

Fin Stabilizers System

FINCANTIERI
The sea ahead



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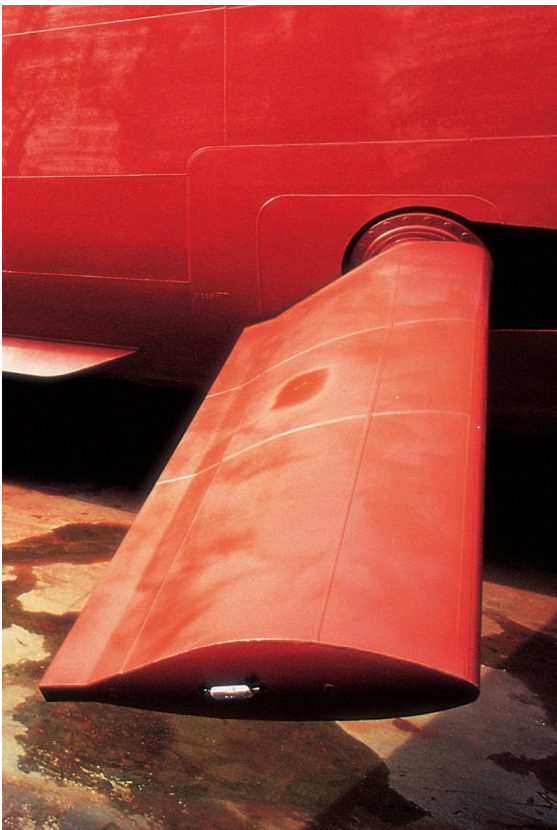
— The largest shipbuilding group in the Mediterranean area, Fincantieri has more than forty years of experience in the design and manufacture of fin stabilizer systems. This long-term experience has resulted in the development of a wide range of stabilizers which can assure the highest percentages of roll reduction at designed speed, high reliability, minimum noise and vibration, limited drag in the water in order to achieve an high fuel saving.

Active Fin Stabilisation System

— The active fin stabilizers - at present universally recognised as the most efficient system for marine technology - are able to ensure a dramatic roll reduction with the consequent advantages in terms of passengers and crew comfort; of ship stability; of course keeping; etc.
In case of severe sea conditions rolling can force a ship to deviate from the planned course to avoid the rough sea or bring it ahead, resulting in loss of time and money.
Besides, heavy rolling in naval vessels may cause the guns or the missiles to miss their target and prevent the landing or take off of helicopters or aeroplanes.

The Best System for Each Application

— Fincantieri fin stabilizer systems can meet any particular customer requirements as they are tailor-made taking into consideration: vessel shape; speed; position of the stabilizer fins; dimensions; and Owner's preferences.



The Range of Fincantieri Stabilizer Systems includes:

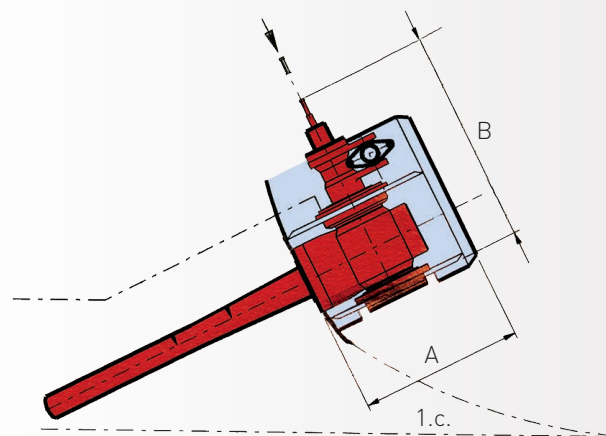
- Retractable fin stabilizers (type SR)
 - with or without flaps;
 - with rigging-out: either "stern to bow" or "bow to stern"
- Fixed fin stabilizers (type SF)
- Sliding fin stabilizers (type SS)
- At anchor stabilizers (type SFZ)

SR Type

— Each fin - either the flapped SRA type or the unflapped SRO type, with the tilting and rigging in/out mechanism, and equipped with its own hydraulic power unit - is installed in a fin-box designed and built to be suitably connected to the hull. The fin-box structure minimises the displacement losses due to the housing recess of the retracted fin.

Each fin-box is provided with its own insert plate of adequate thickness and size in order to compensate the hull opening.

The insert plate is also arranged to perfectly fit the hull shape and, in conjunction with the fin box, it forms a fully assembled modular unit which is tested at the workshop and is delivered to the Client as a ready-to -install equipment.



SR Type	SR-0	SR-1	SR-2	SR-3	SR-4	SR-5
Fin Surface (m²) each fin	2 ÷ 3.6	3 ÷ 6	4.5 ÷ 8	7.5 ÷ 13	12 ÷ 17	16 ÷ 22
Complete System Mass (t)	16 ÷ 18	23 ÷ 28	55 ÷ 57	86 ÷ 99	139 ÷ 142	200 ÷ 205
Displacement loss per unit (t)	5.5 ÷ 6.5	7 ÷ 11	12 ÷ 18	18 ÷ 26	28 ÷ 29	46 ÷ 48
Installed Electric Power x unit (kW)	14 ÷ 22	22 ÷ 30	37 ÷ 45	55 ÷ 75	75 ÷ 105	90 ÷ 110
Dimension AxBxC (m)	1.6x2.0 x5.2	2.0x2.3 x6.5	2.4x2.6 x8.9	3.1x3.1 x9.2	3.2x3.9 x10.1	3.5x4.0 x11.4

Control System

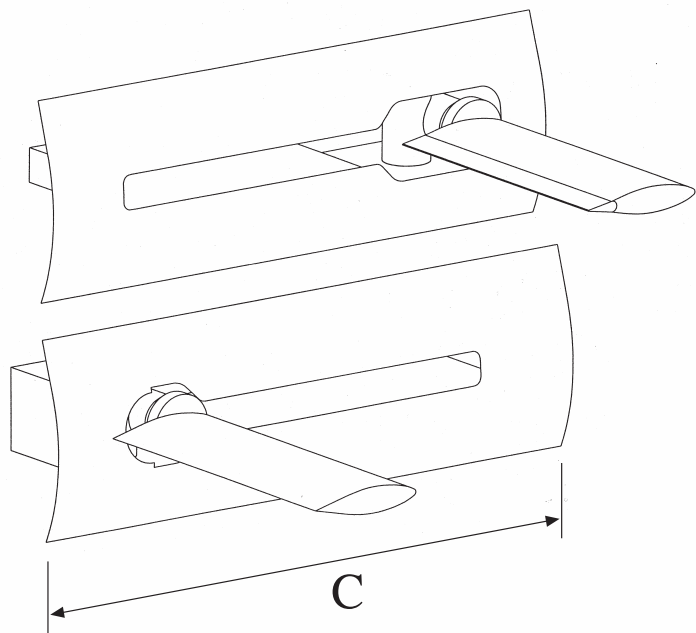
— The fins are controlled and monitored by a Fin Stabilizers Control System. The roll motion is detected by two sensors: a Rate Gyro and an Inclinometer. The signals are processed by the PLC-based Main Control Unit in order to control the optimum fin angle position at different vessel speed. The System is provided with a Ship Log Interface, and can be interlocked with Bow Thrusters operation upon request. The Fin Stabilizers Control System is designed in compliance with the most restrictive existing standards and meets Solas requirements.

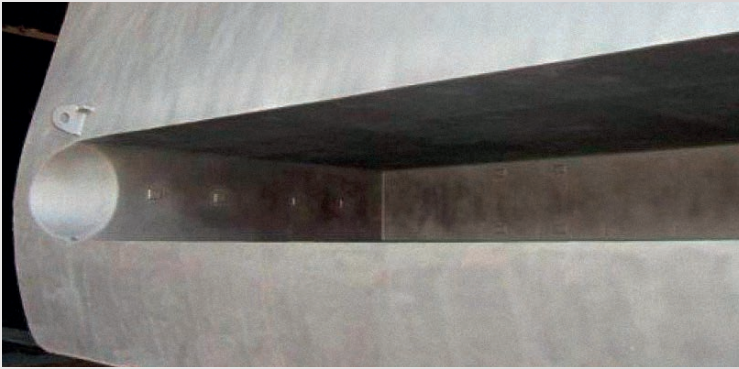
Design and Testing

— The stabilisation systems are designed, manufactured, and tested by Fincantieri Mechanical Products Line and comply with the many Classification Society requirements.

Hydraulic Power Unit

— Fin tilting and rigging are actuated by hydraulic cylinders. The hydraulic power is provided by two hydraulic power units, each one connected to a fin, thus keeping each fin independent from the other. This solution is particularly effective in case of an emergency as it will be possible to stabilise the ship by the use of a single fin.





Antipollution Sealing System

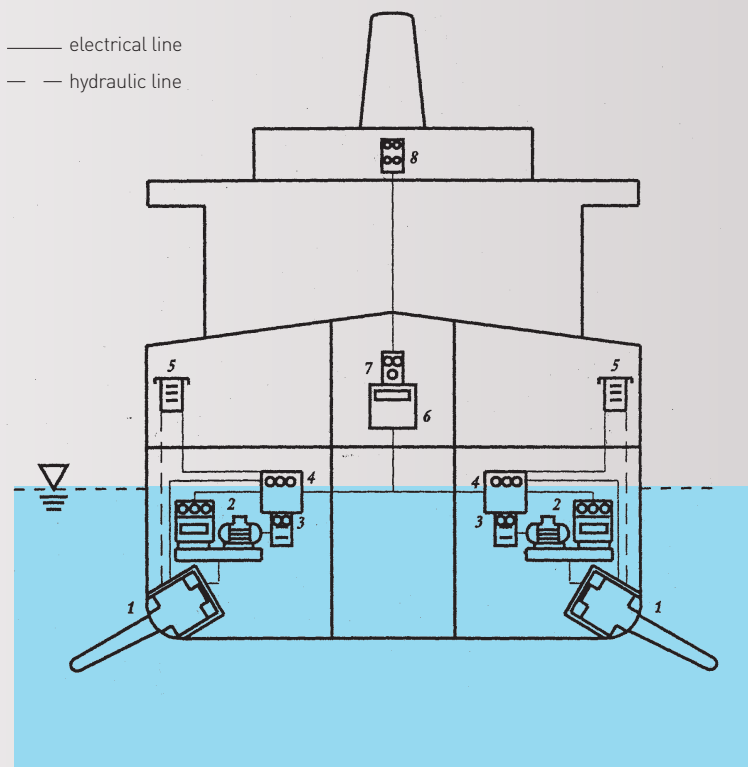
— The inner parts of the heavy machinery are lubricated by oil. The oil pressure is maintained at an appropriate level by a gravity tank in order to prevent sea water contamination. The fin shaft is equipped with special double gaskets having stainless steel springs. The gaskets - through a dedicated drain - prevent sea water inlet and oil outlet.

Hydrodynamics Advantage of Stern to Bow Opening Mode

— New generation Fincantieri retractable fin stabilizers units are designed to operate with stern to bow opening mode. Benefits are expected in terms of hull resistance (fuel consumption). This particular solution leads to following advantages:

- When fin is extended, incoming water flow isn't affected by turbulences and vortexes due to a forward hull opening (typical of bow to stern opening), this resulting in a more efficient hydrodynamic behaviour of the fin.
- If the fin hits foreign object, stern to bow opening results to be a safer solution, reducing the risk of hull plating damage by the fin; if a foreign object such as a net or a cable are pulled along there is a chance to retract the fin allowing the water flow to remove the object.

— For further hydrodynamic performance a metal shield is installed on the fin shaft housing (crux casing), less turbulence is generated within the recess; astern the fin box hole, a "Flow - off - pocket" may be installed to help water flow getting off the recess, resulting in a clearer flow the way of fin box hole and consequently reduced drag.



- 1 FIN
- 2 HPU (Installed on fin box)
- 3 MOTOR SWITCHBOX (Installed on fin box)
- 4 LOCAL CONTROL UNIT (Installed on fin box)
- 5 GRAVITY OIL TANK
- 6 MAIN CONTROL UNIT
- 7 CENTRAL SWITCHBOX
- 8 BRIDGE CONTROL PANEL

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SS Type

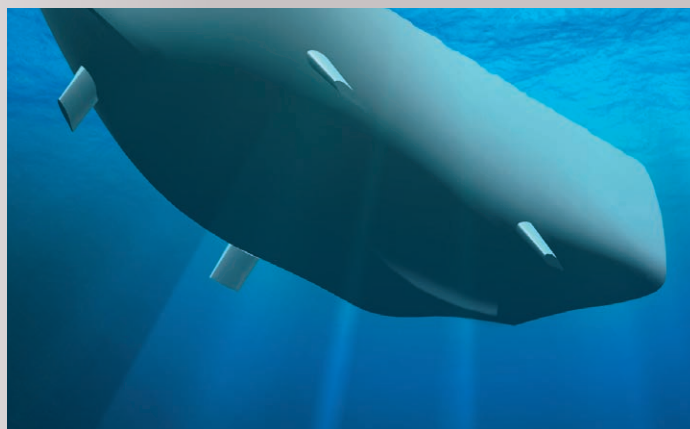
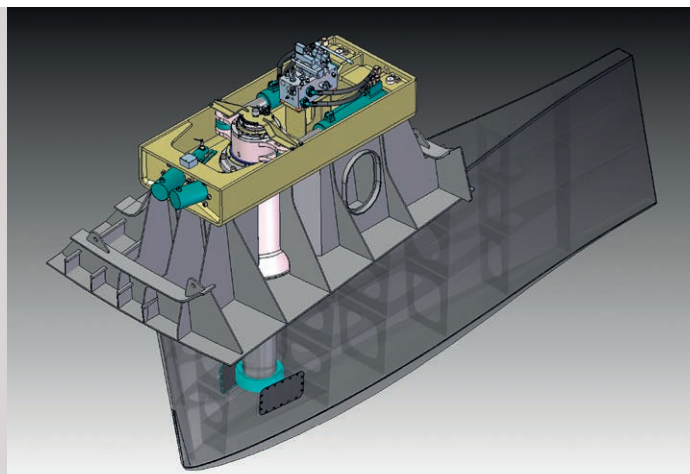
— The SS stabilizers have been specifically designed by Fincantieri to be installed onboard fast vessels, and are especially effective on ships having limited longitudinal dimensions; reduced weights; and minimum hull opening. This type of stabilizer is also supplied with a ready-to-install fin box, so that it can easily fit into the hull structure, its insert plate being suitably shaped. The standard control system - equipped with the rigging in/out control - is essentially identical with the one fitted to the SF type. The external bearings and sliding-blocks immersed in the water are made of special self-lubricating material. The external guides are made of very high quality stainless steel.



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SFZ Type

— The Fincantieri non retractable at anchor fin stabilizers SFZ has been specifically developed and designed to be installed onboard large yachts, in order to satisfy the high level of comfort (roll reduction) typically requested for this particular applications even at anchor. Moreover the plant is able to assure all the performances of a traditional fixed fin stabilizers system.



Type	SFZ-0-30	SFZ-1-75	SFZ-2-100	SFZ-3-130
M/Y LOA (m)	< 50	50 - 60	60 - 90	90 - 150
FIN AREA (m²)	3,0	7,5	10,0	13,0

SF Type

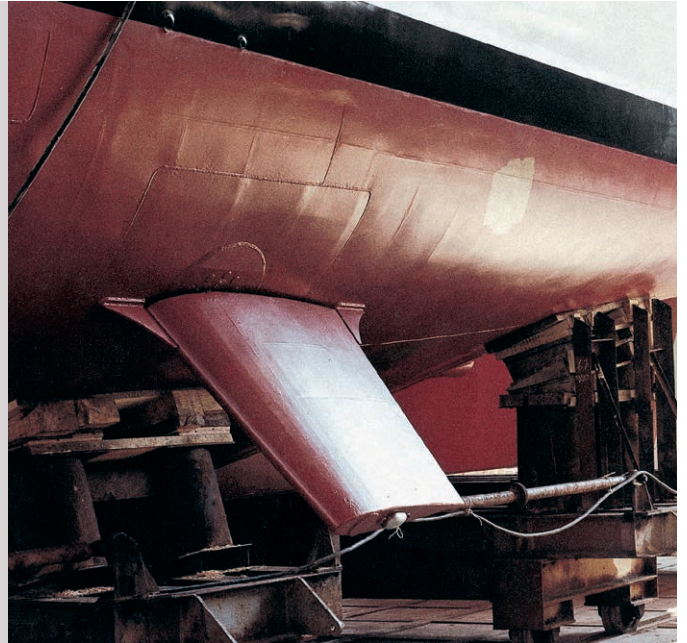
— The unflapped non-retractable SFO type and the fully flapped SFA type fin stabilizer systems are the result of Fincantieri wide experience and technical capability in the naval shipbuilding field. The trapezoidal form of the fin is characterised by a NACA profile.

It has been designed according to the hull form by taking care to maintain the aspect ratio over 1.3, if possible.

The inside dimensions are reduced to a minimum, as well as the total weight of the system. No displacement loss occurs due to the lack of recesses.

The fine tilting is activated by two double action cylinders acting as a common tilting lever connected to the fin shaft.

Thanks to their control system and intrinsic mechanical stoutness, these stabilizers are especially reliable in the applications requiring the fin rated speed being considerably lower than the maximum speed for the ship.

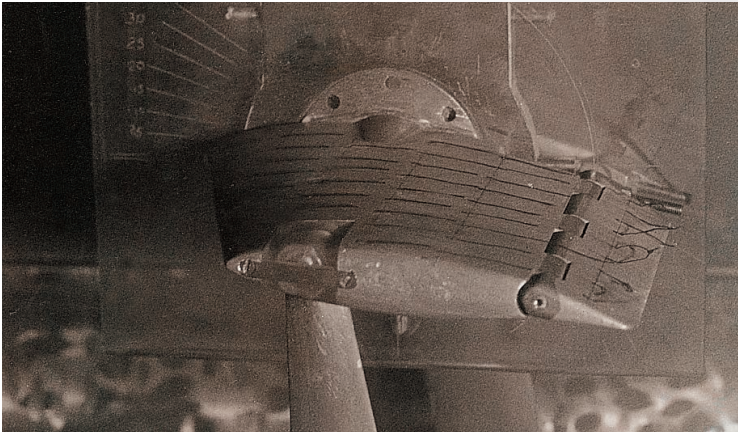


Type	SF-0	SF-1	SF-2	SF-3	SF-4
Fin Surface (m ²) each fin	1.3 ÷ 1.8	2 ÷ 4	4 ÷ 6	6 ÷ 12	13 ÷ 18
System Mass (t)*	3 ÷ 4	4 ÷ 9	11	11 ÷ 16	25 ÷ 40
Installed Electric Power x unit (kW)	15 ÷ 20	20 ÷ 30	30 ÷ 40	40 ÷ 65	65 ÷ 75
Fin span/fin cord (m)	1.3x1	1.8x1.4	2.7x2	4 x75	4.5x3.7

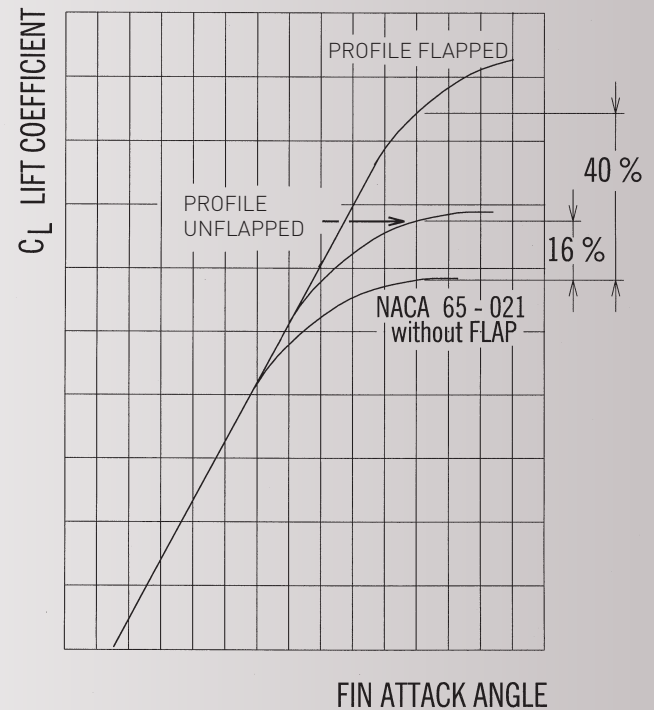


Research and Development

— A team of engineers, working in close collaboration with universities and research companies, is in charge of the research and development activities. Their goal is to reach the highest competitive level of performance of the system and, therefore, of Customer satisfaction.



— Results of the basic comparison between Fincantieri unflapped and flapped profiles used for type SR retractable fin stabilizers and NACA coded profile, following cavitation tunnel tests.



Quality Assurance

— The Quality System implemented for the design and manufacturing of the Fincantieri Mechanical Products is certified with reference to ISO 9001 standard.



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