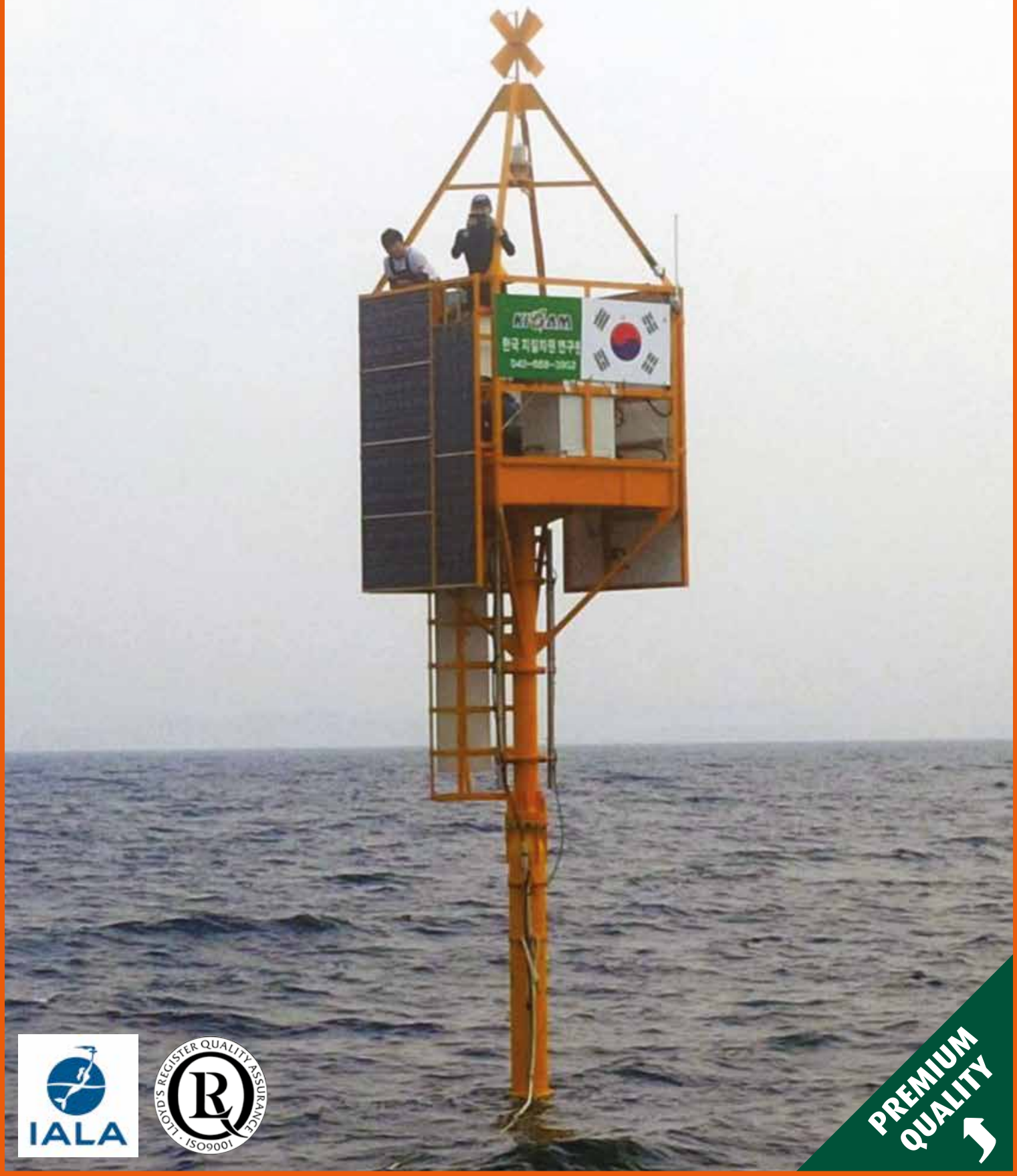
RESINEX
SINCE 1961 MARINE TECHNOLOGY

ELASTIC BEACONS

The widest range of elastic beacons in the world



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Introduction to the elastic beacon

The complete range of Resinex elastic beacons today offers the most advanced, versatile and economic marine signalling system existing on the market drawing on our experience of the thousands of installations throughout the world. It was our company which in fact invented the elastic beacon in the 1970's. Over the course of time Resinex has carried out constant innovations through the study, research and production of ever more up-to-date models enabling us to maintain our international market leadership. The first beacon installation was carried out in 1972 for the Port of Genoa Authority and following this our company installed and activated the complete navigational signalling system for the Suez Canal. Today we are the first supplier for the National Light Service and Aids to Navigation of the Italian Navy. In its history, which began in 1961, Resinex has projected innumerable applications for the beacon, adaptable for the most diverse of uses (from signalling to environment control) in all sea conditions and of any depth.

What is it and its uses

The elastic beacon is a semi-rigid structure with a metallic pole of variable length, fixed to the bottom by a concrete weight. The pole is kept vertical by a very big submerged float which can have various shapes, according to the different sea conditions.
A tower is only visible above water level which can be equipped with a platform and whose height above sea-level gives it excellent day-time visibility even at great distances. These characteristics make it an ideal support to mount lights, radar equipment, acoustic signalling instruments, systems for the monitoring and checking of the water. Power is supplied by solar panels or aeolic generators.

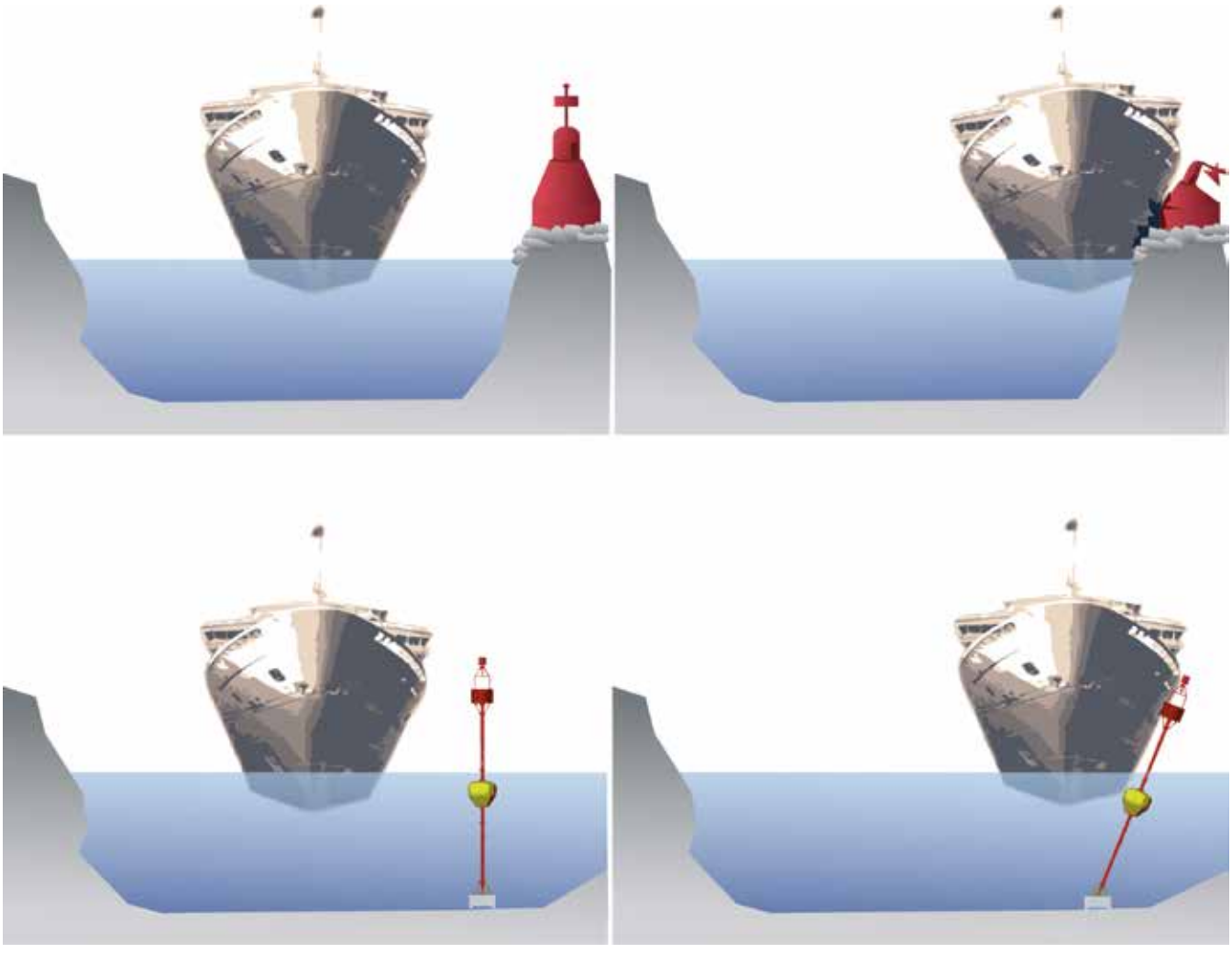
Stability

The structural characteristics of the beacon were expressly projected with the aim of reducing current and wind drag to a minimum. The big float and exclusive Resinex anchoring system, which has the characteristic of being elastic but fixed, allows the pilon very little freedom of movement in a horizontal direction yet guaranteeing elasticity (and so automatic repositioning) in the event of collision.
For this reason the Resinex elastic beacon assures correct positioning, reliability and a signalling security impossible to match with the traditional buoys. In addition, in the case of need, it can be easily removed and repositioned. It is particularly suitable for the precision marking of navigable canals or of the presence of underwater pipelines and cables or any other obstacles which could be found below water level.

Precision

The signalling precision is of uppermost importance in all situations and as a result the Resinex elastic beacon has been, above all, studied to guarantee this function.
The limited possibility of movement in relation to the anchorage results in the beacon being pratically fixed in the optimum position for navigational signalling (light, acoustic, radio) without creating any problems in adjustment. Also in the case of charging the solar panels, the reduced possibility of torsion in the vertical axis of the elastic beacon permits a very precise placing of the equipment on the tower most exposed to the sun at a precise angle therefore ensuring a very powerful alimentation. Finally, the floating structure requires a very limited maintenance overhaul, every eight to ten years. All this helps to considerably contain the total cost of maintenance.

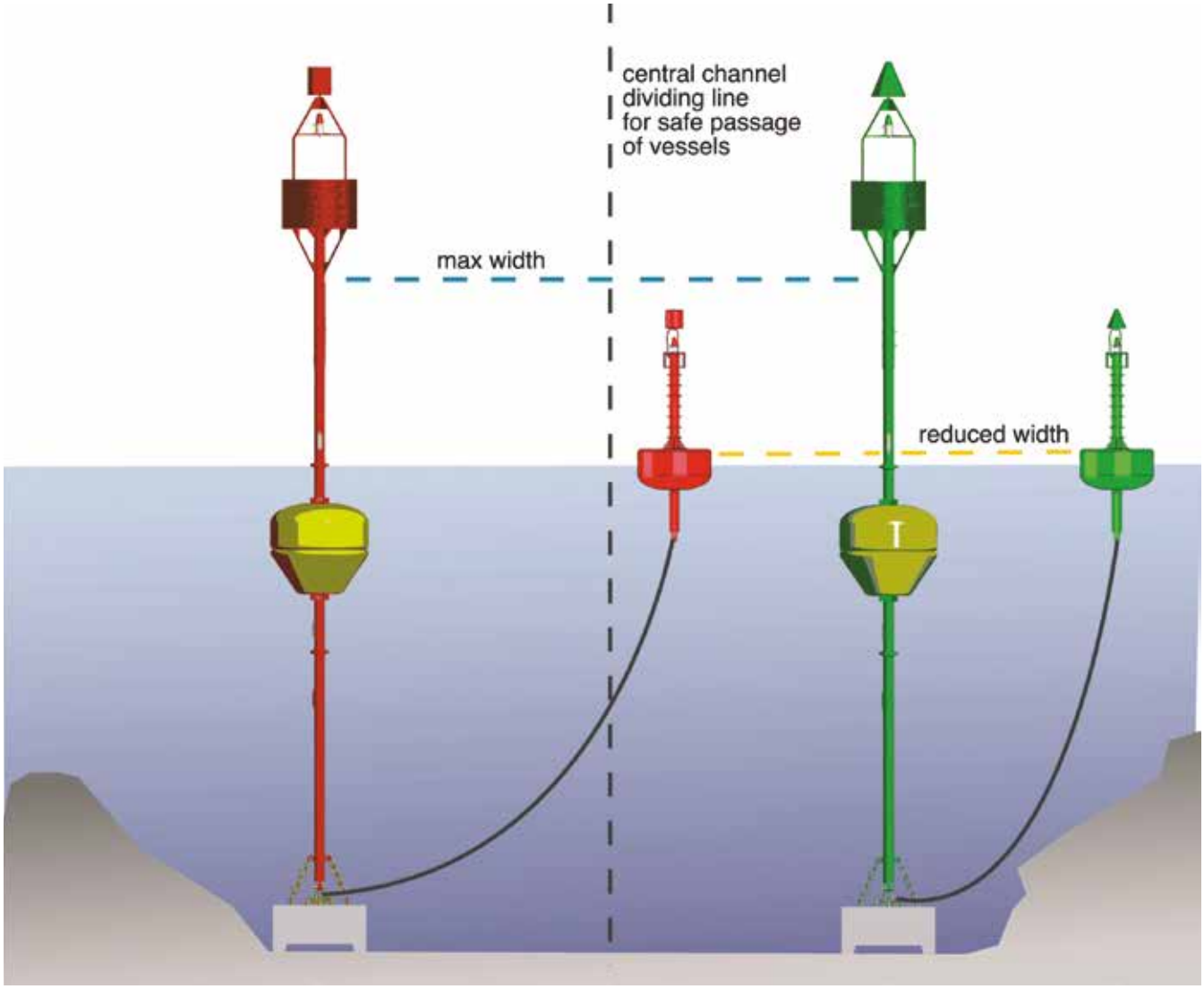
The innovation of the elastic beacon



The idea of the elastic beacon, created in Resinex at the beginning of the 70s, since the beginning it has been a great success, demonstrated by the first installations in the Port of Genoa, by the Resinex's successful tender for the complete signalling system of the Suez Canal, by the supplies for the signalling of the Italian coasts given to the Italian Navy.
Which are the main points of force of the elastic beacon compared to the fixed one?
They are clearly shown on this page.

1. If a vessel collides with a fixed beacon, the latter is usually destroyed and must be reconstructed. Navigation becomes risky for all the period of time in which there is no signalling. Almost always, moreover, even the ship's hull is damaged and must be repaired.
2. In case of collision, the elastic beacon which is strong, but at the same time flexible and light, causes moderate economical damage. The blow makes the elastic beacon incline, but the float makes it return quickly to the vertical position. The signalling never stops. The hull of the vessel suffers little damage.
3. An elastic beacon is less expensive and can easily be assembled compared to a fixed beacon, whose assembly in the sea requires binding works. In case of need, the elastic beacon can be moved and installed again.

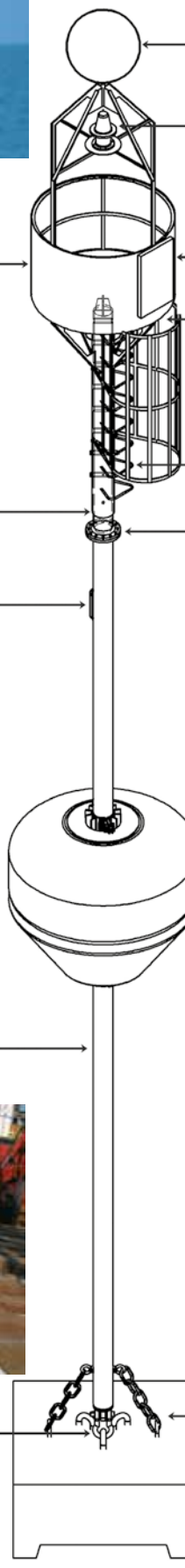
When the elastic beacon is better



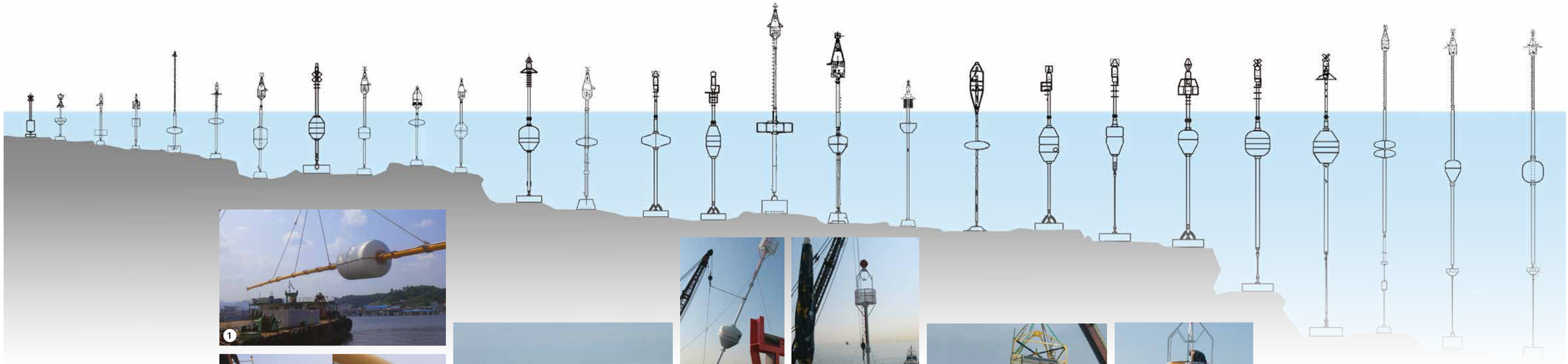
The elastic beacon was invented by the Resinex technical department at the beginning of the 70s. It was necessary to find a solution which allowed the completely safe signalling of the navigable channels or the obstacles to the navigation, as an option to the expensive and dangerous fixed beacons and to the traditional buoys.
In fact, in the navigable channels, as shown in the drawing, the superiority of the Resinex elastic beacon is evident compared to the traditional buoys.
These are its main advantages:

1. The elastic beacon is more precise, as shown in the drawing, does not change the width of the channel in respect to its axis and offers the maximum width for the safe passage of the vessels which travel the tract of sea.
2. The signalling is more efficient because the elastic beacon is higher and better visible.
3. The elastic beacon is more stable, and this means a cost reduction. The power system, with solar panels can be halved as it is orientated southwards with more precision compared to the buoy, which is, on the contrary, subject to the rotation on the mooring.

Elastic beacon at X rays



From 2 to 500 meter depth, a complete range for every need



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The range

The range of products and applications is very wide. Geographical location goes from tropical environment to glacial seas. The "light" elastic beacons have a fundamental superstructure with the essential functions of day and night signalling placed at the top. The elastic beacons equipped with turret are made of a stronger structure able to accommodate instrumentations and additional equipment. The elastic beacons designed for low and medium depths have the lower mooring eye directly hinged to the eyebolt of the concrete sinker and are provided with stabilizing chains.
Elastic beacons studied for higher depths are connected to the seabed through a special anti-torsion cable which prevents twisting on the vertical axis.

The assembling

The sequence of pictures shown on these pages demonstrates the easiness of the positioning of Resinex elastic beacons in diverse situations.
The elastic beacons are transported to the site either completely or partially unassembled (picture 1). The assembly of the metallic part and concrete sinker which is linked to the mooring system can be done either on shore (picture 2) or at sea (picture 3). The elastic beacon (either fully or partially assembled) is transported by a floating pontoon to the exact point of destination and then positioned in the water.
The mooring system pulls down the float, until only the upper part of the elastic beacon is visible above water (pictures 5,6,7,8 and 9).
If necessary, the length of the telescopic pipe, can be perfectly regulated in the sea, until reaching the desired focal plane (picture 10).
Finally, the signalling and/or monitoring systems are assembled, and then, the solar panels are permanently positioned in the best way in order to guarantee the optimum power supply of the system (pictures 11 and 12).

Environment monitoring

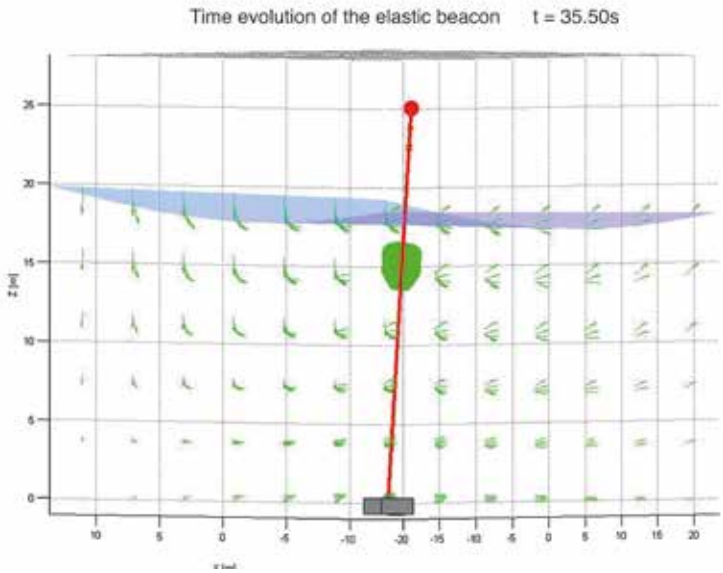
The particular characteristic of the Resinex elastic beacon makes it the ideal support for the instruments necessary for a correct and constant monitoring of the marine and lake environment, both for the high pollution risk areas and nature and tourist attractions. The structure is extremely stable with more than ample space on the tower: this permits a high level of precision and monitoring unobtainable with alternative support systems such as traditional buoys, rafts, fixed poles or floating crafts. In addtion to a traditional meteorology unit equipped with anemometer, thermometer and barometer, the beacon can host a complete bearing system.

Anti-Tsunami. The sensors are able to define any parameter regarding water. It is a particularly advanced answer to the needs of the environmental checking of the waters. In the same way an automatic correlation can be done as regards the direction and the wave height. It is therefore a particularly advanced system to monitor the currents or to signal in advance the presence of unusual waves or tsunami.

All the detection systems can be configured and activated using SMS through the usual GMS telephone ret. It is also possible to monitor the conditions and the system efficiency at distance, checking the main power supply systems (such as batteries and solar panels), and the lighting system (lantern). In case of damage or bad working, the system generates alarms that, reaching the shore, advise the technicians about the eventual damages.

Our software gives safety

Working closely with Mox of the Milan Polytechnic, Resinex has created an original and exclusive mathematical simulation programme aimed at studying and analysing the behaviour of the elastic beacon in high seas and strong variable currents. The software couples the principal meteo-marine variables with the hundreds of Resinex product variants with the scope of analysing all the possibilities in order to find the most compatible floating system for any installation location. The computer creates a dynamic 3D image showing the behaviour of any specific Resinex product in pre-defined environmental conditions for a determined period of time.
The programme can also analyse the behaviour of the elastic beacon in the most extreme marine conditions and this represents an important advantage for the Resinex client as we are able to supply an ever more safe and reliable product. The Mox (Scientific Calculation and Modelling) is a centre of excellence of the Mathematics Department of the Milan Polytechnic which works in the field of mathematical models and number simulation.



Quality control

The Resinex Marine Research Centre is equipped with five pressure tanks for the high deep pressure tests.
The Resinex procedures guarantee that all the products are manufactured with appropriated materials and in accordance with manufacturing specifications.
The Resinex Quality Management System is certified ISO 9001 by Lloyd's Register Quality Assurance and follows each order during manufacturing procedures. Resinex guarantees high standards and performances of all products. Customer requirements are strictly followed during all production phases.

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