

Turkish teamwork

RMK MARINE HAS INVESTED HEAVILY TO BECOME THE WORLD'S MOST ADVANCED VACUUM-INFUSION FACILITY. NOW IT IS BUILDING OYSTER'S LATEST SUPERYACHTS
JAKE KAVANAGH REPORTS

A recent report shows that Turkey is now the second largest superyacht producer in Europe — and that it is rapidly closing the gap on the front-runner, Italy.

Walk across the huge RMK Marine shipyard at Tuzla, near Istanbul, and it's not hard to see why. The facilities here are second to none.

The shipyard is part of the giant Koc (pronounced 'koch' as in 'scotch') group, which last year ranked 172nd in the Global Fortune 500 index. Founder Vehbi Koc started the business in 1924 when he bought a small shop with his father. From that initial investment, Koc now has a turnover of US\$44billion a year. With 90,000 employees, it produces everything from TVs to tankers, and has major interests in the finance, energy, tourism and automotive sectors. It also owns a chain of hotels and marinas and refines 70 per cent of Turkey's petroleum. Koc accounts for 11 per cent of Turkey's GNP.

But the Koc group's interest in the maritime sector isn't purely commercial — there is passion there too. One of Vehbi's sons, Rhami, is a keen yachtsman so it was natural that he would turn Koc's industrial might towards building some of the finest superyachts afloat. He also lent the new marine division his initials.

To start its marine business, the Koc group bought an existing shipyard and after ten years relocated it from Halic to Tuzla Bay on the Marmara Sea. Here it joined one of the



Nazenin V was completed at RMK Yachts in 2009 and at 52m she remains the largest aluminium sailing yacht yet built in Turkey

highest concentrations of shipbuilders in the world, with 40 other yards in close proximity. It became RMK Marine in 1998 and whilst it had built several small ships and a few motor yachts, it had yet to build a sailing vessel.

Turning point

Twelve years on and RMK Marine is now split into three divisions, all based at the same 95,000m² facility. RMK Ships continues the core business of commercial shipbuilding, RMK Naval specialises in warships, and RMK Yachts creates top-end leisure craft. RMK Yachts has been responsible for some iconic builds including three 37m explorer yachts — *Jasmin*, *Caressa K* and *Private Lives*. The 52m



Below: A huge 95,000m² facility at Tuzla, just 45km from Istanbul, hosts all three divisions of the RMK Marine operation

ketch *Nazenin V* was recently added to the portfolio. An elegant Sparkman and Stephens design, she is the largest aluminium sailing yacht to be built in Turkey and her fit-out absorbed 15,000m² of teak veneer.

The start of the build in 2006 marked a turning point. Former VT Halmatic MD Mike Burnham joined the management team and the focus moved from fully-custom projects to a far wider remit. Together they began re-organising the yard to help take the company forward.

"We began a rapid phase of development," explains Burnham. "We moved from building one yacht at a time to a broader business plan for refits, one-off builds, and semi-custom production yachts. The team wanted to offer yachts in all relevant materials and to be at the cutting edge of technology and not just excelling in the traditional materials."

When Oyster's founder, Richard Matthews, decided to build a new class of 100ft-plus superyachts, he approached Burnham (who was still at VT Halmatic) to discuss his plans. VT was busy moulding the new Sunseeker 105 hulls at the time and had recently built the 72m sloop *Mirabella V*. When Burnham moved to RMK Marine he realised the yard's potential to take up the Oyster challenge. Whilst RMK Marine had no composite experience or infrastructure, Oyster's management were attracted by the huge skills base, the backing of the powerful Koc group — and Turkey's increasing presence in the superyacht sector.

Forward planning

A deal was signed to build the new generation of 100 and 125 Oysters at RMK Yachts, and the celebrated naval architect Ed Dubois was commissioned to design them. Even as the

TOPVIEW MIKE BURNHAM TEAM LEADER

At the heart of RMK's yacht team is business development director Mike Burnham who trained as a naval architect before joining VT Halmatic in 1978. He worked in design and sales before being promoted to managing director in 1998. For the next eight years his role was very hands on, particularly during the building of the spars for *Mirabella V*. Built at VT, she remains the largest single-masted composite sloop ever launched.

He brought in a wealth of experience in short run production and composite construction which has helped RMK Yachts kick-start a radical change to its business plan.

"Koc is a staggering operation," Burnham says. "Despite its size, it is still essentially privately owned by the Koc family, with a group of professionals around them. Vehbi Koc's mission statement, which is on the walls of every factory, invokes good business practice, returning shareholder value, and actively contributing to the Turkey's development."

"Our superyacht division is setting out to do the same thing — to perform as a quality organisation. Obviously, with Oyster, we want to build a reasonable number of boats but they still have to be the very best available."

"Turkey has developed enormously in the superyacht field in recent years and there are now a number of significant yards here doing some great work."

"When I started, there were just 10 people in the RMK yacht office. Now we have recruited talented graduates as managers who speak good English. We decided to keep everything in-house, except mechanical disciplines, and invested heavily in composites. The idea was to get away from one-offs — and we were either very fortunate or had really good foresight, but we put everything in place just before the economic crisis."

"Our superyacht division is setting out to perform as a quality organisation. With Oyster we want to build a reasonable number — but they have to be the very best available"



Mike Burnham, Business Development Manager, RMK Yachts

It worked out really well and now we've got four yachts in build.

"Quality extends to the design of our products and we like to work with names such as Sparkman and Stephens, Ron Holland and Ed Dubois. They are all at the top of their game and bring a great deal of experience. We also work with top interior designers such as Redman, Whiteley & Dixon and Design Unlimited."

"We had a large sail portfolio with *Nazenin V* and the Oysters, but wanted to retrace our roots and build more motoryachts, which is why the BN80 project came about."

"Currently, the global percentage of superyachts is roughly 10 per cent sail and 90 per cent motor. We want to cover all bases with strong portfolios in power and sail built in steel, aluminium and composites. We have put into place all three technologies."

"On the vacuum infusion side, with Oyster, it was relatively straightforward. Both Stephen Thomas and I had spent our careers in composites and knew the possibilities. The ethos of Koc really helped and their support made us attractive to Oyster, even though we had no composite infrastructure. *Nazenin V*, though, showed them what we could achieve. And, of course, we mustn't forget the other vital ingredient — a great deal of hard work!"

INTERNAL BULK HEADS

Internal bulkheads are vacuum infused FRP composites. A typical shell laminate consists of a mix of e-glass CSM, e-glass biaxial, and Aramid woven cloth. The inside skins of all the tank boundary shells are coated with three layers of hand laid 450g/m² e-glass CSM



preliminary sketches were being fleshed out, a whole new manufacturing facility was being planned and built at Tuzla. It was a massive undertaking, requiring an ultra-modern 3,720m² (40,000ft²) building hall and an attendant post-curing oven.

"The yacht team told RMK Marine what was needed, and they supplied it," Burnham explains. "This is the company's style. It has a very 'can do' attitude. Our long-standing relationship with Oyster and our commitment to production tooling for both the new models has allowed this project to quickly get off the ground. For other builders, the set-up alone could have taken years, and been prohibitively expensive."

In 2007 Stephen Thomas — a British naval architect and former project manager at VT Halmatic with a great deal of composites experience — was brought in to manage the build of the new Oysters.

"We were starting from scratch," he remembers, "and we only had a few elderly buildings in the yacht division. But in many ways this allowed us a free rein."

Another important advantage was the low cost of labour in Turkey. The yacht team was able to commission equipment and facilities

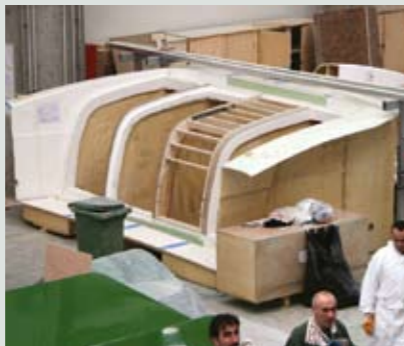
that would be exorbitant further west.

"The new Oysters would be built to Lloyds + 100 A1 SSC Yacht Mono G6 MCH and certified to the MCA LY2 Code. This means they could be chartered worldwide, from the tropics to the Southern Ocean," Thomas says. "Building to this exacting specification would involve laminates of carbon fibre, Kevlar and e-glass, with differing saturation levels, so the moulding process was going to be an exciting challenge. Nothing this big had ever been infused before."

Despite his expertise with vacuum

TESTING ON MOCK-UPS

Full size mock-ups are made to test mechanical and electrical systems, and assess the best way to fit equipment. This mock-up of the main entrance hatch features curved windows. A similar mock up has been made for the bow section to test the installation and operation of custom-built stainless steel arms deploying twin anchors



infusion, Thomas called in consultant Arjen Koorevaar from the Dutch-based company Polyworx to help tackle the complexities of scale. Koorevaar had developed RTM-Worx software that would "take the risk out of the process," as he puts it.

It also allowed the composites team to experiment on smaller hulls and mock-up hull sections before upscaling to the Oysters.

In the meantime, work began on the new facilities and the building of the Oyster complex within the yard's boundary. This included what RMK Yachts claims is the biggest curing oven in the world.

"We certainly couldn't find one of this size when we were looking to commission it," Thomas says. "The 40m gas-powered oven can reach temperatures of 71° C, but we post-cure the hulls for 48 hours at 60°C. This minimises resin shrinkage and prevents witness marks."

During this period RMK experimented by building a much smaller yacht to one of

MAIN SALOON

As a semi-custom build, the material choice is specified but headlining and hull lining are made of fabric-covered panels. Non-structural bulkheads are plywood with a layer of insulating material mounted to the structure. Cabin soles are of walnut, oak, cherry or teak-faced plywood



Thomas's own designs. The 11m hull was fully vacuum infused and the Polyworx programme was used to monitor resin flow to identify where it needed improving. Extra staff were recruited to create a composites team of 55 people — managed by Emek Gökkaya — prior to moulding the first Oyster.

Infusion process

Vacuum infusion has many advantages over more traditional resin layup, especially when it comes to skilled labour.



POST CURED HULL

Hull and deck mouldings are post cured in a purpose built oven which can reach 71°C. It is used to post cure for 48 hours at 60°C. The entire facility had to be earthquake-proof. The mould tools are held in steel cradles and mounted on a series of castors. They are moved around using fork-lift trucks and are steered by choreographed manpower



UNDER HULL ACCESS

Yachts are held off the ground for fitting out, which creates a useful workshop area beneath the hull. It also facilitates the fitting of the keel which on the Oyster 125 Flybridge comprises a 18t keel stub bolted onto a widened keel flange to make the keel bolts accessible from the engine space. A 27t lead bulb is then bolted to the stub

"There is much more time to double check that everything is where it should be, without being rushed by catalysts," Thomas explains.

"This takes the pressure off the shop floor workers. Neither our Turkish — nor their English — is quite up to speed yet, so we get around that by posting a series of Turkish/English glossaries around the factory. This allows us to indicate the more technical aspects of each job. RMK Marine's recruiting drive is also providing a lot of English-speaking graduates for the expanding management team which is also helping.

"As all the resin is held in containers and pipes, the infusion process is also very clean, which makes for a much more pleasant working environment."

It took a considerable amount of experimentation by the RMK Yacht team and the Polyworx consultants to establish the best resin and processes for the job.

"We used Reichhold's Hydrex 100HF vinylester resin in the end," Thomas says. "The resin chemistry was adjusted so it could be used effectively in a temperature window between 20°C and 35°C without worries about excessive exothermic reactions. If the ambient temperature gets too high, we always have the option to mould at night. The actual infusion only takes a couple of hours."

Experiments on hull sections also



Preparing the 125 Flybridge deck moulding. Workers carefully lay the laminates of e-glass CSM and e-glass 0/90 biaxial and quadaxial that will sandwich a 25mm 150kg/m³ balsa core

"Our commitment to tooling has allowed the project to get off the ground quickly. For other builders, the set-up could have taken years — and been prohibitively expensive"

OWNER'S CABIN

Running the full width of the 10m hull, the owner's cabin features a double berth to port with a seating and television area to starboard. As with the rest of the yacht, the teak is a matching veneer and is part of the 15,000m² that was specially sourced for the project



ALUMINIUM CONSTRUCTION

Nazenin V was built upside down using aluminium throughout. Work began in 2006 and once the completed hull was inverted, the internal fit-out continued for longer than usual with the deck removed. This allowed the easy fitting of large components, such as the Caterpillar C32 engine



helped to develop the optimal resin delivery system. The Hydrex 100HF would be drawn out of one tonne containers into degassing chambers, and from there to the mould by high volume vacuum pumps.

"The delivery pipes are placed in prime positions around the mould, where full laminate saturation will be guaranteed."

Whilst the new infrastructure was being created, the designs arrived and the tooling for the two new Oysters began. By December 2008 the project was well underway, but



CENTRAL CONTROL



The complex control systems are fed through one dedicated control centre in the engine room, monitored by the chief engineer. The swivelling computer screens also serve as monitors for the CCTV cameras dotted around the ship, including at the mastheads. The centre also monitors security

made by infusion. Around 7t of resin will be used in one three-hour session.

Financially robust

Despite the success of the Oyster contract, RMK Yachts is pushing ahead with other projects. *Nazenin V* was launched in 2009, and now another steel and aluminium project is taking shape in the yard – the Ron Holland designed BN80.

This 42m steel motoryacht has an aluminium superstructure and a capacity for 12 guests and 11 crew. When completed in 2011, she is destined for the private use of an experienced yacht owner and his family.

The interiors have been created by Design Unlimited, and are based on a contemporary Asian feel. The owner and his wife are paying great attention to detail, using influences from Japan and Thailand.

As with the Oysters, mock-ups of the interiors were being built in the three-storey joinery workshop on site, where CNC-cut MDF ribs provide the accurate internal shape of the vessel. Experiments involved offering the dark wenge timber of the BN80 against light fabric panels and grooved white ceilings to test the effect.

Despite the recession-beating order book for three Oysters and the BN80, RMK Yachts has also focussed on the profitable short-term refit market. In the yard during our February

RMK Yachts is keen to work with the very best designers. Ron Holland, left of picture, discusses upgrades to the BN80 with the English-speaking Turkish management

The Ron Holland designed BN80 steel and aluminium 45m motor yacht is currently taking shape in the yard. RMK Yachts want to increase the breadth of the power portfolio



"The Turkish people have a great work ethic. Business is based on respect and pride in their work. They are also very forward-looking and invest willingly — and wisely"

visit, no less than 12 large yachts were cocooned in transparent tents, with some undergoing a mild refurbishment, and others a full masthead-to-keel refit.

RMK Marine's hard standing area can cater for up to 15 yachts of 30m each, served by three travel lifts of 40t, 100t and 320t.



The yard also has a new custom-designed 685t slipway which can take vessels of up to 60m. A combination of water and land cars running on tracks makes launch and recovery a very smooth operation. There is also a 13m x 40m specialist paint shop and a host of other electrical, metalworking and plumbing facilities on site.

"The Turkish people have a great work ethic," Burnham says. "Their business is based on respect, and pride in their work. They have a very forward-looking approach, and at RMK Marine in particular, they invest willingly — and wisely.

"The financial clout behind the RMK Yacht division must make the Oyster project one of the most financially robust boat building operations in Europe — if not the world."

Once the first 100 and 125 Flybridge have been successfully completed, RMK Yachts plan to produce between three and four semi-custom Oysters a year. Combined with other projects, such as the BN80 and several good orders for the shipbuilding yard (including four corvettes for the Turkish coastguard) RMK Marine's future as an internationally recognized superyacht builder and composite specialist seems assured.

CRAFTED BATHROOMS

All of the guest cabins have en-suite bathrooms — such as this one in the owner's stateroom. The level of detailing is extraordinarily high with every single hinge, drawer handle, light fitting and switch, custom made. The items are then sent to Germany where they are hand finished in gold plate to prevent tarnishing



experiments continued with the resins, with major midship keel sections and potentially awkward hull and deck joins being infused.

Thomas, Burnham, Koorevaar and Gökçaya lay under a glass table to watch resin soak slowly through experimental laminates. Nothing was left to chance.

"We had excellent support from the Turkish fibre suppliers Metyx, who were closely involved throughout," Burnham recalls.

The first 100 hull and deck was infused in June 2009, an operation that deployed nearly

4t of resin in just three hours. The mould was made deliberately longer than the hull to allow for better shaping at the transom, plus the ability to extend or modify the stern slightly if required. To discover the best way to attach fittings or hardware — and to check they operated correctly — large mock-ups of the 'areas of concern' were made first.

By early 2010, the 125 Flybridge mould tooling was nearing completion, and in terms of weight was destined to become the biggest one-piece composite hull ever



OYSTER 125 FLYBRIDGE SPECIFICATIONS

TECHNICAL DETAILS

- ▶ **LOA:** 38.14m (125ft)
- ▶ **Waterline:** 34.11m (111.8ft)
- ▶ **Beam:** 8.95m (29.4ft)
- ▶ **Draft:** 3.85m (12.6ft)
- ▶ **Classification:** Lloyds 100 A1 SSC
- ▶ **Total keel ballast:** 45t (99,200lbs)
- ▶ **Displacement:** 157.2t (346,566lbs)
- ▶ **Fuel capacity:** 15,000lt (3,962 gal US)
- ▶ **Water capacity:** 5,000lt (1,320 gal US)
- ▶ **Main engine:** Caterpillar C18 600hp
- ▶ **Generators:** Twin 400v 50kW Onan
- ▶ **Mast:** Carbon fibre (Hall Spars)
- ▶ **Air draft:** 53.78m (176ft 5in)
- ▶ **Rigging:** S/S rod size 60-320
- ▶ **Deck gear:** Lewmar Hydraulic winches
- ▶ **Sail area:** 739m² (North Sails)
- ▶ **Guests:** eight
- ▶ **Crew:** six
- ▶ **Construction:** Vacuum infused e-glass CSM, e-glass biaxial and quadraxial rovings, carbon fibre and Aramid woven cloth, hand-placed over a balsa core. Reichhold's Hydrex 100HF vinyl ester resin is used for infusion layup with gelcoat finish
- ▶ **Concept and design:** Oyster Marine
- ▶ **Naval architecture:** Ed Dubois

YACHTS UNDER CONSTRUCTION OR PLANNED

- 1 x **Oyster 125** (125ft - 38.14m) Yard number 1

- 2 x **Oyster 100** (100ft - 30m) Yard number 2

- 3 1 x **BN80 motor yacht** (45m - 135ft) Yard number 4

