

Safety in numbers

The WFSA's fifth annual conference gave voice to a range of perspectives on ferry safety, and celebrated the results of this year's student ferry design competition



Student teams drawn from China, Indonesia, Mexico, Singapore and the UK received awards for their submissions to the WFSA's Designer Competition for a Safe, Affordable Ferry

Bangkok, Thailand played host to this year's instalment of the Worldwide Ferry Safety Association's (WFSA's) annual conference, presenting a forum for the promotion of best practices related to domestic ferry operation and design, and recording its biggest turnout to date.

Following on from previous WFSA meet-ups in New York City in 2017

and 2018 (see *Ship & Boat International* November/December 2017, pages 20-24, and May/June 2018, pages 68-70), this year's event was well attended by representatives from class societies, industry associations (such as Interferry), boatbuilders, naval architecture firms and even the World Bank Group. The latter organisation was represented by senior transport

specialist Rajesh Rohatgi, who assessed the "historically neglected" waterways of Bangladesh and India – which, given adequate investment and an attempt to rectify a perceived "lack of multimodal integrated transport policies", could become cost-efficient channels for freight and passenger transport, he opined.

Despite this hurdle, Rohatgi added, India has undergone a "quantum jump" in waterway development, growing its tally of national waterways from five in 2014 to a current total of 11, covering 24 states. Bangladesh was also described as having a "large and vibrant inland waterway transport sector", with at least 12.3% of Bangladeshis reliant on waterborne transport and more than 2,200 registered passenger vessels on its books. Much more can be achieved, though – and, with that in mind, the World Bank's US\$360 million Regional Waterway Connectivity Project is intended to enhance both efficiency and safety along Bangladesh's Chittagong-Dhaka-Ashuganj regional corridor.

Building up the FastCat fleet

Philippines-based operator Archipelago Ferries plans to expand its current fleet of FastCat twin-hulled passenger ro-ro vessels to 60 by 2030, the company announced at the WFSA 2019 conference.

Since the company's formation in 2002, Archipelago has amassed a fleet of 12 FastCats, all designed by Sea Transport Solutions of Australia and built in China to the principle of "one look, one design". As a stepping stone to this goal, Archipelago expects to have 30 FastCats in operation by 2021.

Each FastCat measures 50.6m x 17.5m and features a car deck with capacity for 35 cars and seven trucks or buses. Their catamaran hulls, comprising 10 watertight compartments, are intended to prevent them from sinking should they sustain damage.

VR in the classroom

The rise of virtual reality (VR) as a classroom tool was also analysed in a joint presentation by Philippines-based operator Archipelago Ferries (see box) and e-learning system provider Seaversity. Ephrem Dela Cerna, Seaversity chief executive, commented: "Today's classrooms are full of pedagogy that's stale and bland. However, 'Generation Z' students are technologically savvy and expect to be engaged." Even 'cheating', supposedly one of the worst crimes imaginable in

academia, can prove “the best way of learning” in some cases, he added.

To bypass fusty tutorials, Seaversity recommends a policy of “gamified learning” to attract and engage students, reasoning that interactive, hands-on learning trumps paper-based preparation every time. “A crew training system that incorporates VR technology can prevent crew from being exposed to risk factors and space constraints during training,” Dela Cerna said. Another key advantage of VR is that it enables budding ferry personnel to study and learn at their own pace and convenience.

Indeed, Archipelago has reported favourable results from its own experiences of implementing an e-learning programme for its ferry-going personnel. However, it’s not a perfect fix: Dela Cerna also conceded that, for many schools (and especially those within developing countries), the costs associated with implementing VR and e-learning packages can be prohibitive, and too much screen time can lead to headaches...a problem that, incidentally, could well crop up for those developing shore-based pilot stations for remote-control vessel operators.

A plan for the Pasig

From a designer’s point of view, however, one of the most interesting aspects of the WFSA conference is the organisers’ annual ‘Designer Competition for a Safe, Affordable Ferry’.

This year’s challenge called for a “linear urban ferry” suitable for deployment on both an existing and a proposed route on the Pasig River in Manila, the Philippines – a waterway spanning some 25km and, unfortunately, polluted with rubbish, most of it plastic.

Said vessel would have to factor in several key requirements, including: low wake, for minimal impact on the Pasig’s riverbanks and other boat users; an air draught restriction of 2.4m at high tide, to enable the ferry to safely pass under the concrete MacArthur Bridge; an onboard system to facilitate fast passenger turnaround times, for minimal delays between trips; and the incorporation of innovative safety features. The call for entries also requested that it would be

The SIT/Newcastle University team presented plans for M/V *Pasig Express*, a 20m ferry concept with three levels of onboard fire protection



good for the teams to consider an ‘extra feature’ to distinguish their particular designs, provided it met the criteria of being practicable, cheap and easy to implement by smaller, local boatbuilders.

In all, 20 student teams registered for the challenge, with four making it through to the final. Third prize was shared by Team Zheng He from Shanghai Maritime University, China and Universidad Veracruzana of Mexico, while Sepuluh Nopember Institute of Technology (ITS), Indonesia scooped second place. Top spot, however, went to a collaborative team made up of members of the Singapore Institute of Technology (SIT) and Newcastle University, UK, who submitted the winning M/V *Pasig Express* concept.

Low air draught

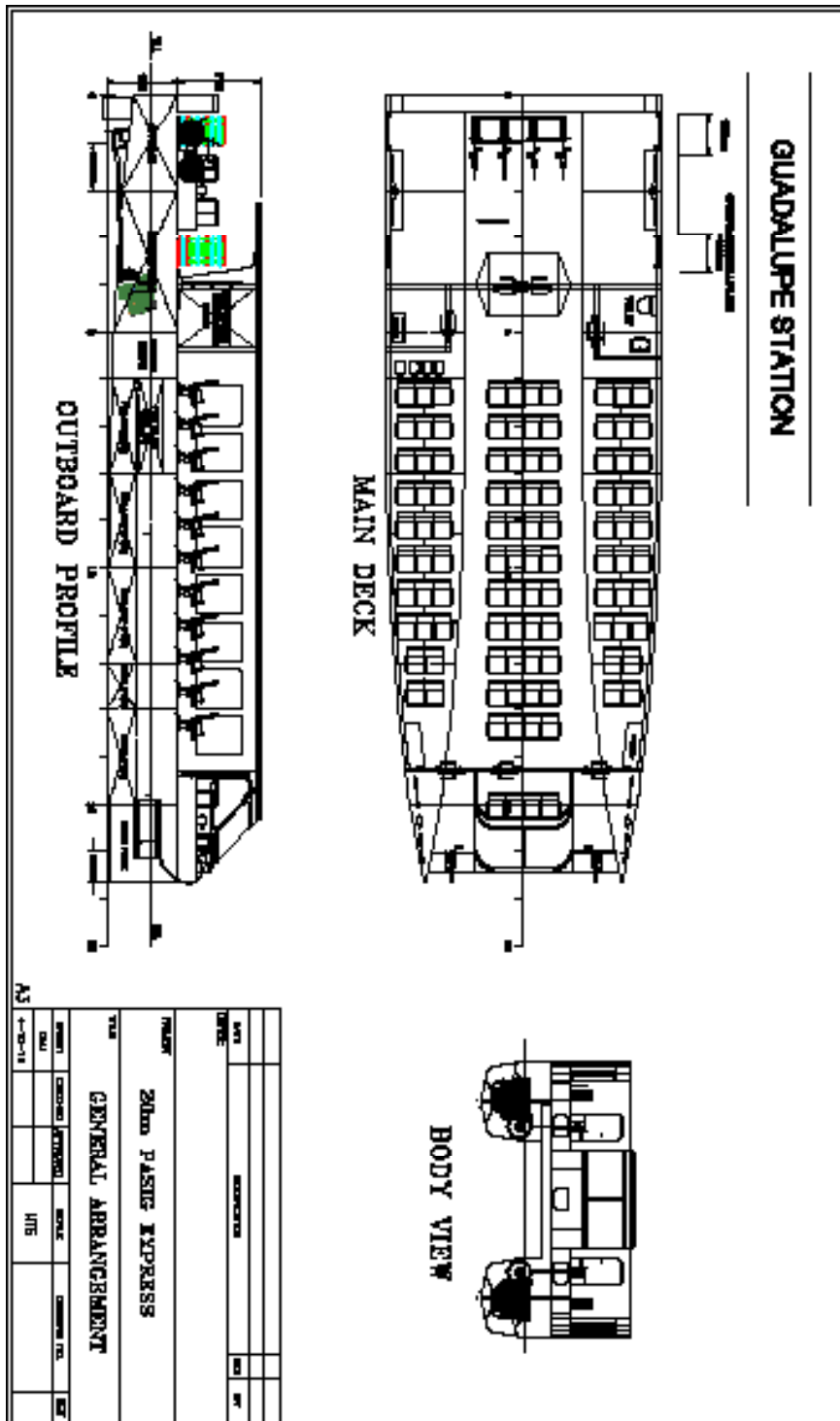
Designed to carry 100 passengers (see Technical Particulars), M/V *Pasig Express* would incorporate a catamaran hullform to meet the low-wake requirement. Aluminium was selected as the best construction material – not only for its light weight and high corrosion resistance, but in recognition of the “reputable aluminium shipyards near Manila that could produce the vessel,” team leader Daniel Sukartio tells *Ship & Boat International*.

Simultaneously, low interior ceilings and the incorporation of four ballast tanks – unusual for a river catamaran – would help the vessel to pass safely under the MacArthur Bridge. Consequently, the team says that its concept ferry would have a design air draught of 2.12m.

The ability to navigate under this bridge is crucial, Sukartio explains, because “the ferry might need to perform bunkering at the mouth of the Pasig River, or visit the shipyard and/or docks for maintenance”. Striking a balance between designing a vessel with a low ceiling height and maintaining high standards for passenger comfort proved somewhat of a challenge.

“For example, the ceiling height for the vessel is designed to be 2m, in order to allow sufficient headroom while providing enough reserve buoyancy for stability purposes,” Sukartio says. “Also, due to the presence of the ballast tanks and the reduced headroom, other compartments had to be smaller in size. We had to perform many iterations that would strike a balance between safety and comfort.”

TECHNICAL PARTICULARS	
M/V <i>Pasig Express</i>	
Length.....	20m (oa) 19.2m (bp)
Breadth, moulded.....	7m
Depth, moulded.....	1.8m
Draught	1.1m (design) 1.4m (max)
Lightship.....	25tonnes
Service speed	13knots
Max speed.....	19knots
Capacities	
Fuel	3,380litres
Fresh water	1,000litres
Ballast water.....	7,620litres
Crew.....	4
Passengers	100



A general arrangement of the M/V Pasig Express concept

To speed up passenger embarkation/disembarkation, and to ensure that trips between the terminals at Guadalupe and Lawton were completed within the hour, the team also designed the ferry’s boarding ramps to match the openings at these terminals, for a seamless and stable connection. Six dedicated

exit ramps can also be utilised in the event of an emergency.

Deck arrangement

The team was also keen to tackle the problem of passenger overcrowding and the knock-on risk posed to vessel stability. With this in mind, the

passenger deck aboard the concept ferry was designed in an ‘enclosed’ fashion. “Many river vessels in developing countries are designed with an open deck area where passengers are allowed to stand for the duration of the journey,” Sukartio says. “This concept, in our opinion, encourages the boarding of passengers above the permitted capacity. An enclosed deck area with seating, and an aft boarding entrance, will help the crew to monitor the number of passengers boarding the vessel. The passenger area would feature 100 seats and cover 63% of the total deck area.

“We tried to make as little open area as possible: a clear boarding plan, seating arrangement and strict intervention by the crew are key factors in preventing overcrowding.” However, old habits die hard, and there is always the chance that some unscrupulous operators will still try to squeeze in more fares than their boats can safely carry. While naval architects and builders cannot determine how their vessels are used, the team nonetheless factored this possibility into its design. “The ferry can carry up to 240 passengers in the unlikely event that overcrowding occurs,” Sukartio says.

Additionally, a three-tier fire defence plan was drawn up for M/V Pasig Express. One ‘safety layer’ would comprise water sprinklers and adequate insulation in the engine room; the second, provision of manual fire extinguishers; and the third, the incorporation of fire extinguisher balls – typically small, plastic foam spheres of 1.5kg or less, packed with fire-retardant agents, which effectively ‘self-detonate’, dispersing their contents over a certain area, when touched by flames.

Rubbish collection

As for the ferry concept’s ‘extra feature’, it was decided to tackle the Pasig’s litter problem by attaching specially designed scoop-bins – or *malinis* (*malini* being Tagalog for ‘clean’) – to the bottom of the hull. These are essentially cylinder-shaped bins which collect waterborne rubbish as the ferry moves along.

Each bin features a conical inlet at its front end, to prevent collected trash from flowing back out into the water, and a wire



The ferry's 100-seat passenger deck was designed with "as little open area as possible", to dissuade overcrowding

mesh outlet at the back end, to similarly keep rubbish within the container. The *malinis* would be operated by one of the ferry's four-man crew via a "simple mechanical winch" at the vessel's fore, Sukartio says. "The winch and rubbish collector are connected by a hook and loop with metal wires," he continues. "We designed the *malinis* to be at the waterline level, so no tilting is involved. To retrieve the rubbish, the crew member operates the winch manually to collect

the rubbish and releases the winch to return it to its original position. The filtration process will be similar to that of using a fish net: solids are trapped but water is filtered out."

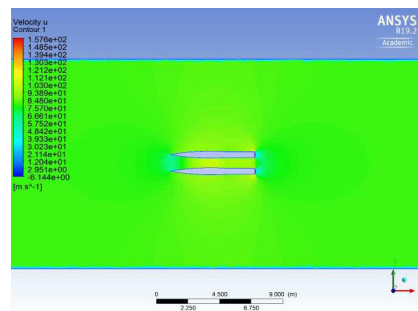
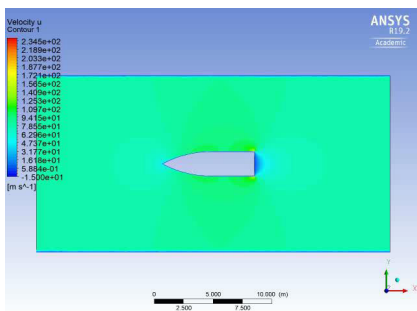
Two *malinis* would be fitted on the inner sides of the catamaran hulls, with another two available should the first couple fill up quickly. "According to the density of the rubbish and the size of the *malini*, each is estimated to carry 18-20kg of trash," Sukartio adds.

Of course, the addition of the rubbish bins would add to the ferry's overall drag. In response, the team has planned an array of solar panels on the vessel's roof, "to make up for the energy losses from this increased drag", Sukartio says. These panels would also cover the ferry's electrical requirements.

The most likely engine choice would be a pair of Volvo Penta D4-300 diesel engines, one at each hull, while a Citimarine generator, rated 25kWh, would provide the ferry's auxiliary power. The team has also considered equipping *M/V Pasig Express* with the Hi-Fin propeller device developed by Korea's Hyundai Heavy Industries (HHI). The Hi-Fin has been designed to be attached to the hub of the propeller and to offset the propeller-generated swirls with countering swirls – which, HHI reports, can improve propulsion efficiency and potentially lead to fuel savings of 2.5% compared to propellers without the device.

All four student teams were congratulated at the conference by Chet Pastrana, chairman of Archipelago Ferries, who expressed his thanks for their efforts in "helping our country and our people". **SBI**

A catamaran hullform (right) was selected over a monohull (left) for *M/V Pasig Express*, to reduce wake and consequent riverbank erosion and disturbance to other boats (credit: Singapore Institute of Technology)



IRClass focuses on Assam

The Indian Register of Shipping (IRClass) has signed a memorandum of understanding (MoU) with the Government of Assam, whereby IRClass will provide assistance in areas such as drafting technical vessel specs, evaluating shipyard bids and conducting inspections during the vessel construction and certification phases.

The Government of Assam has secured funding from the World Bank to modernise its inland waterway transport system, which currently comprises the largest grouping of navigable inland waterways within the country. Part of this modernisation strategy will entail further integration of high-quality passenger and vehicle ferries into Assam's waterborne transport network.

"The office in Guwahati has been operationally ready since 28 January 2019," IRClass tells *Ship & Boat International*. "We have one surveyor based in Guwahati, who will be supported from the IRClass Kolkata office. Our immediate action plan is to ensure that all passenger vessels built under IRClass comply with the passenger safety rules and requirements."