



# RESINEX

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## TOP MODEL

### Exceptional stabilized mooring buoys for the South Angsi-A oil field in Malaysia

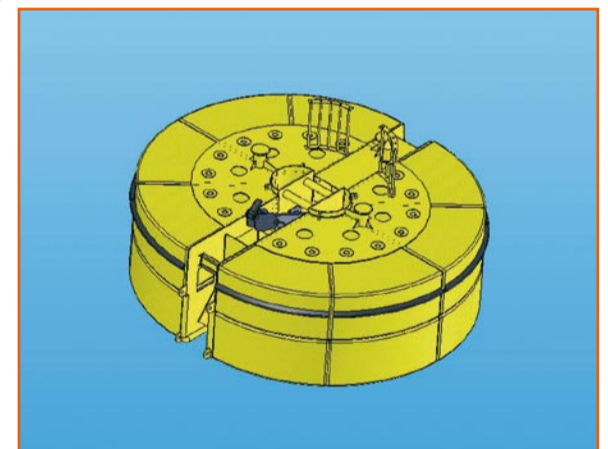


**5**,8 metre diameter, 40 ton net buoyancy, 75 ton SWL. These are the top model features of our Resinex Catamaran Buoy type Pem 58 x 2000. It is the top model in the world range, being the widest and most stable mooring buoy in plastic ever made for the offshore oil market.

The exceptional stability of the buoy is due to a particular mooring stabilizing system which Resinex has studied to guarantee the maintenance of a constant structure even during a 75 ton mooring traction.

Twin buoys were designed, produced and assembled by Resinex technicians in August 2005 for the Malaysian companies MSE (now MMHE - [www.mmhe.com.my](http://www.mmhe.com.my)) and MISC ([www.misc.com.my](http://www.misc.com.my)) subsidiaries of Petronas. They were immediately installed 55 miles off Terengganu on the east coast of West Malaysia in the PM-305 block of the South Angsi-A (SA-A) offshore oilfield. They will be the mooring point for the shuttle tankers of the FSO (Floating, Storage, Offload) operated by Talisman Energy.

The project was also supervised by London Marine Consultants ([www.londonmarine.co.uk](http://www.londonmarine.co.uk)).



#### SPECIFICATION

<b>Width:</b>	5800 mm
<b>Height:</b>	2000 mm
<b>Net Buoyancy:</b>	40000 Kg
<b>Water Depth:</b>	72 Mt
<b>SWL:</b>	75 tons
<b>Ship Mooring:</b>	Mampaey QRH
<b>Marine Lantern</b>	Pharos Marine Fa-85 801
<b>Mooring System:</b>	Resinex Multi-Lever System and chain Ø 64 mm
<b>Client:</b>	MSE (Malaysia Shipyard and Engineering)
<b>Final User:</b>	Talisman Energy - South Angsi-A Field Malaysia
<b>Materials:</b>	Structure: galvanized steel Nuts & Bolts: stainless steel AISI 304 Floating Body: linear polyethylene and polyurethane foam

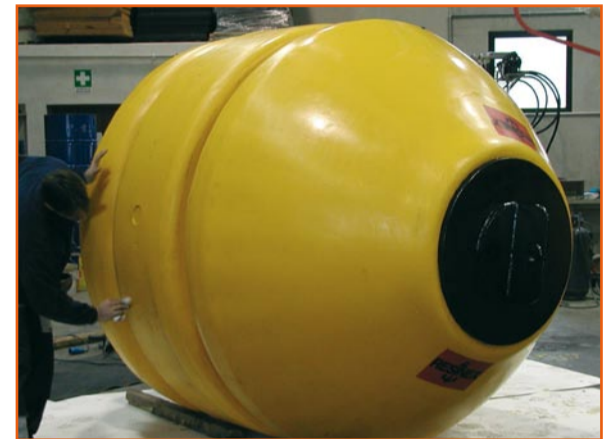




## RESINEX SUBSURFACE BUOYS FOR MODEC BONGKOT FSO2 PROJECT

At the beginning of 2005, Modec Tokyo ([www.modec.com](http://www.modec.com)) commissioned Resinex to supply two Pem 21 x 2550 deep-water buoys for the Bongkot FSO2 project in Thailand. The buoys with 4,300 kg net buoyancy and 75 metres of operational depth were studied by Resinex for offshore high pressure resistance and high hydrodynamics. The double countering cone-shaped form which was chosen enabled the satisfying of both requested requirements.

SPECIFICATION	
Net Buoyancy:	4300 kg
Diameter:	2100 mm
Operational Depth:	75 mt
Client:	Modec Tokyo
Materials:	Structure: galvanized steel - Nuts & Bolts: galvanized steel, S.S. AISI 316 Floating Body: linear polyethylene and polyurethane foam



Last retouches

## GUARANTEED DEVELOPMENT WITH RESINEX BUOYS



### New buoys for Zakum Development Company in the Emirates

In 2005 the Zakum Development Company (ZADCO) of Abu Dhabi chose Resinex and in particular 8 mooring buoys (made in very compact and reliable plastic) for the development of the upper Zakum Oilfield. Resinex created a particular crucifix design of mooring for Zadco, so as to minimize the possibility of damage of the mooring ropes. The buoys are also equipped with a reflecting strip for night visibility.

SPECIFICATION	
Net Buoyancy:	2600 kg
Diameter:	2100 mm
Client:	Zakum Development Project - UAE
Materials:	Structure: galvanized steel - Nuts & Bolts: S.S. AISI 316 Floating Body: linear polyethylene and polyurethane foam

## GATHERING THE DALIAS

### The control of waves in deep water for Total group



The ship FPSO (Floating, Production, Storage, Offload) which drills and stores oil in block 17 of the Dalia Oil Field off the Angolan coast on behalf of Total EGP Angola ([www.total.com](http://www.total.com)) will be fitted with a sophisticated control system for sea conditions.

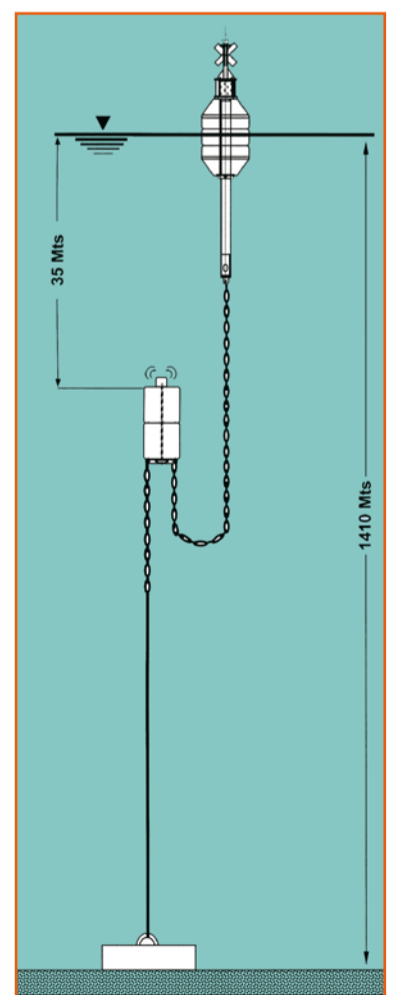
Pressure sensors installed on a Resinex jumper buoy positioned at a 35-meter depth will transmit, by cable, data relating to sea conditions to a Resinex surface buoy which in

turn is able to send the same data, in real time, to the control station of the giant French oil company. The entire system was developed by Id Scope of Monaco (MC) ([www.id-scope.mc](http://www.id-scope.mc)) technicians, the company specialized in monitoring, together with Resinex R&D department.

The particular planning problems due to the great mooring depth (1,410 metres) were overcome thanks to the use of new simulation programmes which are specifically designed for virtual moorings (jumper) recently developed by Resinex together with MOX of Milan Polytechnic University.



Jumper buoy







# SAIPEM FOR BP AZERI PROJECT

## Jumbo buoys for a Caspian success

**F**our big buoys of 30 ton net buoyancy were supplied by Resinex in the spring of 2005.

They were used to support the chains and anchors during the installation of the pipeline which Saipem ([www.saipem.eni.it](http://www.saipem.eni.it)) did for the BP Azeri Project (Azeri-Chirag-Gunashli oil field) in the Caspian Sea. The four big buoys have integrated the 20 modular plastic buoys (6 ton net buoyancy) which were supplied to Saipem in 2004 for the same project.

The four buoys were made with 18 independent modules in reinforced plastic material



and filled with high density polyurethane foam. The modularity and filling make them unsinkable and give the possibility of continued use even in the event of partial damage. The damaged parts can anyway be easily repaired on site.

This part of the BP Azeri Project was completed in record time. The utilization of the buoys certainly contributed, even if only a minute manner, to this success.



*The four jumbo buoys on the deck of the supply vessel*

SPECIFICATION	
<b>Width:</b>	4300 mm
<b>Height:</b>	4950 mm
<b>Net Buoyancy:</b>	30,6 tons
<b>Operational Depth:</b>	surface/5 mt
<b>Mooring:</b>	Crucifix
<b>Client:</b>	Saipem Azerbaijan Baku
<b>Project:</b>	BP Azeri
<b>Materials:</b>	Structure: galvanized steel - Nuts & Bolts: galvanized steel Floating Body: linear polyethylene and polyurethane foam



*Hard work for the 6 ton buoyancy "small" buoys*





# NEMO, THE TELESCOPE

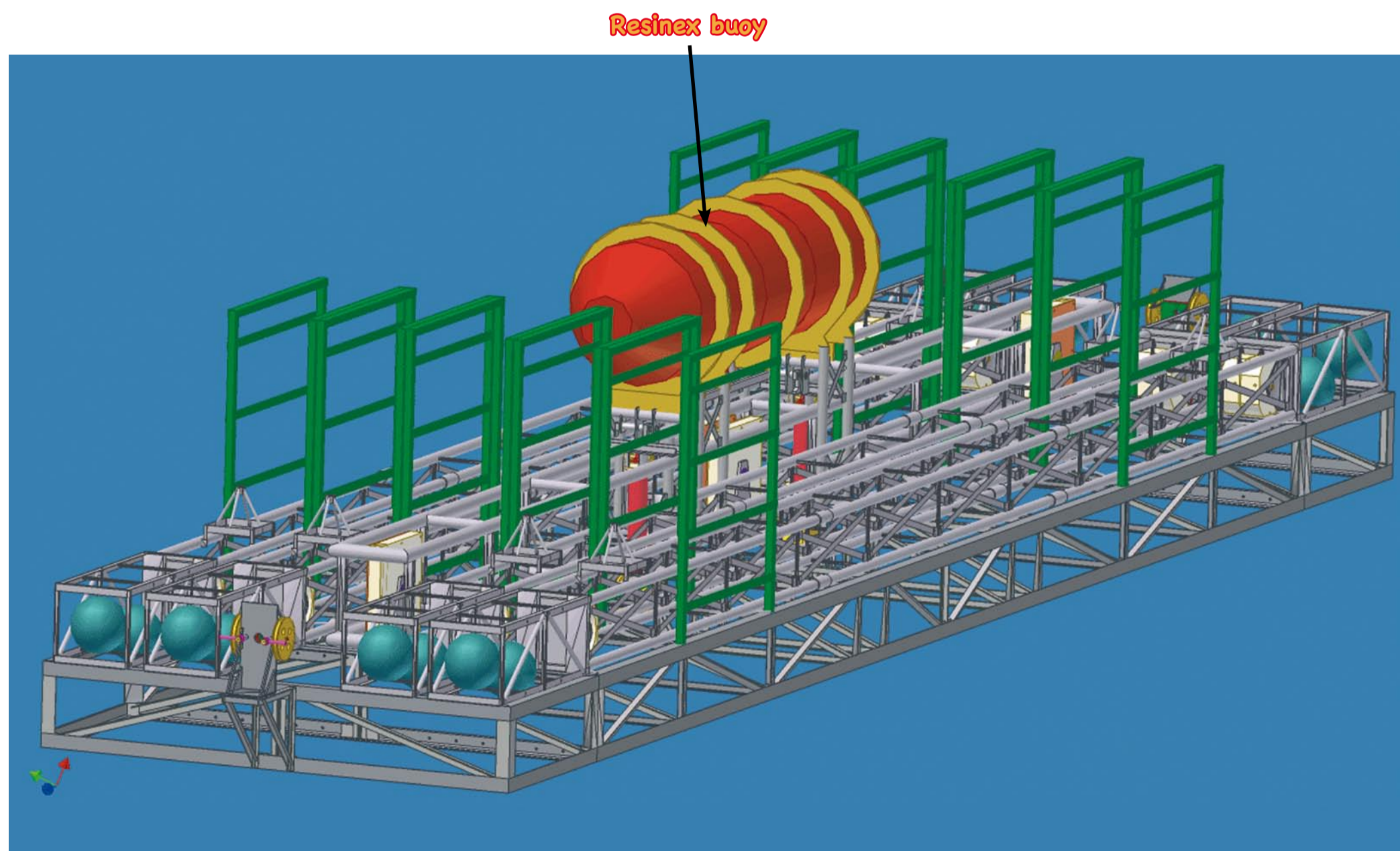
## 2000 metres under the sea in

In late spring 2005, Resinex was chosen by the “Istituto Nazionale di Fisica Nucleare” - INFN - ([www.ct.infn.it](http://www.ct.infn.it)) (Italian National Institute of Nuclear Physics) as the supplier for the first two buoys of the Nemo Project (see next page).

They are modular buoys suitable to go to a depth of 3500 metres but, at the moment, used “only” to depths of 2000 metres.

The buoys were produced in Synt 3500 and checked at our new automatized plant in Torbiato di Adro (BS) and tested in modules in the nearby Resinex Marine Research Centre of Adro.

They will be positioned in the spring of 2006 off Catania (Sicily) and will take part in the hunt for neutrinos supporting the complex system of “nets” created by INFN technicians.

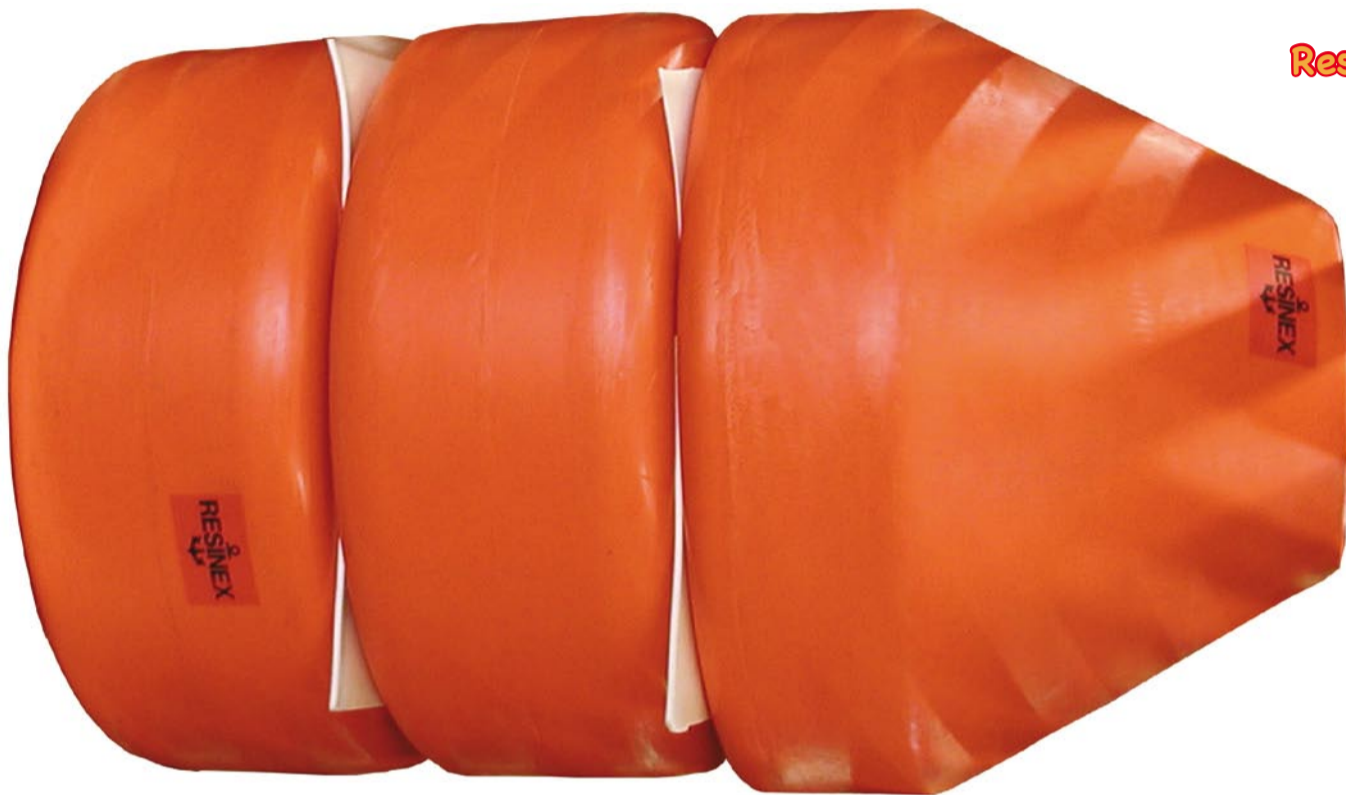


*The closed tower*

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## PE OF THE ABYSS

### n search of neutrins



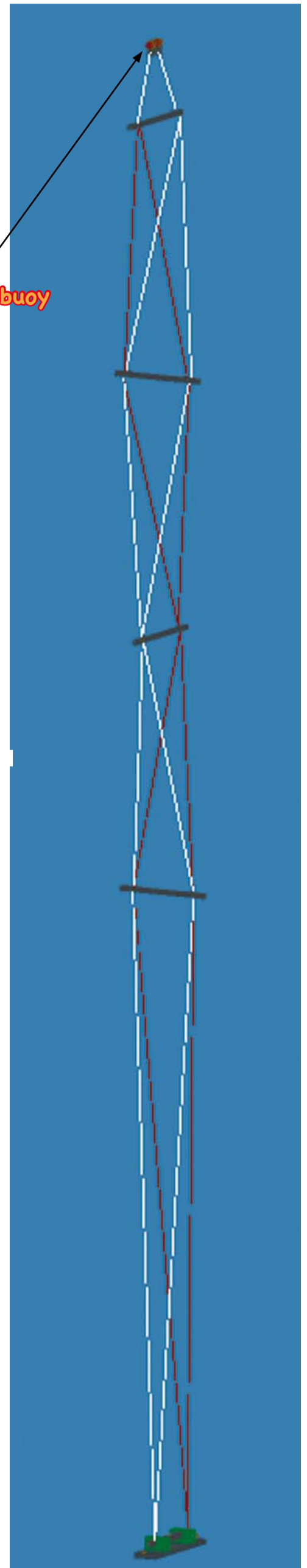
*Modular Resinex Buoy for 3500 metre operational depth*

### *what is Nemo*

This is the first tower of the Nemo (NEutrino Medi-terranean Observatory) Experiment. This activity, conceived and financed by the Italian National Institute of Nuclear Physics, is aimed to creating an apparatus to reveal high energy neutrins coming from astrophysics sources.

The installation of the tower, which will take place in the spring of 2006, 14 miles off the Port of Catania at a depth of about 2000 metres, will represent the first operational test of such an apparatus of 1 km<sup>3</sup> volume. The tower will then be connected by a Rov to an underwater optic electric cable coming from the INFN "Laboratori del Sud" (National Laboratories of the South) land station.

Resinex buoy



*The open tower*



# RESINEX

## LAYING CABLES SAFELY

### 8 big steel buoys for Pirelli in the Philippines



**T**hey have been chosen for their high long-life performance and safety standards.

8 steel light buoys were used by Pirelli Cavi for the Leyte-Cebu Interconnection Uprating project in the Philippines.

Strong, solid, safe, reliable. We have given the Italian Multinational the possibility of operating in safety in the Asian waters.

The final clients are the National Power Corporation (NPC) and the National Transmission Corporation (TRANSCO) of Philippines.



*The mooring test at Iseo lake*

SPECIFICATION	
Focal Plane:	3000 mm
Diameter:	1900 mm
Net Buoyancy:	4700 kg
Marine Lantern:	Pharos Marine
Client:	Pirelli Cavi e Sistemi Energia
Final Client:	National Power Corporation, National Transmission Corporation (Ph)
Materials:	Structure: galvanized steel - Nuts & Bolts: S.S. AISI 316 Floating body: steel and polyurethane foam

## LITEPIPE

### Innovation in the Mediterranean ports

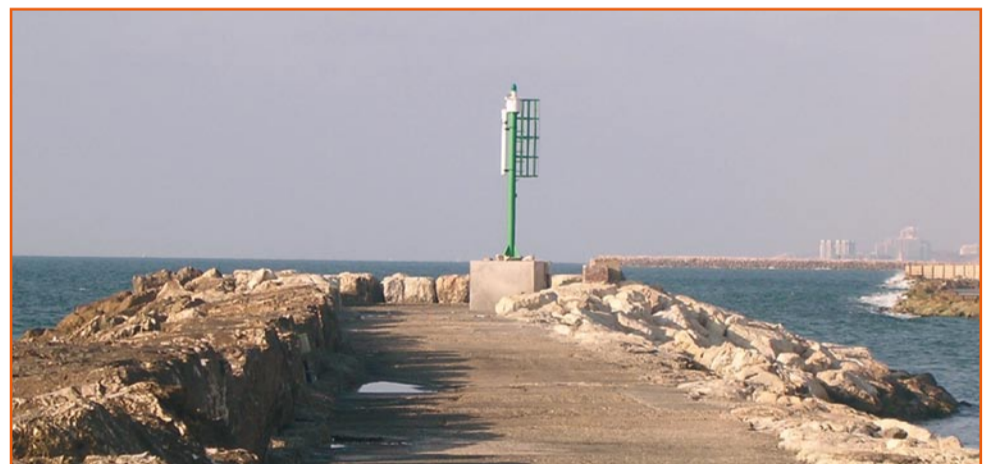
**A** Pharos Marine Litepipe and a Resinex stainless steel land beacon were installed for the extreme protection of a pier in the Mediterranean sea in June 2005.

The considerable visibility of the vertical signal guarantees a precise positioning to the sailors also in the presence of background light crowding (such as towns and factories).



The Litepipe is coupled with a marine lantern type LED Pharos Marine FA-249: high reliability, low maintenance.

([www.pharosmarine.com](http://www.pharosmarine.com)).



*Litepipe from the Pharos Marine catalogue*

## COLOURFUL SPAIN

### Navigational aids for the Port of Cadiz

**S**ix big buoys (3 green and 3 red) have been installed in the Cadiz Bay (Spain) and more precisely in the Darsena de Cadiz and Darsena Zona Franca.

The two steel buoys have a diameter of 2200 mm; those in plastic have the new Resinex cylindrical float of 1800 mm diameter.



*Steel buoy*



*Plastic buoy*





## THE DA VINCI COVE



### Even Leonardo would have chosen Resinex beacons for the “Porte Vinciane” of Cesenatico protected harbour

**M**ore than 500 years (503) have passed since Leonardo da Vinci studied the way to regulate the flow of a course of water with what we have now called “Porte Vinciane” (Da Vinci gates), but we are sure that to signal it, if Resinex had been in existence (some of us would have been born within a few years) he would, after a very careful check, have chosen Resinex.

Well, this is what has happened many centuries later, when CMC (Cooperativa Muratori e Cementisti of Ravenna [www.cmc.it](http://www.cmc.it)) created an exceptional reference to the “Porte Vinciane” in regulating the navigation in the canal port of the Romagna town.

Two Resinex towers, entirely in stainless steel, with a Pharos Marine APRB 288 rotating beacon were installed in the spring of 2005.



They are equipped with remote control lighting and warn boats and ships at sea with a yellow beam (of 4 nautical miles at day and 20 miles at night) of any closure of the gates invented by Leonardo da Vinci many years ago.

We are also sure that Leonardo would have taken the opportunity to put our beautiful towers into one of his frescos. But maybe we are slightly exaggerating.



*The mouth of the Cesenatico “cove”*

## ARTIFICIAL ISLAND

### An artificial island at the Venice Lido



**I**t will be built by the Cidonio Company at the Venice Lido mouth of the lagoon.

It will be used as a watershed for the realization of the moveable bulkheads to protect the lagoon (Mose Project).

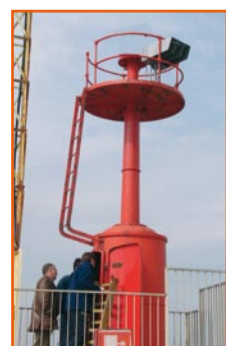
The realization of the future island has been protected in its complete circumference by Resinex towers installed on fixed pipes to the sea bed. The towers guarantee a very high operational safety. The marine lanterns are, also in this case, Pharos Marine LED.



*Curiosity in the lagoon*

## MIND THE FOG IN THE ADRIATIC SEA

### A very helpful anti-fog kit from Pharos Marine



**T**he north coasts of the Adriatic Sea are probably among the foggiest ones in Europe and the coastal municipalities are taking measures to help their sailors even during the foggiest months of the winter season.

The Cervia Municipality has equipped the entrance of its channel port with a Fog Detector type Pharos Marine FD 310. Resinex is the exclusive agent of Pharos Marine products in Italy and has installed and approved the detection system during the 2005. The system consists of an optical sensor with double switching which perceives the presence of fog at various distances (till 4 Nm). The sensor then transmits a signal to a Power Supply Cabinet which runs the Fog Horn. This kind of anti-fog kit is also utilized by the Italian Navy.





# RESINEX

## IN THE PITS OF THE FORMULA 1 OF THE SEA

### Success of our mooring equipment used to keep still the pawing Formula 1 of the America's Cup

**F**ew days to do it, but a great success. The Italian stage of the 2007 America's Cup stopped in Trapani (Sicily) and was a real success. The wind was not lacking and neither was the emotion. Only in the evening were the tapered and ultra modern boats able to be stopped and harnessed. But to be sure, the Società Italiana Dragaggi company ([www.dredging.com](http://www.dredging.com)) which achieved the work in record time had no choice but to choose Resinex mooring equipment: 48 buoys of 940 N.B.



Pit stop

Reassured by the Resinex's record for mooring in all the world meant that, even the most famous skippers moored their "sea arrows" to our buoys and were able to leave their jewels in safe custody and with peace of mind, tranquilly to discover the beauty of Trapani.

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## WORKING AT SEA: TOTAL PROTECTION WITH THE RESINEX OFFSHORE BARRIERS

An innovative barrier that protects both surface and subsurface water

**I**t is the new necessity for those who work at sea (digging, dredging, etc.). It is the new Resinex Offshore Barrier with total top to bottom protection.

It creates a total barrier from the sea surface to the sea bed and does not permit any polluted material to pass.

The OSB Resinex barrier is particularly suited to this type of operation thanks to its elevated horizontal floating capability on the surface of the



This allows the barrier to easily support many metres of underwater skirt and, at the same time constantly follow the state of the sea till a force 3 condition.

Grandi Lavori Fincosit ([www.glf.com](http://www.glf.com)) for their worksite at Brindisi LNG Terminal, has acquired from Resinex 300 metres of our barrier with a protection to a depth of 8,5 metres.



## in brief

Even

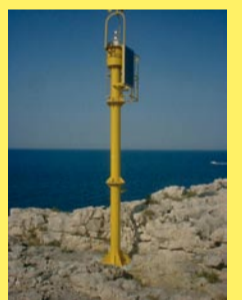
Pantelleria, after Lampedusa and Linosa, adopts Resinex signalling for the harbour works. They are small buoys and land beacons, but with a signalling system of high range.



The mooring for the yachts in the marine Park of the Ustica Island is supplied by Resinex which, together with the Divemex company ([www.divemex-snc.it](http://www.divemex-snc.it)) author of an innovative patent of an ecologically compatible mooring, has created a complete safety mooring system through 20 buoys of 380 kg net buoyancy.



More than a hundred mooring buoys and the complete system of delimitation of the park (5 offshore buoys and 2 land beacons) are the quantities of what probably is the



highest buoy number in the Italian marine parks. It was made in Siracusa at Plemmirio's Park ([www.plemmirio.it](http://www.plemmirio.it)) in the summer 2005 by Resinex



together with Divemex (see above). The metallic structures of the moorings are in stainless steel to set to zero their maintenance. All the moorings are provided with jumper system to avoid damage to the marvellous sea bed.

Jumper in action

Here are the super mooring buoys type Resinex PEM 30 (3 metres of diameter, 13,600 kilos of buoyancy) at work (see Resinex Newsletter 10/04) in the La Valletta harbour (Malta). They are utilized by Grand Harbour Marina ([www.ghm.com.mt](http://www.ghm.com.mt)) for the mooring of the very luxurious big yachts.



Starting from 2005 Resinex is a IALA industrial member ([www.iala-aism.org](http://www.iala-aism.org)) the international organization which establishes the norms for the navigational aids.



Three big Resinex elastic beacons to safeguard the Port of Cagliari (Sardinia). They were positioned by Soilmare in the autumn of 2005. LED Marine Lantern and Resinex quality assure low cost maintenance.

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