

Chapter 24

CARE, RETENTION, AND DISPOSAL OF DRILL CORE, SOIL, AND ROCK SAMPLES

General

These guidelines for the care, retention, and disposal of drill core, soil, and rock samples apply to (1) foundation exploration for structures, such as dams, canals, tunnels, powerplants and pumping plants, (2) construction materials investigations including riprap and borrow, and (3) safety of existing structures investigations. Sample retention and disposal guidelines for concrete aggregate, pozzolan, land classification, drainage (except for drainage structures), and hazardous waste studies are excluded.

These guidelines are intended to maximize care of samples and cores, minimize storage costs, meet minimum technical requirements, and avoid unnecessarily long storage periods. Special circumstances or needs may require modification of the guidelines.

These guidelines apply to rock and soil core and samples taken without special sampling sleeves, tubes, or containers. When undisturbed samples taken in sleeves or containers or undisturbed hand-cut samples are specifically intended for laboratory examination or testing to supply design data, the samples should be taken, prepared, cared for, and handled in accordance with USBR 7100 [1] and USBR 7105 [2]. Undisturbed samples should be shipped immediately to avoid deterioration and changes in physical properties. Chapter 23 describes proper procedures for protecting and shipping samples. Appropriate logs, sample data sheets, or other pertinent information should be submitted with the samples.

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Location of Storage Facilities

The preparation of an adequate log or description of the core or samples should be done before storing and subsequently disposing of samples. If the sampled material, such as slaking shales, breaks down upon drying and loses in-place characteristics during storage, it may be better to drill new holes than to store large quantities of core that will seldom be looked at or will lead to wrong interpretations if inspected or tested after years of storage.

The following are the general requirements for storage of core and samples:

1. Provide minimum storage conditions. (See the next section, "Conditions of Storage.")
2. Eliminate unsupervised storage. The storage facility should be at or near the site of a project or investigation.
3. Minimize transferring core and samples from one storage facility to another because work on a structure site or project progresses through successive stages of investigation and construction.
4. Provide accessibility so that minimum travel is required for examination of the core and samples. Frequent inspection may be necessary for design purposes and for prospective bidders on construction specifications.
5. Survey existing unused space before constructing or acquiring new space or use space initially provided for other purposes but adaptable to core and sample storage. For example, the lower

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floors and galleries of many powerplants and some pumping plants or buildings erected for temporary use during construction have storage space.

Storage During Investigations

Core and samples should be kept at the nearest existing storage facility. A new storage facility should be established only if required by the location, the amount of core and number of samples anticipated, and the duration of investigation or access convenience. In some instances during periods when actual drilling and sampling operations are in progress, temporary storage at the site may be required to facilitate logging, selection of samples, or ready reference while geologic, soils, or other field studies are in progress. Temporary onsite storage should be limited to short periods of actual need and should prevent damage or deterioration of the core and samples.

When a field office maintaining core storage facilities is closed following preliminary investigations, core and samples no longer required should be discarded (see section entitled Retention of Rock Core and Samples), and the remaining core and samples should be transferred to an appropriate location. When exploration is resumed, the core should be examined to determine whether the samples are still useful or whether redrilling is necessary.

Storage During Construction

Core and samples should be stored locally during construction. The core and samples provide foundation and materials data to geologists, designers, and construction personnel during construction and claim processing.

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At the close of construction, special samples should be selected for possible future testing (See the section on "Retention of Rock Core and Samples"). Sample selection is better when personnel familiar with the core, samples, and foundation conditions are available.

At the close of construction, arrangements should be made for continued storage of core and samples until applicable core and sample retention criteria have been met. The core and samples should remain at the local storage facility, if practical.

Storage During Operation and Maintenance

Any transfer of a structure from one organization to another should include arrangements for core and sample storage until the applicable standard core and sample retention periods are met.

Conditions of Storage

The minimum conditions for core and sample storage are:

1. Protection against wetting and drying but not against temperature changes. Cores that might be damaged by drying or freezing should be appropriately protected.
2. Protection against unauthorized access, damage, vandalism, and snake or rodent infestation.
3. Grouping core boxes and samples by drill hole number, investigation site, and project and stacking to permit reasonably easy access and examination. The core and samples should be accessible without excessive unstacking and moving of adjacent core boxes and samples. The

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safe height of core box or sample stacks depends on the strength of the boxes and reasonable ease of handling. Core box racks should be provided only when repeated reexamination and study are anticipated and when the time saved by having the boxes separated in units of four or five boxes would be cost effective.

4. The office responsible for storage should maintain adequate records including copies of final logs, photographs, inventory, and location map of the core and samples stored at each core and sample storage location. The records should include the name of the feature or investigation site, drill hole number, number of boxes and samples, and whether the cores or samples have been tested.

Length of Storage

Proposed Structures or Projects

All core and samples collected during site investigations should be kept until the proposed structure, unit, or project is built and has performed satisfactorily for a period of time or is abandoned. The following are exceptions.

Appraisal.—Core and samples obtained in investigations for dams, canals, etc., should be disposed of at the end of appraisal stage investigations, such as the abandonment of a proposed structure site or completion of reconnaissance designs and estimates, except in special cases.

Feasibility.—Disturbed soil samples from borrow pit investigations obtained during feasibility stage investigations and not used for testing should be discarded at the end of the investigations unless interest in the project is

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sufficient to ensure continuing development. If, at the end of 1 year, further development work has not materialized, the samples should be discarded on the assumption that deterioration makes tests on the samples unreliable.

Undisturbed soil samples can be discarded after 1 year.

Design Investigations and Completed Structures or Projects

Requirements for length of storage for various types of samples and core are as follows:

Borrow Pit Investigations for Design.—Borrow pit soil samples collected for design investigations should be retained until construction is complete and all claims are settled except as the samples are consumed in routine testing.

Borrow Investigations for Construction Control.—Soil samples collected for construction control investigations and field laboratory testing should be discarded after completion of the field laboratory testing and all claims are settled.

Record Samples from Fill.—Samples collected for record tests and not consumed should be retained unless the number of samples is more than necessary to represent the materials used for construction.

Foundation Core and Samples.—Foundation core and samples obtained during design and construction investigations and not consumed in testing may be disposed of when the following requirements are met:

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1. Canals and distribution systems including pipelines, minor or small engineering structures, and low dikes or embankments are trouble free for 1 year.
2. Large or major engineering structures such as dams, powerplants or pumping plants, main feeder canals, and main power conduits are trouble free for 5 years. The 5-year time period should begin after operating level reservoir filling for large dams. Representative core and samples from a few representative drill holes should be kept for the life of the structure.
3. Contractual negotiations and settlement of claims which might involve reinspection or testing of the core or samples are complete.
4. Initial safety of dams analysis, modification, and construction activities are complete.

Disposal of Core and Samples

Photographs and an adequate log or description of the core and samples should be available before disposal. When the minimum retention periods and other requirements outlined above have been met, concurrence of the design and operation and maintenance (O&M) offices should be obtained by the office responsible for the core or samples before any core or samples are discarded.

The responsible office should consider giving the State Geologist's Office, technical schools, colleges, museums, or similar groups the opportunity to select samples or retain the core.

The recommended disposal procedure is to place permanent markers in the core boxes, wrap the boxes in plastic, and bury the boxes in a marked location.

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If selected cores or samples are retained as representative of the foundation and dam, appropriate assistance in selecting the samples is necessary. Assistance can usually be obtained from the design office.

To facilitate storage, handling, and inspection, standard core box sizes and labeling procedures should be used. Core boxes should withstand a reasonable amount of careful handling, stacking, and shipping when filled with rock core.

To help identify the boxes when stacked, information should be shown on one end and the top of each core box. Temporary labeling of core boxes used while drilling a hole should be replaced with permanent labeling of core boxes which will remain legible after handling, stacking, or storing for long periods. A map or an index file of drill hole core should be maintained which shows the location of drill hole core if the boxes are stored in a large or congested storage area.

Bibliography

Bureau of Reclamation, U.S. Department of the Interior, USBR-7100, "Obtaining Undisturbed Block Samples by the Hand and Chain Saw Methods," *Earth Manual*, Part II, 3rd edition, 1990.

Bureau of Reclamation, U.S. Department of the Interior, USBR-7105, "Performing Undisturbed Soil Sampling by Mechanical Drilling Methods)," *Earth Manual*, Part II, 3rd edition, 1990.