroke. The ram is accelerated by the pressure of the gas above the

piston and reaches a maximum acceleration of 2g. This reduces the maximum stroke that is required and at the same time increases the blow rate of the hammer. After impact, the cycle is repeated automatically. Due to the independently set acceleration force, the Hydrohammer® can operate at any inclination, even horizontally. The hammer can operate leader guided or free hanging.



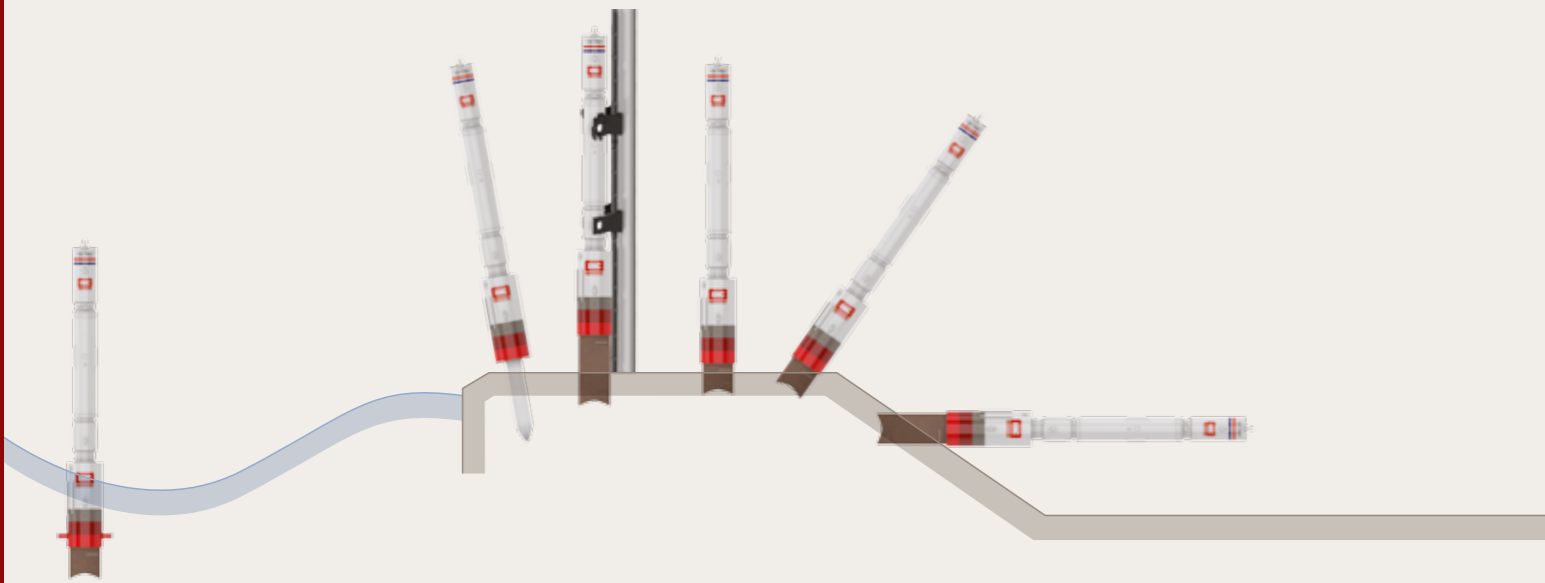
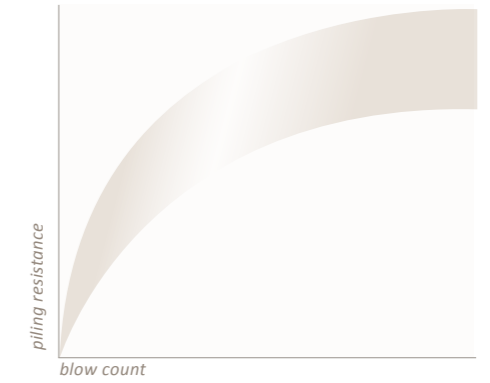
Thinking possibilities

IHC Hydrohammer® is the global standard in the field of pile driving hammers. Why? Because we think in solutions. After all, in practice, every problem on the market demands its own, innovative solution. It is in our nature to think in opportunities. Our years of experience, our empirical approach and - in particular - our intensive cooperation with many onshore and offshore clients means we always see room for improvement.

For example, in recent decades we have broadened our horizons. On the one hand, by not compromising and only being satisfied with the best. On the other, by entering into joint ventures and partnerships with users. Elevating each other, creating opportunities and subsequently capitalising on them. Success starts with the right attitude. It makes you think in solutions.

DRIVEABILITY

A proper choice for a hammer can only be made after careful interpretation and assessment of the properties of the soil. To support its users IHC Hydrohammer® has a staff of experienced civil engineers to assist them with pre- and post-pile driving analyses. These driveability studies are carried out using the most sophisticated computer programs (IHCWAVE and TNOWAVE). These programs are also used to enable IHC Hydrohammer® design engineers to optimize hammer components.



HAMMER CONTROL & MONITORING

All hydraulic functions of the hammers are electronically controlled and monitored. This ensures optimum control of the energy, blow rate and an optimum transfer of the energy into the pile head. Safety features are built into the controls. They include protection against too high or too low a ram stroke, too high level and incorrect hammer/pile positioning. The electronic signals from the hammer

sensors and from the power pack controls are fed into a single control box. In the event of a malfunction the control box software assists in solving the problem. The piling data can be printed on site or stored in a data logger. The data logger option facilitates information transfer to a PC, allowing engineers to conduct detailed analysis of the driving operation.



TWO SERIES OF HAMMERS: S AND SC

The Hydrohammers® are available in two series; the S- and SC-series. The ram weight of the S-series is relatively light and the hammer gets a greater part of its energy from acceleration due to the gas pressure on top of the piston. This makes the hammer ideal for driving steel piles, such as casings, H-beams and offshore piles. The SC-series have a heavier ram weight and lower acceleration because of the lower cap pressure. With the same stroke as the S-series, the SC-series have a lower impact velocity, making these hammers the better choice for driving concrete piles, or when a universal hammer for various types of piles is required.



C34 Control Box



P-31 Printer / P-32 Data Logger



Vertical pile driving

IHC Hydrohammer's® unique design makes it suitable for all types of piling and foundation works, both leader guided or freehanging. With regards to this, all kinds of profiles can be

driven like sheetpiles, H-beams, MV-piles, tubulair piles and so called combi piles whereby different steel profiles are connected by slots.

*Suitable for all types of piling
and foundation works*



Cast-In-Situ technique

One of the unique features of the Hydrohammer® design, besides its sturdiness and high level of controllability, is its ability to facilitate extraction of earlier driven casings.

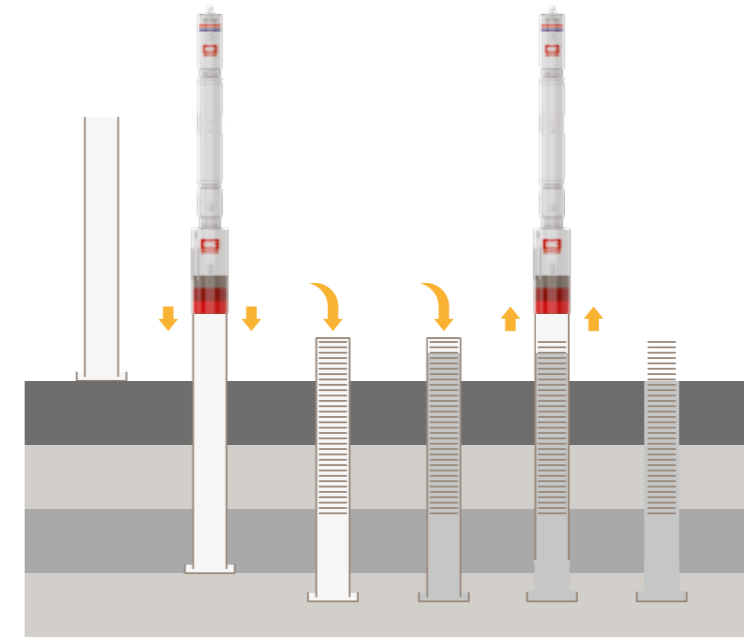
Cast-In-Situ process steps

A steel tube with a steel cover plate (on the bottom) will be driven by a Hydrohammer® with extraction cap into the ground until the required penetration depth is reached, or until sufficient resistance to penetration is encountered. Inside the empty tube a reinforcement cage will be placed and concrete will be poured. The Hydrohammer® with extraction cap will be connected to the tube by link plates, controlled by the pile driver assistant. Hydrohammer® and tube will be extracted by line pull of the rig in combination with small blows downwards or upwards of the Hydrohammer® to reduce the soil frictional resistance. The concrete will flow into the soil cavity.

The required amount of concrete is estimated beforehand. In case of extra consumption, which can happen in very loose soils, the tube will be refilled with concrete before being completely extracted to compensate the extra flow out. A concrete pile of high quality is the result.

Cast-In-Situ advantages:

Fast installation method. High frequency operation of the hammer with extremely low energy per blow reduces soil frictional resistance, enabling pile extraction at crane loads significantly lower than used for conventional static pulling. Under extremely difficult circumstances it is even possible to generate an additional upward force by impacting the hammer housing in an upward direction. This can set a jammed pile into motion. This combination of features means that only one hammer is needed for both driving and extracting, making them ideal for handling cast-in-situ (vibro) piles. Economical, since reinforcement is installed after tube installation, compared to precast piles, where reinforcement must be designed with respect to transport and handling. Concrete can be delivered within a few hours at request by a concrete mixer truck, which prevents storage of precast piles and makes it easier to reach the jobsite. Reinforcement of pile shaft can be increased at top of pile. Due to an increased end bearing and optimal friction along the shaft, a high bearing capacity is usually achieved. Allowable pile loads can be very high. Another advantage is that the adjustable pile length can be determined at the job site.



Driving Cast-In-Situ piles



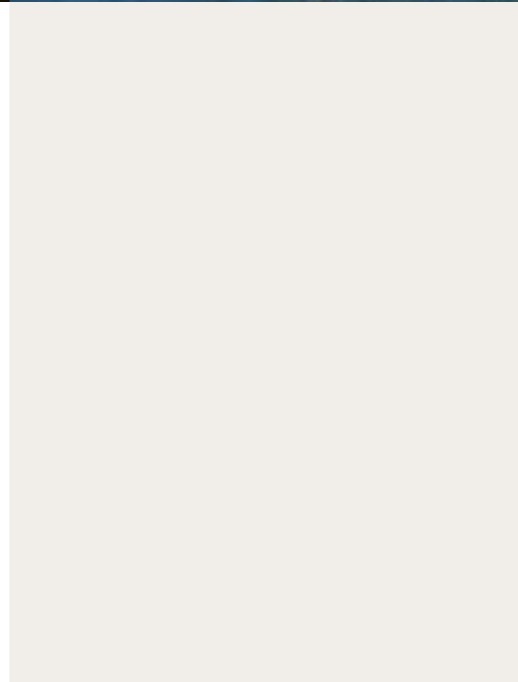
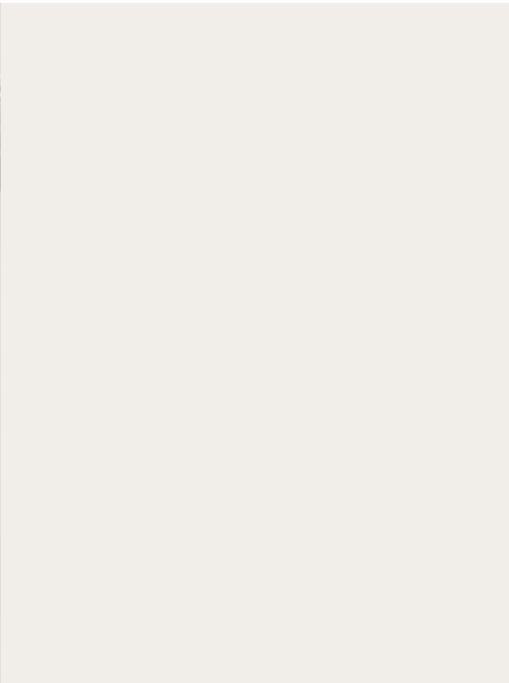
Raked piles

By adjusting the gas pressure above the ram's piston head, the ratio between the energy delivered by gravity and by gas can be adjusted. When driving raked piles the gas pressure is increased to compensate for the

loss of gravity energy. Battered piles up to a rake of 1:1 (45 degrees) can be driven at full energy. It is even possible to drive horizontally. In this case it is only the gas pressure which accelerates the ram to full energy.

Battered piles up to a rake of 1:1 (45 degrees) can be driven at full energy.

It is even possible to drive horizontally

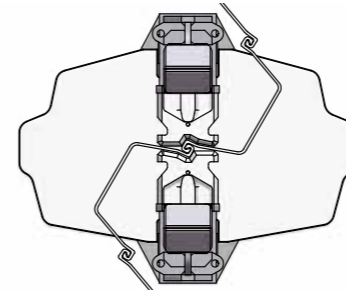


Sheet piles

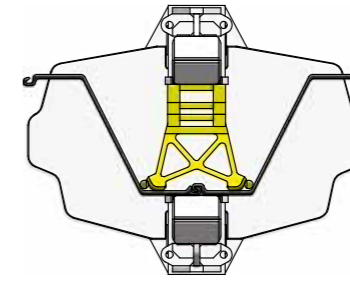
For driving sheet piles both the S-series and SC-series can be equipped with *sheetlegs*. These legs give the hammer the required stability when driving sheet piles in a free riding mode. This eliminates the necessity of a leader and driving can be done with the aid of a regular crane.

Many types of profiles can be driven, single sheetpiles, double sheetpiles, single H-beams, double H-beams, combi walls, etc. Our new and smallest S-30 Hydrohammer® is specially designed for driving sheetpiles. The small diameter of Ø460 mm gives the possibility to drive single sheetpiles and the weight of the hammer in combination with the sheetlegs is beneath the 7 tons. Another new development is the polygonal anvil. The special shape gives the possibility to drive a wide range of sheetpiles with maximum coverage. This range goes from the small profiles, width 500 (for

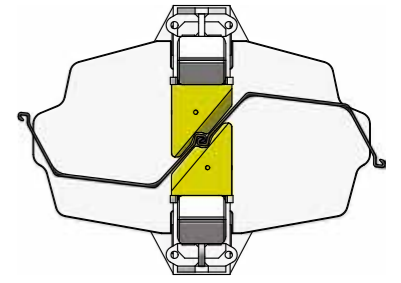
example: Hoesch L25) to the big profiles, width 700 (for example: Arcelor AZ40-700) or width 750 (for example: Arcelor AU26). Our newest development is the new type of sheetlegs for our S-30 and S-40 Hydrohammer®. The futuristic shape of the upper part has a high stiffness. These sheetlegs can be used with the polygonal anvil for double sheetpiles and with an anvil for single sheetpiles.



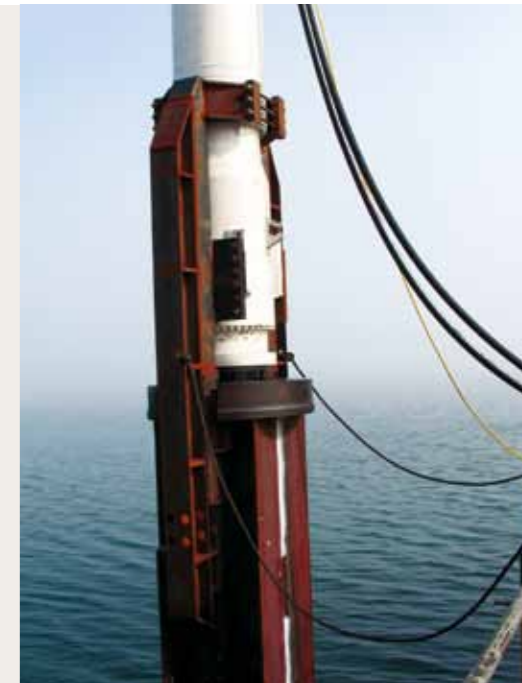
Coverage with the polygonal anvil at the profile L25



Coverage with the polygonal anvil at the profile AZ 40-700



Coverage with the polygonal anvil at the profile AU 26

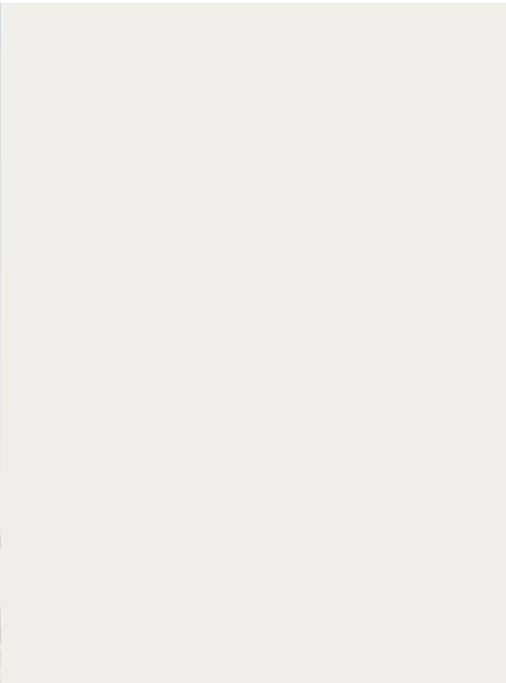


Noise insulation enclosures

A new feature of the Hydrohammer® is the possibility to equip the hammer with a noise reduction package. This consists of an enclosure at the point of impact and bellow sections around the pile. The design was

developed in collaboration with the Dutch Research Institute TNO/TPD. Noise levels can be reduced to less than 80 dB(A) at 7 meters, which is a great improvement in noise emission levels for today's building sites.

Noise levels can be *reduced to less than 80 dB(A) at 7 meters,* which is a great improvement in noise emission levels for today's building sites.



Horizontal driving

When large diameter piles, tubes or tunnel sections have to be installed horizontally over an appreciable distance, powerful tools are required to deliver the amount of driving energy or of a sufficient cutting capacity. IHC Hydrohammer® is specialized in piling jobs where large diameter piles (up to 4.3 m, 15 ft diameter) have to be driven. Due to two unique features in the design of the hydraulic driven, double acting Hydrohammer®, it is possible to operate the hammers under every inclination, even horizontally.

1 The first feature is the double acting principle of the hammer, whereby part of the kinetic energy of the ram is obtained by a pressurized gasbuffer above the main piston. When operating under a batter, increasing the pressure of the gasbuffer can compensate the loss of energy delivered by gravity.

2 The ram of the Hydrohammer® is guided by two oil-lubricated bearings. There is no contact between ram and guide columns or ram and housing. This prevents excessive wear and tear.



ADVANTAGES OF HORIZONTAL DRIVING SYSTEMS

There are a number of distinct advantages in using IHC Hydrohammer® and the Hydrohammers®, when (large diameter) piles have to be installed horizontally:

- 1 Easy to change configuration for different pile diameters (only sleeve and anvil have to be replaced underneath the hammer)
- 2 Faster tube installation progress
- 3 Standard Hydrohammers® can be used, no modifications required
- 4 Extensive experience in driving large diameter piles
- 5 Large rental fleet available
- 6 Cleaner operation
- 7 Safer operation: working tool is outside, not inside the tube



HAMMERTYPE		S-70	S-90	S-120	S-150	S-200	S-280
OPERATIONAL DATA							
Max. net energy	kJ	70	90	120	150	200	280
	ft.kips	51	66	88	110	147	206
Blow rate at max. blow energy (1)	bl/min	50	46	48	44	45	45
Min. required line pull	kN	120	140	180	200	280	350
	short tons	13	15	20	22	31	38
WEIGHTS							
Ram	kg	3500	4500	6200	7500	10000	13600
	lbs	7716	9921	13228	16535	22046	29762
Total weight (hammer only)	kg	8300	9700	14300	16200	25800	30500
	lbs	18298	21385	31526	35715	56879	67241
DIMENSIONS							
Length hammer (2)	mm	7400	8055	8166	8900	9095	10390
	ft. in	23'5"	25'10"	26'2"	28'7"	29'3"	35'10"
Outer diameter	mm	610	610	712	712	915	915
	ft	24	24	28	28	36	36
POWER PACK TYPE							
Recommended		P-250	P-250	P-460	P-460	P-800	P-800

All data approximately only and depending on final design and lay-out

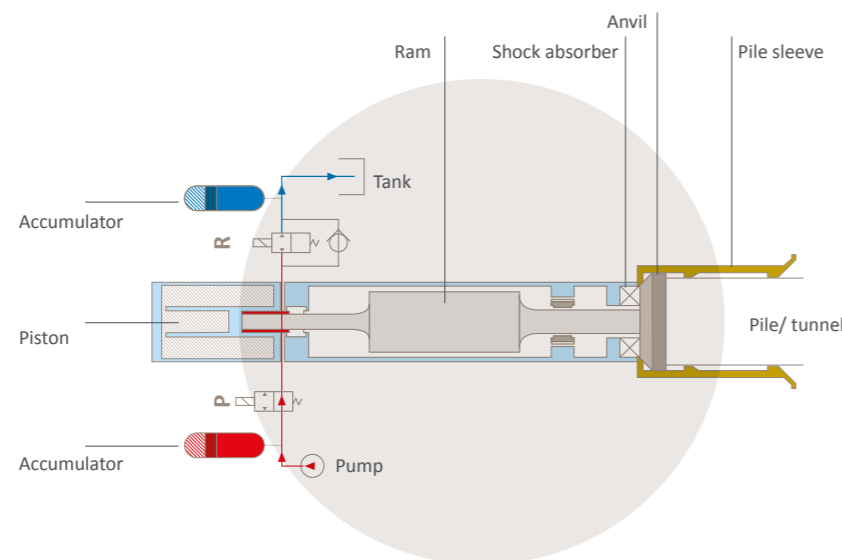
NOTES

- 1 When using recommended powerpack
- 2 Transport length



PRINCIPLE OF HORIZONTAL DRIVING OPERATION

The figure on the right shows the hammer set-up when driving horizontally. To counteract against the increased pressure in the gas-buffer, a constant tension (pull down force) is required to keep the hammer housing firmly on the pile. A spring arrangement is located between the tension-wires and the hammer to prevent too high shock loads in these wires.



Rockbreaking

Equipped with a chisel set, the Hydrohammer® becomes a highly effective and powerful rock breaker. As the S-series has the highest impact velocity, this type is the most suitable for producing the high impact force necessary for breaking rock, cemented layers, concrete floors, and slabs. If cutter dredging is no longer possible because the rock is too hard (average

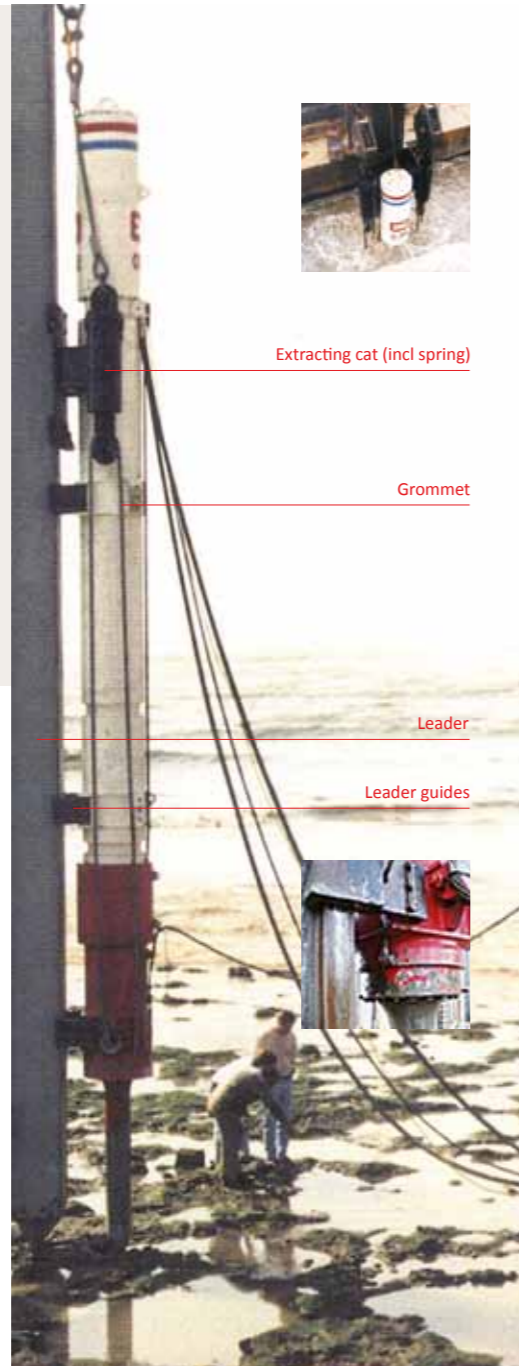
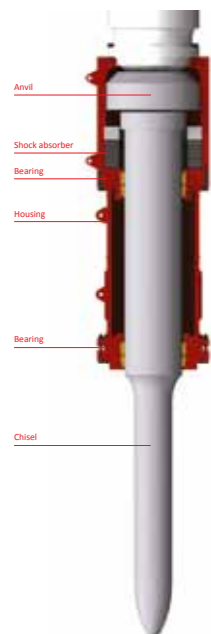
compressive strength greater than 40 MPa), or dredging is not justified economically in the case of relatively small volumes, a rock breaker can be an excellent solution. Where removal of hard rock by means of explosives is not permitted for safety or ecological reasons, the use of an IHC Hydrohammer® rock breaker may be the ONLY solution.

Operating Methods

Different types of handling equipment can be used to lift and position the rock breaker and leader profile such as: piling rig, excavator or backhoe or a cutter dredger. The choice depends on water depth and (mostly) on the equipment available for/on the project. Naturally, the handling equipment needs sufficient lifting capacity to position the hammer and chisel and sufficient traction power to retract a jammed chisel. Extraction takes place with use of an extracting cat (spring buffer) placed on the leader profile in between the pulling line. This will create a continuous pulling force on the rock breaker and prevent damage during extraction.

CHISEL WITH HOUSING

The Hydrohammer® can be used as a rock breaker both on land and underwater. For that purpose, the standard S-30, S-40, S-70, S-90 or the more powerful S-200 and S-280 Hydrohammers® are equipped with a special sleeve with an internal anvil (seated on spring cushioning) and a chisel that slides in the special sleeve. After being driven into the rock, the hammer and chisel are lifted and moved to the next spot. This way, holes can be punched in a certain pattern, leaving the fractured rock to be removed by other equipment such as an excavator or clamshell. An important advantage of the Hydrohammer® is the ability to deliver up-wards blows. Doing so while lifting the hammer at the same time strongly facilitates the retraction of jammed chisels.



THE SYSTEM

In order to withstand the heavy resistance forces to which the hammer and chisel (rock breaker) are exposed, the Hydrohammer® needs to be properly guided in a leader guide profile. This operating criterion secures the central alignment of the chisel and hammer for optimum energy transfer between ram/anvil and chisel. The position of this leader profile should be fixed during breaking (making one hole) and extracting.

PILING RIG

One of the most proven methods of breaking rock under water is the use of a piling rig whereby the leader can be lowered down in the water. This way the leader is part of the rig. With a standard IHC FUNDEX Equipment F12SE piling rig the leader can be lowered down about 15 m under water. With a special long leader and some other modifications a water depth of about 45 m can be reached.



EXCAVATOR OR BACKHOE

The combination with an excavator provides the most versatile operation: breaking is possible at any angle and the hammer with chisel can be moved rapidly and independently from the pontoon. The only limitation is the water depth. The operation of the rock breaker with an excavator has been successfully carried out on several projects. In these cases a custom build short leader of about 10 m length is fitted on the stick of the excavator. The water depth reached depends on the excavator and varies between 8 and 13 m. Extraction of the chisel is done by two hydraulic cylinders mounted on the leader. The Hydrohammer® can be used for precise breaking operations, such as those close to works of art and ancient foundations, both on land and under water. The Hydrohammer® also offers a good solution for large dredging operations where relatively small amounts of hard rock need to be removed.



CUTTER DREDGER

If cutter dredging is no longer possible because the rock is too hard (average compressive strength greater than 40 MPa), or dredging is not justified economically in the case of relatively small volumes, a rock breaker can be an excellent solution. It is possible to mount a custom build short leader to the cutter ladder of an IHC Merwede cutter dredger to handle the rock breaker.



Rock Breakability

Which rocks can be broken or fractured with the Hydrohammer® depends on a number of factors:

- Rock hardness
- Rock stratification and homogeneity
- Thickness and surface profile
- Method used, which in itself depends on the water depth and available equipment

ROCK HARDNESS

So far, rocks with a hardness up to 80 MPa (a very high compressive strength) have been successfully broken using an S-70 Hydrohammer® to punch vertical holes in a relatively level surface. If the fractured rock can disperse from the breaking zone, it will undoubtedly be possible to break even harder rocks. The average compressive strength that a normal cutter dredger can handle is 40 MPa. Bigger hammers such as the S-200 or S-500 are able to break harder rocks.

STRATIFICATION AND HOMOGENEITY

If the rock has horizontal layers, good results can be obtained by positioning the rock breaker at an angle and/or adapt the breaking pattern to achieve penetration in harder spots in the rock.

THICKNESS AND SURFACE PROFILE

A relatively thin layer will be easy to crack. If layers are thicker than e.g. 1 m, it may be necessary to break layer by layer. Needless to say, irregular surfaces are easier to break as the broken material normally crumbles away.



Technical specifications

WEIGHTS AND DIMENSIONS	UNIT***	S-30	S-40	S-70	S-90*	S-200	S-280
WEIGHT							
Rock breaker	ton	4	4	5,2	5,2	18	18
Hoisting equipment & leader guides	ton	3	3	3	3	16	16
Hammer	ton	3,9	4,7	8,3	9,7	25,8	30,5
Leader	ton	2,4	2,4	2,4	2,4	**	**
Total weight(T)	ton	13,3	14,1	18,9	20,3	**	**
LENGTH							
Rock breaker	mm	3750	3750	3850	3850	5620	5620
Hammer	mm	6100	6850	7400	8055	9095	10390
Total length(T)	mm	9850	10600	11250	11905	14715	16010

All data approximately only and depending on final design and lay-out

* when an S-90 hammer is used in combination with a rock breaker set, the setting of the energy level is never allowed to exceed 70 kJ

** upon request

*** incl. rock breaker, Hydrohammer® and leader

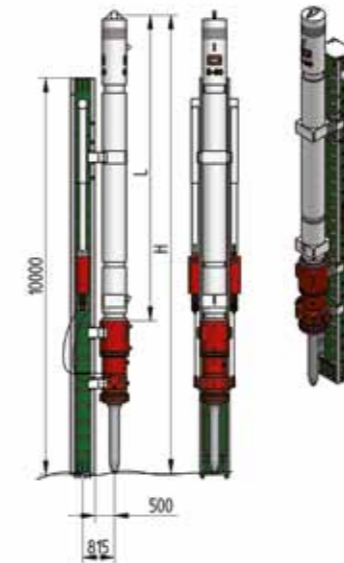
REFUSAL

For efficient operation and to prevent damage to the hammer, it is essential that the chisel penetrates the rock. The refusal per stitch is met when the total cumulative energy, delivered to the chisel, reaches a value of 20.000 kJ (For an S-70 this means 285 blows at full energy). If more strokes are required to break the rock, a more powerful hammer can be selected. There is a wide variety of Hydrohammers® to choose from. So far, the S-35, S-70, S-90, S-280 and S-500 have been used during rock breaking operations.



STANDARD S-70 ROCK BREAKER CONFIGURATION

Leader	2,4 ton
Hammer S-70	8,3 ton
Rock breaker	5,2 ton
Leader guides	0,5 ton
Hoisting equipment	2,5 ton
Total weight	18,9 ton



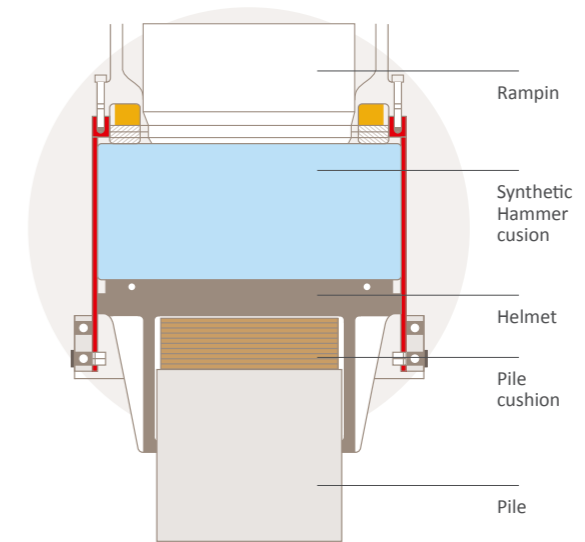
Prefab concrete piles

Prefab concrete piles can be driven with Hydrohammer® SC-series. The following Hydrohammer® SC-types are available for rent and for sale: SC-75, SC-110, SC-150 and SC-200. This type of Hydrohammer® is specially designed to drive concrete piles but is besides that also suitable to drive steel piles at maximum energy. The standard concrete cap configuration to drive concrete piles is shown in the illustration on the right. The Ramp point of the ram weight hits on a Synthetic Hammer Cushion. The Synthetic Hammer Cushion transfers the energy into the Helmet and through the wooden Pile Cushion into the Pile without damaging the concrete.

The SC-type Hydrohammers® can be supplied with an energy rating up to 200 kJ. Similar as the S-type Hydrohammer®, which is designed for steel piles, the SC-type is capable to drive

piles below the waterline. When driving piles below the waterline an air hose is connected to the sleeve through which compressed air is supplied into the hammer to keep water from flowing into the Hydrohammer®.

The Prefab concrete piles can be driven with a Hydrohammer® in two ways, free riding and leader guided. When driving piles free riding a longer sleeve is required than while leader guided. The reason for the extended sleeve is the fact that the total weight and moment induced by the hammer needs to be transferred through the sleeve into the pile.



Less is more...

UNIVERSAL AND UNIQUE

There are no compromises in the design of the hydraulic Hydrohammer® where reliability, efficiency, possibilities and safety are the focus. A design forged from billions of hammer strikes, both onshore and offshore.

The Hydrohammer® combines a solid one-piece ram with a fully enclosed hammer housing. The result is an elegant yet robust and reliable hammer. IHC Hydrohammer®'s unique design makes it suitable for all types of piling and foundation work, ranging from piling impact sensitive concrete piles, to piling large and long offshore caisson piles. The hammer can even be used to break rock (also under water).

MORE RELIABILITY

Solid piece Ram. The ram weight, ram pin and piston rod are forged in one piece, which means there is no risk of the parts separating.

Materials. The forged alloy steel guarantee durability. This also allows unlimited piling on steel using full power.

Shock absorber. The robust and tested construction and the materials used sustainably resist the reaction forces from the pile.

Bearings. The ram is guided above and below by lubricated bearings. This reduces ram wear to a minimum.

Limited parts. The use of a limited number of parts leads to lower risk of failures and fewer spare parts.

MORE POSSIBILITIES

Enclosed hammer housing. The energy supplied by the Hydrohammer® is the same both above and below water.

Tools. The hammers can be equipped with rock chisels, noise bellows and sheet piling and pile guides in all sizes.

Sleeve design. Due to the flat anvil, the sleeves can be adjusted to suit any pile diameter.

Free hanging. The Hydrohammer® can operate leader guided and free hanging (fitted with a pile sleeve).

Clamp system. A special clamp system rigidly connects the pile head and the hammer housing. As a result, only one Hydrohammer® is needed to drive and to extract piles. This makes the Hydrohammer® ideal for the installation of cast-in-situ (vibro) piles.

Acceleration energy. In addition to piling vertically, the Hydrohammer® can also operate at full power horizontally and at any other inclination. Thanks to the acceleration energy, it has a relatively low weight and a high peak force to overcome soil resistance.

Forged pieces. Due to the high-quality forged and alloyed parts, the Hydrohammer® is suitable for driving steel on steel.

MORE EFFICIENCY

Hammer control. All hydraulic functions of the Hydrohammer® are electronically controlled and monitored. This contributes to allowing the optimal blow energy to be set.

Modular structure. All parts that could possibly need attention between major services are easily accessible from the outside.

Oil flow. Due to the accelerated ram weight, it is possible to realise a high blow count at a relatively low oil flow.

Real time monitoring. The piling data are directly printed on site or stored in a data logger. This allows a detailed analysis of the driving operation to be conducted.

INCREASED SAFETY

Safety provisions. Signals from the hammer sensors are centrally processed in the control box. If the length of the ram stroke is too long or too short, the hammer is stopped. If the hammer/pile positioning is incorrect, the hammer cannot be started.

Environmentally friendly. The Hydrohammer® can use biodegradable oil. Noise reduction is optimised by fitting the Hydrohammer® with the available noise reduction packages.



HAMMER S SERIES		S-30	S-40	S-70	S-90	S-120	S-150	S-200	S-280	S-500	S-600	S-800	S-900	S-1200	S-1400	S-1800	S-2000	S-2300
OPERATIONAL DATA																		
Max. blow energy on the pile	kNm	30	40	70	90	120	150	200	280	500	600	800	900	1200	1400	1800	2000	2300
Min. blow energy on the pile	kNm	3	4	7	9	12	15	20	28	50	60	80	90	120	140	180	200	230
Blowrate at max. blow energy (1)	bl/min	65	65	50	46	48	44	45	45	45	42	38	38	38	40	35	35	30
WEIGHTS																		
Ram	ton	1.6	2.2	3.5	4.5	6.2	7.5	10	13.6	25	30	40	43	60	69	90	100	115
Hammer with ram in air (2,3)	ton	3.9	4.7	8.3	9.7	14.3	16.2	25.8	30.5	57.5	64	83	120	140	148	210	225	242
DIMENSIONS																		
Length hammer (4)	mm	6100	6850	7400	8055	8166	8900	9095	10390	11943	12715	14610	12795	14297	16090	16510	17335	18290
HYDRAULIC DATA																		
Oil flow	l/min	175	175	250	250	460	460	800	800	1600	1800	1800	2400	2400	3600	4400	4400	4800
POWER PACK TYPE																		
Recommended		P-175	P-175	P-250	P-250	P-460	P-460	P-800	P-800	on request								

HAMMER SC SERIES		SC-75	SC-110	SC-150	SC-200
OPERATIONAL DATA					
Max. blow energy on the pile	kNm	75	110	150	200
Min. blow energy on the pile	kNm	8	11	15	20
Blow rate at max. blow energy (1)	bl/min	50	45	45	45
WEIGHTS					
Ram	ton	5.7	7.9	11	13.6
Hammer with ram in air (2,3)	ton	9.8	14.1	18.7	26.5
DIMENSIONS					
Length hammer (4)	mm	6245	5755	6630	5730
HYDRAULIC DATA					
Oil flow	l/min	250	460	460	800
POWER PACK TYPE					
Recommended		P-250	P-460	P-460	P-800

POWER PACK TYPE		P-175	P-250	P-460	P-800
OPERATIONAL DATA					
Max. pressure	bar	350	350	350	350
Max. oil flow (5)	l/min	175	250	460	800
Power	kW	110	168	387	565
DIMENSIONS					
Length	mm	2613	3500	4030	4500
Width	mm	1200	1540	1545	1800
Height	mm	1775	2044	2225	2520
WEIGHTS					
Net. weight	ton	2.4	3.5	5.4	7.8
Weight incl. fuel and oil	ton	3.8	4.5	7.4	9.7

ACCESSORIES

Pile sleeves	Printers
Sleeve inserts	Monitoring equipment
Anvils	Noise reduction packages
Pile cap	Control cabins
Winches	

NOTES

- 1 When using recommended power pack.
- 2 Hammer weight without anvil/pile cap and pile sleeve.
- 3 Sleeve and anvil dimensions and weight depend on application. Information on request.
- 4 Transport length.
- 5 All hammers and power packs can be operated using bio-degradable oil.

