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SAVING ON THE COST OF PERSPEX LINER USED IN SEDIMENT CORING OPERATIONS

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Abstract

The use of polythene tube inside the expensive perspex liner in sediment-coring operations helps avoid longitudinal splitting of the perspex liner so that the latter can be repeatedly used. The merits and demerits of such a practice are discussed. After weighing the pros and cons, it is found that the use of polythene tube brings down the recurring expenditure on perspex liner practically to nil and at the same time it offers many advantages.

Introduction

In the collection of sediment cores in marine and other under-water environments, a perspex liner is usually placed inside the metallic tube of a sediment corer to avoid contamination and to remove the sediment easily. However, the sediment collected is taken out only after the longitudinal splitting of the perspex liner. Since the liner material is expensive, collection of a large number of cores on a routine basis involves large expenditure on perspex liner—large not for Universities/Institutions bestowed with adequate research grants, but for those with meagre financial support for research activities. (Incidentally, the author carried out this investigation to evolve a procedure to save on the cost of perspex liner when he did not have any research project on hand to finance collection of sediment cores).

Materials and Methods

To start with, rigid PVC tube (used for water supply and drainage lines) was tried. But the standard diameter (in which these tubes are manufactured and available in Mangalore) was found unsuitable for the corer; the required diameter being 3.3 cm for Phleger type sediment corer. Even if a PVC tube of appropriate diameter is obtained, it would pose the following problems : 1) Since the PVC tube is opaque, sedimentary structures are not visible and logging the core immediately after collection is not possible unless the PVC tube is split longitudinally, and 2) If the core is not freeze-dried immediately after collection, cations in the pore water will diffuse to other layers of the sediment column due to removal of sediments from the original environment. Therefore, a proper study of pore water chemistry on such a core cannot be carried out. Because of these problems, the possibility of using a polythene tube inside the perspex liner was explored.

A polythene tube of suitable diameter and length was graduated at 1 cm interval using a marking pen and inserted into the perspex liner that was previously wetted with water. Since polythene is a flexible material, inserting it into the perspex liner was easily accomplished by using a metallic wire as leader. This is similar to the way electricians put a galvanised iron wire first into the PVC pipe for final insertion of silk wire. Keeping one end closed, the polythene tube was inflated by blowing air into it through the other end. This made the polythene tube stick properly to the perspex liner. About 5 cm of both the free ends of the polythene tube were cut into a number of longitudinal strips. These strips were turned outwards to rest on the outer surface of the perspex liner and tied securely with a thread. It took less than 10 minutes to ' prepare ' one perspex liner. This arrangement was used in the

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sediment corer and the coring operation was carried out off Mangalore in the usual way.

After hauling up the corer, the metallic tube was dismantled from the main body of the corer in a vertical position. Sediment particles were allowed to settle down from the water that remained on top of the sediment column. The supernatent water was removed and the perspex liner taken out. The procedure now onwards can be done either on board or onshore, depending on the needs and sampling schedule of individual scientists. The threads were untied and the polythene tube was carefully pulled out. Both ends of the polythene tube were tied with thread to avoid contamination and loss of pore water due to evaporation. The core was sub-sampled at required intervals by making incisions on the polythene tube and then cutting the sediment material with a blade of stainless steel/synthetic material to avoid contamination. The subsamples were stored in separate plastic bottles for laboratory studies.

Depending on the sample collection program, as many perspex lines as required can be kept ready with polythene tubes inserted into them (as described above) before going to sea. This will save the time required to 'prepare' perspex liners on board. The time saved is even more when there is rolling and pitching.

This procedure has been successfully used for collecting sediment cores off Coondapur and Mangalore for carrying out geochemical studies on sediments of these regions (Hegde, 1986; Karbassi and Shankar, under preparation).

Advantages and Disadvantages

This method of collecting cores using polythene tube has the following advantages and disadvantages:

Advantages

1. Polythene tube costs $< 1\%$ the price of perspex liner (the cost of these being ca. 30 paise and Rs. 40/- per foot respectively in 1983). This means a substantial saving on the perspex liner expenditure.
2. Unlike in PVC tube, immediate core logging is possible and sedimentary structures are visible through the transparent polythene tube.
3. Since the core can be sub-sampled soon after collection and stored in separate plastic bottles, there is no 'within-the-core' diffusion of ions present in the pore water. However, it may be better to freeze-dry the subsamples so that pore water chemistry even within the sub-samples would not change.
4. Compared to perspex liner, polythene tube is easily available in the market in most towns and cities. Moreover, hundreds of metres of polythene tube material can be rolled up and stored in a small space.
5. If the practice of using polythene tube is adopted, there is no need to have a core-splitting device in the laboratory. The time required for splitting the core can also be saved.

Disadvantages

1. Care has to be exercised while handling the polythene tube containing the sediment until sub-sampling is done. The method suggested in this paper would inevitably involve some distortion of the sample.
2. One cannot have the samples in the form of a core for preserving sedimentary structures, for x-radiography and other purposes, *if* sub-sampling is done on board.

3. Some extra time is needed to 'prepare' the perspex liner (< 10 min./liner). But this is quite insignificant.

Conclusion

The use of polythene tube inside the perspex liner during coring operation is found to have many advantages over the conventional method. The most significant advantage is that there is no recurring expenditure on procuring the expensive perspex liner. This is particularly important and pertinent in the Indian context – Scientists use public money in the form of research grants for various research activities. This being the case, and given the economic condition of this country, every effort should be made by researchers to judiciously use the grants and to cut down the expenditure on research *without* sacrificing the quality. It is hoped that the idea presented in this paper will provide the impetus for efforts in this direction.

Though this work was done using a Phleger type corer, the same idea can probably be used for gravity corers of bigger size with the same advantages mentioned above. May be a polythene tube of greater strength and/or thicker guage can be used inside the PVC tube in such bigger corers. As pulling out the polythene tube from large gravity corer is quite difficult without distorting the core, the suitability of this method in large gravity corers needs to be tested.

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Announcement

INSA Medal for Young Scientists 1989. Instituted by the Indian National Science Academy in 1974, the Medal is awarded annually in recognition of outstanding work of scientists below the age of 32 (as reckoned on 31st December preceding the year of award). Only those **born on or after January 1, 1957** are eligible for consideration in 1989. The work done in India by the nominee will be taken into consideration for the award.

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