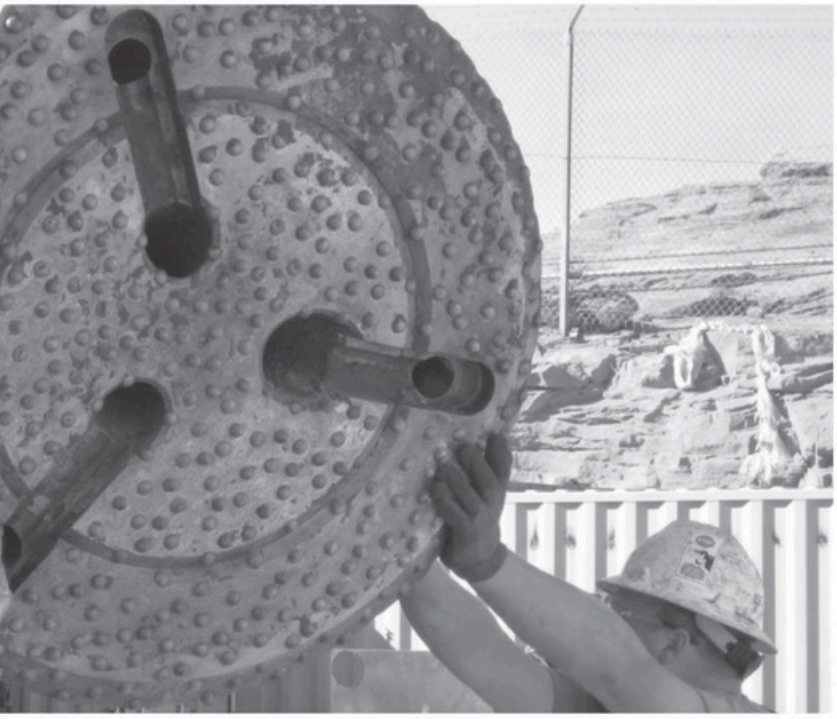

## REVERSE CIRCULATION

FULL RC SYSTEMS YIELDING OPTIMUM EFFICIENCY DEVELOPED
OVER 40 YEARS OF RC INNOVATION

HOLTE
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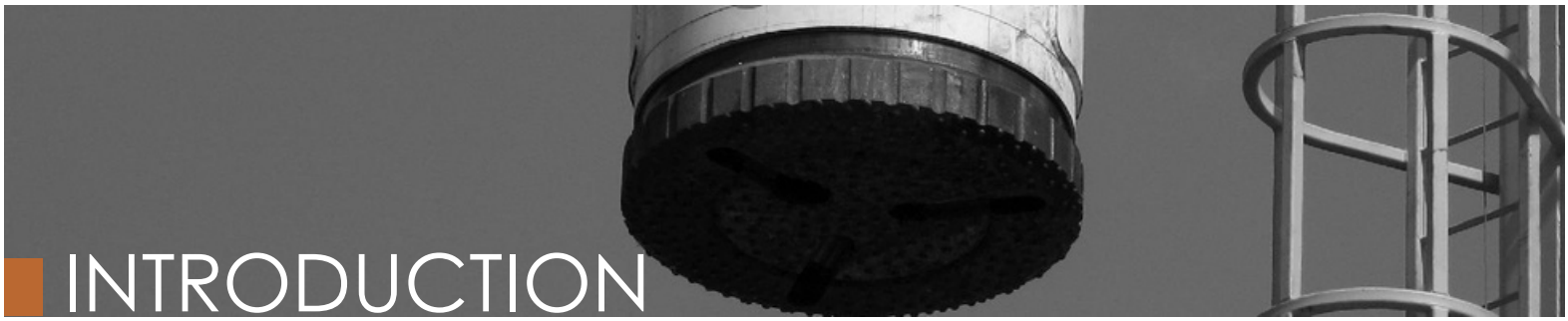


# INTRODUCTION

## Early Pioneer of Reverse Circulation

From the beginning Holte recognized the significant advantages of reverse circulation (RC) drilling while out on the job site. Holte's first true RC hammer, designed in the 80's, has evolved into an offering of complete RC systems. Matched air channels and cuttings discharge, from top-to-bottom, optimize performance and minimize wear. Ultimately this means the driller can tackle more difficult jobs while using less air, with the added benefit of controlling where cuttings go.

The Reno Retrack project drilled 2000+ holes through Reno, Nevada's sensitive downtown infrastructure. On the Whitestone Bridge in New York City, 772 mini-piles were drilled with Grout Through, to support the expansion of the I-678 bridge across the East River, connecting the Bronx with Queens.

## How Reverse Circulation Works

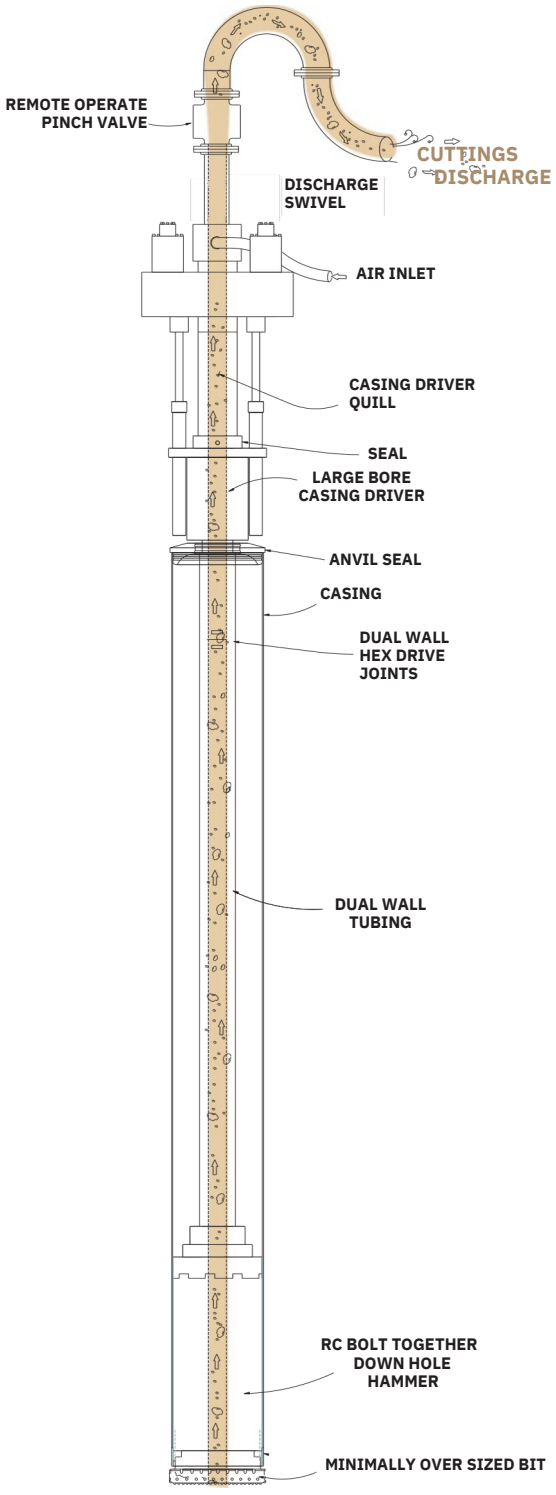
In RC drilling, the bit has a hole through the center to permit cuttings to travel up the center of the drill pipe, rather than around the drill pipe or casing as in conventional rotary drilling. As in conventional drilling, the air exhaust from driving the hammer is used to force cuttings back up to the surface.

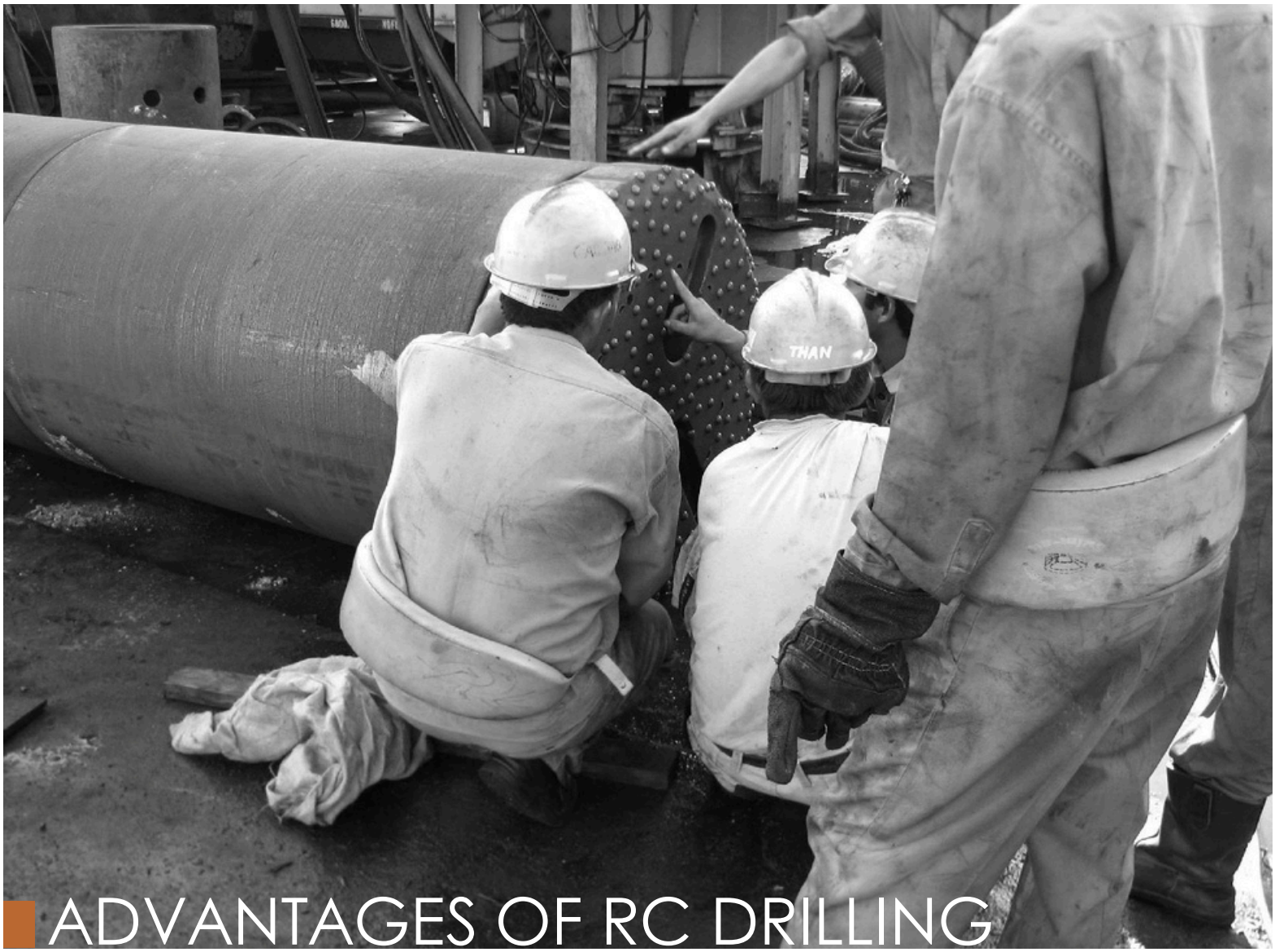
RC is ideal for porous formations that take up air easily, because exhaust air travels up the center with the cuttings—maintaining the air pressure and reducing air loss. It is the choice tool for exploration and ore grading. But more than that, it simply makes drilling any hole faster and less expensive.

## The Reverse Circulation System

A RC system (shown to the right) is composed of a RC bit, RC down hole hammer (DHH), RC drill pipe, RC Top Head, and a cuttings discharge tube. A RC system can be used with a casing driver, a drive shoe down the hole, or casing rotator. RC also lends itself to holes that don't need a casing.

It is possible to adapt your conventional system to a partial RC system giving many of the benefits of RC drilling while allowing you to use your current drilling system. RC systems also facilitate Grout Through filling of the hole as the drill is extracted.





# ADVANTAGES OF RC DRILLING

## Reverse Circulation Lowers Costs

Simply put, reverse Circulation (RC) drilling lowers operating costs and hassle compared to conventional drilling. In RC drilling the cuttings are exhausted up the center of the bit and drill pipe which allows for several ground-breaking advantages:

- Removal of cuttings allows faster drilling (~2-8X faster than conventional drilling)
- Lower drilling friction causes less wear, making tooling and buttons last longer
- Uses less air and can take out bigger, heavier, rocks
- Reduces the chances of rocks falling in the hole and getting the bit, hammer, or casing stuck
- Drills more sensitize formations with less chance of borehole wall cave-in
- Control of cuttings exhaust means less mess, a smaller affected area, and allows drilling in public places
- Cuttings discharge often used for exploratory mineral sampling or just to route waste for easy hauling
- Exhaust side check valves and water flow via the cuttings path lead to less drowning out of the hammer
- Grout Through technology allows back filling of the hole as the drill retracts
- No need for expensive and environmentally regulated lubricating foams for deeper jobs
- Holte's RC Down Hole Hammers allow easy access to key parts making them faster and easier to maintain

- [ RCDHH ] Features
- Bolt together design allows rotation in both directions
- Quick Change Bit system allows quick access to Bit without removing the Hammer from the drill string
- Oversized center return allows effective large debris removal for faster penetration
- Designed to be easy to take apart and reassemble—using hand tools
- Bit Shroud keeps cuttings out of the gap between the Bit and Hammer.
- Drill Straighter holes—the Bit Shroud design minimizes Bit slip when drilling non-uniform hardness rock
- Key drive eliminates Bit weight and length offering better Piston/Bit weight ratio
- Check valves at the bottom of hammer reduce the possibility of debris from entering the hammer


# REVERSE CIRCULATION DOWN HOLE HAMMERS [ RCDHH ]

Reverse Circulation Hammer Technology comes from experience. Designing and manufacturing with our customers to meet specific job needs, we have been able to incorporate innovative solutions and develop some of the most efficient, durable tooling available. Our large diameter hammers continue to set the benchmark for the industry.

Holte's Reverse Circulation Grout Through Hammers have proven successful in drilling down the hole, then grouting through the bit face on the way out by simply switching a valve

We can manufacture and heat treat, in-house, any hammer up to 43" (1092mm) to ensure balance between strength and durability of materials.

| HAMMER SIZES [ RCDHH ] | | | | | | | | | | | | | | | RC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal Size | Description | 5" | 6" | 7" | 10" | 12" | 14" | 15" | 16" | 18" | 20" | 24" | 30" | 38" | 42" |
| Holte Available | Reverse Circulation DHH | | | ● | ● | | ● | | | | ● | ● | ● | | ● |







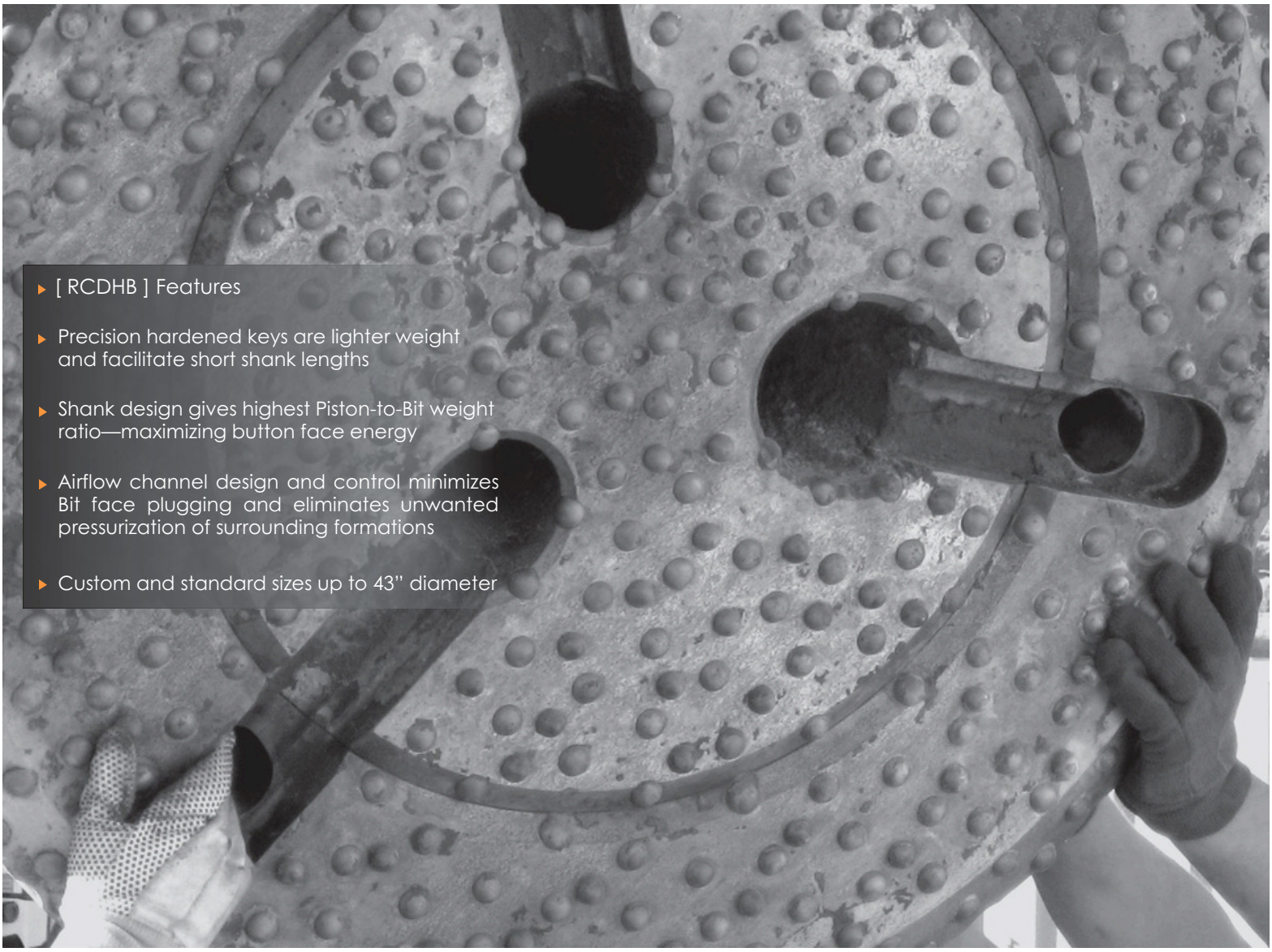
## Standard Reverse Circulation Down Hole Hammers [ RCDHH ] RC

| | | RC7 | RC10 | RC14 | RC20 | RC24 |
|---|---|---|---|---|---|---|
| Standard Diameter* | in (mm) | 7 (178) | 9 (229) | 14 (356) | 20 (508) | 24 (610) |
| Length w/o Bit** | in (mm) | 27.5 (699) | 41.6 (1057) | 56.6 (1438) | 60.3 (1532) | 56.0 (1422) |
| Weight w/o Bit | lb (kg) | 210 (95.3) | 605 (274) | 2235 (1014) | 3685 (1672) | 4690 (2127) |
| Cylinder Bore | in (mm) | 5 (127) | 7 (178) | 10 (254) | 14 (356) | 16.8 (427) |
| Stroke | | 3.3 (83) | 4.0 (103) | 4.4 (112) | 4.7 (119) | 4.8 (122) |
| Center Bore | in (mm) | 2.3 (59) | 3.4 (86) | 4 (102) | 6.2 (156) | 6.2 (156) |
| Piston Weight | lb (kg) | 32 (14.5) | 88 (39.9) | 335 (152) | 735 (333) | 1207 (547) |
| Working Pressure | psi (bar) | 100-200 (7-13.8) | 100-300 (7-21) | 100-300 (7-21) | 100-300 (7-21) | 100-300 (7-21) |
| Maximum Working Pressure | psi (bar) | 200 (13.8) | 350 (24.1) | 350 (24.1) | 350 (24.1) | 350 (24.1) |
| Min-Max CFM Required† | cfm | 480-1600 | 480-1600 | 800-1600 | 1275-2600 | 1275-4250 |
| Standard Top Sub†† | | 6 5/8 API | 5.4 RC Hex | 9.4 RC Hex | 11.2 RC Hex | 9.4 RC Hex |
| Min/Max Bit | in (mm) | 7-10 (178-254) | 10-14 (254-356) | 14-18 (356-457) | 18-25 (457-635) | 24-36 (610-914) |

Specifications subject to change without notice. Specifications for sizes not shown available with order.
*Minimum compatible casing size available. Larger sizes can be accommodated to meet most specifications.
**Length from tool joint shoulder to hammer bottom.
†@200 psi. Min for 6000 ft/min velocity in largest I.D. drill pipe combo, Max for 20,000 ft/min velocity in smallest I.D.
††Additional top sub connections available.

Call or email Holte for pricing or custom sizes at +1 541.935.5054 or sales@drilling.com.

A driller in the Reno Retrack Project was drilling one of many 400' deep holes through gravel and boulders. Partway through one hole he stopped advancing—but having HOLTE's Hex Drive joints throughout his RC system allowed him to simply change the direction of rotation and quickly complete his drilling to the specified depth.




# REVERSE CIRCULATION DOWN HOLE BITS [ RCDHB ]

## Holte Reverse Circulation Bits Offer Control

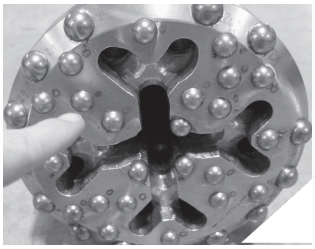
Thanks to Holte's long history with drilling, we understand bits and the importance of having a durable, effective, design leading your tooling down the hole. Art Holte invented the key drive system so our complete line of reverse circulation bits can be changed quickly with hand tools.

Precision, hardened, keys are the core of our key drive system, taking the place of traditional splines. They allow shorter shank length and lighter weight bits with very high piston-to-bit weight ratios. Delivering maximum energy to the button face means the drill is bringing rock chips to the surface, not wasting time making dust.

Tapered airflow channels reduce the chance of bit face plugging to ensure the hammer keeps running in all types of conditions. Careful control of airflow better directs air to the center of the bit face, helping to eliminate the unwanted pressurization of surrounding formations—making drilling in sensitive sites less risky.

Holte RC bits are available in a variety of shank styles which include an innovative two piece design utilizing tungsten carbide or optional diamond buttons for the ultimate in durability. Sizes range up to 43" (1092mm), but our flexible design, manufacturing and heat treatment process is capable of adapting to meet your needs if another size better suits the job. RC under-reamer bits are also available.





## REVERSE CIRCULATION SOLUTION COMBINATIONS RC

| HOLTE [ RCDHH ] | HOLTE [ RCDHB ] | HOLTE [ RCPIPE ] |
|---|---|---|
| RC7 | 7" - 10" | 7" x 3.8" |
| RC10 | 10" - 14" | 7" x 3.8" |
| RC14 | 14" - 18" | 7" x 3.8" or 8.625" x 4.90" |
| RC20 | 18" - 25" | 8.625" x 4.90" or 10.75" x 6.25" |
| RC24 | 24" - 36" | 10.75" x 6.25" or 13.625" x 7.80" |

*Specifications may change without notice. Additional sizes and combinations can be customized.

During Ocean floor drilling in South Africa, the driller had to change bits every 1-2 holes, spending half their time changing bits. HOLTE convinced them to switch to diamond buttons and they finished the next 18 holes with a single bit (and could have kept going)! Common in oil drilling, diamond buttons sell less bits, but they last longer and more than pay for themselves by keeping your bits sharp and your team drilling.

Photo previous page: 42" Bit on RC30 in Page AZ, Glen Canyon Dam. Photos left to right. Top: a)RC30 in Karratha Western Australia. b)Bit just out of heat treat (true color glow). c)7" RC Bit. Bottom: d) Reassembling the Hammer in Australia. e) Machining Key slots in the Bit (true color cutting fluid).


# REVERSE CIRCULATION DRILL PIPE

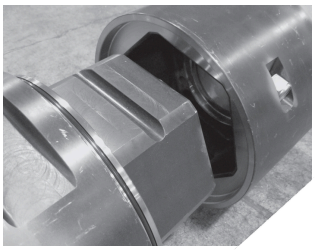
## Field Proven Around the Globe

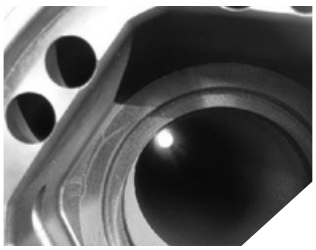
As an early proponent of RC drilling, Holte has remained dedicated to developing new ways to continually improve RC pipe design and manufacturing techniques. Holte produces traditional threaded and Hex Drive joints. We developed the original patent for Dual Wall Hex joint drill pipe. To ensure the highest quality, and balance of durability vs. hardness, Holte runs a dedicated Heat Treat facility.

Holte's standard RC dual wall pipe allows for air to move through the annulus between the center tube and the outer pipe, while the cuttings flow freely up through the center. Airflow channels are designed for optimum efficiency and to be matched to Holte DHHs and Top Heads.

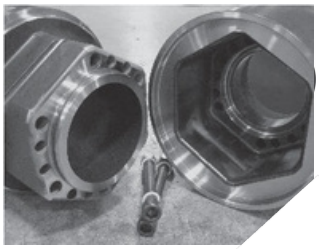
## Simplicity and Durability

Our expertise in understanding materials and the strains placed on them during drilling derives from our years of manufacturing and working in the field alongside our customers. Precision machined tool joints and pipe are carburized during heat treatment for additional hardness. Prior to welding the outer pipe to the joints, we carefully torque the inner pipe into the machined joint, creating additional strength.










## Hex Joint Pipe Advantages

Holte's Dual Wall Pipe with Quick Release Hex joint provides a solution to the problem of thread binding. This is particularly a problem with large diameter systems using traditional threaded joints, due to the high amount of torque applied to the drill strings. Holte Hex joint Pipe eliminates this, while adding several other advantages over traditional threaded joints.

Hex Drive joints are intuitive, when disconnecting Hex joint Pipe no counter rotation is needed as the joints simply fit together. When connected, the joints are held together by two machined pins that utilize a standard wrench for removal. This reduces the time spent assembling and disassembling pipe. Another advantage of Hex joints is the ability to rotate the drill in both directs. When difficult conditions persist this option will keep you drilling instead of stuck.

## Complete Drilling Systems

To get the full benefit of reverse circulation drilling, the airlfow channels and cuttings discharge should be matched in size from the Bit to the Hammer and through the Drill Pipe. For this reason, Holte is proud to offer everything from top head to bit, including custom top head drives specifically designed and outfitted for RC drilling.

### REVERSE CIRCULATION DRILL PIPE RC

| | Diameter (OD x ID)* | Area (in2) | Velocity (ft/min) @ 1000 CFM | Max Torque (ft/lbs)** | Weight (20'L)*** |
|---|---|---|---|---|---|
| Thread | 4.5" x 2.25" | 4 | 36,200 | 13,100 | 600 |
| | 7" x 3.8" | 11.5 | 12500 | 35,000 | 940 |
| | 8.625" x 4.90" | 18.9 | 7630 | 43,700 | 1120 |
| | 10.75" x 6.25" | 30.7 | 4700 | 65,600 | 1800 |
| Hex | 8.625" x 4.90" | 18.9 | 7630 | 43,700 | 1250 |
| | 10.75" x 6.25" | 30.7 | 4700 | 65,600 | 1930 |
| | 13.625" x 6.25" | 30.7 | 4700 | 87,500 | 2370 |
| | 16" x 7.80" | 47.8 | 3000 | 105,000 | 2610 |

* Custom sizes available. Inner pipe shown is standard size.
** Torque is estimated and subject to change. Torque shown is with a 2:1 safety factor. If higher torque is required call Holte for special application pipe.
*** Holte pipe is sold to the length required. Weights modeled. Specifications subject to change without notice.

Photo previous page: Tapered thread pipe stacked in the Holte yard. Photos left to right. Top: a)Hex joint pipe ends mating. b)Air channels in Hex joint pipe and 20' inner bore. c)Tapered thread pipe with O-ring seats. Bottom: d) Tapered thread pipe threads being cut. e) Hex joint showing two bolts for joining pipe.


- Top Head Drive Features
- Reverse Circulation ready Top Head Drives
- RC exhaust through the center of the Top Head permits max drill pipe length and passes larger cuttings
- Less tool wear means less replacement than a side discharge swivel
- Compact 3000 series Top Head or versatile and powerful 6000 series Top Head

# TOP HEAD DRIVES

## Rotary Drives Designed for Reverse Circulation

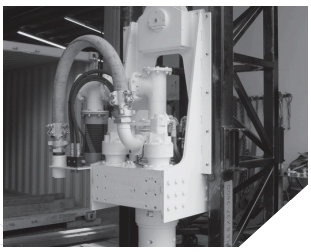
Holte manufacturing began making Top Heads 25 years ago when it became clear that existing products on the market were not meeting the needs for RC drilling. Holte started machining gears and the RC Top Head Drive was born.

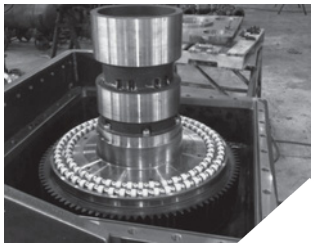
Over the last quarter century, our design has matured to be durable, dependable, and straightforward for easy maintenance. Top Heads are customizable for reverse circulation, grout through systems, tilting heads, and more.

## Powerful Top Drives in Two Sizes

The 6000 series has a torque rating of up to 84,000 ft/lbs continuous, and 100,000 ft/lbs intermittent. The 6000 can run hammer sizes from 10"- 40" and multi hammer drills up to 60".

The compact, yet powerful, 3000 series fits into the mast of smaller drill rigs. The 3000 features a continuous torque rating of 18,000 ft/lbs with intermittent operation up to 28,000 ft/lbs.





## Gearbox

- Hydraulic Motors
- Built in Air Inlet Swivel
- Cuttings Discharge with replaceable wear seals
- Continuous Internal Oiler
- Bulkhead with hydraulic and air connections
- Provisions For Tilt Addition Upgrade
- Provisions For Casing Driver Mount Upgrade
- Slow rotation speeds for large diameters

## Options

- Housing or Mast Slide
- Cuttings Discharge Auto Disconnect (for Tilt)
- Two Tilt Cylinders (with leveling stops; 90°)
- Bulkhead (slide-mounted with connections)
- Grout Through System
- Casing Driver Mount

## REVERSE CIRCULATION ROTARY TOP HEAD DRIVES RC

| | Gear Box (L X W X H) | Torque-3 motors (ft/lbs) | Torque-4 motors (ft/lbs) | Center Hole Diameter | RPM Range | Diameter Range |
|---|---|---|---|---|---|---|
| 3000 | 25.3" X 25.3" X 13" | n/a | 18,000 | 6" | 2-30 | 0"-30" |
| Metric | 643 X 643 X 330mm | n/a | 203 Nm | 152mm | 2-30 | 0-762mm |
| 6000 | 32" X 34.9" X 13.6" | 42,000 | 84,000 | 7.8" | 0.16-15 | 10"-40"/60" |
| Metric | 813 X 886 X 345mm | 4750 Nm | 9500 Nm | 198mm | Same | 254-1016/1524 |

Specifications subject to change without notice. The 6000 drive can be adapted to casings down to 6" diameter using a sleeve.

Photo previous page: Bridge piling being drilled and filled for a raised highway from Oslo to Bergen. Photos left to right. Top: a)6000 series Top Head being assembled in the fab shop. b)Top Head with tilt being used in the French Alps to extend a ski lift. c) 6000 series on crane leads. Bottom: d) Drive gearshaft extension with bearings. e) Top Head Gears machined and heat treated in-house.

# GROUT THROUGH SYSTEM

## Ready to Grout

Holtes's Grout Through technology comes standard in all of our down hole hammers. By eliminating the traditional check valves in the top and distributing them around the bottom of the inner barrel, Holte Hammers minimize entry of water and debris into the operating portion within the hammer, resulting in extended hammer life. This innovation also facilitates grout pumping into the hole. Grout flows down the evacuation center of the dual wall Drill Pipe, Hammer, and Bit. In overburden conditions, the grout can serve as the casing.

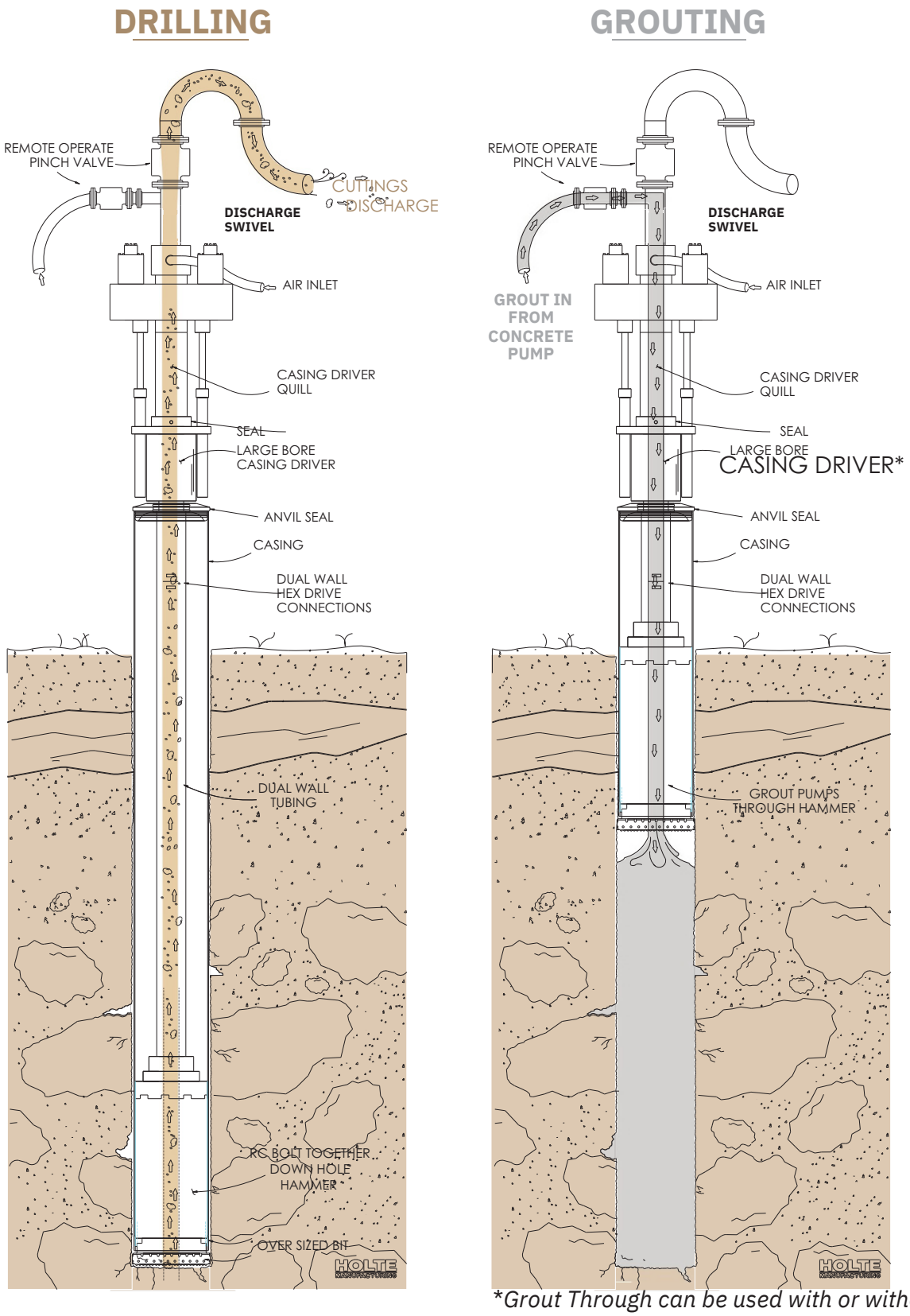
## Simply Switch the Valves

When the desired drilling depth is reached, a valve is opened in the Top Head, allowing grout to be pumped in through the system while the tooling is retracted back to the surface. Once the hole is complete, the fully rigged mast can be trammed to the next hole to repeat the process while rebar and pile reinforcement is added.

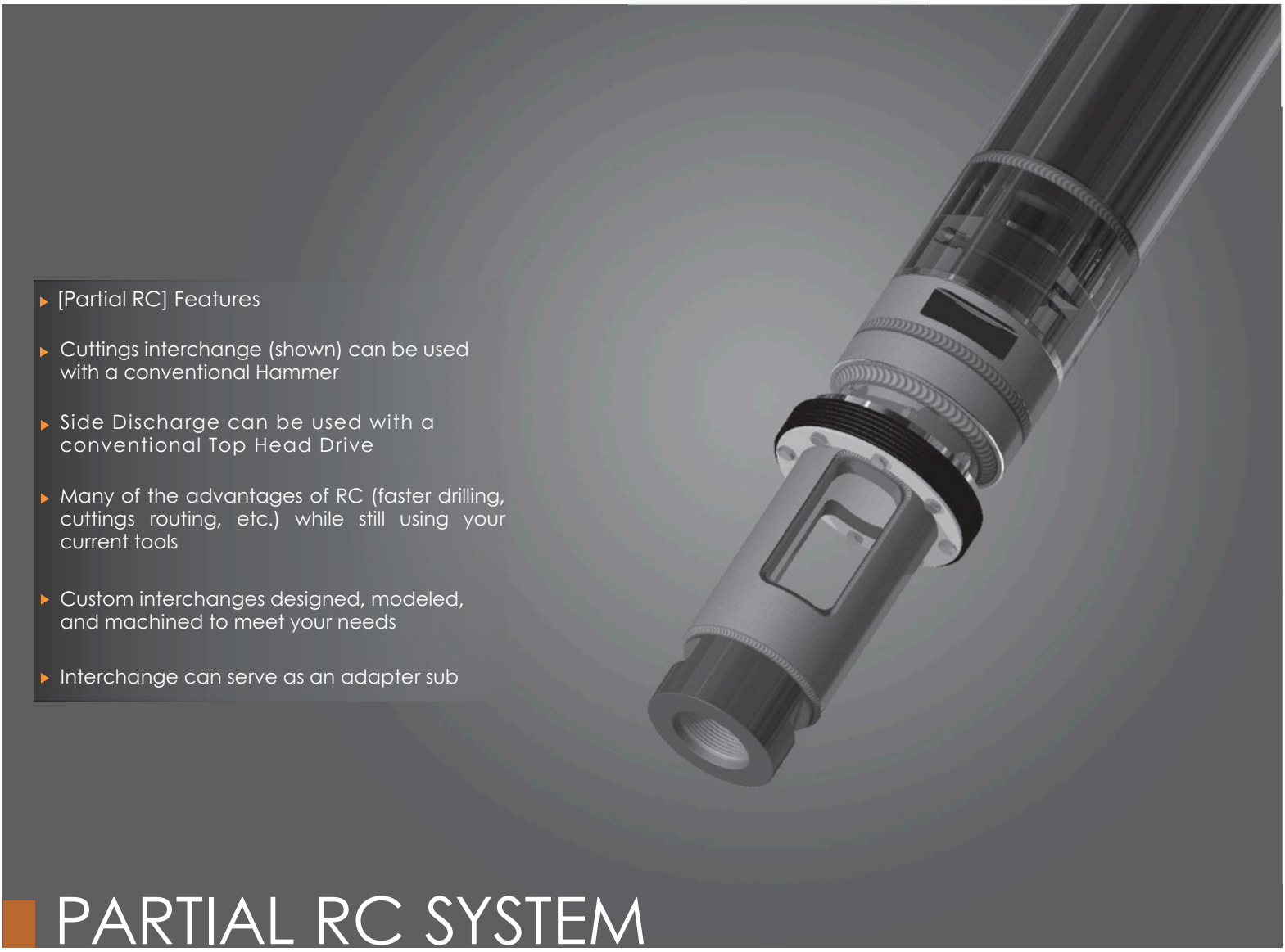
Using portable grout plants and the ability to use a truck or container as a cutting containment system can further simplify and speed up the process.

## Grout Through Schematic

During drilling a pinch valve closes off the grout line such that cuttings properly discharge through the top of the rig (as in RC w/out Grout Through). After drilling is complete, the cuttings discharge pinch valve closes, the grout pinch valve opens, and grout is pumped in as the drilling rig is extracted from the hole. Grout flows through the centers of the top head rotary drive, dual wall drilling pipe, RC down hole hammer, and finally the RC bit.




**Grout Through can be used with or without a casing driv*



- [Partial RC] Features
- Cuttings interchange (shown) can be used with a conventional Hammer
- Side Discharge can be used with a conventional Top Head Drive
- Many of the advantages of RC (faster drilling, cuttings routing, etc.) while still using your current tools
- Custom interchanges designed, modeled, and machined to meet your needs
- Interchange can serve as an adapter sub

# PARTIAL RC SYSTEM

## Get Started with RC Drilling at less expense

A partial RC system makes use of a Cuttings Interchange, mounted above the down hole hammer, to route cuttings away from the outside of the drill pipe into the center of the drill pipe. This brings many of the benefits of a RC system such as less air needed vs. conventional drilling, faster and easier removal of the cuttings facilitating faster drilling, and less disturbance of the hole/borehole wall. Unlike 'True' RC, the cuttings don't enter through the center of the bit at the very bottom of the hole, but must travel around the bit and hammer. The interchange results in better performance than conventional drilling, but cutting removal is not quite as fast or smooth as 'True' RC.

## Components of a Partial RC System

The Cuttings Interchange reroutes cuttings to the center of the drill pipe and is covered with an Umbrella, which prevents air loss around the drilling pipe. A Side Discharge may be used right under your conventional Top Head Driver to route cuttings out the side of the drilling rig top. Holte recommends using a RC Top Head Drive to route cuttings out the top of the rig for less tooling wear and max Drill Pipe length. The Cuttings Interchange can be used either with a casing driver, a down hole drive shoe, or without any casing. The Cuttings Interchange can be threaded to meet your needs, Hex joint, or serve to adapt between different sub types.

# RC UNDER WATER

When drilling in water, additional back pressure from high water depths can cause serious degradation in DHH performance. Routing water up the center in RC significantly minimizes the 'Flood-out-Factor" by reducing the back pressure.

A unique variation of RC is that systems can be run in a 'closed loop' in which waste is circulated back into the ground. This eliminates large mud puddles or holding ponds on the ground and simplifies issues of salt water contamination when drilling through brackish & stratified water layers. RC cuttings routing inherently helps to lower turbidity in sensitive surrounding waters, circumventing the need for floating containment rings.

Another example of closed loop drilling comes from a Power Plant in Page, Arizona near Glen Canyon Dam. The lake level had been dropping below the current cooling well depths, threatening to shut down power, and requiring deeper cooling wells. Instead of generating large amounts of mud as they drilled through an aquifer and ultimately the lake level, they used closed loop with a collection tank to simultaneously pump the water (via the casing) back where it came from.

Photo: Pier pilings in Northwestern Australia.

# CONVERSIONS

Because older rigs are not capable of using reverse circulation systems effectively, we have found it necessary to modify them for RC. By applying our experience and custom components, we are able to fabricate the proper tooling to work most efficiently with the rig.

High torque, Top Head Drive units for RC are a common Rig modification which enables the most efficient and lowest wear drilling. Accessory upgrades can also ensure you are getting the most from your rig.

Call or email HOLTE to find out how we can simplify outfitting your rig for RC at +1 541.935.5054 or sales@drilling.com.


# SUPPORT

## We judge our job based on your success

As the drilling industry continues to demand more from its people, equipment, and tooling, Holte strives to remain the leader in offering customers solutions to difficult drilling projects.

uConsulting

If you haven't drilled Reverse Circulation before, we can tell you if the job will benefit from RC, help you pick the right equipment, and walk you through the process of getting started with RC.

uCustom solutions

We can evaluate if RC will work with your rig, provide the needed accessories, or a custom solution tailored to your equipment and project.

uPhone support Having interacted with drillers on all types of projects has given us a unique breadth in troubleshooting. We're available by phone, after you've gotten started, to solve problems or issues implementing a new technique—so that you can finish the job.

uField support

As part of your RC system purchase we can add on a field support package. This can be training, making sure that everything is installed and runs effectively, or helping you get to the bottom of a stubborn hole .

# INNOVATING THE INDUSTRY

## Look No Further Than Holte

Over 45 years has led to ingrained RC expertise. Our founder, Art Holte, remains one of the most gifted innovators in the field. For the ultimate control and efficiency when hammer drilling, look to Holte Drilling Tools. Holte offers entire systems and solutions for Reverse Circulation—from Top Head to Bit. In our fab facility we can modify existing rigs to meet your needs. Our support staff is readily available and able to travel throughout the globe to support your needs during all phases of the job.

## Matched RC Systems

Holte RC tooling works effectively by itself, but the secret to our customers' repeated successes is the careful pairing of a Bit, Hammer, Drill Pipe and Top Head drive to use air flow efficiently throughout the system. A proper design ensures cuttings are easily removed in large pieces while wear is minimized from the Bit face to the discharge system on the surface.

A driller in Hawaii was always drilling 3 successively larger holes to ensure the finished hole was straight—HOLTE convinced him to try it with our tools in one shot. He became a believer when he could see sunlight reflected off the water in his 380' deep hole. Holte Hamnmers' closely matched Bit Shroud drills straighter holes.

## Drillers Keep Choosing Holte

- Dedication to new technologies and the resources to utilize them
- An openness to tackle new challenges with custom solutions
- Matched RC systems for max efficiency
- Tooling for large diameter holes

## When to Switch to Reverse Circulation: Typical Conventional Drilling Examples

| Borehole/Bit Diameter (in) | Drillpipe OD (in) | Conventional Evacuation Area (in2) | Air | CFM | FPM | Evacuation Result | RC Drilling CFM for 6000 FPM |
|---|---|---|---|---|---|---|---|
| 6 | 4.5 | 12.4 | Small | 900 | 10477 | Just Right | 479 |
| 8 | 4.5 | 34.4 | Small | 1000 | 4191 | Use Foam | 479 |
| 10 | 4.5 | 62.6 | Standard | 1170 | 2690 | Use Foam | 401 |
| 12 | 4.5 | 97.2 | Standard | 1170 | 1733 | Bigger Pipe or Switch to RC | 786 |
| 24 | 20 | 138.2 | 2 units | 2340 | 2438 | 4 Compressors or Switch to RC | 1278 |
| 36 | 30 | 311.0 | 10 units | 11700 | 5417 | More Air or Switch to RC | 1991 |

6,000-12,000 feet per minute cuttings speed (uphole velocity) is ideal for evacuation. Over 20,000 FPM backpressure makes air find an easier way (through pebbles or sand). The penetration rate drops and the drill can get stuck. Less than 6,000 FPM and it will only be able to evacuate sand; diesel and time get spent pulverizing rocks. If your setup (Bit-Pipe-Compressors) can't get you into the sweet spot, you'll need some tricks to get your cuttings out efficiently. Foam can help or sometimes more air is needed. Switching to a Reverse Circulation will provide for the most effective evacuation, penetration rate, and control over the uphole velocity. RC drilling uses significantly less air (and less diesel)to get great evacuation !


HOLTE Manufacturing

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## Veneta, Oregon

Holte's manufacturing facility in Veneta, Oregon is home to the innovating manufacturing team that produces the quality drilling tools Holte is known for. This is headquarters for our design, machining, inventory, and shipping center as well as the office and support staff. If your project has the need, Holte is set up to manufacture with a rapid and flexible turnaround time for custom projects.

Feel free to schedule a visit as we have an open door policy extended to Holte customers for tours and consulting.

## Springfeld, Oregon

Holte's heat treatment facility in Springfield, Oregon houses over half a dozen industrial ovens, a pit furnace, an endothermic generator and several styles of quench tanks to ensure that our final products are the ultimate balance between hardness and durabil- ity, while allowing careful control throughout the process.

## Veneta, Oregon

Holte's separate fabrication facility and storage yard in Veneta, Oregon is for custom and retrofit work on drill rigs as well as a product testing grounds for our tooling.

Holte is known for their pride and excellence in workmanship with steel fabrication, welding, hydraulic, and pneumatic work.

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