Engineered structures for utility and stability

Floating buildings at modern marina sites reflect ongoing advances in engineering skills. While small, lightweight harbormaster offices are often seen at the end of docks to greet visitors, Bellingham Marine (BMI) also builds floating structures that encompass significantly greater area, weight and windage, and can be used for anything under the sun. Robert Wilkes reports

One of the largest BMI projects to date is the Loyola Marymount University (LMU) Boathouse located in Marina del Rey, California. The 15.2m by 22.9m (50ft by 75ft) float was designed and built by the company in 2000 and supports a large timber framed boathouse used for the university's rowing activities. The boathouse also has a bathroom inside; a good idea if one is about to step into a rowing shell. A waste tank was embedded inside the core of a float module and sewage is pumped to land as the tank is filled. The boathouse sits on a rigid platform composed of floats similar to those used to construct docks for marinas.

Bellingham’s manager of project development for the southwest division, Eric Noegel, has been involved in several projects with floating buildings. “The key criteria are strength and stiffness,” he said. “Just as any building on land requires a stable foundation, a float under a building must act as one piece as a wave passes underneath. The float under the LMU Boathouse does just that.”

More typical of floating buildings is the ‘ship’s store’ built in 2003 in Cabo San Lucas next to the fuel dock. Boaters can access the store as they enter and exit the marina, giving new meaning to the term ‘convenience’ store. Boaters can tie up alongside, buy supplies and load them straight onto the boat.

Engineers must consider the weight and height of the building when designing the platform. Building height relates to wind loads, not unlike pressures on marina structures from boats moored in a marina during a storm. The float at Cabo needed more weight-carrying capacity than many other applications, as freezers, coolers and tons of inventory add considerable weight above and beyond the weight of the structure.

Andy Kurtz, owner of Seaforth Boat Rentals, was planning a new location for his San Diego business when he happened to visit Cabo San Lucas and saw the floating store. He decided to use a floating building for his new facility in Coronado Island. Local authorities have strict building codes to ensure that new construction conforms to their characteristic ‘Old California’ elegance. To win approval, Kurtz developed an architectural rendering of the building he envisioned with colours and rooflines that imitate the grand Del Coronado Hotel and the nearby boathouse on the beach. The rendering was approved and permits were issued.

Kurtz retained BMI to design-build the docks, including the metal building which was designed from his own rendering. The company’s crew erected the building as part of the installation of the docks in 2007. Eric Noegel was also project manager for the Seaforth Boat Rental facility. “Seaforth used our match-casting manufacturing technique,” he explained. “Floats are cast in a manner in which they interlock with each other. Not only does that increase strength and stiffness, but it simplifies the design and speeds up installation significantly.”

“The facility has been very well received by everyone,” said Kurtz. “It looks great. It’s super strong and super functional. The combination of float and building is completely stable. The building is used to conduct our rental activities and houses our computer system, coolers for refreshments and our workshop.”

Robert Wilkes is a freelance writer based in Washington, USA. He can be contacted on email: rcw@wilkescreative.com
Floating Structures

Marina Housing to build Finnish floating village

In response to growing interest in the prototype and Mark II version floating houses Finnish company Marinetek has built at New Port Marina in Espoo, the company has set up a subsidiary firm dedicated to promoting floating homes and other structures. Its first major project will be under way this summer.

Marina Housing Ltd is marketing its innovations to private home buyers looking for a high quality individual floating permanent or holiday house, hotel chains and marinas. Aside from cluster developments, like marina village communities, the company can design and deliver tailored floating restaurants, hotels, apartments, office buildings, spas, swimming pools/centres and club houses.

Marinetek built the first version of its showroom house – Villa Helmi – several years ago, testing and evaluating it for five years before promoting it as a commercial concept. Today, it sports many innovations, fine technical details, the latest modern architecture and chic interior styling. It features second generation Marinetek house pontoons with an integrated sewage and balancing system and is securely moored with Seaflex cables to massive concrete anchors on the sea bed. This ensures it is exceptionally stable but able to move gently in response to changing water levels.

The floating houses have minimal negative effect on the environment. Technological features include an air heat pump, energy-saving machine-assisted ventilation and air conditioning. Exterior walls are manufactured from fibre plaster and the spacious terraces of plastic wood. All used water is pumped back to the local sewage network.

"Villa Helmi makes us reconsider our old prejudices concerning living in a floating house," says Marina Housing CEO, Kimmo Anttalainen. "This example shows very vividly and convincingly that the solutions provided by Marina Housing are not only stylish and safe but can offer a very relaxing lifestyle. We are firmly convinced that the markets for the floating houses will rapidly grow in Finland and in the rest of the world."

This confidence is endorsed by Marina Housing’s current project to build Finland’s first floating village in Reposaari near Pori on the west coast. Reposaari Marina Village, a shareholders’ housing company, will consist of 16 floating houses situated in a sheltered bay known locally as Tukkiviikki (Log Bay). The houses will be built this summer to two designs: 10 two-storey Captain’s villas and six single-storey Fisherman’s villas.

The Captain version features spacious terraces with seaside view, studio-style living rooms with sliding glass doors and cozy master bedrooms. Extra options include enclosed glass sided terraces, a fireplace and a heated whirlpool bath tub. Fisherman’s villas have similar features and a large sleeping loft. All properties have their own water space and a mooring spot alongside the terrace.

In addition to housing based projects, the company is also promoting ‘Active Pier’, a modular floating concept that can be used for multiple functions like offices, workspaces, restaurants, cafes, municipal services, exhibition space and gardens. Active Pier comprises prefabricated modules that can be combined together to suit client needs and deployed in city centres or boat harbours.
Interest mounts for floating home concept

There is increasing interest being shown today by professionals and private individuals in the development of new floating communities. Influencing factors include a greater realisation of the commercial benefits and possibilities, growing environmental awareness, heightened competition between different geographical regions and, of course, the individual's private dream to be able to own a comfortable home in a unique on-water setting.

One man who can bear witness to this seminar on floating homes in Stockholm in May is Richard Bergström, founder of Swedish company Aqua Villa (see Marina World Nov/Dec 2006). “At AquaVilla we have noticed a steady growth in people's interest in developing new floating communities,” he says. “We are currently in discussions with a large number of different parties from various organisations in around ten countries. They all share a common desire to create new floating communities.”

The development of such schemes is a complex and capital-intensive process that requires the co-operation of several different parties. “We have learnt through experience that we have to get many different interest groups to work together,” Bergström explains. To help this process, Aqua Villa will hold the first international seminar on floating homes in Stockholm in May.

“The seminar will address professional interest groups that want, for different reasons, to speed up the development process. Among other attendees, we expect to see representatives from municipalities, housing developers, estate and marina owners as well as building companies that have shown an interest in obtaining a licence to work with the AquaVilla concept.”

Why does Bergström think the interest has increased, and why now? “One obvious reason is that the products and know-how have advanced to a stage where floating communities can be built safely and skilfully and at reasonable cost. We see an industry emerging with players who can make use of the options available for scaling projects to suit sites and budgets, and thus keep costs down.”

But there are more reasons.

Commercial opportunities

Rising property prices over the last decade and the willingness of individuals to pay for waterside living have combined to boost interest from many commercial and municipal entities. Considerable profits can be made from ‘unused’ lake, river or coastal sites if they are developed sensibly.

“Many marina owners have unknown wealth in their marina basins. Introducing floating homes into an existing facility does not normally involve high extra costs but the advantages can be considerable. Profits increase because of higher fees paid by permanent residents and in the northern hemisphere where the boating season is short—just a few months—floating homes generate year-round income.”

Indirect values, such as increased security, should also not be underestimated.

Large housing developers who often invest in coastal land also see value in the concept as they recognise the opportunities for exploiting water space as well. Floating communities help make the waterside more attractive and, aside from giving the developer more homes to sell, also raise the value of the land-based property and accelerate sales. Commercial opportunities are obviously emerging.

“We are speaking with a number of local entrepreneurs and builders who want to acquire regional licences for the AquaVilla concept. They have all identified substantial local business opportunities.”

Green awareness

Global debate on the environment has not escaped anyone and many people are far more
conscious about what they buy. In this respect, floating homes score well. "Two years ago, the environment was not an important sales angle for us but, today, it has become one of the most important arguments," Bergström explains.

Floating homes and associated components can, to a large extent, be fabricated in a rational and environmentally-friendly way under indoor conditions. The fact that the components are not manufactured on site reduces the impact on the site environment and, as construction is swift, further reduces damage to the location when compared with traditional construction. Water can also be used as an energy source for heating the homes. "We use our patented AquaEnergySystem, which utilises the energy in the surrounding water. Together with a heat pump, the system generates 60-70% of the heating required for a Swedish climate."

Last but not least, floating communities have a smaller permanent negative impact on the environment. It is even possible to move an entire community to another setting and thus redress any environmental impact at a reasonably low cost.

Regional branding
The term 'regional branding' has emerged in recent years. Put simply, it describes a move to reinforce their identity and compete with one another. It's used strategically to attract tourists, new tax payers and enterprise to a region. Floating communities can play an important role in these efforts by strengthening 'waterside profile' or highlighting the region's efforts in new and innovative housing development.

The Swedish municipality of Västervik was swift to grasp this concept and is now working at an advanced stage with Aqua Villa on a project in its region. Harald Hjalmarsson, chairman of the board for municipal management, comments: "In the past Västervik has been affected by serious economic problems. We were determined not to be defeated and have worked steadily to restore local faith in the region's future and attract more people and more business. Of course, we also want to attract more tourists as this is important income for us," he reveals. "As we are located on the Baltic coast, it's been essential to boost the profile of the Västervik region and, at the same time, enhance the existing marine environment in the town itself."

When council representatives visited Pampas Marina, where AquaVilla homes are well established, and were introduced to the AquaVilla concept, they immediately realised what they were looking for. "But we wanted it on a larger scale so that it would become a landmark - or seamark rather - for Västervik: a symbol of our belief in the future. Local development plans are far advanced and we hope to be able to start building in 2009."

Living the dream
Many people dream of living beside the water, maybe even on the water. Unfortunately, living on the water has often been synonymous with living on a boat in a damp, cramped space with little comfort and few facilities. This is no longer the only option!

Life in a floating house offers all the convenience and space as a land-based home but you can have your morning coffee in privacy on the water's edge, dive from the terrace of your home and go for a swim and live as close as possible to the natural elements.

Taking the weight – an iconic floating bridge in Dubai.

One of the company's most recent high profile projects was a floating bridge commissioned by His Highness Sheikh Mohammed Bin Rashid Al-Maktoum and developed with the expertise of the Dubai Road Transport Authority. Clement Systems Gulf CEO, Juergen Clement, commented: "This is the longest floating structure of its kind in the world and will not only help alleviate Dubai's traffic flow, but install another icon in Dubai's ever growing list of economic and structural achievements."

The bridge was designed with six lanes, measures 464m in length and is built on the Dubai Creek between Al Maktoum and Al Garhoud Bridge. The structure weighs 25,000 tons and covers 10,500 sq m. The project was completed by a team of highly qualified engineers and technicians, now hard at work developing a church-shaped cultural meeting place for an ecological group in Germany, and a floating restaurant and floating sales office for customers in the Gulf region.