

# ADVANCES IN AUGER BORING

JIM ROBINSON CEO – ROBINSON UNDERGROUND  
CONTRACTING

DAVE GASMOVIC – MCLAUGHLIN a Vermeer Company



## TOPICS WE WILL COVER

- ON TARGET STEERING SYSTEM (OTS) and PILOT TUBE SYSTEM
- IMPROVEMENTS IN ELECTRONICS FOR GRADE CONTROL
- NEW IDEAS ON CUTTING HEADS
- BORING TECHNIQUES

## PILOT TUBE SYSTEMS

- IMPROVEMENTS IN PILOT TUBE SYSTEMS HAVE IMPROVED PILOTS IN DIFFICULT GROUND.
- IMPROVED ELECTRONICS HAVE INCREASED DISTANCES.
- ONLY METHOD FOR A COMPLETE SOIL INVESTIGATION THE LENGTH OF THE BORE.
- EVEN AN INCOMPLETE PILOT TUBE GIVES VALUABLE INFORMATION ABOUT SOIL CONDITIONS.
- LAUNCHING FROM A BORING MACHINE TRACK POSITIONS MACHINE FOR UPSIZING



## PILOT TUBE SYSTEMS

- USING OVERCUT RING CAN LEAD TO DROPPING CENTER LINE PER PASS
- COMPACTED GROUNDS AND SAND CAN LEAD TO THRUST EXCEEDING MACHINE CAPABILITY.
- ROCKY GROUND CAN LEAD TO DEFLECTION AND REFUSAL.





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## ON TARGET STEERING SYSTEMS AN ALTERNATIVE TO PILOT TUBE



## LIKE PUTTING A STEERING WHEEL ON A CASING

- USES 4 STEERING FLAPS TO HELP MAINTAIN LINE AND GRADE.
- STANDARD WATER LEVEL MONITORS GRADE.
- HALOGEN LIGHTS MONITORS LEFT /RIGHT MOVEMENT.
- WELDED CUTTING SHOE AND CHANNEL PROTECTS ALL LINES.





## TAPER CONE DESIGN HELPS STABILISATION

- TAPERED FRONT CONE ASSISTS STABILIZING FACE WITHOUT WING CUTTERS.
- SOIL BECOMES COMPRESSED BEFORE IT IS REMOVED BY AUGER.
- HELPS HOLD FACE IN RUNNING SAND OR SOUPY CONDITIONS.
- OVERCUT ½"



## TIPS ON MAINTAINING LINE AND GRADE

- 1000'S POUNDS OF LEAD CASING SITS ON 2' LEDGE OF SOIL OR CRADLE.
- AS CASING ADVANCES WEIGHT WILL DROP LEADING EDGE
- USE THE BOTTOM OTS FLAP TO RAISE CASING AND MAINTAIN GRADE.





## TIPS FOR MAINTAINING LINE

- DOOR CYLINDERS USE MINIMAL FORCE TO EMBED LEAD RING TO RETURN TO LINE.
- MAKE SMALL CHANGES  $\frac{1}{2}$ " OR LESS.
- LARGER CHANGES WILL CREATE FRICTION AND REQUIRE MORE THRUST.
- START WITH SMALL CHANGES AND DON'T FORGET TO RETURN TO NEUTRAL WHEN CORRECTION IS COMPLETE.
- SAME AS DRIVING A CAR DRIFT LEFT STEER RIGHT
- USE THE "STEERING WHEEL" TO KEEP BORE PATH WITHIN  $\frac{1}{2}$ " RADIUS

## LINE CHECK

PLUMB BOBS AND  
LIGHTS CHECK LINE

ONE LIGHT BLINKS OTHER  
IS SOLID IN CASE LIGHT  
FAILS

SMALLER AUGER BEDS  
ITSELF







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## MY FLEET OF OTS SYSTEMS





# ADVANCEMENT IN ELECTRONICS FOR PITCH

- ELECTRONIC PITCH SENSOR AND DISPLAY COMPLIMENTS WATER LEVEL DOESN'T REPLACE IT.
- ELECTRONICS IMPROVE PRODUCTION LESSEN APREHENSION.
- GIVES YOU TWO INPUTS TO CONFIRM WHERE YOU ARE.
- ACCUARACY CAN BE 1,000<sup>TH</sup> OF A PERCENT BUT A TENTH IS WHAT WE USE.
- LETS YOU KNOW WHEN TO CHECK WATER LEVEL



## REMOTE CONTROL MACHINES

- ORDERED FIRST REMOTE CONTROL 60" MACHINE FROM JIM BARBERA IN 1999
- WIRELESS REMOTE CONTROL IMPROVES SAFETY, LESSENS OPERATOR FATIGUE.
- ALLOWS OPERATOR TO BE OUT OF BORE PIT.
- ALLOWS OPERATOR TO OBSERVE AUGER MAKE UP



## CUTTING HEAD IMPROVEMENTS THE BASICS

- CUT IT
- REMOVE IT
- FAILURE OF MATERIAL IS ACHIEVED BY EXCERTING A HIGHER PSI THAN MATERIAL
- CUTTER SHOULD NOT RUB. MORE TEETH HIGHER HP
- LARGER CUTTINGS MOVE WITH LESS POWER AND FURTHER PER REVOLUTION





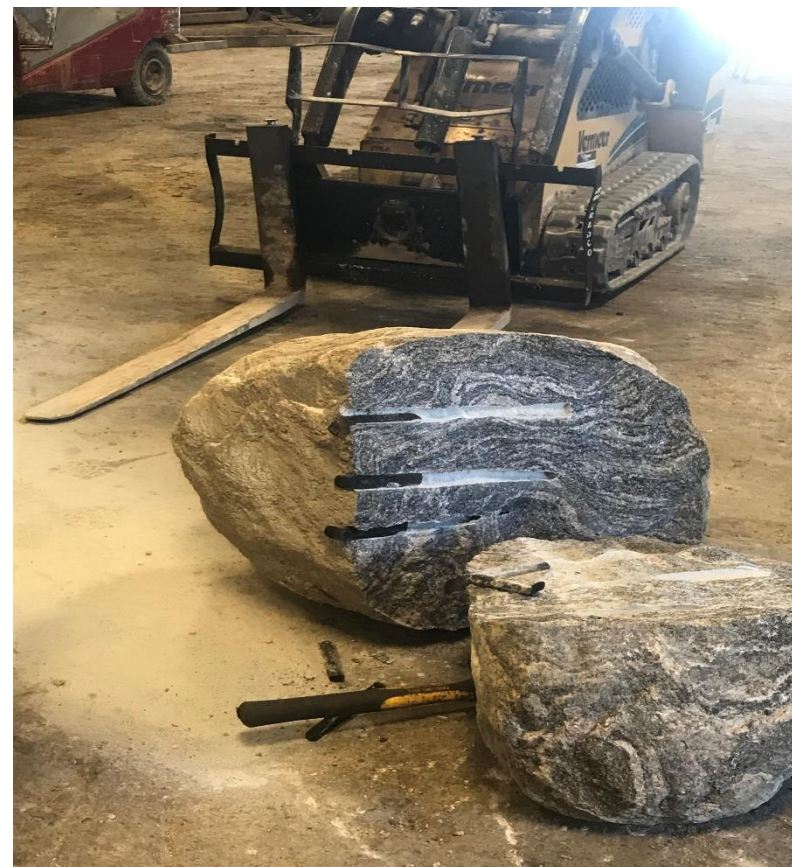
## CUTTING HEAD IMPROVEMENTS

- WE BUILD OUR OWN CUTTING HEADS
- A HALF HEAD WITH CARBIDE TEETH WILL REDUCE POWER NEEDED TO CUT INCREASE POWER FOR TRANSFER.
- CARBIDE BULLETS HAVE SHORT LIFE OVER 6,000 PSI ROCK
- ADVANCEMENT IN DIRT  $\frac{1}{2}$ "- $\frac{5}{8}$ " PER REVOLUTION.



## CUTTING HARD ROCK

- ROCK THAT IS 15,000 PSI COMPRESSIVE STRENGTH IS ONLY 1,500 PSI UNDER TENSION.
- KING KONG TEETH WITH BACK BEVEL POINT LOADS THE IMPACT ZONE.
- FAILS THE ROCK LIKE A HYDRAULIC BREAKER.
- THE WEDGE IS EXERTING TENSION





# THE PRINCIPLE OF POINT LOADING WORKS ON LARGE ROCK AND CONCRETE WITH REBAR





## CORE BARREL

- WE DESIGN CORE BARRELS TO CUT GRANITE.
- ADVANCE RATE OF UP TO 1" PER MINUTE BY CONCENTRATING FORCE ON THE KERF.
- REQUIRES HARD MATERIAL FILLER IN THE WELD BEADS TO WEAR A PATH IN THE ROCK.



## STARTING AND FINISHING





# CORES







## BORING THOUGHTS

- PAST TRENDS IN THE INDUTRY IS LOWER RPM GREATER REDUCTION.
- THIS CAN RESULT IN ROTATIONG AN UNRESTRAINED BORING MACHINE.
- AT LOW RPM TORQUE YOU WILL BUILD AUGER(ROD) WRAP OF 1 REVOLUTION PER 100'
- BREAKING AUGER.
- USE HIGHER RPM AND HP NOT LOW RPM TORQUE
- WE ACHIEVE 20' OF 1.5m ( 60") IN 35 MINUTES USING THIS METHOD.

# BORING THOUGHTS

- A 225hp MACHINE WILL NOT TURN 400' OF 24" AUGER IN HIGH GEAR FULL OF DIRT.
- YOU NEED TO LET IT CLEAN OR USE FLUIDS
- FOR 12" TO 24" WE USE A 200hp HYDRAULIC MACHINE AT 70 RPM AND I HAVE NOT BROKEN A 3" HEX





# LARGER BORES

- 36" -48" BORES MECHANICAL MACHINE







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## LARGER BORES ABOVE 48" SUPER OTS





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## SUPER OTS VIDEO





THANK YOU FOR YOUR ATTENTION  
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