A New Bollard® For The Bering Star

The Bering Star is a hard working 108’ Marco crab boat built in 1978. Recently, the owners decided to haul at Pacific Fishermen for a substantial up-fit. The deck would be peeled and redone, a bulbous bow would be installed, new bow thruster and larger genset with hydraulic drive, new crane and a paint job.

MER was brought on board to address the anticipated challenges for application and installation of the new genset. The existing machine was based on a 135kW Cat 3306. The new unit needed more power for hydraulically driving the new thruster, salmon pump for tendering, crab block, crane, and electrical power for a pair of 50 ton RSW systems.

There were significant space constraints for this project. The rear of the generator was next to the hydraulic oil tank. Access to the back side required clearance in front of the hydraulic pumps mounted on a two pump Marco drive on the front of the crankshaft. The bulkhead and system piping limited access so we determined the new 245 kW Bollard genset needed to be carefully designed to minimize length. Furthermore, the support structure for the entire unit was on the top of a fuel tank so special consideration had to be given for reducing noise and vibration.

Thankfully our engineering department enjoys a challenge. They developed a SeaDrive PTO for the John Deere 9.0L engine to drive hydraulic pumps with a clutch and cover mounted on a cast SAE 2 housing that was as short as possible.

We partnered with Marathon for a specially engineered Mariner generator end which enabled installation close to the hydraulic tank while providing access to the diode ring at the rear. The genset design kept the length short enough to fit the larger 245kW in place of the 130kW unit.

The mounting system provided another challenge. In order to properly support the entire system with SeaDrive and maintain alignment, rigid mounting the unit to a massive base frame was required. The base frame was designed to be flexibly mounted on isolators that were selected in close consultation with the mount manufacturer. Careful coordination with the yard was also required to provide a suitable structure on the top of the fuel tank to receive and support the complete unit.

A series of meetings with the vessel owners refined the specification to meet their specific requirements. The clutch selected for the SeaDrive PTO was a 2,000 lbs-ft. Pitts electric model. This replaced an Eaton air actuated clutch configuration on the old CAT which had needed periodic repairs and maintenance at sea in potentially poor weather conditions. A new electronic control and monitoring system was installed by MER with an engine room display and one in the wheelhouse. The spec included a SCOR bypass lube oil filtration system to extend oil change intervals and provide superior filtration for engine longevity. Exhaust system components designed and fabricated by MER were added. The genset was to be painted with white Imron polyurethane for a durable finish. To ensure compatibility of all rotating elements, a theoretical torsional vibration analysis (TVA) was done before we burned steel and confirmed during commissioning with extensive testing.

The Bering Star was hauled by Pacific Fishermen and the project had a tight window to make their tender charter. An opening was cut out of the side of the hull so that the genset could be installed. MER installed the electronic controls and monitoring system which included upgrading instrumentation for the main engine.

The results have produced a very happy customer. The Bollard MG245 provides the electrical and hydraulic power as required. The higher output machine fit into the existing space and there is adequate access to all key systems. When running, the vibration transfer from the genset to the tank is exceptionally low. The new monitoring and control provides capabilities and performance was not available from the old system. The combination of the advanced EPA tier 3 engine with a high efficiency generator provides low fuel consumption and operating cost, always a key objective for Bollard genset.

Bollard MG245 with SeaDrive PTO

Wheelhouse engine monitoring
It has been a challenging and wonderful year for our ever growing SeaDrive PTO brand. Our two new mechanical engineers, Nicholas Downs & Dennis Risser, are taking SeaDrive to new heights. Nicholas, raised in AK, paid his way through engineering school on the dock of a Bering Sea Crabber. Now Nick co-owns the crabber “The Dangerous Cape” and takes off a month every summer to run his Bristol Bay gillnetter. Just like the MER family, his experience as a fisherman, boat owner and PTO user himself gives him with a great holistic perspective about the needs from our customers. Dennis Risser, a Mechanical Engineer from Oregon State University, comes to us from a stint in aerospace. An avid gearhead, Dennis’ evenings of late are busy rebuilding his rotary engine. His wealth of knowledge in CAD modeling, machining, engine mechanics and how to safely take power off engine drives have become invaluable.

Last year we announced our entrance into the Cummins market with our PTO for the 6.7 - an engine capable of 734 lbs-ft off the front, and the 8.3 - capable of 200 lbs-ft. Since then we’ve rounded out our Cummins lineup to include the legendary 5.9 - an engine capable of 210 lbs-ft off the front, and the 9.0 series - capable of 520 lbs-ft.

One thing we take pride in at MER is being flexible and engineering for specific customer needs. This challenges us to push ourselves and often takes us into new and exciting territories. This year, after much collaboration with customers and various companies, we are proud to announce that we are now offering our first front mounted PTO for Scania; Starting with the D13 - an engine capable of 885 lbs-ft off the front. Scania is a well known European brand with a great reputation. Developing SeaDrive for Scania has opened up a lot of new opportunities and possibilities for our customers, particularly in large engine applications. What’s next for SeaDrive? - the D8 Volvo!

If you are interested in what SeaDrive can do for you please call us at 1-800-777-0714 or visit our website at www.merequipment.com.
Technical Bulletin

How Generator Winding Temperatures Effect Your Bottom Line - Robert Allen

Let's talk about how improvements in insulation polymer science can cost you money. In a nutshell, generators are rated by kW output at a given temperature. Over time manufacturers have adopted similar standards of measurement. Kilowatt (kW) is a rating at the given temperature rise of the windings at a given ambient or engine room temperature. They all measure output in degrees Celsius as it sounds cooler than degrees Fahrenheit. For many years the continuous duty shipboard gold standard was considered to be an 80° C rise over 40° C (120° C total) ambient. Converted to Fahrenheit that would be 248° and spin it around at 1800rpm and you will understand why standby generators get replaced at very low operating hours.

Currently the American Bureau of Shipping (ABS) and NEMA class F temperature consider "continuous duty" as 96C/50C (145C total) or 105C/40C (also 145C total). Both of these temperature standards total 145C (293F). If you have ever put a piece of plastic in the oven at 293F you probably know it gets a little soft. Leave it in there for hours at a stretch and spin it around at 1800rpm and you can see why generators rated at higher winding temperatures are a bad idea. When the insulation fails we have a dead short and the smoke gets out. Generators running cooler not only last longer, they take less fuel and make the same electricity. Make sense?

Now consider the economy end of the generator spectrum, some generator manufacturers rate their continuous duty machines at NEMA class H, 115° C/50C or 125° C/40C (both 165° C / 329° F total) - pretty hot for plastic, but still considered to be a continuous rating according to NEMA H. Then consider the standby generator market. They rate their generators up to 150C/40C (190° C total) - that's 374° F. Heat that plastic up in your oven again to 374° and spin it around at 1800 rpm and you will understand why standby generators get replaced at very low operating hours.

Remember that if you are in an engine room with limited circulation and generator surface temperatures ranging from 248° up to a potential of 374° F... What happens to the ambient temperature in the room? That same air intake temperature of the other engines, pumps, and motors in the equipment space? Consider that for every 1 degree of intake temperature rise you will see 5 degrees of exhaust temperature rise in a typical diesel engine. Exhaust systems get hot and breakdown sooner; pumps and motors run hotter because of superheated air needed for cooling. Main engines and auxiliary engines use more fuel because high intake temperatures reduce HP output. It's a fuel economy snowball of sorts all initiated by the ability to save money on copper because insulation properties got better with science.

Sometimes the latest science isn't in your best interest. That's why Bollard generators are still built at 80° C rise over 40° C ambient, the gold standard. Our motto is "Pull Harder". They cost a little more out of the shoot, but the lowest cost of ownership is our goal. If you make your living in this business you know it's mandatory to keep your operating costs down and maximize your equipment service life.
Boyd “Buckwheat” Roberts was one of the most influential people in my life. People cross our paths every day, most we take little notice of - some change who we are. Buck earned the respect of everyone who knew him. He went to Alaska in 1945 hired by his sister's father-in-law - Vic “Pappy” Engblom. Pappy was the trap boss in Uganik Bay on Kodiak Island. Buck signed on as a pile buck on the crew building fish traps for San Juan Fishing and Packing Co. He worked the Pile Driver and fish traps for a few years and became the trap boss when Pappy retired.

When Alaska became a state the traps were outlawed and he became the beach boss at the San Juan cannery. He was a man with no end of confidence that was augmented with good common sense. “Can’t” wasn’t in Buck’s dictionary. He said an excuse was just “the skin of a lie stuffed with reason”, or like Yoda would say, “Do, or do not, there is no try.” He accomplished feats most would think impossible with little more than hand tools, chain saws, peeves, come-alongs, and double blocks. Although he did have a pile driver with a really cool steam engine - perhaps the most powerful engine I’ve ever worked around.

A farm-kid from eastern WA, I went to work for Buckwheat on the beach gang in 1969. Our crew loaded and unloaded the boats, kept the water line and maintained the mountain dam that ran the cannery. We built the docks and piles, painted the roofs and buildings, skidded the fishing boats and side tracked them the winter. We drove piling, lugged huge wooden pipes up the hillside to the dam. We built and moved buildings, installed tank farms and oil docks. We built a cannery in the wilderness where 200 people lived and worked the salmon season. In 1964 the earthquake sank our side of the island 3’. Buck showed up with his crew in spring and raised the docks and warehouse up with little more than muscle and grit. Each year we shipped out hundreds of thousands of canned salmon, then winterized everything only to come back and do it again in spring. Hardest work I’ve ever done, and the best education money couldn’t buy.

Buck’s attitude was that if he gave you a job and tools, he expected your best effort and would inspect your best work. You gave everything you had and you felt as if you accomplished something - this endeared men to him. He never held a grudge but wouldn’t associate with those he didn’t consider honorable, trustworthy or honest. I know that Buck and Ivan Fox made me and others much of who we are and I’m thankful. I like to think they would be proud of how we all turned out; I wish I could sit and chat with them both.

From The Captain

Buckwheat in 1969 - by Robert Allen

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The girl with the deep blue eyes turned out to be the superintendent’s (Ivan Fox’s) daughter and Buck’s adopted niece - just my luck, protected like princess Leia. Christy was her name, I tried calling her Chris once and was quickly corrected, “It’s Christy!” I asked her how to spell it, she said “It’s Christ with a Y!” I was so smitten and shy I couldn’t even talk to her. Every time I tried the words came out sounding stupid and confused, I sounded like an idiot. Again, all I could think was, “Oh my god, it’s going to be a long summer...”