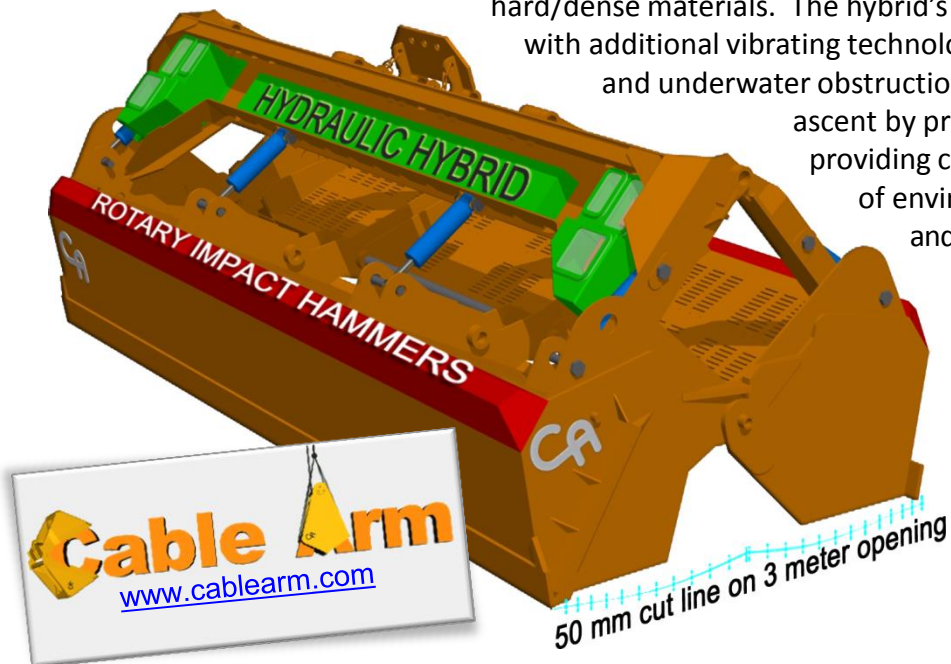


Improving Equipment Efficiency and Reducing Maintenance Cost with Advanced Hydraulics

Limit lost loads and environmental contamination by sustaining a sealed bucket during every closing cycle.

The common source of power within cable operated dredging systems is the engine. The power supplied to hydraulic systems is generated by the powertrain. The powertrain is most often found within the excavator, but can also be affixed to the bucket in an electro-hydraulic system. The new Hybrid, designed by Cable Arm® & NRG Dynamix®, utilizes the electro-hydraulic system to generate power near the bucket's point of closing impact while further introducing accumulators to store the appropriate power required to activate pistons. This simple, yet highly effective change can generate closing pressures of up to 500,000 pounds. Optional vibrating technology can also be included to facilitate greater bucket penetration into hard/dense materials. The hybrid's hydraulic design, when combined with additional vibrating technology, can cut through trees, pilings, and underwater obstructions to reduce sediment loss during ascent by providing a tightly sealed bucket. By providing complete bucket closure, full loads of environmental waste, without leakage and further dispersion, can be obtained.



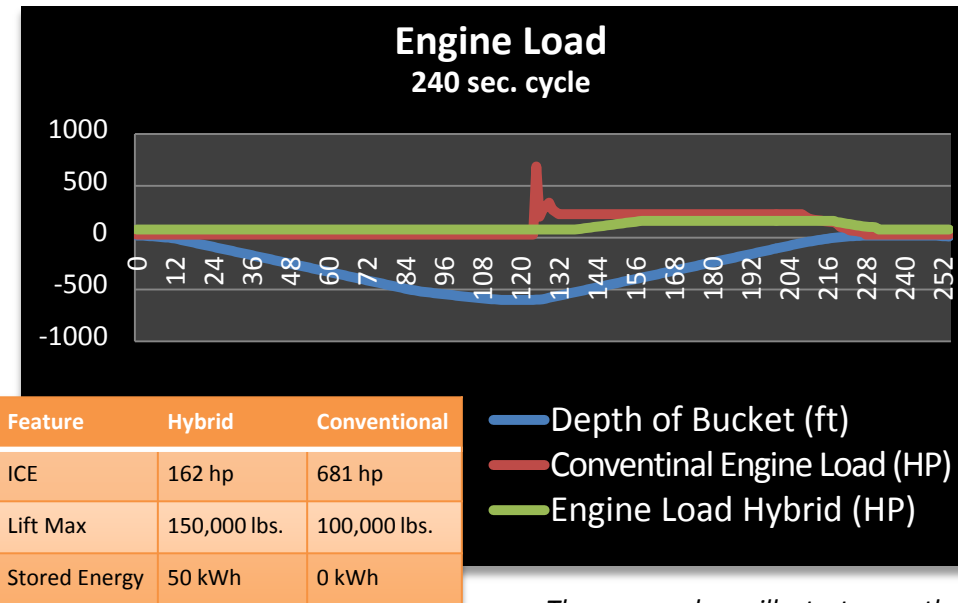
Eliminate inefficient power usage and machine fatigue.

Power surges cause jarring and improper distribution of stress to the joints and parts of equipment and accessories. These surges not only increase maintenance requirements, but also burn more fuel and create greater emissions. Pressure spikes overtime are the second leading cause to wear of hydraulic and structural equipment parts. The accumulators utilized by the hybrid system can absorb, and store, these spikes. The hybrid system works to eliminate heat and chemical instability, reduces energy lost through relief valves, and provides a smooth operational force throughout.

Efficiency and lower maintenance for the entire system.

NRG is further developing advanced hydraulic technology for the listed accessories. The NRG solutions will generate, store, and deliver power through an accumulator installed within each accessory as opposed to the current delivery method, from the primary unit (engine or powertrain). The current Cable Arm® hybrid clamshell system utilizes 7 key components while a typical hydrostatic drive requires 12. Component failures and complex troubleshooting have, therefore, been greatly reduced. A fully upgraded system will further reduce horsepower requirements and engine surges to the primary unit, and reduce maintenance costs associated with each additionally upgraded accessory.

Product Type		Avg. hp	Peak hp	Working hp	Working time	Startup time/max load
Short Duty Cycle Accessories:						
Spuds	40,000 lbs.	10.8 hp	270 hp	0 hp	10 min.	25 sec.
Environmental Bucket	6 yard ³	2.0 hp	120 hp	0 hp	3 min.	3 sec.
Digging Bucket	3 yard ³	2.0 hp	120 hp	0 hp	3 min.	3 sec.
Long Duty Cycle Accessories:						
Pile Hammer	25 hp	15.1 hp	25 hp	15 hp	10 min.	4 sec.
Conveyor	25 hp	15.0 hp	25 hp	15 hp	240 min.	30 sec.
Tree Chipper	100 hp	72.2 hp	100 hp	50 hp	5 min.	240 sec.



The graph illustrates the significant change in Engine Load during an approximate 4 minute (240 second) duty cycle and also notes the primary differences in operating metrics for a NRG Hybrid versus a Conventional solution.

Operate more within Tier 4 emission regulations.

New regulations on emission controlled units can greatly limit dredge efficiency and capabilities. Powertrains/engines are sized to meet peak load requirements, with horsepower requirements often 33% to 50% greater than average horsepower used. New Tier 4 units cannot replace current units due to limited form factor, leaving no choice but to replace the entire machine. The newly designed accumulator system from NRG provides a solution to refurbish/upgrade existing units.

Product Type & Usage	Avg. hp	Peak/Surge hp	Non Work Articulation hp	Complete Cycle time	Peak Load time
Excavator:					
Dredging 6 yard ³	71.2 hp	300 hp	50 hp	2.7 min.	15 sec.
3 yard ³ trench	63.1 hp	220 hp	50 hp	2 min.	10 sec.
18" trenching	57.0 hp	120 hp	50 hp	1.5 min.	10 sec.
Crane:					
Dredging 6 yard ³	59.3 hp	231 hp	45 hp	3 min.	15 sec.
3 yard ³ trench	56.9 hp	200 hp	45 hp	2 min.	10 sec.
Trees 100,000 lbs.	63.3 hp	250 hp	40 hp	2 min.	15 sec.
Front End or Fork Lift Loader:					
30,000 cap	22.3 hp	180 hp	17 hp	5 min.	10 sec.
100,000 cap	44.2 hp	320 hp	35 hp	5 min.	10 sec.
Tree relocating:					
30,000 cap	56.9 hp	320 hp	35 hp	5 min.	25 sec.

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