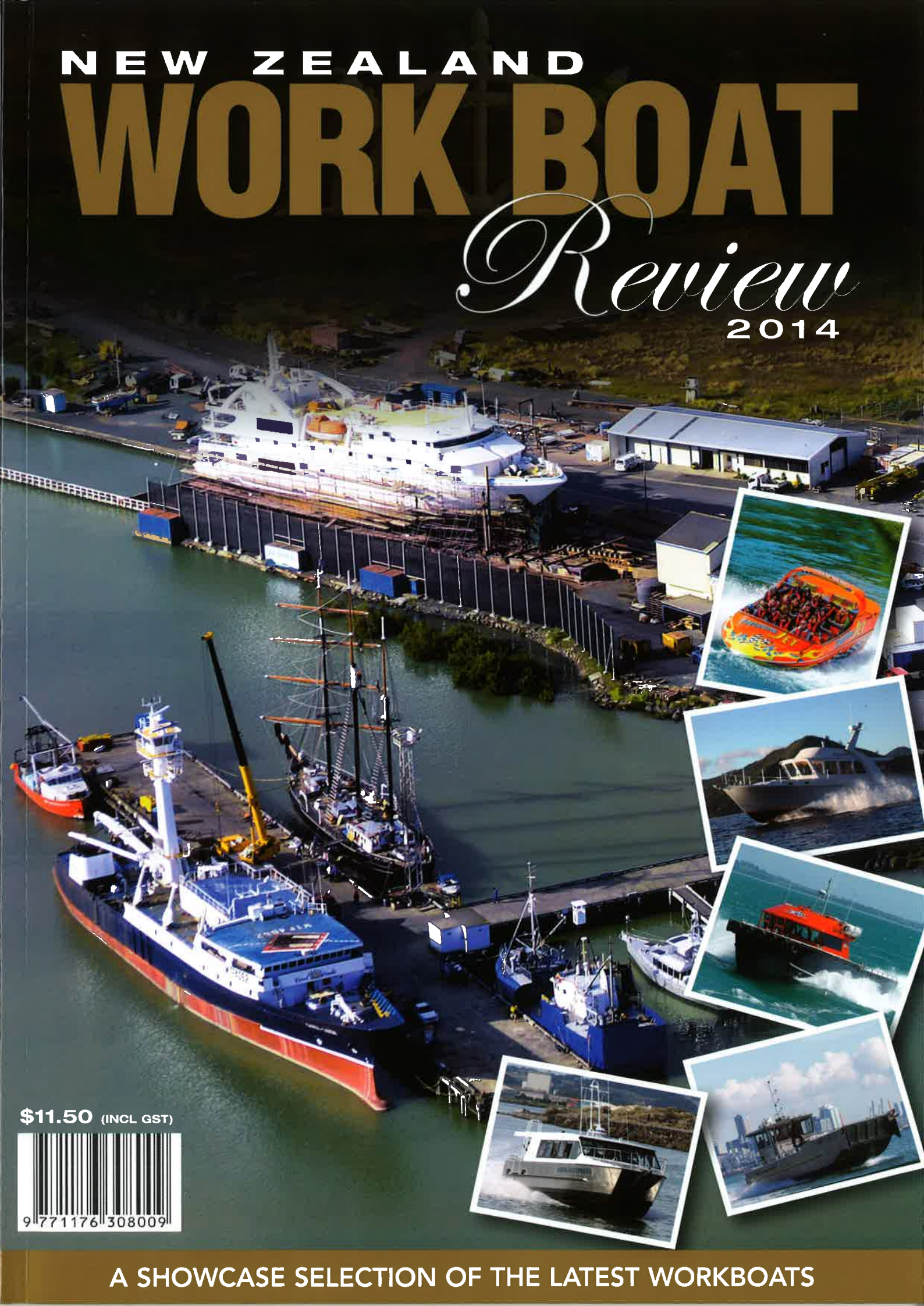
NEW ZEALAND

WORK BOAT *Review*

2014



$11.50 (INCL GST)

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A SHOWCASE SELECTION OF THE LATEST WORKBOATS

TR Healy takes ON THE JOB

"Time and tide" waits for no man, and with each tidal flood silt is deposited in our draft sensitive waterways. Working ports, local wharves and marinas all require some form of maintenance dredging.

Auckland's Pine Harbour marina is no different, and the launching and delivery of its purpose-built 1,200 gross tonne spoil dump barge *TR Healy* certainly turned some heads.

Coastal Resources Limited made the decision to commission a 40m split hopper barge with a capacity of some 1,000 tonnes to aid in disposing maintenance dredgings for various marinas. The brief was for a vessel of a nominal two-metre draft so it could be loaded within the sheltered marina basin itself, but still large enough for the economical trip to the disposal ground. However, the "head turning" and unique feature of this particular barge design was that the construction material is almost entirely marine grade aluminium alloy.

Designer Nic de Waal of Teknicraft Design says that in a vessel such as this, where deadweight capability is crucial to the viability of operation, it made perfect sense to use aluminium instead of steel. An additional 20 percent capacity (approximately 160 tonnes) has been added to the carrying ability of the vessel as a result of utilising this lightweight alternative.

"Aluminium also features the added benefit that it does not need to be treated by a protective coating to prevent corrosion, and therefore significantly reduces the long term maintenance cost of the vessel," Nic says.

"The design has a hull length of 40 metres, with a carrying capacity of 1,000 tonnes, she is a non-propelled vessel with an efficient hull shape so that it can be towed by a relatively lightweight tugboat," says Nic.

Ideally suited for work in shallow water inlets, boat marinas and river areas where shipping channels need to be kept open, the design means that the *TR Healy* can operate at a draft of only two metres whilst still carrying more than 600 cubes of material.

"As the barge is designed to be unmanned, the operation of the hydraulic rams is performed by a remote control system from the towing vessel either whilst stationary or underway," Nic explains.

Built by Q-West boat builders in Whanganui, essentially the "split hopper barge" is in two halves, each a mirror image joined by two super large five leaf hinges mounted on deck, fore and aft. Brevini were contracted to develop a suitable hydraulic package to control the dump operation of the barge, which included the large hydraulic cylinders that open and close the two main hulls, lock cylinders, and the twin anchor winches. This included the 60hp diesel hydraulic power pack which incorporates a full remote radio control start up and shut down system. The specialist items were made to order in the Italian Brevini workshop and imported, with the remaining development being carried out in their East Tamaki workshop.

The all weather power pack is fabricated from aluminium to provide both shelter and the lightest frame possible – and to match the material specification for the barge.

TR Healy is powered by a Yanmar water cooled industrial 4TNV88-EPP with an EC-150 controller delivering 46.9hp @ 3000rpm which drives a Brevini tandem pump set. This provides both high flow low pressure and low flow high pressure oil supply via a proportional valve bank to the two main cylinders and the two locking arm actuating cylinders. The power pack was installed and commissioned by Whiting Power Limited. The engine drives the hydraulic pump system, which then delivers motive power to all hydraulic rams, locking pins and winch motors utilising the Parker compact spiral hose system known for its high pressure and tight radius capability – something that is essential when installing long service runs and requiring tight radiuses on vessels.

The split hopper barge cylinders were custom built to suit the severe marine conditions in which the they are required to be submerged for significant periods of time when the barge is loaded. This required specially treated rods, cylinder barrels and composite rod and tube end bearings. The hopper system may be operated remotely


The split hopper barge holds 800 tonnes


Hydraulic power pack is remote controlled

via the radio remote control system, giving a distance of control of approximately 350m from the tug.

Up on the bow, besides the anchor points for the towing bridle and mooring bits, there are the twin hydraulic winch drums holding a mix of wire-to-cable-to-anchor bottom tackle. The anchor winches were custom designed and are powered by the Brevini hydraulic motors and gearboxes. Interesting to note was that the twin anchoring system not only allows for redundancy but also when the barge is split there is a safe means of anchoring in an emergency. Also in this area is the mast for the prescribed navigation lights, which have light sensitive operation that is solar powered.

Down aft on the starboard quarter is a large tool and stowage box, while lashed on deck is the emergency tow line already rigged and secure in preparation for any emergency if the main tow parts or is ever lost.

Looking at the hull form, the bow, although somewhat bluff, is shaped and moulded to assist in sea-keeping abilities when under tow. Get this wrong and trouble can quickly manifest into an ugly unwanted tow. Likewise, at the stern of the barge, the fins require good water to give assistance to a stable towing track.

Designer Nic de Waal ventured into the unknown for a vessel this size by using an alloy construction and dispensing with a ballast system, along with all its associated problems such as pumps and internal tank maintenance.

Coastal Resources have contracted one of ▶


On the command dump the GPS is marked and the barge opens


Fully loaded ready for the trip east


The heart of the hydraulics

Auckland's leading independent towing companies Thomson Towboats Limited. When the barge is lying idle or being loaded the tow boats are not required, and as such are not a cost against the job. Clearly using specialised professionals when required is a win-win for both parties.

Once at sea the barge remains totally unmanned and the operation of the dump mechanism is carried out from the towboat, in this case the 14 tonne bollard pull, 1000hp twin screw *Christine Mary*. Once underway from the marina, it takes about 10 hours to reach the dump site. Both the tug and barge are on AIS and when the dump button is hit, the point of dump is recorded on GPS in accordance with the resource consent rules.

As the barge is nearing, or is on station, the motor is started remotely and allowed to run for 10 minutes to warm up and build up hydraulic pressure. Once the dump is triggered and the locking pins release to open the clamshell barge, there is no holding back. It takes about 10-15 seconds for the barge to empty and pop up. To close and bring the hulls together takes a further four to five minutes, during which time the hopper is flushed before the locking pins engage once again sealing the barge. Once the green lights register that the pins are safely re-engaged and the barge locked closed, the hydraulics and motor may be shut down and the trip home begins.

In observing the tow when leaving the marina, we note the barge appears to be a bit lively on a short 50m tow, necessitating the use of a second smaller towboat for both close quarters control and safety. Once clear of the inner islands the tow is lengthened to 200m, which includes a section of 14m of 38mm stud link in the centre, at which stage the barge tends to settle on one quarter depending on the prevailing weather.

Clearly, the flat bottom nature of the barge slides well, even when loaded with 1,000 tonnes of wet, gooey spoil. Once empty, the 80 tonne lightweight barge becomes lively again but makes for an easy tow as long as there is a substantial vessel in charge upfront.

As a light ship this barge punches well above her weight, she can carry some 1,000 tonnes before creeping towards the load line – this is no mean feat given her size. Her light unladen weight offers both plusses and negatives, but as in all vessels where a compromise develops, as long as the plusses outweigh the negatives, one has got to be on the right side of the ledger.

TR Healy is the first of the new generation alloy dump barges that we have been fortunate to review and it is engineered with vast proportions, the internal framing and structure is immense – and for a dumb clamshell split hopper barge she has appealing lines and a functionality about her that sets her up for the job. ■

specifications

Owner	Pacific Plant Limited
Home port	Auckland, New Zealand
Builder	Q-West Boat Builders Limited
Designer	Teknicraft Design Limited
Launched	January 2013
Construction	Marine grade aluminium
Length (LOA)	40.2m
Beam	12.5m
Depth	3.85m
Draft	2.05m
Hopper capacity	620m³
Total load capability	800 tonnes

CATCHING UP
with the tropical express

Mining a tropical island volcano in Papua New Guinea for millions of ounces of gold requires thousands of workers – and water taxi *Aniolam Express* gets them to the mine on time. Designed to carry 24 passengers and two crew as well as 1500kg of stores, the vessel is essentially a fast bus bringing Newcrest Mining employees to and from work each day.

Launched in May 2013, she's a passenger ferry from the Wanganui yard of Q-West Boat Builders Limited. The 13m *Aniolam Express* was designed by Teknicraft Design Limited as a foil assist passenger catamaran to operate between the main workers' villages on Komos, Kavieng, Namatanai and the mine site at Londolovit on Lihir Island, Papua New Guinea. Since production commenced in 1997, the mine has produced more than nine million ounces of gold.

Aniolam Express is constructed in 5083 marine alloy plate with a hull comprising of 5mm plate, and the sides and cabin are 4mm – there is a mix of various sizes for stringers and scantlings to give added strength.

Powered by twin Yanmar 6CXBM-GT 341kW marine diesel engines, coupled to ZF286 1.2:1 gearboxes driving twin Hamilton HJ322 water jets, *Aniolam Express* is fitted with the efficient HamiltonJet blueArrow operating system. Using an adjustable foil the vessel can maintain a fuel efficient laden service speed of 35 knots. To guard against the monsoons and ensure only clean dry air reaches the engine rooms, the machinery spaces have been protected by the Seaworth Defence filter systems.

Separate built in tanks below are provided for 100 litres of black water, 100 litres of fresh water and 1400 litres of marine diesel fuel.

Built to the NSCV Code, National Standard for Commercial Vessels for Australia/Papua New Guinea, the hull design and construction complies with these new standards – including structural fire protection, fire detection systems and the FirePro fire suppression system. To hush up the noisy puppies down below, all machinery spaces have been lined with sound proofing fire retardant material.

Because the vessel is designed to operate in the tropics with passengers who are acclimatised to the local conditions, there are no air-conditioning units fitted, rather we have the "open air-conditioning" system which is very effective once at cruising speeds. Side curtains or clears are installed to cater for the monsoon season and keep the passengers dry. The interior is pretty austere, while the seating throughout is the functional upholstered bench type designed by Q-West with painted decks in the main saloon.

The central pilot station forward, which remains open to the main passenger cabin, is fitted with two Hi-Tech Plastics adjustable shock riding helm seats for the skipper and crew members.

Some effort has been made to reduce the tropical glare in the interior of the vessel, with soft white-grey paint in the cabin and charcoal on the for'ard screen around the pilot station.

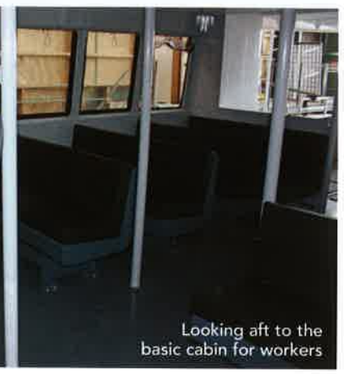
The helm station and controls have been laid out in a functional manner, from the small helm to throttle and bucket controls when in manual and the blueArrow mouse boat at ease of hand when standing while manoeuvring.

The electronics are basic and suitable for the job. Remember, this is essentially a fast bus on water so the Furuno electronic package includes radar, chart plotter and sounder to assist the skipper in keeping the vessel safe. All engine instrumentation and the main switch panels are in a good line of sight or at ease of hand.

To the portside of the pilot station on the crew side is the access door to the small foredeck for berthing or anchoring. The main screen windows, quarter lites and watertight screen door supplied by SeaMac marine ▶


Fully equipped conning position


Crew seating


Looking aft to the basic cabin for workers

Yanmar power below

joiners, are fitted with Wynn screen wipers to beat off the occasional monsoon drenching. There is also reasonable space on the aft deck for freight as well as the passenger heads.

While the hulls above the waterline are left in natural alloy, the cabin, roof and interior have been painted using the international two pot paint systems.

In the case of an emergency, besides passenger life jackets, there are two RFD 16-man life rafts carried on board.

It was a pleasant surprise to find that once underway *Aniolam Express* performed even better than expected, and kicking up her heels she was on the plane in no time. With a design service speed of 35 knots achievable and consuming 100 litres per hour, this small ferry scarpers along as the foil offers immediate lift and relief from hull drag – while still offering a soft ride.

With distances of up to 76nm between stops, we can understand the need for speed in returning these workers home after a hard shift in the mines.

Kiwi boat building skills have been exported successfully yet again with the *Aniolam Express* – and no doubt she will serve her gold mining community well, taking her small but significant part in building economic value for the nation of Papua New Guinea. ■

specifications

Owner	Newcrest Mining Limited
Designer	Teknicraft Design Ltd
Builder	Q-West Boat Builders Limited
LOA	13m
Beam	4.6m
Draft	0.75m
Power	Twin Yanmar 6CXBM-GT 341kW marine diesels
Propulsion	Twin Hamilton HJ322 water jets with blueArrow
Passengers	24
Service speed	35 knots
Fuel Capacity	1400 litres
Survey	Australian NSCV, Service Category Class 1C, Category F2 Fast Craft