

Land Survey Vibroseis Party

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ONGC's first and till now the only contract land seismic crew operated in Iraq from 1.6.76 to 27.2.78. It covered of 2655 kms of reflection work using vibroseis technique in the highly sandy deserts of southern Iraq.

First five days were spent of experimental work and full dress rehearsals to meet "zero error", a slogan of the party. This slogan was coined as part of the cost control measures as ONGC was to be paid on line km basis under stringent quality control. The rate per kilometer was such that it did not allow for any laxity of faltering in technical performance. Inventory of men and material had therefore to be kept minimum, and at the, same time it had to be ensured that there was little equipment or machinery breakdown. For achieving this, the party had just sufficient repairmen and even a medical man in the camp to look after the personnel's health.

Planning such a survey was a tussle between what is too much and what is too little. We were to work in a desert area for removed from civilization. All material for daily consumption had to be transported and stored in the cam. Highlight of the work was the extreme of the temperature from -5 degree centigrade in the wintry nights to 55-60 degrees centigrade in the afternoon of summers. Many a time rescue teams were sent to locate and provide succor to a group of persons lost in heat and dust. Some patches of desert were so bad that bulldozers were used to pull the vibrators.

One aspect where the ample caution used proved inadequate was in keeping the documentation on import and export of equipment and spare parts as it was against the law to leave any junk in their country. We had to prove at the end of the project that everything we had was initially imported against proper licenses and that nothing was being left behind.

The crew excellent relations with the Iraq National oil Company (INOC) under whose jurisdiction and overall control the work was done Mr. S.N. Sengupta, GM (Overseas) did most of the planning and monitoring on ONGC's side. All members of the crew till today remember Late Mr. Sengupta for his vigilant guidance and encouragement. He conducted the negotiations on ONGC's behalf for this contract and he took all precautions to make the work a success.

As this was the first chance for ONGC to prove its mettle in a contract job abroad, ONGC accepted the best rate they could get. In spite of the various problems Land Survey Vibroseis Party managed to complete this 21 months long operation smoothly with only 15 maintenance/breakdown days. As against the prediction of many, the party brought home a reasonable profit. Credit goes to Shri Ranvir

Singh Party Chief and his team. INOC was so satisfied with work that they extended the scope of work from 2000 kms. To 2600 kms.

Previous work in an adjoining area had shown reflections upto 2 sec using dynamite as a source but the data was badly fogged by noise. A number of geophone and shot patterns had been tried with little success. Anticipation was that a properly designed and executed vibroseis survey would improve the data to the desired level. LSVP had Foru Failing Y-1100 vibrators, A SUM-IT VI 1 recording seismograph besides other essential accessories like cables, geophones, VHP sets for line communication, HF sets for communication with the base.

Noise studies carried on the first day of experimentation showed that the noise frequency range from 10 Hz to 35 Hz and the wavelength range from 10-180 meters. This was tackled well by having 48 geophones per group, arranged in four rows parallel to the line, each consisting of 12 geophones 10m apart, and one row separated from the other by 5m with a lateral shift of 5m. Further improvement in suppression of the still present frequencies/wavelengths of noise came with optimization of vibrator pattern and sweep characteristics. Vibrator pattern used had to be varied sometimes depending on the area but the most commonly used pattern was a rectangular box (3x2x6) i.e. three vibrators together give 2 pops, move ahead by 15m and give another set of pops, and in this manner occupy a total of 6 positions per record giving a total of 36 sweeps per record.

For adequate control on near surface static correction, short bi-directional refraction profiles were run every 4-5 kms along the line. A simple two layer model gave spot values of weathering velocity, thickness of weathering, and sub-weathering velocity and hence the datum correction to the datum. These velocity data were plotted on a map and contoured to generate a smoothed picture for picking the values to be used at intermediate pickets. Contouring also-helps in locating any error in interpretation of data. Interpretation can be avoided in this manner. An assumption that the top of sub-weathering is reasonably smooth surface helps in fixing the thickness of weathering at the intermediate pickets.

Topographic survey in a barren country where long straight lines of 100-150 kms had to be laid on ground with precision required a special procedure. The party used a T2 theodolite for azimuth determination by astronomical observations on the Sun. Grid bearing was calculated from the topographical map. After allowing for convergence, the observations of the azimuth were used to relay the line on the ground. T0 theodolite was maximum loop closure in elevation was only 3 cms per km.

Final Words

This paragraph is normally for acknowledgment and thanks. The author also wishes to use this space for the same and thank all those connected with this work and congratulate all the erstwhile members of LSVP.