

Standard Operating Procedure - Underway Geophysics Lab

Nov. 2003

The Underway Lab technician shares his/her duties between the Core Lab and the Underway lab. This SOP only addresses the Underway Lab duties per se. For details on the Core Lab duties, refer to the Core Lab SOP.

I. PORT CALL-ON COMING

- Cross over with the off going Underway technician. Read the lab report from the previous leg and discuss any changes in computer, software or procedures.
- Attend introductory meeting or any other safety or training meeting.
- Assist with loading/unloading freight and other tasks as directed by the Lab Officer (LO) or the Assistant Lab Officer (ALO).

Additionally, the following tasks are to be done in port call:

- Check with Lab Officer to see if lab power will be maintained during the entire port call. If not, shut down the SUN computer systems.
- Clean-up Winfrog PC's old files and directories if not already done, check free space.
- Set up new Leg directories.
- Check Winfrog set-up: configure devices, enter waypoints, survey lines (if known) and set up first transit event. Record data to verify proper operation. Reboot Winfrog PCs to verify proper operation and passwords (underway).
- Check the Underway account on the Sun computers (Ross and Hess), make sure Site_fix.pro,disp, a2d, and gmt are available (see Cookbook). Remove unnecessary files. Run a2d to verify operation. Log on to Ross and Hess as root to verify the password has not changed (login: underway, password: underway).
- Synchronize Datum clock, Hess, Ross, and Winfrog PCs with the GPS clock.
- Check calibration of digital depth meter on 3.5kHz EPC.
- Check bridge, Userroom and Co-Chief office Winfrog PCs.
- Stock supplies such as printer, plotter, recorder paper, pens, etc.
- Check paper in the recorders. Make sure there is enough and that it is properly aligned.
- Post underway watch schedule, find out from the Lab Officer when watches will start and notify personnel.
- Print a big supply of Underway Transit Log sheets.
- Set up the Excel Depth spreadsheets on Winfrog2.
- Put out a copy of the UW Watchstander Guide.
- Prior to transit, warm up the PDRs by switching them on STAND BY.

II. SITE PREPARATION (DURING TRANSIT)

Most of the Underway technician's work is accomplished during transit. The following is a list of actions that are accomplished at the start of a transit and during a transit.

Start of Transit

- Start a transit event collection on WinFrog.
- Start the U/W Watch application on WinFrog 2.
- Start the EPC recorders for 12.0 and 3.5 kHz. Switch the CESP's and the PTR's ON.
- When the speed is high enough (> 6 kts), ask the Bridge for a permission to put the magnetometer out. Once it is in the water, call the Bridge and confirm the deployment, turn it on, initialize it on the U/W Watch application and tune it from WinFrog.

During Transit

- Check EPC operation. Keep an eye out that pulse lengths, widths, gains and delays are correct. Annotate the recorders daily to make sure the delay is correct. Verify range and perform a depth check if necessary.
- Plot the ship's track on the bathymetric chart.
- Check the Underway Log sheets daily for errors.
- Check the Excel depth file for errors, backup file somewhere safe.
- Keep track of the transit mileage.
- Check the records for proper annotation.
- Change the paper in the Line Scan Recorders when needed.

III. ON SITE (SEISMIC SURVEY)

The following is a list of actions that are accomplished when approaching the site and once on site (no survey). See the last section of this document for a description of the actions that are accomplished on a seismic site survey.

- Keep track of expected arrival time and pull the magnetometer in before arrival at the site. Notify the bridge when the magnetometer is in.
- When the ship is positioned over the beacon, get an accurate PDR depth corrected with the Matthew's tables for the Operations Manager.
- Once on site, stop the event collection for the transit in Winfrog and start a new event collection for the site position fix.
- **End of Hole:** Run Site Fix program on the SUN at the end of each hole and check the results by comparing them to the Dynamic Positioning data. Give results to the Operations Manager, Staff Scientist, Lab Officer and Yeoperson.
- **End of Site:** Enter the Winfrog waypoints for next transit and start a new event collection file for the transit.

For more details, see the Underway Geophysics Lab Procedures cookbook.

IV. LAB MAINTENANCE

- Keep the lab clean. Take trash to the appropriate containers when needed.
- When changes in equipment configurations or procedures happen, update the cookbook files.
- Make note of any equipment maintenance or upgrades in the Maintenance Log notebook.
- Perform a physical count on the water gun and air gun parts at least once a leg.
- Keep the fantail clean and perform appropriate maintenance on all equipment. Service the water guns and the air gun as soon as possible after a survey to avoid corrosion. For servicing the guns, see the cookbooks for S-80 water guns and PAR-1500 air gun.

V. END OF LEG ACTIVITIES

- Write the technical report. Include Survey distances and the time devoted to seismic surveys and vertical seismic profiles (VSPs).
- Clean the lab paying special attention to the floor for it can accumulate a lot of grease and rust from the decks.
- Take trash to the appropriate containers
- Stock the lab.
- Give the Lab Officer a list for port purchases if any.

LAST DAY

- Quit Winfrog event logging.
- Copy WinFrog navigation files, the depth file, magnetometer and survey data on a 4 mm and an 8 mm tape. Place the tapes in the data drawer in the lab. Make an additional copy of the 4 mm tape to send back to ODP in the Prime Data box.
- Pack and label (Leg, Line, recorder id) all underway data, organize by line number and give to the Yeoperson or ALO. The following items are to be sent back to ODP in the Prime Data box:
 - The 3.5 kHz and 12 kHz recordings
 - A 4 mm data tape (nav, raw, depth, mag, surveys)
 - The logsheets
- Make sure all non-essential data are erased from the hard disks of the Sun, MAC and PCs.

At the end of the Leg, it is usually the responsibility of the Underway Technician to clean the Underway Lab and the guns on the Fantail. The lab should be cleaned as follows:

- Vacuum all the shelves and wash thoroughly shelves and cabinets.
- Clean the desk and the stereo system.
- Clean all monitors, keyboards AND mouse pads.
- Clean the lights and vents.
- Vacuum the chair seats and wash their feet.

- Vacuum and scrub the floor.

VI. PORT CALL—OFF GOING

- Crossover with the oncoming Underway Technician. Make sure the technician that is replacing you is aware of any changes made to the computer, software, procedures, and if port purchases are necessary.
- Attend port call meeting.
- Unload off going air freight and frozen shipment, or any freight as required. Load on coming freight if time permits.

SEISMIC SURVEY

(Picture of Seismic set-up goes here)

PRE SURVEY

- Ask the co-chiefs for the survey line (with waypoints) and desired ships speed. Ask them to give a copy of the survey line to the bridge well in advance of the survey (or you can bring a copy of the proposed survey line to the bridge).
- Ask the co-chiefs to take into account that the underway lab needs about 30 min to 1 hour for equipment testing before the survey. Some questions to ask the co-chiefs:
 - What is the expected water depth?
 - What is the expected length of survey?
 - What filtering to use on both the analog recorders and the SUN?
- **Special Note:** If time permits, it is optimal to allow about an hour during the transit to the site to slow the ship to survey speed in order to fully test all of the equipment. It is not possible to fully test the water guns without firing them under full pressure in the water. If the guns fail just prior to a survey, there is no time to fix them.

EQUIPMENT SET-UP

- Enter survey line to WinFrog
- Sync the clocks (Datum, SUNs, PCs) to match the WinFrog time
- Test the SUNs, load new tapes
- Check the Analog 1 and 2 recorder paper supply and turn them on. Annotate.
- Turn on gun trigger box, streamer box, oscilloscope, filtering devices and the amps. Typical settings: **Wavetek** Lowpass = 250Hz, Highpass = 20Hz, **Krohn-Hite** bandpass 30-150Hz
- Test that WinFrog trigger signal gets to fantail, check that guns solenoid clicks (no air to the guns please)
- Test that signal comes in from streamer
- Inject signal from signal generator, check that output is good from amps, filters and that A2D and analog 1 and 2 recorders are working correctly. The test signal should be approx 10mv

amplitude and the frequency should be on the low end of the bandpass for better visibility of the sine wave.

- Put the S-80 water guns in the water (charge with 500lbs pressure first)
- Let out streamer
- Check streamer signal on oscilloscope. Make sure the signal is not clipping.
- Start WinFrog trigger and test fire the guns, check that the signal to SUN is <5v (disconnect trigger from SUN)
- Stop WinFrog trigger, set up A2D.
- Reconnect Sun, load new tapes, start A2D. A2D must be started before WinFrog trigger if shot numbers are to be coordinated.
- Start WinFrog trigger and event logging
- If running two guns, adjust gun delays. This can not be done if you are using WinFrog to trigger the system.
- Set delays, if necessary, on Analog 1 and 2 recorders

DURING SURVEY

- Keep track of times and shot numbers for the start and stop of the survey as well as any waypoints.
- Watch delays
- Check amplified streamer signal on oscilloscope, adjust amplifier gains if necessary (i.e. shallowing water, extra gun firing).
- The quality of records obtained in shallow water can be improved by reeling the streamer in closer to the ship. This has to do with the incident angle of the reflected shots relative to the streamer.

AFTER SURVEY

- Quit A2D after survey, check that data writes to tapes (4 mm and 8 mm), write protect tapes, run checktape to verify data
- Disconnect air supply to the guns
- Annotate records
- Pull in the guns and streamers, rinse off with fresh water.
- Make a back up of WinFrog navigation dat and raw files on Tech in the Underway\Safe folder
- Turn off power to survey equipment

LATER AFTER SURVEY

- Fill out data collection summary sheet
- Run SIOSEIS on seismic data, pass on to co-chiefs. The initial process should include filter, agc, and water column mute. Plot on plotter. Further processing is usually done by the scientists.
- Produce ship's track using GMT program on Sun

For more detail, see the Underway Geophysics Lab Procedures cookbook.