

Wait-and-see approach could strain scrubber supplies



Color Line's SuperSpeed 2 has been fitted with Wärtsilä's new inline scrubber system

The uptake of scrubber technology by passenger ship operators is increasing, but some are waiting to see what fuel prices will be before taking action. Rebecca Moore reports

THE use of scrubbers within the passenger ship industry is growing as the introduction of lower sulphur limits approaches, with scrubbers aimed specifically at ferries and cruise ships being launched. But it seems that some passenger ship operators are hesitating about installing emissions abatement solutions, as they wait to see what marine gas oil (MGO) prices will be once the low sulphur fuel regulations come into effect next year. These operators risk facing a scrubber supply shortage, opined Nicholas Confuorto, chief operations officer of CR Ocean Engineering (CROE), which provides a wide range of air pollutant control technologies.

He told *Passenger Ship Technology*: "This is my personal opinion, but it seems to me that many of the ship operators who are opting simply to switch between heavy fuel oil and MGO are banking on fuel prices not going up too much in 2015. They are adopting a wait-and-see approach before making a capital investment in solutions such as scrubbers. However, this is a gamble, as no one knows for sure the future of

fuel prices. Based on the supply and demand concept, it would seem to me that the price of MGO will have to go up as more shipping companies start to use this, while the price of heavy fuel oil will have to drop."

He warned: "I think some operators will have problems in 2015. Once the regulations come into play, there could be a rush for scrubbers, and there might not be sufficient global capacity to supply all of them."

In contrast to the lack of stability and unpredictability of fuel prices, Mr Confuorto said he believed that scrubbers provide a much more stable future for companies. "They can much more easily predict what it is going to cost them, while fuel will always be subject to price fluctuations."

CROE has been providing its scrubbing systems to a wide variety of industries - including the chemical, electronics, fertiliser and waste markets - for almost 100 years. During the past year it has successfully entered the marine market, winning a contract for two scrubbing systems on a US-based bulk carrier. Although the company's

first contract is for a bulk carrier, it is also targeting the cruise and ferry market as it believes that its product is very suitable for this sector. This is because of its small size and high efficiency.

Inside the CROE scrubber is a proprietary combination of metallic spray nozzles and scrubber packing - specially designed metallic rings with many edges that shear droplets into multiples. The packing causes droplets to multiply quickly and also forces the droplets and the exhaust gas to be in close contact. The very high and efficient level of contact between the gas and the liquid enables a much lighter, smaller and more efficient scrubber design. The CROE system can be installed without a bypass and is designed to replace the silencer inside existing funnels, or in newbuilds.

Pia Meling, sales and marketing manager at Clean Marine which offers the Clean Marine exhaust gas cleaning system (EGCS), also highlighted the need for ship operators to move forward with plans to fit ships with emissions abatement solutions. "The cruise and ferry operators who have fixed routes

with high ECA [emission control area] exposure have been amongst the early adopters of scrubber technology, but still many owners and operators are playing a waiting game. As there is a minimum six months lead time from signing the contract to completing the installation, there is no time to lose. The more time the shipowner allows for planning, the easier and cheaper the installation will be."

Her advice was: "Contact the scrubber manufacturers now and find out what the business case will look like for your vessels. Lead times are likely to increase as demand outweighs the supply of proven scrubbers."

The Clean Marine EGCS is a hybrid system which can run as either open or closed loop without interrupting the ship's operation. The company also offers a purely open loop system, which enables vessels to transit from waters of high alkalinity and salinity to low alkalinity and salinity, without loss of SOx cleaning efficiency. In open loop mode the system will ensure the vessel meets the 0.1 per cent sulphur limit in brackish water, rivers and estuaries, too.

Ms Meling said: "The Clean Marine EGCS is a future-proof solution. The quality of discharged wash-water exceeds IMO regulations and meets the much stricter US EPA requirement



CR Ocean Engineering's scrubber causes droplets to multiply quickly and forces them into close contact with the exhaust gas

of a pH of no less than six at the ship's overboard discharge. The close to neutral pH in effluent water also means it is less corrosive to the hull and pipework."

Clean Marine's open loop EGCS is the only one which complies with DNV GL's Clean Design environmental class notation. In order to qualify for this notation the pH must be no less than six at the overboard discharge, although during manoeuvring and transit a maximum difference between inlet and outlet of two pH units is allowed. Major charterers are already requiring Clean Design notation for long charters of newbuildings. Given the increasing focus on environmental shipping, Clean Marine expects this notation to become a competitive advantage for shipowners.

Although no contracts have been signed yet, Clean Marine has been in discussions with many cruise and ferry operators.

Elsewhere, Wärtsilä has launched a scrubber specifically designed for cruise ships and ferries that has been retrofitted to a Color Line high speed ferry - and the Norwegian ferry operator is planning to install it in three more of its vessels.

The new inline scrubber system operates in a similar way to a conventional Wärtsilä open loop scrubber system, but it has three water inlets in the main body of the scrubber, as opposed to two in the conventional system. The exhaust flows enter from the bottom and exit at the top, while water is sprayed, in three stages, in a counter flow to the exhaust. In the conventional system the exhaust gas enters from the top. Wärtsilä sales engineer Ole-Johan Øby Svendsen said that the new configuration has allowed Wärtsilä to minimise the footprint in a vessel and allow ease of retrofit. "The design has allowed us to minimise the diameter of the scrubber while maintaining low back pressure." The system is available as both an open loop and a hybrid solution.

The first vessel to utilise the new Wärtsilä scrubber is Color Line's *SuperSpeed 2*. The installation took place in March 2014 at Fayard in Denmark, in three weeks. Four 10MW scrubbers were installed.

Mr Øby Svendsen said: "The space limitations meant that it was impossible to install a conventional scrubber, so we used our new system. We replaced the silencers with scrubbers; they fitted the exact same spot as the silencers, which

is quite unique. In most retrofits with a conventional scrubber we need to do a lot of modifications to the funnel. But in this case, we fitted the scrubbers quite snugly, and no modifications were needed."

Another ferry scrubber contract has also been announced. Green Tech Marine, which is supplying scrubbers to Norwegian Cruise Line vessels, is supplying scrubbers to a ropax ferry - its first ferry customer. Work to the vessel, which cannot be named yet, will be carried out at the end of this year. Green Tech Marine marketing manager Carl Dahlberg commented: "Space is the main challenge in a ferry conversion." He said that Green Tech Marine would install the scrubber in the casing and funnel of the ferry, so that no cargo space would be lost.

A major benefit of the Green Tech Marine scrubber is that it doubles up as a silencer, which saves weight and space. **PST**



Wärtsilä's new inline scrubber system has been specifically designed for cruise ships and ferries



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Carnival builds on its scrubber strategy

Carnival Corp's Tom Dow tells Rebecca Moore about the drivers behind the cruise ship operator's strategy

CARNIVAL Corp is investing up to US\$400 million in designing and fitting scrubbers to more than 70 of its vessels across its 10-brand fleet, including 22 Carnival Cruise Lines ships, nine Holland America Line ships, seven Princess Cruises vessels and three Cunard ships. The cruise ship operator will also install the systems on 10 Aida Cruises ships and six Costa Cruises vessels. Ten vessels have so far been installed with scrubbers, with the rest of the retrofits taking place over the next three years.

When he announced the expansion of the installation of the gas cleaning system in a recent media briefing, Carnival Corp chief executive Arnold Donald highlighted how it would "drive significant benefits for the company and, of course, the environment."

He added: "Increasing environmental sustainability is one of our most important corporate goals, and having the new systems on our ships will be another effective way for us to meet that objective."

Carnival Corp vice president of public affairs Tom Dow told *Passenger Ship Technology* that the origins of the cruise operator's scrubber strategy were in the implementation of the North American emission control area (ECA). "Carnival, along with the entire cruise industry, began looking at what options might be available in order to comply with low sulphur fuel requirements, particularly with the implementation of the North American ECA. This presented such a significant impact that it stimulated an approach



A scrubber being installed on AidaLuna

of looking at any and all options," Mr Dow explained. "But it is not just about the ECA requirements that are coming up. We are also looking ahead to the global low sulphur fuel requirements of 2020."

He explained that there were only a few options available for meeting these requirements: using scrubbers, or marine gas oil (MGO), or LNG. Retrofitting cruise ships to use LNG is not practical. He said that the operator had decided against MGO because of its higher cost, both when purchasing it and when using it; as it consists of lower energy than heavy diesel, more needs to be burned. But other considerations also stopped Carnival from pursuing this option: "Existing ships are designed to burn heavy fuel, not MGO, which has a lower flash point so is more

volatile. There is less lubricity, and there are longer term concerns about maintenance," Mr Dow said.

Carnival's first foray into using a scrubber was not entirely successful when it trialled one on a ship a few years ago. "It proved to be impractical. It was very large in size and there were significant issues with process water discharge, and problems with configuration," said Mr Dow.

Since then, Carnival's research and development team has followed the evolution of scrubbers. Mr Dow highlighted how a significant breakthrough came when the size of available scrubbers shrank, making it easier to install them in retrofits.

The system it chose - ECO Exhaust Gas Cleaning (ECO-EGC) - is not only small in size, but is able to fit into the same space as that which is

emissions abatement technology

occupied by the silencer, something which was “really critical”, Mr Dow said. Another strong advantage is that by taking the place of silencers, the scrubbers are fitted lower in a ship’s structure. This means that the sea water that has to be pumped through the system does not have an impact on the trim and balance of the ship. If the scrubber was installed higher up, water would have to be pumped to a higher level in the vessel.

The ECO-EGC had only ever been used in land based installations when Carnival selected it. Some shore based testing was carried out and then the cruise ship operator decided to go ahead.

A major challenge was that Carnival’s fleet of ships varies so much in size and shape. Mr Dow commented: “We do not just have one size of ship, but over 100 vessels in the fleet with a wide range of capacity, from large to mid-sized. Even ships of the same size are not all the same generation and design and have different engine space configurations. That is why we are rapidly deploying the scrubber on a variety of different vessels to get some consistency in the installation and configuration. But not all units are going to be exactly identical.”

Following the installation of the scrubber across 10 vessels, Mr Dow commented: “We like what we see so far. There have been no big negatives, but it is still a matter of fine-tuning these systems.”

The plan is to deploy scrubbers in every ship in Carnival Corp’s fleet. “We are planning on equipping all our ships

“Carnival is willing to make the investment and take the risk to further develop the scrubbers, which makes it clear to the broader shipping industry that it is practical and will help to maintain balance in the global low sulphur fuel supply.”

Tom Dow (Carnival)

by 2020 [when the global sulphur limit will be enforced] or sooner. Our ships move between different itineraries all the time, so ensuring all are equipped with scrubbers will allow full flexibility in deployment.”

The scrubbers are currently being installed by a range of shipyards. In North America, the work is being carried out by Grand Bahama Shipyard and Victoria Shipyards Co in British Columbia, Canada. In December the cruise ship corporation will start using San Francisco. In Europe, ships are being retrofitted at Lloyd Werft Bremerhaven and Blohm & Voss Shipyards in Germany, and Marseilles in France. At the end of the year, Trieste and Palermo in Italy will be added to the list, as well as Sembawang Shipyard in Singapore.

Carnival is looking at ways of making the installation of scrubbers quicker and more efficient in the future, Mr Dow said. “We are looking at ways to bring these scrubbers into the ships in components and prefabricate them, which cuts down on the requirement to drydock them.

However, right now we are planning on major component installation around scheduled drydocks.”

He highlighted how Carnival’s investment would benefit the rest of the industry. “Carnival is willing to make the investment and take the risk to further develop the scrubbers, which makes it clear to the broader shipping industry that it is practical and will help to maintain balance in the global low sulphur fuel supply. Low sulphur fuel refining and storage is a challenge for all major marine terminals as they are set up to supply conventional marine fuel. We are concerned about the kind of disruption this would cause and the impact it could have on other users. The challenges may not be offset by increased supply and better logistics.” He pointed out that by being able to continue to use higher sulphur fuel, because of the use of scrubbers, Carnival can not only avoid any problems related to the supply and availability of low sulphur fuel, but also free up supplies of low sulphur fuel for other ship operators. **PST**



Arnold Donald (Carnival Corp):
“Increasing environmental sustainability is one of our most important corporate goals...”

CLIA calls for uniform scrubber rules

Cruise Lines International Association (CLIA) has “significant concerns” about the lack of uniformity of the operating and regulatory parameters for using scrubbers. The secretary general of CLIA Europe, Robert Ashdown, told *Passenger Ship Technology* that a particular concern is that the wash-water criteria for scrubbers can be determined

by each individual port. He explained: “It is very unclear to the industry whether we can use the scrubbers that many of our members have invested millions of dollars in installing, in all of the ports in Europe. We are working with the European Commission to get Europe-wide guidance, to encourage ports to apply harmonised standards so that we have clarity.”

He added: “We are urging the European Commission to develop this guidance, and to encourage Europe’s ports to apply the same standards, so ships can have operational certainty.”