

HOT-48: Chief Scientist Report

Chief Scientist: L. TUPAS

Cruise Dates: July 24(test cruise); July 26 (aborted);
July 28 (aborted); July 31 (aborted)

Vessel: M/V Na'Ina (reclassified as a research vessel;
July 21 - August 1, 1993)

Operator: Auakewai Salvage, Diving, Fishing, Inc., Honolulu

Charter agreement with UH Marine Facility, Stan Winslow acting as
coordinator

Science Personnel:

Test Cruise:

Luis Tupas - UH Scientist, JGOFS, Chief Scientist
David Karl - UH Scientist, JGOFS
Dale Hebel - UH Scientist, JGOFS
Terrence Houlihan - UH Technician, JGOFS
Jef Snyder - UH Technician, WOCE
Richard Muller - UH Technician, HOT
Luigi Pozzi - UH Marine Facility, STAG
Jim Dorton - UH Marine Facility, STAG
Karin Bjorkmann - UH Visiting scientist

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Jim Dorton - UH Marine Facility, STAG
Ricardo Letelier - UH Graduate Student
John Dore - UH Graduate Student
Sean Kennan - UH Graduate Student

Daily Reports

July 21, 1993

M/V Na'Ina docks at UH Marine Facility, Snug Harbor to begin refit. A
portion of the starboard railing near the bulkhead had already been cut
off to provide an opening for the CTD trolley system. At 1200, 3

laboratory vans were loaded on deck, as well as a trolley system for the CTD package, a hydrowinch, a hydraulic power pack, and a rope winch. The vans were mounted and welded onto pedestals at their corners. All the above items were welded onto the deck of the vessel. Other pieces of equipment such as the spar buoys, floats, lead weights and equipment boxes were loaded and secured to various places on the ship.

July 22, 1993

Electronic and laboratory equipment were loaded into the vans. Items were moved around to make best use of the limited space available on the ship. Electrical power was supplied to the trolley system, hydrowinch, rope winch and vans. Hydraulic and electrical components of the hydrowinch were installed. It was planned to set sail the following day for the test cruise, however, the hydrowinch was not completely operational and no testing on it had been done. Additionally, a crutch to support the crane while acting as a point of support for the hydrowire had not yet been installed. Sailing day was set for July 24.

July 23, 1993

The hydrowinch was fully installed and tested. In addition, the vans were chained to the pedestals they were mounted on. The CTD frame was lowered over the side of the ship and the position of the crutch was determined. The crutch was fabricated and installed. A series of tests were made using the CTD frame to determine the best method to conduct a safe deployment and retrieval. I was satisfied with the results of the tests and the final layout of the equipment on the ship. It was the best we could do given the type of vessel we had to configure. I scheduled departure time for the test cruise at 0800, July 24.

July 24, 1993

We departed at 0800 with all hands on board. The test site was 3 miles off Barbers Point, Oahu where the bottom depth was about 800 fathoms. The skies were overcast and it was raining. The remnants of Tropical Storm Doris was just crossing the Hawaiian Islands at this time. We were experiencing 8 foot seas and strong winds. We arrived on site at 1000 and began a 500 pound weight cast to 1000 meters. After the weight cast, a series of frame "dunk" casts were conducted to work out deployment and retrieval procedures and familiarize the personnel with the operation. After the frame cast, we attempted to deploy the sediment trap array from the stern. It was a difficult procedure under the sea conditions we were experiencing and I decided to stop the procedure after the weight and line had been paid out. Retrieval of the complete package would have been very difficult under present conditions. During this time, the CTD electronics and 3 bottles were being assembled on the frame. A CTD cast was conducted to 250 meters and some water was collected. Throughout all these operations the deck was constantly awash and it was difficult to move about. We left the test site at 1500 and arrived at Snug Harbor at 1700. Due to the difficulties we experienced on board ship while trying to execute the

operations, as well as the presence of another storm system (Tropical Storm Eugene), I decided to conduct HOT-48 on July 26. The ship was definitely not capable of sustaining the operations under the conditions we experienced today.

July 25, 1993

A few additions to the ship were made. Chains were strung over the railing and stern as a safety measure. Cleats were welded onto the deck to provide support for the tag lines used during deployment and retrieval of the CTD package. A plastic pipe was used to cover the electrical wiring from the ship to the laboratory vans. Work vests were borrowed from the R/V Kila.

July 26, 1993

I had scheduled sailing time at 0800. Upon arrival at Snug Harbor I was told that the crew of the ship were being held at their office by the US Coast Guard for random drug tests. The crew finally did arrive and we set sail with all hands at 1100. We were experiencing 4 foot seas and moderate winds on the leeward side of the island. We reached Kahe station at 1400 and conducted the first CTD cast. During its retrieval however, it was found that the hydrowinch could not bring the full package (all 24 bottles filled with water) from the sea surface onto the deck of the ship. Any attempt to lift the package out of the water with the winch would result in the package slipping back. The winch would not even hold the package with its breaks when the package was out of the water. We tried repeatedly to retrieve it using a combination of the ship's crane and the winch. In the process the CTD package hit the side of the ship and hung onto the deck of the ship with the sampling bottles. We damaged 3 bottles in the process. The package was finally brought on deck but not without extreme effort and considerable risk to the personnel. Sea conditions were relatively mild this day but I certainly would not do these operations again under similar conditions. After sea water samples were taken, I decided to return to Snug Harbor and have the hydrowinch looked over the following day. We set sail for Honolulu at 1700 and arrived at 2030.

July 27, 1993

UH Marine Facility personnel looked the hydrowinch over. It was found that the winch had to be in low gear to lift the package onto the ship. Previous instructions to keep the winch in high gear throughout its operation were not correct. The truth is, none of the marine center STAG personnel were aware of the proper gearing of the winch. I had set sailing time at 1200 today but after checking the weather reports, I decided to call today a weather day due to the presence of strong winds (25 knots) and high seas (18 feet) at Station ALOHA. In retrospect, similar weather at Station ALOHA the previous day would probably have forced us to return to Honolulu. Marine Facility personnel raised the hydrowinch power pack onto stilts due to the

amount of wash on the deck each time we sailed. More lead weights were loaded onto the ship to conduct a 1500 pound test weight cast. I scheduled to set sail the following day.

July 28, 1993

We departed Snug Harbor at 0800 with all hands on board. We arrived at Station Kahe at 1100 and commenced with a 1800 pound weight cast to 1000 meters. The hydrowinch was unable to maintain a winch rate of 60 meters per minute during the upcast at high gear. We had to switch to low gear and maintain a speed of 35 meters per minute. This was not a desirable speed but there was little we could do to improve it. After the CTD cast, it was discovered that the heat exchanger of the powerpack's cooling system was not attached. A cooling system using the ship's seawater outlet (actually a fire hose outlet) was rigged to provide coolant to the power pack. After modifications to the power pack were made we set sail for Station ALOHA. Weather reports from NOAA showed high seas and strong winds in the channels and further north of the island. I decided to continue towards ALOHA and assess the situation once we were further north of the island. Sea conditions worsened once we hit the channel and remained generally rough with strong winds once we had gone past Kaena Point. We were experiencing twelve foot waves and 25 knot winds gusting up to 30 knots. I decided to stop the ship twelve miles northeast of Kaena Point and check wind and sea conditions and determine if we could conduct CTD operations. Floating arrays were already canceled. The rough and high seas combined with the wind were totally unacceptable and beyond the safety standards we had set. New weather reports showed that these conditions would remain until Friday due to the presence of a high pressure system to the north which was moving east. I decided to return to Honolulu to wait out the bad weather.

July 29, 1993

HOT PI's (JGOFS and WOCE) held a meeting to assess the situation and analyze weather reports at the UH Department of Meteorology. The high pressure system was continuing westward and better weather was predicted starting July 31. July 30 was to be called a weather day. Sailing time was set for 0030 on July 31 and operations will be restricted to CTD and water sampling. No biological experiments will be conducted. All unnecessary equipment would be unloaded the following day. Later in the afternoon, the HOT PI's individually received an internal memo from the participating graduate students stating their assessment and concern over safety aspects of the M/V Na'Ina and their refusal to join the science party on the ship. Due to the lateness in the day, HOT PI's were unable to meet to discuss the situation. Discussions were set for the following day.

July 30, 1993

HOT PI's met at 0830 to assess the situation regarding the internal memo addressed to them. The loss of 3 personnel from the science party would make operations, even scaled down, more difficult. The memo

itself created anxiety among the science party which was already under stress from the previous attempts at sea. Furthermore, the memo raised the question of operational safety onboard the M/V Na'Ina based on previous efforts to conduct CTD operations and the general outfit of the ship. Although the HOT PI's believe that given good weather conditions it would be possible to do a limited amount of work, a decision was made to end the charter based on the increased liability to the PI's for any mishap that could occur. UH Marine Facility was informed of the decision and this was communicated to Auakewai. Unloading of the ship commenced at 1000 and was completed at 1600. HOT-48 was history.

General Summary and Assessment

The M/V Na'Ina severely limited the operational capability of the program. Even under ideal sea and weather conditions, only a limited amount of work could be achieved. Unfortunately, weather conditions during the period of the charter did not allow us to conduct even the limited amount of work planned. The safety of the science party and the equipment was my primary concern in all aspects of the cruise and at all times. It was also the position of the HOT PI's that I be conservative in my judgment of the situations we faced at sea. Despite our efforts to prepare the vessel for oceanographic work, inherent aspects of the ship compounded with equipment difficulties gave us very little room for error and almost no flexibility.

It is unfortunate that our experience with the M/V Na'Ina had to be as such. It's use during HOT-21 was also unsuccessful. Based on that experience, it was the position of the HOT PI's that the vessel was unsuitable for oceanographic purposes. At that time, the ship was not as well prepared for our kind of work. Through unforeseen circumstances, the program was left with no choice but to attempt a cruise this year on the same vessel. JGOFS and WOCE personnel spent a considerable amount of time (close to 2 months) planning this cruise (HOT-48) and setting it up. It was hoped that the weather and sea conditions during this summer would open up for us a window of opportunity, however narrow, in which to conduct our research. We were not that lucky.

A final comment on the safety aspect of this cruise. From the standpoint of legality, the vessel had passed both US Coast Guard and UNOLS safety standards specifically established for charter vessels. The assessment of safety, however, is also an operational parameter. This parameter has to be assessed under the changing conditions of the environment. What is operationally unsafe at one time would be considered safe at another time. The use of the M/V Na'Ina restricted the safety boundaries of operations. A good oceanographic vessel should allow safe operations under a wide range of conditions. The M/V Na'Ina was definitely not one and we should not convince ourselves that it could be.