

# innovations

Focusing on innovation in the global cruise industry

## Stabilisers' digital transformation to green-tech



**Special Report**  
International Cruise Ship Industry

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*Stabilisers are vital pieces of equipment for passenger ships and need constant repair and maintenance for optimal operations*

## Stabilisers have been an important component of cruise ship and ferry operations for many years.

They are mainly used as an aid to vessel stability, while at the same time, allowing passengers, crew and the cargo a more comfortable and safer passage during inclement weather.

As well as the design, manufacture and installation of stabilisers, repair and maintenance is of equal importance in ensuring a system works when needed.

One of the leading companies involved in the servicing of ships' stabilisers is Genoa-based Pinfabb srl. Innovations spoke with CEO, Matteo (Matt) Fabbri about this vital service to the cruise, ferry and ro-ro sector.

He explained that the company's history goes back to 1981 when under the name of Alfa sas, it was focused both on navigation equipment and stabiliser repairs.



*Pinfabb's CEO, Matteo (Matt) Fabbri*

By 2010, more and more customers were asking for stabiliser services, resulting in the company investing in the business until 2016, when it was decided to drop the navigation equipment service offering in favour of purely concentrating on stabiliser repairs.

However, Fabbri explained that this was not the only driving force for change, as it had

also been down to the passion of his father, Salvatore, for such complex machinery as stabilisers.

He said; "This passion has been passed on to me in a way that today, I can say that the company and my name are forever linked to stabilisers.

"Looking at my father's stuff following his passing, I found a drawing made by myself in 1992 when I was five years old. This was a drawing of a futuristic dream system installed on a funny couple of stabilisers," he said.

Turning to the claim that stabilisers save fuel and CO2 emissions, even when a stabiliser can cause extra drag when in operation, Fabbri said that this idea came to mind in 2011 during a business trip to Curacao with his father when they received some interesting information concerning the technology applied to the most up-to-date aeroplane engines, which enabled considerable savings, compared with the older technology in use.

"If you think about aeroplane engines, you can easily see how the latest models can save fuel or CO2 emissions, compared to old type engines, when they are used for propulsion and to lift the plane. In fact, the point here is not to eliminate engine consumption, or the drag of the stabilisers, but how to reduce, or optimise, this consumption.

"We always had a very honest, serious and realistic approach about the savings we can achieve and the reality always confirmed our figures, which is to cut the stabiliser's drag by a good 50%. On average, this turned out to be 2-4% of the ship's propulsion," he said.

Pinfabb's drag-saving technology is based on creating an ECO-profile for each ship, which works like a curve, where the actual data is entered and collected by the sensors to calculate exactly how much use is made to stabilise the ship's every moment and how to manage the stabilisers' angle of attack. Unique to this concept, this is managed independently by the company's POSEIDON control system, thus optimising the drag and reducing the resistance to a minimum force underwater.

Another point, which helps the latest POSEIDON4 program attain optimisation and energy savings, is the accuracy with which the angle of attack of each stabiliser is managed. Every angle accounts for a lot when you have a large surface resisting the water at a certain speed, he explained, adding that having the capability to control a stabiliser to 5 deg without overshooting nor creating a dumping effect, is key to the efficiency of the system.

This achievement was made possible thanks to a partnership with one of the company's US-based hardware suppliers, which has a worldwide recognised reliability in motion controls.

## Extra savings

A further savings benefit can be provided by real-time weather data integration into the stabilisation algorithm, which is featured in the latest version - POSEIDON4.

Last but not least, it is important to note that the less drag generated on the stabilisers will correspond to less mechanical stress and wear being applied to the stabilisers and their mechanical and hydraulic components.

Thanks to more than 40 years experience, today Pinfabb is able to service stabilisers of every type, manufacture and age.

“The amount of experience collected in more

than 40 years of activity is just huge. We have a technical library divided in four large shelves in two offices, plus we generate a Technical Advice Sheet for our service teams in order to instruct them on how to operate each kind of stabiliser.

“This approach helped us to conserve the experience learned by our technicians through time and pass it on to the new generation of service engineers. There are still certain types of stabilisers in operation where the maker has ceased to exist. Pinfabb can cover these systems as well,” Fabbriotti said.

“We operate on cruise ships, but also perform a lot of services for ferries and ro-ros and we also have very loyal car carrier clients,” he added.

Orders for services or repairs normally come direct from the vessel's shipowner or manager. The company also has good connections with some shipyards and on occasion, orders will emanate from these yards.

Talking specifically about cruise ship stabiliser repairs and servicing, Fabbriotti explained that today, Pinfabb has a strong international profile with projects abroad running above 95% of the business.

“We are not very much focused on the internal (Italian) market, however we have carried out repairs/maintenance in Fincantieri's and Palumbo's shipyards,” he explained.



Stabiliser system control panel



*Getting to the bottom of a problem*

He stressed that the company is focused on existing ships and today is thus far not involved in the newbuilding sector. However, he said that Pinfabb was receiving more requests to provide technology for newbuildings and so in the long-term, this will be something that will be evaluated.

“What is important to underline is that Pinfabb does not represent any stabiliser manufacturer: the company has grown by presenting itself as a professional, reliable and competitive alternative to the makers for all clients, and this will continue to be one of our core values for the future.

“We are today capable not only to retrofit any kind of stabilisers plant with a unique system, but also to supply completely compatible hydraulic spare parts and also produce and supply mechanical spare parts, such as seals, bonding kit, bearings, bushes, flap overhaul spares kit, flanges, screws, etc.

“This has made Pinfabb a 360 deg stabiliser service provider and a single and solid point of contacts for various clients,” Fabbriotti said.

Since 2020, the company has offered a maintenance package agreement - Remote Maintenance Package. Clients who install the

POSEIDON4 software can make use of this option, which will enable them to gain various benefits gained from long-term services.

This option is aimed at spreading and reducing the maintenance costs over time, while keeping the stabiliser system at a good working level, thus avoiding any disruption or breakdown.

“We are experiencing very positive feedback from our clients who have access to this option, and they are using it with great success and satisfaction for efficiently managing their maintenance tasks and expenses,” he claimed.

## **Severe weather**

Turning the conversation towards today's weather patterns, which seem to be more severe, Fabbriotti warned that higher roll motions will result in bigger stabiliser movements, meaning more mechanical stress and bigger forces acting on the stabiliser blades and components.

“This kind of mechanical stress could lead to various levels of damages - from cracks to consumptions on bushes/bearings. Here's where POSEIDON4's angle management gives an extra benefit in less mechanical consumption and consequential wear.

“Just to give an example: we have recently retrofitted a cruise ship where for some months, the crew were experiencing a serious leakage from the tilting piston. This leakage was so significant that it nearly led the crew ceasing to use the stabiliser. After the POSEIDON retrofit and the relative PID adjustments, the leakage was reduced by 95%, even when the ship was sailing into the Bay of Biscay in 6.5 m waves,” he said.

Pinfabb also offers a Remote Monitoring Service by which, POSEIDON4 will provide the operator with a simple visual indication of the future maintenance tasks to be scheduled, according to the machinery’s condition.

Moreover, when and if needed, remote assistance can be arranged and service provided via a specialist at Pinfabb’s Genoa remote service room directly to the system on board. The service room can also assess the condition of the entire stabilisation system.

“This technology enables our specialists to monitor the whole plant from the software down to each single solenoid coil or sensor, providing timely instructions to the crew.



A ‘good as new’ stabiliser system ready for transportation back to the ship

“It has been calculated that 97% of the issues in the last four years have been resolved by remote assistance, and the average solving time was two hours. Recently, we resolved an issue on board in 5 minutes from the email request arriving from the crew. Imagine what this means in terms of travel costs and CO2 emissions saved,” he said.

On average, cruise ships are drydocked every two years, while, for some ferries or ro-ros, the intervals can be up to three years, depending on the status and age of the ship.

## Afloat repairs

For stabilisers, a good percentage of the maintenance, especially for hydraulic and electric systems - which shouldn’t be undervalued - can be undertaken with the ship afloat or even while at sea but for the external mechanical tasks, the ship needs to drydock.

“An important factor for stabiliser maintenance is the time taken. Pinfabb is well organised and is prepared to meet this type of challenge,” Fabbriotti stressed.

Not all mechanical maintenance tasks have to be repeated at each drydocking, and this is another reason why the Maintenance Plan is used for planning and overhaul projections for the next five years.

“Performing the right tasks at the right moment in the proper working time can give a strategic gain to our clients and avoid them encountering problems or a stabilisation system breakdown,” he explained.

With regards to the POSEIDON4 system and spare parts, Pinfabb normally keeps a stock to enable it to offer spares’ shipments within 24 hours.

For mechanical and hydraulic maintenance spares, the company adopts a diversified and strategic policy. Mechanical parts are ordered from suppliers, which are industry leaders. Fabbriotti said that it is important to stress that most of the components and the consumables are always, even in the case of the manufacturers, sub-contracted out to third parties.

Pinfabb usually keeps the most common mechanical spares -especially seals - in a store



*Pinfabb also offers maintenance and repair training services*

and a warehouse. When and if the requested parts are not in this list, they are ordered through the suppliers network and despite the global supply chain troubles, the company claims the delivery time is no longer than four weeks.

For the hydraulic components it is more or less the same, however for the hydraulics, it is possible to provide not only the original parts but also fully compatible ones. This makes the operation more flexible and able to achieve better lead times.

## **Specialist engineers**

Because the company has been focused exclusively on stabilisers for many years, Pinfabb has geared its engineering capability specifically for this market.

The company has six project managers, three mechanical/hydraulic and three electronics engineers, who are based in Genoa and Venice (Italy), while another six teams of service engineers (mechanical, hydraulic and electronics) are sourced from authorised service

agents, trained by Pinfabb's project managers.

"This organisation permits us to simultaneously manage several projects all around the world," Fabbricotti explained.

He added that most of the training is performed on board ship on which engine and deck officers are trained and familiarised with the POSEIDON system after each installation.

"We also arrange training on board for crew on how to operate the stabilisers hydraulically or manually, as our engineers are skilled in operating all the different models. We also conduct in-office training courses, which are arranged to update our engineers and also to instruct new engineers or our agents' service engineers," he said.

Speaking of the pandemic problems, he claimed: "We could say that we have never stopped our service activities even through the pandemic. However, we had to stop all activities on 15th March, 2020, due to the pandemic spreading all over Europe. Even when we had ongoing projects in France and North Europe, we were able to finalise them and organise the return travel for all of the engineers.

"This was a success considering the lack of travel opportunities the world had discovered during this period. However, we continued our activities even during the pandemic's very high period, providing services and drydock overhaul assistance during April and May, 2020 especially thanks to our Greek service agency.

"As soon as flights restarted, we started to fly engineers abroad from 7th June, 2020 and from that point never stopped, travelling to countries, such as Spain, UK, Ireland, France, Turkey, The Netherlands, Canada and then later to Finland, Sweden, Singapore, New Caledonia, Portugal, Tunisia, Croatia, Mexico, Caribbean, US, Polynesia and more.

"Travelling difficulties have been huge with every country applying different rules and different exclusions related to Covid-19. The Pinfabb mind-set of 'never give-up' came to the fore. Our logistics office and its head, Laura Vazio, made the difference. We have gained so much experience that other companies contacted us to ask how to reach a country and in some cases our office knowledge exceeded that of the travel agencies," he concluded.