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Electrify

Electric winches continue to make inroads.

By Michael Crowley, Correspondent

When you buy a new car, you decide how you want your new vehicle outfitted - lots of horsepower, tinted windows, leather seats, etc. With workboats, outfitting is often dictated by contracts that require a certain level of performance to handle a specific job. Bruce Washburn of boatbuilder Washburn & Doughty Associates, East Boothbay, Maine, said contracts often contain “buzz words” that are in a “spec and you have to live with that.”

CONTRACT DRIVEN

One example Washburn cited was the James R. Moran and Kaye E. Moran, 92'x32'x13'9" sisterships the yard delivered to Moran Towing Corp. in 2004. The tugs were built to assist LNG tankers that call at the Dominion Cove Point LNG terminal on Chesapeake Bay.

Washburn said the contract contained the phrase “intrinsically safe,” which, because the tugs would be working with LNG tankers, was interpreted as “non-sparky-type stuff.” And that translated into the installation of hydraulic winches instead of electrical ones.

So the Moran tugs ended up carrying a DYS-42 hawser winch from Markey Machinery on the bow and a Markey DYSS-24 winch for towing on the stern. The winches are the only hydraulic ones that Washburn & Doughty has put on tugs that work with LNG tankers.

“People soon realized that long before the [electric] winch causes a problem, you would have sucked gas into the engine room and gone boom anyway,” Washburn said. And there’s not much danger since the motors for the electric winches are totally enclosed and the electrical components are located below deck.



Markey Machinery has almost entirely replaced its line of hydraulic winches with electric models, such as this hawser winch on the Crowley Marine Services tug RESPONSE.

Electrically driven winches “are really great for continuous duty, they’re very quiet and don’t have a lot of heat. And there’s a lot of heat in hydraulics,” said Barry Griffin, marketing representative for Seattle-based Markey Machinery Company. Griffin said Markey has almost totally replaced its line of hydraulic winches with electrically powered models.

REGULATIONS

In addition to contract stipulations, government regulations are also driving winch development and sales. Like contract stipulations, regulations can be a powerful force when it comes to selecting the type of machinery that goes on a workboat. In the petroleum transport sector a prime example is the Oil Pollution Act of 1990, which has resulted in the use of more electrical mooring winches on petroleum barges.

“Traditionally it’s always been hydraulic winches, but several operators have elected to go to AC-variable frequency drives,” said Mark Scairono, president of Coastal Marine Equipment Inc., Gulfport, Miss. Scairono said barge owners have “spent millions of dollars double skinning barges to keep them from polluting water. They don’t want to have an occasion where they bust a hydraulic hose on deck and still pollute the water.”

STICKING WITH HYDRAULIC

But it’s not all going the way of electric. At least half of the anchor windlasses on Gulf of Mexico workboats are hydraulically powered. That’s been the breakdown for 20 years and that is unlikely to change soon.

A winch company that has been expanding into the workboat market after supplying trawl winches to commercial fishing boats for 25 years is Seattle-based Rapp Hydema U.S. Throughout its history, Rapp Hydema has relied on hydraulic winches and only hydraulic. That tradition has carried over from the fishing industry to the workboat market.

One of the company’s first workboat sales was a tow winch to Western Towboat Co. in Seattle - the TOW-2201, rated at 41,000 lbs. of line pull and 128’ per minute line pull. The winch, which was delivered in 2002, is powered by a WDU-7500 hydraulic drive. Rapp Hydema developed these hydraulic drives as replacements for Hågglunds drives.

Business for Rapp Hydema’s hydraulic winches has been improving, with sales to Sause Bros. Inc. in Coos Bay, Ore., and Olympic Tug & Barge in Portland, Ore., and interest is picking up in the Gulf of Mexico as well, said Scott Atkinson, vice-president at Rapp Hydema. The company launched Rapp Mareq LLC in 2004 and opened a sales office in Houston to help develop non-fishing commercial markets in North America, especially in the Gulf of Mexico region.

In February, the company gave its first quote for an electric winch - a mooring winch for an operator in the Gulf of Mexico.

This “Electrify” article generated several WorkBoat Magazine “Mail Bag” letters, which have been reproduced on the next three pages in the same order they were published (JonRie, Rapp Hydema, Markey).

WorkBoat Magazine “Mail Bag” letter – June 2006

Says winch article fell short

In response to the April 2006 article “Electrify”, I believe the article falls short of addressing all the issues. The article notes that electric motors are safe due to their location below deck when the fact is that this application is an exception. The same old problems with electric motors on deck are the elements, when one stuffing tube is not sealed properly the motor is junk along with the encoders and brakes.

The article goes on to state that new AC drives are now simpler when in fact it's AC converted to DC controlled and reconverted back to AC which in reality is more complex. The DC winches of 30 years ago were reliable Ward Leonard designs and fell out of favor again having electric motors out on deck and the constant maintenance. Heat was another issue back then and now when you regenerate (payout under load), your resistors dissipate heat and if any dust collects on them they sometimes catch fire. Is this a safe application for an LNG tug? Well that depends on the testing and how often the units are cleaned.

On a recent Navy conversion, replacing eight-year-old unreliable electric mooring winch drives with state-of-the-art drives created more problems and a few cabinet fires. Needless to say, was it the fault of the drives or improper application, operation and installation? Thermodynamics is the same for the electrical system as it is for the hydraulics, as unused energy in both cases is transformed into heat. As with any change, you sometimes trade old problems for new ones.

It may have been a misquote, but the article has a manufacturer state that they have a replacement for Hägglunds drives, which are the most rugged motors on the market. The photo of the (Rapp Hydema) winch shows four motors and some pretty complex piping. Is this just a replacement or is it a better replacement? The article is confusing since it's not too often (when installed properly) that a Hägglunds motor fails. The article also falls short on pointing out the versatility of a central hydraulic system for jacks, A-frames, rams, and winch motors.

As a regular reader of *WorkBoat*, I believe with a little more research the article could have presented a better cross-section of the industry and a better understanding.

Brandon Durar

President

JonRie InterTech LLC, Manahawkin, NJ

WorkBoat Magazine “Mail Bag” letter – August 2006

Reader says Rapp's drives are superior to Hägglunds

In response to Brandon Durar's letter (“Says winch article fell short,” Mail Bag, June 2006), a few clarifications are in order. Mr. Brandon touts the performance of Hägglunds drives as the most rugged on the market while casting doubt on whether Rapp Hydema drives are an improvement over them. He even goes on to say that “it's not too often (when installed properly) that a Hägglunds motor fails.”

Evidently JonRie's winch applications aren't very rigorous, or Mr. Durar has simply been careless with his statements or both. Rapp's gearbox drives were originally developed in 1990 specifically owing to failures in Häggglunds motors. During the '70's and '80's, Rapp, as a world leader in trawl and other winches for the commercial fishing industry, was one of the largest consumers of Häggglunds anywhere. Indeed, we had Häggglunds on each of our winches worldwide. But during the birth of the great American factory trawler fleet in particular, Häggglunds motors proved simply unable to keep the pace. Rapp supplied most of the winches on the 100-plus vessels here, which admittedly work in very rough Bering Sea conditions.

To say that Häggglunds motors failed would be the understatement of the century. In fact, well before Rapp was compelled to take the rather unorthodox step of developing its own gearbox design, we opened a remote Dutch Harbor, Alaska office, developed considerable in-house expertise in the repair of Häggglunds, and carried a considerable Häggglunds parts inventory at both Seattle and Dutch Harbor.

But the day of reckoning at last came. Large vessel-owner clients insisted that they would never again lose either of the two trawl winches, the critical revenue generators on state-of-the-art multimillion-dollar trawlers. They insisted on a winch that in the event of motor failure would continue to operate – even if at a reduced capacity. Thus the idea for the Rapp drives was born.

Unlike Häggglunds, Rapp drives have multiple smaller motors so that if one fails others continue to work. Among others, the gearbox provides a buffer and added survivability to the motors that a direct-drive system like Häggglunds lacks. Häggglunds proved vulnerable to over-speeding spikes. Rapp motors are very efficient volumetrically, so leakage factors are also reduced. So it must be that JonRie's Mr. Durar was unaware of these facts.

It may also come as news to him that just as Häggglunds have appeared in a range of powering applications beyond winches, so too have Rapp drives. Most recently, Rapp's ABS Type-approved 14000BB series gearbox replaced two Häggglunds on a Baker Marine jackup in Sabine Pass, Texas. Rapp has also just received an order for replacing a number of Häggglunds on some semi-submersible bowthrusters. Rapp has now supplied over 1,500 of these drives since the first was installed 15 years ago.

Scott Atkinson

Vice-President

Rapp Hydema US, Seattle, WA

WorkBoat Magazine “Mail Bag” letter – December 2006

The hydraulic vs. electric winch debate continues

It is with great interest and some amusement that I've followed the exchange between JonRie InterTech and Rapp Hydema in response to the April 2006 article “Electrify” on the trend towards electric winches.

WorkBoat readers need to know that both Rapp and JonRie have a long-standing reputation for being hydraulic winch builders, and that both companies build winches in order to sell gearboxes (in the case of Rapp) or Häggglunds hydraulic motors (in the case of JonRie). The

article makes several points that ring true from our perspective as winch-designers with no allegiance to any particular hydraulic motor, gearbox, or electrical drive system.

Tug owners and operators are clearly driving the trend towards electric winches. Markey Machinery is well known for building the highest quality electric winches available on the market today. We're also known for building well-engineered hydraulic winches, utilizing commercial off-the-shelf reducers and hydraulic motors – in other words, we are not limited to the products that both JonRie and Rapp make a living selling. As such we're in a unique position to offer comments regarding (JonRie InterTech President Brandon) Durar's misinformed opinions.

Electric motors, if specified properly, are perfectly capable of surviving on the working deck of a tug or barge even, as Mr. Durar remarks, if the stuffing tubes aren't sealed properly. The fact is that many of our customers prefer to place the electric motor below deck in order to maximize the available deck space, not because they harbor doubt as to the motors ability to survive. Mr. Durar's comments with respect to the complexity of today's variable-speed AC drive are difficult to reconcile against a similar level of complexity found in many hydraulic systems. The fact is that today's electric drive systems are fairly easy to maintain, and most quality drive systems come with a great deal of self-diagnostics and remove-and-replace type components.

Cabinet fires? In nearly 60 years of building electric winches, I know of no instance where a (Markey) electric winch drive panel has gone up in flames, let alone a bank of dynamic braking resistors. I find this comment alarmist, and it does not address the well-known fact that hydraulic oil under high pressure from a leaking hose that lands on a hot manifold or brake caliper is a more common event and has probably let to more incidents of this nature than any other type of drive system. Durar also intimates that hydraulic systems can be made to operate as efficiently as an electric drive system. This is simply not true for the majority of low-cost hydraulic systems. How can a system that has to push hydraulic fluid through dozens, if not hundreds, of feet of hydraulic piping and orifices be as efficient as an electric motor directly driving a gearbox? Pressure drop is an engineering reality and can amount to at least a 10% sacrifice in power applied to the winch.

I must wholeheartedly agree with Rapp Hydema's comments regarding Hägglunds motors. Durar's comment that "it is not too often that a Hägglunds motor fails" contradicts most of the feedback I've received from winch-users who tell me that these motors are extremely prone to overspeeding, and that they do not have any type of freewheel function. Markey has never actually built a winch that depends on a Hägglunds motor. We've always felt that they are too expensive and unreliable.

In conclusion, there are applications where hydraulics are appropriate and applications where electric drives present significant benefits. We build both. It is our customers that recognize the installation cost savings between electric and hydraulic systems, the increased performance that electric drives offer, the fact that electric winches are not dependent upon a quality hydraulic piping installation and a clean reservoir, and the obvious environmental advantages that electric winches provide.

The key to the success of any system, whether hydraulic or electric, is to purchase a system that is well engineered and does not cut corners to achieve lower cost.

Blaine W. Dempke

President

Markey Machinery Company, Seattle, WA