FOLDING
FIN
ANTI-ROLL
STABILISERS

SAFIR

HISTORICAL RECORD OF THE “SAFIR” CONCEPT

Active folding fin stabilisers have been developed by ACH Engineering since 1978. These fins have been fitted to various types of ships (cruise-liners, ferries, ro/ro, passenger vessels, container vessels) and have proved to be efficient and reliable.

After more than 20 years utilisation, no damage due to cavitation has been found on the fins, despite the fact that several of these fins were mounted on vessels with speeds over 25 knots.

Using the experience in this field, and in order to meet the new requirements of the market, it is offered a new range of folding ALPHA FIN stabilisers.

Fin areas range from 2.4 m² up to 24 m² and are available for both merchant and military vessels.

The main targets for the new design are:
- To reduce production costs.
- To reduce maintenance costs.
- To reduce shipyard installation costs.
- To reduce the duration of tests on board the ship, by carrying out a series of in-factory tests prior to the equipment delivery.
- To attain a higher reliability by simplifying the design and using only tried and tested components.
- To obtain a life time for the mechanical assembly equivalent to the ship life time.

Fouré Lagadec took over the ACH Engineering activities and created its Marine Department for maintenance and development of the product range previously developed by ACH Engineering.
THE MAIN FEATURES AND ADVANTAGES OF THE “SAFIR” CONCEPT

PERFORMANCES OF THE NEW ALPHA FIN

INCREASED LIFT COEFFICIENT
- Lower fin area,
- Reduction of fin box dimensions,
- Reduction of the fin box weight,
- Reduction of the loss of buoyancy,
- Reduction of the opening in the hull,
- Lower stabiliser cost,
- Lower power requirements.

REDUCED DRAG COEFFICIENT
- Reduction of fuel consumption while stabilising,
- Ship speed loss in stabilising mode lower than other existing stabilisers.

SMOOTHER FIN STALL
- Less cavitation, i.e. life time increased,
- Stabilisation less sensitive to wave perturbations,
- Increased safety.

EASY INSTALLATION ON BOARD
- Fin and mechanism packaged with hydraulic power unit, hull plate and local control unit.
- Whole assembly piped, wired and tested in factory, ready to be welded to the vessel hull.
- Use of a digital network, substantially reducing the inter-unit wiring between bridge control unit and local control unit.

ADVANCED ELECTRONIC CONTROL SYSTEM
- Real-time computerized system, with constant self checking (“watch dog”) to ensure correct operations, including standard modules linked by a digital network (Serial line RS 485).
- Bridge control unit incorporating all necessary functions as start / stop, alarms, fin angles indicators, thumbwheels for variable optimisation.
- Local control units, fitted on each fin box including local operator panel and electric motor starters.
- Solid state angular velocity sensor.

LOW MAINTENANCE COSTS

NO ARTICULATED FLAP on the trailing edge of the fin.

NO CONTACT OF THE SHAFT WITH SEA WATER by using a triplex external standard seal packing.

POSSIBLE REPLACEMENT OF THE EXTERNAL SEAL without disassembling the fin.

LUBRICATION OF THE SHAFT ROLLER BEARINGS BY A HEADER OIL TANK preventing any sea water entering even in case of seal failure.

MILITARY APPLICATIONS

The “SAFIR” foldable fin stabilisers can be fitted to Navy vessels.

Electric components are chosen among military approved types. Special care is taken for equipment shock and vibrations resistance and noise level reduction.

OPTIONS

- Engine control room panel.
- Automatic/manual fin housing at low speed.
### MAIN CHARACTERISTICS AND DIMENSIONS OF THE “SAFIR” RANGE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FIN AREA</th>
<th>MECHANISM</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(m²)</td>
<td>A (mm)</td>
<td>B (mm)</td>
</tr>
<tr>
<td>3R</td>
<td>2.4</td>
<td>3,800</td>
<td>1,850</td>
</tr>
<tr>
<td>5R</td>
<td>4.4</td>
<td>4,700</td>
<td>2,150</td>
</tr>
<tr>
<td>7R</td>
<td>5.8</td>
<td>5,320</td>
<td>2,300</td>
</tr>
<tr>
<td>9R</td>
<td>7.3</td>
<td>6,000</td>
<td>2,585</td>
</tr>
<tr>
<td>11R</td>
<td>9.2</td>
<td>6,870</td>
<td>2,700</td>
</tr>
<tr>
<td>13R</td>
<td>10.8</td>
<td>7,240</td>
<td>2,850</td>
</tr>
<tr>
<td>16R</td>
<td>13.3</td>
<td>8,000</td>
<td>3,350</td>
</tr>
<tr>
<td>20R</td>
<td>16.7</td>
<td>8,980</td>
<td>3,650</td>
</tr>
</tbody>
</table>

**NOTES**

1. Weights indicated in the table are given per fin box and do not include the hydraulic power units and electric equipment but include the hull plate. Weights may be adjusted in compliance with the ship’s hull enforcement.

2. For large vessels, two pairs of fins can be used.
The main parts of the installation are:

* 1. Fins
* 2. Stabiliser mechanisms
* 3. Hydraulic power units
* 4. Local control units
* 5. Bridge control unit
* 6. Lubrication oil tanks
* 7. Roll sensor unit
* 8. Engine control-room panel (option)

Hydraulic connections

DIMENSIONS OF THE COMPONENTS

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>HEIGHT (mm)</th>
<th>LENGTH (mm)</th>
<th>WIDTH (mm)</th>
<th>WEIGHT (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge control unit</td>
<td>800</td>
<td>684</td>
<td>310</td>
<td>55</td>
</tr>
<tr>
<td>Roll sensor unit</td>
<td>300</td>
<td>384</td>
<td>160</td>
<td>8</td>
</tr>
<tr>
<td>Lubrication oil tank (without oil)</td>
<td>390</td>
<td>500</td>
<td>400</td>
<td>35</td>
</tr>
</tbody>
</table>

This document is not contractual, all figures are given for information only and may be changed without notice due to adjustment to the ship environment or further development.

Upon request, Fouré Lagadec Marine will quote for any foldable fin stabiliser. The data required for a preliminary quotation are gathered in the standard "OFFER REQUEST FORM".

The main technical data asked are: Type of ship, Displacement, G. M., K.G., Ship cruising speed, Ship maximum speed, Breadth and draught of the ship, Required efficiency (% of roll reduction for a given wave slope), Classification Society, Electric power supply.

Fouré Lagadec Marine is also developing other types of anti-roll stabilising systems, please contact us for any further information.