

# TECHNICAL REPORT

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## A VAN VEEN GRAB SAMPLING METHOD

by

HAROLD H. STUBBS  
DARIO W. DIEHL  
G. PATRICK HERSHELMAN

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SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT AUTHORITY

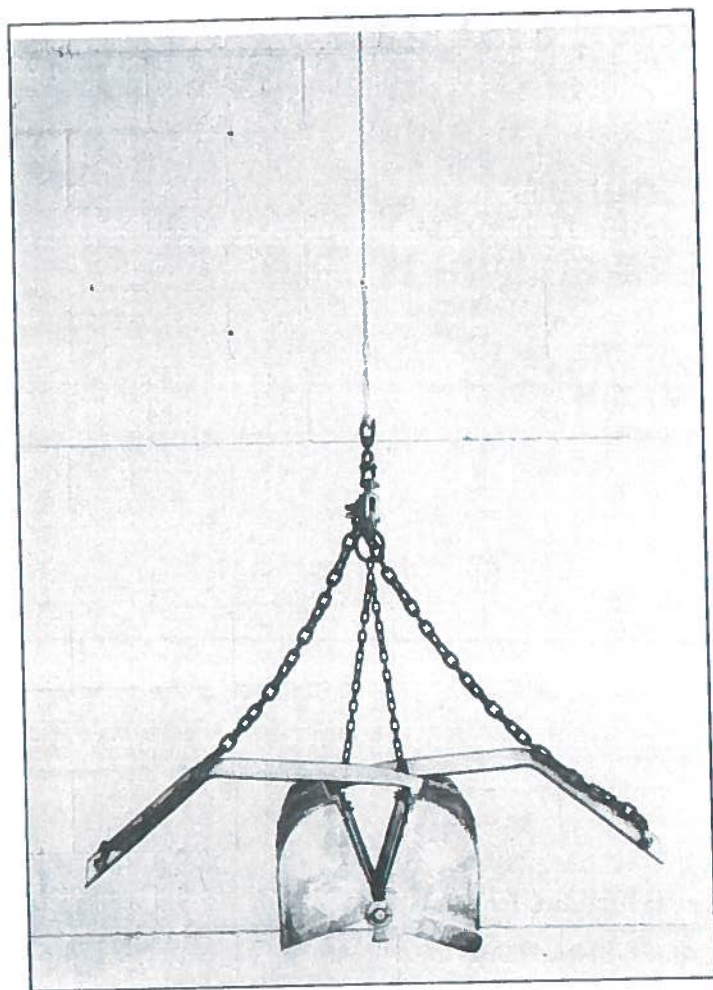
646 W. PACIFIC COAST HIGHWAY, LONG BEACH, CALIFORNIA 90806



## INTRODUCTION

The objective of the Van Veen grab is to obtain a soft bottom or mud sample of the sea floor for chemical, physical, or biological analyses. Upon deployment, the grab is held open by a chain that releases when the grab contacts the sediment. As the retrieving cable attached to the grab is tightened, lever arms force the bottom edges together and hold the sampler shut.

The grab samples a 0.10 m<sup>2</sup> area of the bottom. The grab weighs 39.9 Kg; the cocked height is 0.97 m and tripped height is 1.83 m (Figures 1 and 2). Southern California Coastal Water Research Project (SCCWRP) modified the standard Van Veen by attaching two 0.5 mm screened flap valves in the top of the grab that permits water to flow through on descent, but seals the grab shut upon retrieval, thus preventing loss of sample. The screened flaps are opened on deck for inspection and subsampling of the sediment for chemical and physical analyses. Bulk sediments for laboratory experiments are also obtained with the Van Veen. The relationship between penetration depth and volume is shown in Figure 3.



**Figure 1.** Chain-rigged Van Veen grab in the cocked position prior to sample collection.

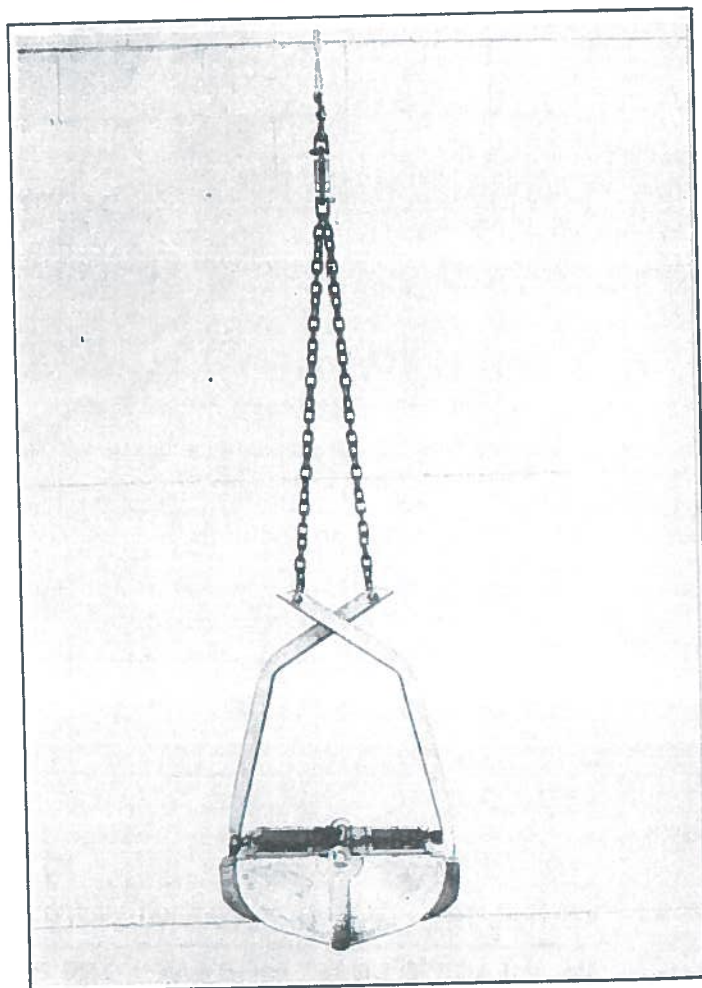
## DATA

Data collected at the time of sampling include: date, water depth, grab penetration, sediment type, sediment smell (e.g. hydrogen sulfide, petroleum), types of samples collected (e.g. organics, metals), and station location (latitude and longitude and loran-C numbers). A grab data form is included as an example (Figure 4).

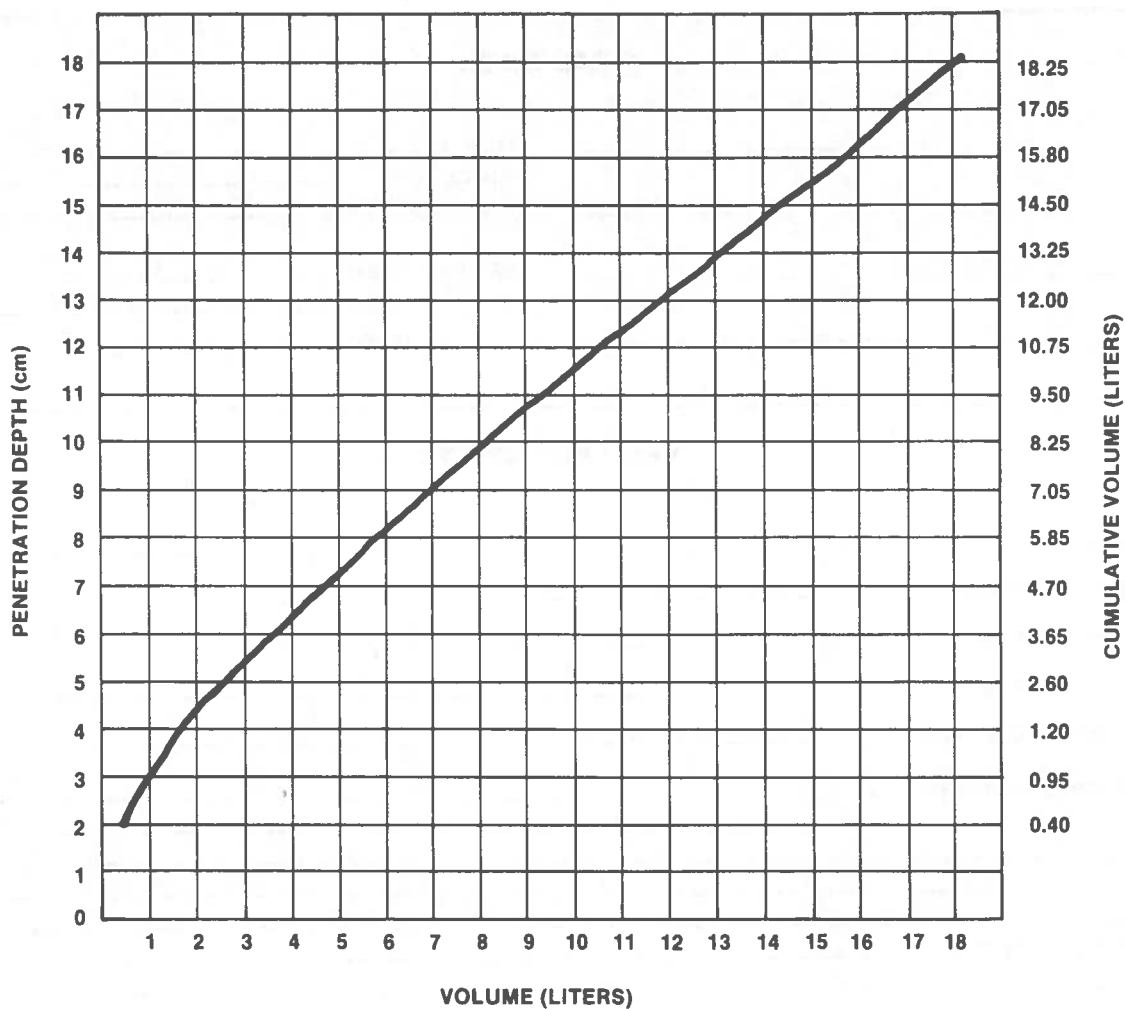
Our rule is to reject a grab with a penetration depth of less than 10 cm. Penetration depth in some bottom types (e.g. sand and clay) and localities (e.g. sides of canyons) can be a problem. Depending on survey requirements, after four attempts, a penetration depth of less than 10 cm is accepted for chemistry samples, or the grab station is moved to a suitable location.

## CHEMISTRY

Sediments for chemical analysis are collected by randomly subsampling undisturbed surface material with a modified syringe. A 50 cc plastic syringe with the end cut off (5.3 cm<sup>2</sup> opening) is used to subsample surface



**Figure 2.** Van Veen grab in the tripped position when sediment sample is brought on board ship.



**Figure 3.** Penetration depth (cm) versus sample volume (liters) for a modified Van Veen grab sampler (0.1 m<sup>2</sup>). (H. H. Stubbs, 1987.)

material, generally the top 2 cm of sediment. Each sub-sample plug has a volume of 10 cc. Fifty cc are taken for organic contaminant analyses; a 100 cc subsample is taken for metals, grain size, and total volatile solids analyses. Subsamples for organic contaminant analyses are placed in kiln cleaned glass jars with acid-acetone washed teflon liners between the lid and jar. Subsamples for metal analyses are placed in 150 ml polystyrene cups and capped. All chemical subsamples are placed on dry ice until they are returned to lab, and stored frozen until subsequent analysis.

The contents of the grab are gently washed through a stacked set of 1.0 and 0.5 mm screens. The retained material is placed in whirl packs or plastic jars and fixed with borax-buffered formalin diluted to 10% with seawater and returned to the lab. After 48 hrs in formalin, the sample is rinsed with tapwater and preserved in 70% ethanol.

## BIOLOGY

A separate grab is taken for biological analysis. A grab is considered acceptable for infauna if it has penetrated 10 cm. Over 95% of individuals and 90% of the species in southern California occur in the top 10 cm (Word et al. 1976; Word 1977).

## GRAB DATA

Area \_\_\_\_\_ Date \_\_\_\_\_  
Station \_\_\_\_\_ Arrival Time \_\_\_\_\_  
Loran C \_\_\_\_\_ Completion Time \_\_\_\_\_  
Vessel \_\_\_\_\_ Weather (wind) \_\_\_\_\_  
(sea) \_\_\_\_\_  
(sky) \_\_\_\_\_  
Scientific party \_\_\_\_\_

## VAN VEEN GRABS

|                   | I | II | III |
|-------------------|---|----|-----|
| Water depth       |   |    |     |
| Grab penetration  |   |    |     |
| Sediment type     |   |    |     |
| Sediment smell    |   |    |     |
| Samples collected |   |    |     |

Special Problems Encountered \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Comments on the findings \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Figure 4. Grab data form.

## ACKNOWLEDGMENTS

The Van Veen grab modified by the Southern California Coastal Water Research Project is manufactured by Kahl Scientific Instrument Corporation, 737 West Main Street, El Cajon, California (Telephone 619/444-2158).

## REFERENCES

- Word, J. Q., T. J. Kawling, and A. J. Mearns. 1976. A comparative field study of benthic sampling devices. Task report to the U.S. Environmental Protection Agency (EPA Grant No. R801152), March.
- Word, J. Q. 1977. An evaluation of benthic invertebrate sampling devices for investigating feeding habitats of fish. In: Fish Food Habits Studies. C. A. Simenstad and S. J. Lipovsky, eds. pp. 43-45. University of Washington, Sea Grant, Seattle, Washington.