special marine projects





wreckremovals
ship raising
cargo recovery
deepsea works

front cover - the *Victory of Samothrace* "lifts" the bow section of the cargo ship *Fenes*. Inhabitants of the small Aegean island of Samothrace commissioned the statue in about 190 BC to commemorate a naval triumph. In one of the sculptor's fine touches, the toes of the winged Victory touch the prow of a ship. One of the masterpieces of Hellenistic sculpture, it stands in the Louvre museum, Paris

inside covers - detail of a custom-made steel cable used in the raising of the sunken warship Anthipoploiarchos Kostakos from the waters of the Aegean, near Samos island

back cover - cross-section of the same cable, reproduced in actual size

Tsavliris' name has been prominent in shipping for well over half a century and the group is established as one of the world's leading marine salvors.

With a bedrock of experience accumulated from successfully handling over 1,500 casualties, today the group is active in all sectors of marine salvage.

As a total salvor, we are geared to providing any service relating to marine salvage and towage - ranging from emergency response on the high seas to industrial-type projects for removing wrecks, refloating vessels, recovering cargo and handling deepsea operations.

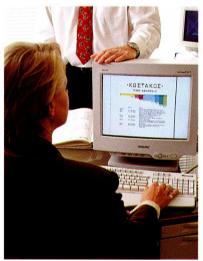
Whatever the challenge, Tsavliris' approach combines a traditional salvor's gallantry and practical ingenuity with contemporary engineering and project planning skills.

This brochure gives an introduction to our comprehensive special project services, illustrated by four recent operations conducted by our group.

It also provides an opportunity for us to warmly thank all those who have entrusted major projects to Tsavliris in the past. Each operation has added to our knowledge and our reputation in the growing field of marine removals and recoveries.

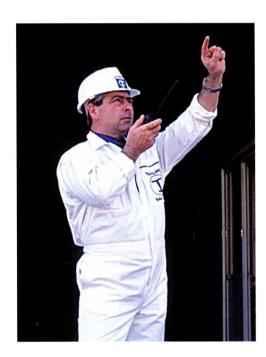
the total marine salvage contractor















so you know what to expect





over the years, Tsavliris people have put their heart and soul into hundreds of successful salvage operations. Increasingly, our knowhow and determination to see the job done have been in demand for major wreck removals and similar large-scale sub-sea and surface works.

Projects to remove or recover submerged assets often arise from environmental concerns, a need to ensure safety of navigation and unobstructed access to ports, or simply the high value of material or equipment which has been lost. Our record of reliably delivering the most difficult projects on time and to the satisfaction of the customer speaks for itself.

Tsavliris' unique approach starts with entering a highly competitive bid for the project. The aim is to always do what we say we can do, which means having the experience to realistically assess complex and often risky undertakings in terms of time and budget. At this initial stage the group's flexibility, allied to industrial-type planning, often enables Tsavliris to achieve significant cost and time savings for the customer.

We are task-oriented and in order to propose the most efficient solution we choose the optimum combination of our own modern salvage equipment and market tools, whenever possible favouring locally available assets which can reduce expense and delay. A similar philosophy is applied to human resources. Our team contains extensive experience in all the disciplines likely to be required - including seamanship, engineering, naval architecture, surveying, sub-sea works and project management skills. In addition, close relations have been maintained for many years with the finest specialised consultants worldwide.

Cases such as those presented in these pages highlight a number of the group's strengths when the operation is in progress. They include strict safety management, motivating and coordinating a large multi-disciplinary task force for the entire duration of the project, and efficient equipment management. We also pride ourselves on maintaining smooth communications with all interested parties, who may include insurers, property owners, the armed forces, local authorities, environmental agencies, or news media.

Moreover, as a casualty salvor of long standing, Tsavliris is prepared for any contingency which can arise when dealing with damaged or volatile assets, often in dangerous conditions.



poseidon express

speed was critical in removing this large ro-ro ferry before the peak summer tourist season arrived. After an unusual accident, the *Poseidon Express* had rolled onto her side in up to 22 metres of water and was partly blocking the port of one of Greece's favourite holiday islands.



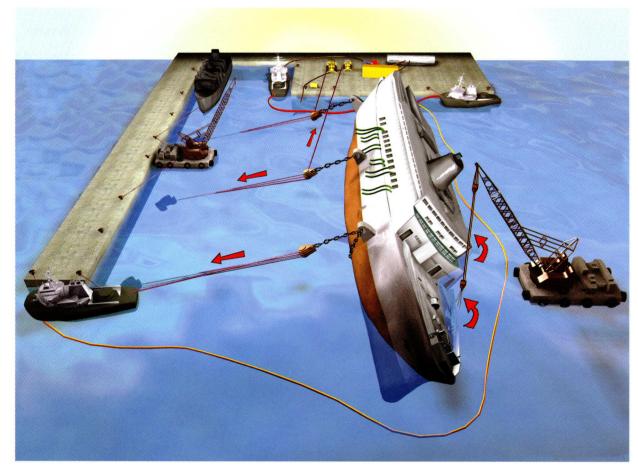
Tsavliris' technicians proposed an innovative solution to save time and cost. The ferry was to be rolled upright using a combination of her own positive stability and brute strength. In the lengthiest stage of the project, divers laboured to seal all openings in the vessel before pumping out the sea water. Constructing a new bulkhead in the garage to make the space watertight helped us stay on schedule. As the hull regained buoyancy, a system of pulleys and blocks, VLCC anchors, tractors, tugs and a floating crane assisted in wrenching the ferry upright. According to the P&I insurers, the 49 days taken to refloat the vessel was faster than forecast by any other major salvor which competed for the project.

Ship raised Location Contracting party 7,300 tonnes (gross)
Paros island, Greece
London Steamship
Owners Mutual Insurance

Project duration

Association
May-July 1996

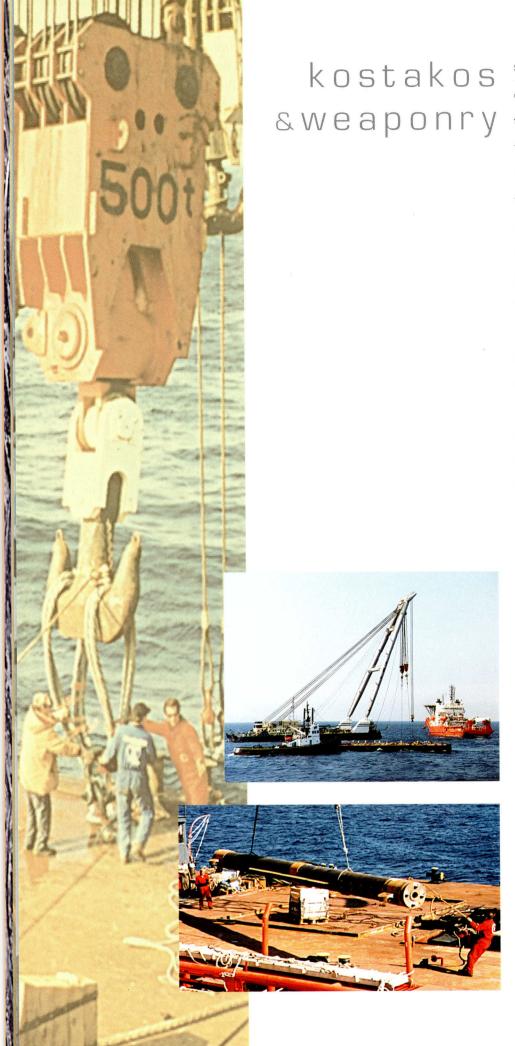




key aspects

- Identifying and tank-testing of a novel new method of righting a capsized ro-ro ferry
- Fast mobilisation of locally available equipment to reduce time and cost. Avoidance of methods using a giant crane and winch platform which would have closed the port
- Management of a salvage team of 80 plus 30 divers on a 24 hours basis
- Improvisation of a makeshift bulkhead to make the ship watertight
- Additional tug and engineering services to maximise usage of Paros Port while the operation was in progress





specialised equipment and delicate calculations were called for in recovering the *Anthipoploiarchos Kostakos*. Her fragile hull almost severed in two at the point of collision, the naval missile boat was lying 160 metres down on the sea floor. To recover four bodies as well as her valuable electronics and missiles, she had to be lifted intact. It was the first time that a ship was to be raised whole by mechanical means from such a depth.

Assets used included a saturated diving station vessel with deep-diving bell and dynamic positioning system, a sheerleg crane with 1,000t lifting capacity and a barge adapted to hold the *Kostakos*. Helpfully, we were able to pre-test our special lifting apparatus, later colourcoded for connection underwater, on an identical military vessel.

We monitored the divers via a submersible robot camera as they surveyed the wrecksite and recovered a missing Penguin missile. They then moved on to dredging under the hull and rigging the steel slings. These were linked to the crane's hooks by sets of secondary tackle. Gently, the vessel was raised in stages corresponding to the height of the crane's A-frame, with an intermediary sling being discarded after each leg.

When the warship broke surface on 15 March 1997, satisfaction with our technical achievement was tempered by awareness of the remains of the four seamen still inside.

Ship raised Location Contracting party 450 tonnes (lightweight) Eastern Aegean Sea Hellenic Navy

Project duration

Ministry of Defence January-March 1997

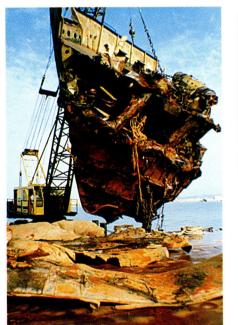






fenes & cargo

uniquely laborious, the Fenes project took four months, interrupted by a break for winter weather which at one point required our salvage crew to be evacuated from the site by helicopter. Run aground on the rocky Corsican coast, the freighter disintegrated under the pounding of waves and spilled her entire wheat cargo as she sank. As the incident occurred in a protected marine park, local officials wanted an exceptionally thorough clean-up, which is exactly what we provided.





We used an underwater vacuum pump to suck up the wheat, which had turned toxic on contact with salt water, from the seabed. Personnel wore masks to protect themselves from the sulphide gases as the cargo was separated from the water and loaded onto a barge for dumping far out to sea.

The vessel herself was in smithereens. After the floating crane had recovered most of the debris, a larger sheerleg crane was brought in to lift the 400t accommodation and engine block. By the end, 700 separate pieces of the *Fenes* were raised from the seabed and disposed of.

Ship raised Cargo removed

2,650 tonnes Location Lavezzi island

off Corsica, France

Contracting party

Ocean Marine Mutual P&I Association

Project duration

October 1996-May 1997

1,800 tonnes (deadweight)





key aspects

- Adjustment of operational goals after the vessel's disintegration in ferocious weather
- Marshalling a team of 75 specialist personnel and divers / equipment including three salvage tugs, a crane barge, and a sheerleg crane of 1,000t capacity
- Handling of a toxic cargo
- Coordination of clean-up with coast guard and environmental officials





'black water' diving was among many hazards Tsavliris overcame in the *Green Opal* project, which took us to India's Hugli River where the sunken cargo ship hindered navigation in and out of Calcutta. Once our salvage tug, floating crane barge and an array of other equipment was on-site, the first priority was to construct a secure mooring and properly illuminate the project for safety.

Since most of the wreck's bottom plating was badly fractured and she was virtually severed, the project required removing the cargo of steel billets and wire coils before the vessel herself. Our divers contended with zero visibility, raging currents and hard packed mud clogging the holds - but altogether they retrieved 3,900 separate pieces of cargo with the aid of a powerful underwater magnet.

Then came the most critical phase, which was to raise the wreck in two sections after parting them along the main existing fracture. 'Sea camels' and 'balloons' attached to the hull provided sufficient buoyancy for the sections to rise from the bottom, so they could be towed to a nearby site for scrapping.

Ship raised Cargo removed

Location Contracting party

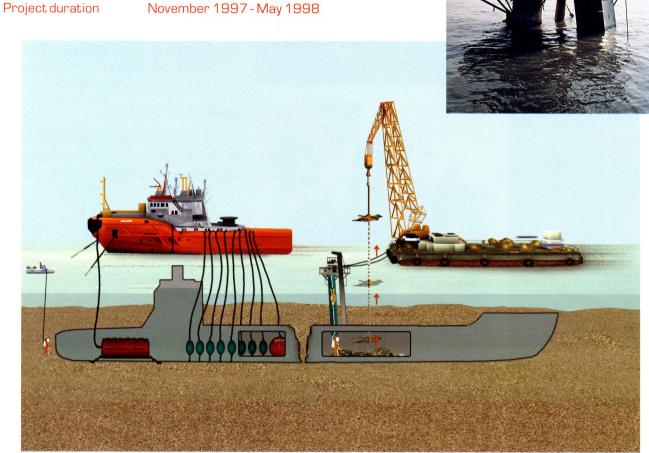
6,176 tonnes (dead weight)

5,748 tonnes

Hugli River, India UK Mutual Steam Ship

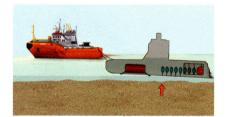
Assurance Association

November 1997 - May 1998



key aspects

- Deployment of a full anti-pollution system and cargo recovery equipment including magnet, mobile lifters, cranes and barges
- On-site manufacture of a diving station and fabrication of a diving trunk to guide divers into the holds of the wreck, saving time required to deliver the nearest equivalent system
- Safety management of a hazardous 'black water' diving operation
- Disease prevention and medical support in an inhospitable environment
- Deployment of 'sea camels' and buoyancy 'balloons'











the total marine salvage contractor

emergency response

pollution control

deepsea towage

ship & cargo preservation

wreck removal

ship raising

cargo recovery

diving & subsea works

firefighting

offshore support

project consultancy

ocean rescue

& all related services

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