**THE GROUNDLINE ANCHORING SYSTEM – AN INNOVATION THAT SUCCESSFULLY PROTECTED ITALIAN HOLIDAY BEACHES**

**An article contributed by George Ross - a historical case history where an initial setback was resolved by innovation that led to a successful outcome. For more than 40 years George has travelled the globe, leading the response at major oil spill events, carrying out training and undertaking projects to build response preparedness all over the world. He is a well-known and respected figure in the international spill response community.**

**ALGAE THREAT IN ADRIATIC 1989-1990**

*****Photo: An aerial view of the mucillagine pollution off the Italian coast.*

When the initial request for assistance was received in Aberdeen, Alba International’s agent in Italy said “It is not nice. It is like the sick of the cat”. The stinking mess was washing up on several of the prime holiday beaches at popular holiday beaches in the Venito region of Italy.

Details of this anomaly are well documented. The tourist industry was ravaged by this decaying Algae bloom and losses were estimated at $800 million. The Italian government were under great pressure to do something to protect the tourist beaches from Algae that was turning the beaches to mud with dead bloom being washed ashore.

In desperation the Government decided to try a deflection strategy as the Algae could not be collected at sea or even on the beaches. This was a PR exercise by the government. Many companies worldwide deployed booms of all kinds during the trial period. The scope of operations depicted booms to be positioned no further than 500m from shore. Water depth was four metres.

Alba International and Jackson booms got together with Seaboard Anchors. Three chevrons of 50m lengths of Jackson boom were positioned with two 25kg anchors at each end of the chevrons for the trial period that was supposed to last for one month.

Four days after the trial began a storm hit the Adriatic with winds of 70mph. In such shallow water the seas that hit the booms were breakers and nothing stood a chance. All trial booms were driven ashore except the Jackson boom. It remained at sea but was rolled up and a shambles. Four days after recovery this boom it was re-built and ready to deploy again. The boom suffered no damage. Spreader bars only had to be changed but the competition was totally destroyed

This might have been a PR exercise for the government but it presented a great problem for Alba - How to moor a semi-permanent boom in such shallow water and subject to such ferocious conditions. A conclusion was reached that the reason the boom rolled up was because the broken seas were hitting the entire 50m length at the same time. To counteract this a decision was made to extend the diversion booms from 50m to 300m so as the boom not being hit could support that which was being hit but also to bridle this boom at each 50m connection.

To set such a configuration of Anchors in single mode and in a straight line would be impossible. Thus the Ground-line concept was adopted. The ground-line could be deployed, tensioned, and anchored in one operation that left only Risers and anchor lines every 50m ready to accept the Jackson Boom.



*In the sketch above the anchors along the length of the groundline are shown as 40 Kg. but may also have been 75 Kg. The area and prevailing weather would govern the anchor size and could vary depending on location. Similar sketches show the different lay-outs for anchoring boom lengths of 400 m, 450 m. and 500 m.*

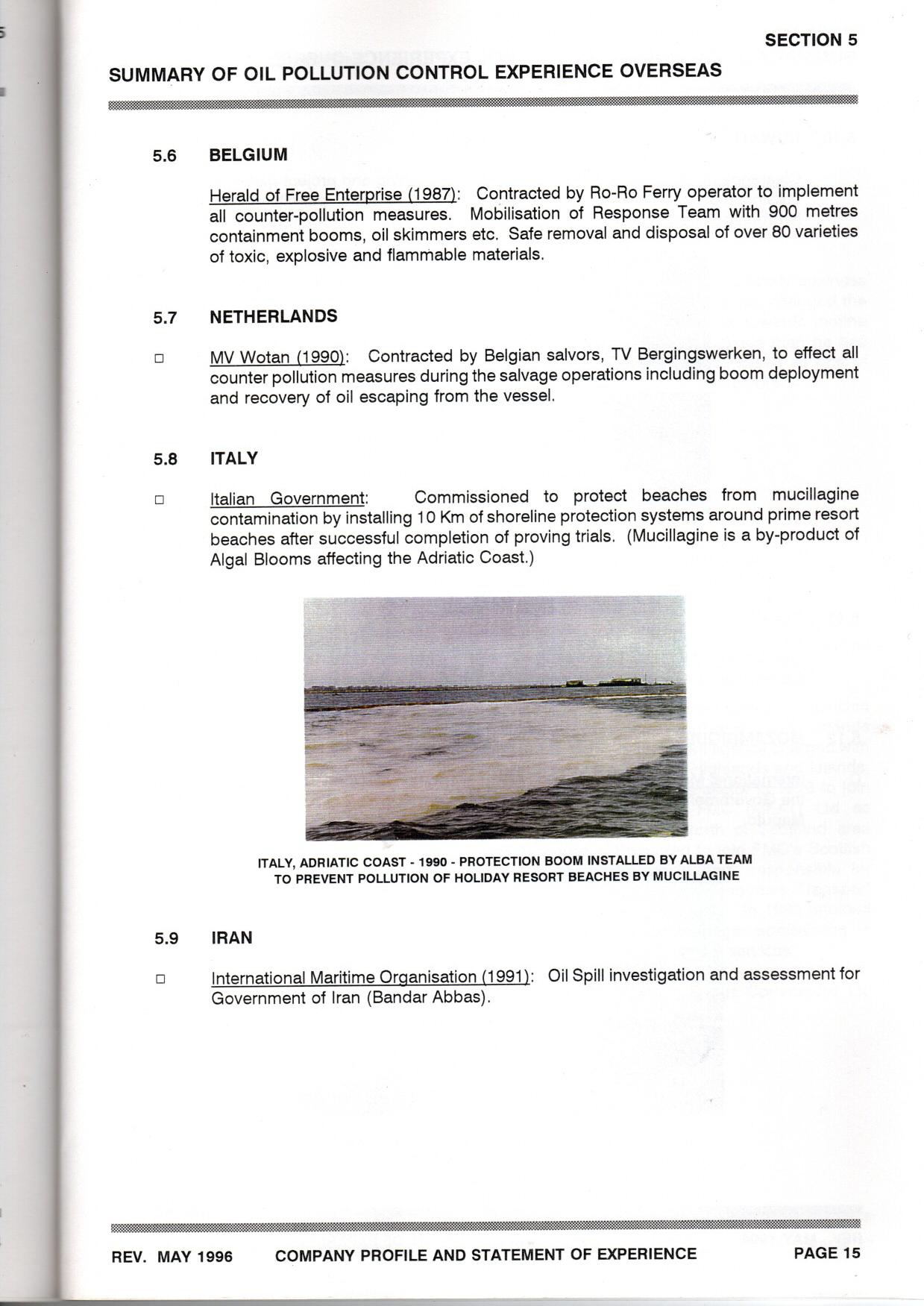
Gavel-end anchors were 150kg and two were set at each gavel. The first riser each end was attached to a large Buoy. Risers down the line were supported by smaller Norwegian type buoys. Anchors along the line were two towards the land three to seaward alternating. Each anchor along the line weighed 75kg and was set with a 2m buoyed tripping line for recovery.

*Pictured left: Boom assembly in progress at Jackson Trawl’s Peterhead factory.*

The entire ground-line system was assembled in the Jackson factory in Peterhead and made of combination wire rope. Anchor lines and Risers were pre-positioned. Deployment was fast and precise. Joining sections of boom with Unicon connectors took a little time but got faster with practice.

This boom configuration survived for six months and weathered everything the Adriatic could throw at it including three storms with winds over 60mph. There were no twists and no rolling up of the boom. When recovered the boom sustained no damage. The Ground-line sustained no damage and only one 75kg Anchor was so deep in the sand it couldn’t be recovered.

The mucillagine problem was repeated over two years (1989 and 1990) and during this time Alba teams installed some 10 km. of diversionary boom at various holiday resorts. At the end of each season the protection systems were retrieved, cleaned and placed in storage ready for re-use when required.



*Adriatic Coast – Protection boom installed by Alba Team to prevent pollution of holiday resort beaches by Mucillagine*

**In summary**

This mooring system is easy to deploy and can be assembled on land. That is a major factor. Straining the line is also achievable after setting the anchors on the first Gavel. The entire line can be tensioned when setting the anchors of the opposite gavel. With the main line under tension the landward and seaward anchors can be set precisely. Everything is rigged for recovery and tripping lines are attached to each anchor.

In the Adriatic the Jackson boom was used because of its strength but since then we have also had occasion to use Ro-Boom solid buoyancy boom at other locations. The system allows for access when required with an opening gateway that can be closed quickly. Gate risers are joined by a pennant underwater at a depth to allow vessels’ draft to clear. This pennant retains the integrity of the floating configuration. Ground-lines can be any length required - there is no limit.

Main Ground-Line 18mm combination wire rope

Risers 16mm Combination wire rope

Anchor lines 16mm Combination wire rope