



THE FULLY ELECTRIC HDD JOB SITE

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Evolution from diesel-hydraulic to direct electric drills









Evolution from diesel-hydraulic to direct electric drills

					EFFICIENCY				+
	Electric-hydraulic (hybrid)		Diesel-hydraulic		Electric-hydraulic (hybrid)		Direct electric (Fully electric)		Direct electric (Fully electric)
SOURCE	DIESEL ENGINE (generator)	Double conversion	DIESEL ENGINE (on-/offboard)	Double conversion	GRID BATTERY	Double conversion	DIESEL ENGINE (generator)	Single conversion	GRID BATTERY
Triple conversion	ELECTRIC MOTOR HYDRAULIC PUMPS/MOTORS		HYDRAULIC PUMPS/MOTORS		ELECTRIC MOTOR HYDRAULIC PUMPS/MOTORS		ELECTRIC MOTORS		
OUTPUT	MECHANICAL POWER AT THE DRIVE CHUCK		MECHANICAL POWER AT THE DRIVE CHUCK		MECHANICAL POWER AT THE DRIVE CHUCK		MECHANICAL POWER AT THE DRIVE CHUCK		MECHANICAL POWER AT THE DRIVE CHUCK







Benefits of the direct electric drive

- Multiple options for a power source
- Minimal maintenance
- High availability
- Ease of service on the jobsite
- Torque
- Minimization of contaminant spills
- Data logging
- Low sound emission





The fully electric HDD jobsite

MR1000 combo mixer/reclaimer 1000 L/min processing capacity







D120E

horizontal directional drill 120 t pullback force 110 kNm maximum torque

R500 reclaimer 500 L/min processing capacity

Depictions shown









D120E

Horizontal directional drill

- 120 t pullback force
- 110 kNm max torque
- Range 2 drill pipe length









MR2000

Combined mixer/reclaimer

- 2000 L/min processing capacity
- Two 10 in desander hydrocyclones
- Twelve 4 in long body desilter hydrocyclones
- Double shaker deck
- Three processing centrifugal pump
- Compact transport dimensions









MR1000

Combined mixer/reclaimer

- 1000 L/min processing capacity
- Twelve 4 in long body desilter hydrocyclones
- Double shaker deck
- Two processing centrifugal pump
- Compact transport dimensions









R500 Reclaimer

- 500 L/min processing capacity
- Six 4 in long body desilter hydrocyclones
- Double shaker deck
- One processing centrifugal pump
- Compact transport dimensions









SA2500

High-pressure mud pump

• 2300 L/min at 80 bar with 7 in liners







CASE HISTORY

Alessandro Cestaro – HDD Specialist – Vermeer Italy Manuel Cherubini – HDD Specialist – Vermeer Italy

25th May 2023







CASE HISTORY – VERMEER MR2000 FULLY ELECTRIC COMBINED MIXER/RECLAIMER



PROJECT INFORMATION:

- -Installation: Gas distribution
- -Pipe material: Steel
- -Bore length = 500 m
- -Final bore diameter = 800 mm
- -Soil condition: fine soil grading unknown

VOLUMES:

- -External fresh drilling fluid storage tank volume = 40 mc
- -External mud pit volume = 60 mc
- -Theoretical soil volume (V_s) = 250 mc
- -Theoretical drilling fluid/soil ratio (r) = 12
- -Total fresh fluid prepared (V₂) = 600 mc

-Theoretical drilling fluid volume without recycling:

$$V_1 = Vs \times r = 3000 \text{ mc}$$

-Saving factor:

$$\frac{V_1 - V_2}{V_1} \times 100 = 80,0\%$$

-Recycling factor:

$$\frac{Vs}{V2} = 41,6\%$$







CASE HISTORY – VERMEER MR2000 FULLY ELECTRIC COMBINED MIXER/RECLAIMER





Drilling fluid volumes (cm)

Sand content: $\% \le 0,25$









CASE HISTORY – VERMEER MR2000 FULLY ELECTRIC COMBINED MIXER/RECLAIMER

Closed Circuit









CASE HISTORY – VERMEER R500 FULLY ELECTRIC RECLAIMER



PROJECT INFORMATION:

- -Customer: Festa s.p.a.
- -Day of work: 21
- -Installation: Gas distribution
- -Pipe material: Steel
- -Bore length = 330 m

-Final bore diameter = 750 mm for 100 m, 550 mm for 230m -Lithology: hardly condition consisting in different layers of marly clay from average to high fracturing, sand,silt and gravel with the presence of limestone passing from fractured to shattered







CASE HISTORY – VERMEER R500 FULLY ELECTRIC RECLAIMER

VOLUMES:

-External fresh drilling fluid storage tank volume = 10 mc
-External mud pit volume = 450 mc
-Theoretical soil volume (Vs) = 110 mc
-Medium Drilling fluid/soil ratio (r)= 15
-Theoretical drilling fluid volume without recycling:

 $V1 = Vs \times r = 1650 \text{ mc}$

-Total fresh fluid prepared (V2) = 495 mc

-Saving factor:

$$\frac{V1-V2}{V1}\times 100=70\%$$

-Recycling factor:

$$\frac{Vs}{V2} = 22,2\%$$









CASE HISTORY – VERMEER R500 FULLY ELECTRIC RECLAIMER



Recycled mud test

Mud weight: 1,06 < SG (g/cm3) < 1,10

Sand content: 0,5 < % < 0,75







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