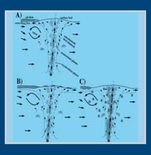
Bubble oil boom (BOB)

The laboratory results support the promise of bubble rafts as part of a more robust oil spill response contingency. The use of bubbles to herd oil spills, a so-called bubble oil boom (BOB), works by generating an outwelling surface flow.

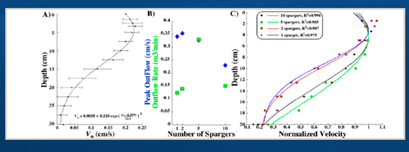


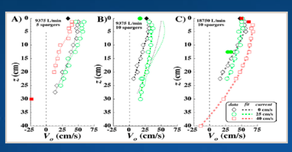
The primary challenge for the use of BOBs arises from oil droplet injection by bubble-induced turbulence at the oil slick front. BOB failure occurs where these droplets are entrained into and pass through the bubble barrier (Fig 1). Recent field and laboratory studies with oil concluded that a distributed bubble source (raft) would provide a solution to this problem (Fig 2 and Fig 3).

- Test and study the flow that are relevant to BOBs and other applications of near-surface area bubble sources.

- Large flume tests
  - Study and quantify the structure of a near-surface, area bubble source and how the surface outwelling flow varies with the number of spargers and air flow rate.
  - A downstream skirt extending from the surface to the bubble source depth of 60 cm was used to simulate a combined bubble oil boom (BOB) (Fig 4 - Fig 6).
  - The tests mapped the velocity structure in far greater detail than would have been meaningful in a smaller flume.
  - The test cases included measurements of the outwelling velocity profiles for various numbers of spargers and Q, for current velocities of 0, 0.25 and 0.40 m/s at 90° and 22.5° BOB angles of attack.

- Results
  - Outwelling profiles in no current (Fig 7).
  - Outwelling profiles against ambient currents (Fig 8).





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