Appendix D
Instructions for Preparing Periodic Summaries of Field Compaction Control Data on Earth and Rock-Fill Dams

D-1. Compaction Control Data Summary Forms

Summaries of compaction control data are prepared at least monthly, using tabular summary form, ENG Form 4287, and one or both of two summary plots: ENG Form 4287A for soils requiring control of both water content and density and ENG Form 4287B for soils requiring only density control.

D-2. Separate Summary Forms and Plots

Separate summary forms and plots should be prepared for (a) significantly different materials (impervious, random, pervious, etc.) used in different zones of the embankment and (b) materials compacted by different equipment (e.g., impervious fill compacted by towed rollers and impervious backfill compacted by hand-operated power tampers).

D-3. Example Summary Forms and Plots

Examples of prepared summary forms and plots are shown in Figures D-1 through D-4. Examples of appropriate entries for tabular summaries are given in Table D-1.

D-4. Summary Plot for Materials Requiring Water Content and Density Control

A summary plot for materials requiring water content and density control is illustrated in Figure D-2. Two vertical lines are first drawn on the plot to show the limiting values of water content in percentage points wet or dry of standard optimum. A horizontal line is drawn to show the desired or specified minimum percent of maximum standard and dry density. The top margin and right side margin of the plot are marked to show the limiting values illustrated in Figure D-2. The data are then plotted using symbols shown on the legend. Should an area be reworked more than once or reworked and tested more than once, only the last test result or last set of test results should be plotted. The test results are summarized in the tabulation form on the right side of the plot in Figure D-2. Total number of tests is the total number of plotted data points excluding retests and check tests. Check tests should not be included in the number retested.

D-5. Summary Plot for Materials Requiring Only Density Control

Use of the summary plot for material requiring only density control is illustrated in Figure D-4. Inappropriate labels at the top and bottom of the plot are lined out. If control is based on maximum density determined using a vibratory procedure, “STD” should also be lined out. Suitable scales are added to the plot, and a vertical line is drawn to indicate the minimum value of relative density, minimum percent of maximum standard dry density, or minimum percent of maximum dry density by a vibratory procedure, whichever applies.

PERIODIC SUMMARY OF FIELD COMPACTION CONTROL DATA

Project _____ Dam
District _____
Location of Project _____ (River)
Report No. 12 Period 5 Nov 68 to 5 Dec 68
Resident Engr S. J. Smith
Insp. or Tech J. S. Jones (Nearest town, state)

TYPE OF FILL	IMPERVIOUS (CORE)
Soil Classification (USCS Symbols)	CH, CL
Stationing of Areas Tested	14+75 to 46+50
Elevation of Areas Tested	832 to 840
Compaction Equipment	Sheepsfoot roller, Ferguson self-propelled model SP-120B (615 psi)
Number of Passes	8
Uncomp. Lift Thick.	8 in.
Roller Speed, MPH	3 to 5
In-Place Density Method (Give % of tests made with each method)	Sand Volume (90%) Nuclear (10%)*
Method of Determining Field w	Oven Drying
Method of Relating Field w to Std Opt w, and Field Density to Max. Dry Density, or Relative Density	Field results compared to laboratory compaction curve for similar soil. Appropriate laboratory curve selected by 1- or 2-point Std compaction test at field w or drier, supplemented with liquid limit test correlation
Specified Range of w (Percentage Points Above & Below Std Opt w)	Opt -1 % to Opt +2 %
(Desired) (Specified) Min. (% Comp. or Rel. Density)**	95%
No. Areas Tested	21
No. with w Outside Acceptable Limits	3
No. with Density Below Min.	2
No. with w and Density Outside Acceptable Limits	1
No. Areas Reworked	5
No. Areas Retested	4

Remarks

* Only the two "initial" tests shown on the summary plot were by nuclear method; check tests and remainder of tests were by sand volume method.

**Strike out inapplicable words.

Summary Prepared by ARG Date 6 Dec 68
Summary Checked by JSJ Date 7 Dec 68

ENG Form 4287
JUN 69 (ER 1110-2-1925)

Figure D-1. Example of a prepared summary form, field compaction control data, impervious (core)

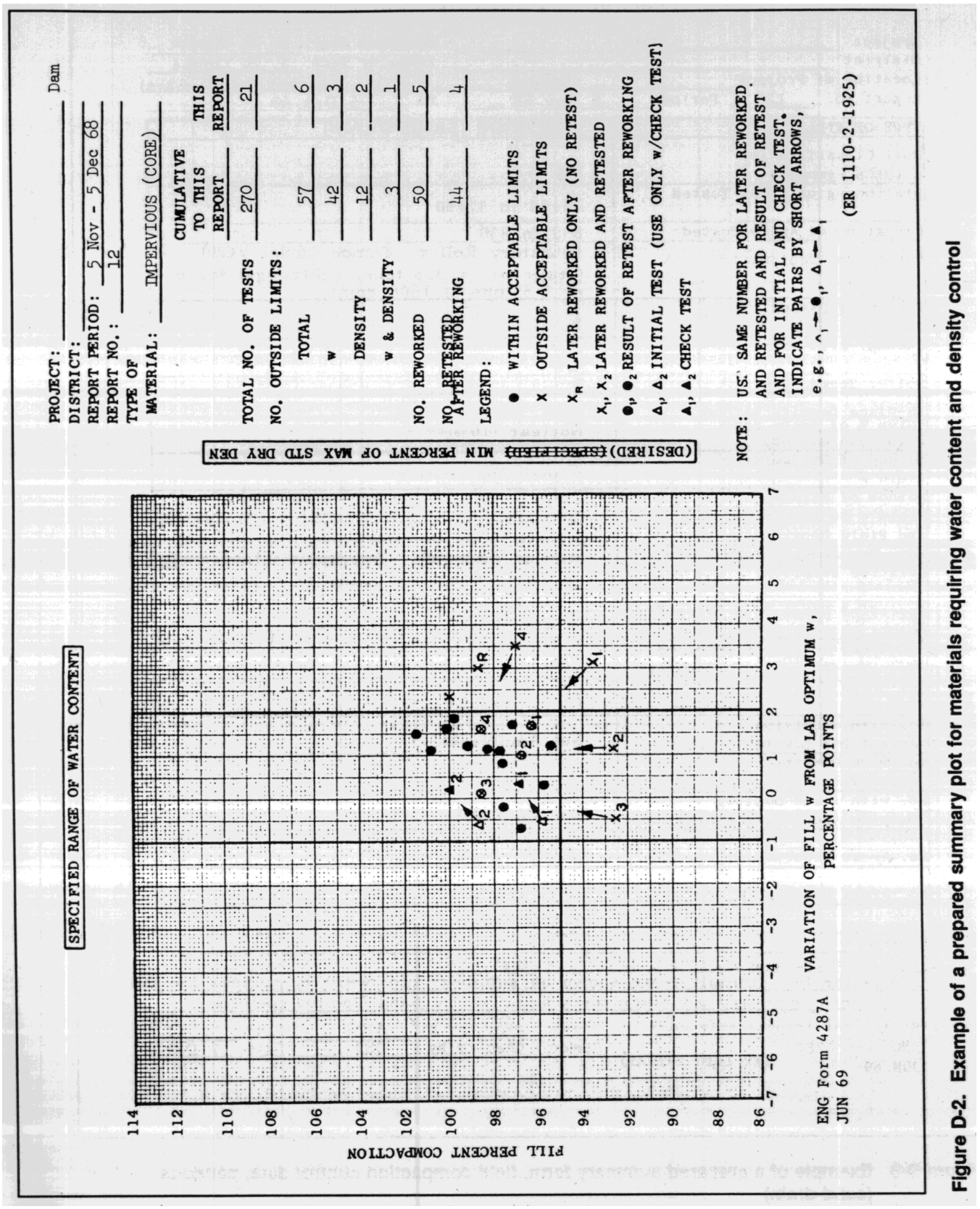

Figure D-2. Example of a prepared summary plot for materials requiring water content and density control

PERIODIC SUMMARY OF FIELD COMPACTION CONTROL DATA

Project Dam — Resident Engr J. S. Smith
District — Insp. or Tech J. S. Jones
Location of Project (River) (nearest town, state)
Report No. 12 Period 5 Nov 68 to 5 Dec 68

TYPE OF FILL	PERVIOUS (SAND DRAIN)
Soil Classification (USCS Symbols)	SW
Stationing of Areas Tested	15+50 to 37+50
Elevation of Areas Tested	830 to 839
Compaction Equipment *	Vibratory Roller, Tampo Model VC80 (static wt. = 3.5 tons, centrifugal force of 7.5 tons at 1600 rpm)
Number of Passes *	4
Uncomp. Lift Thick.	6 in.
Roller Speed, MPH	2
In-Place Density Method (Give % of tests made with each method)	Sand Volume (90%) Nuclear (10%)**
Method of Determining Field w	Visual Observation
Method of Relating Field w to Std Opt w, and Field Density to Max. Dry Density, or Relative Density	Field results compared to results of laboratory maximum (modified Providence vibrated) and minimum density tests on similar material. Appropriate laboratory results selected by gradation correlation.
Specified Range of w (Percentage Points Above & Below Std Opt w)	Saturated during compaction
(Desired) (Specified) Min. (% Comp. or Rel. Density)+	80%
No. Areas Tested	25
No. with w Outside Acceptable Limits	Not Applicable
No. with Density Below Min.	6
No. with w and Density Outside Acceptable Limits	Not applicable
No. Areas Reworked	5
No. Areas Retested	3

Remarks
* If compacted by crawler tractor, change "passes" to "coverages"
** Only the two "initial" tests shown on summary plot were by nuclear method. Check tests and all other tests were by the Sand Volume method.

+Strike out inapplicable words.
Summary Prepared by ARG Date 6 Dec 68
Summary Checked by JSJ Date 7 Dec 68

ENG Form 4287
JUN 69 (ER 1110-2-1925)

Figure D-3. Example of a prepared summary form, field compaction control data, pervious (sand drain)

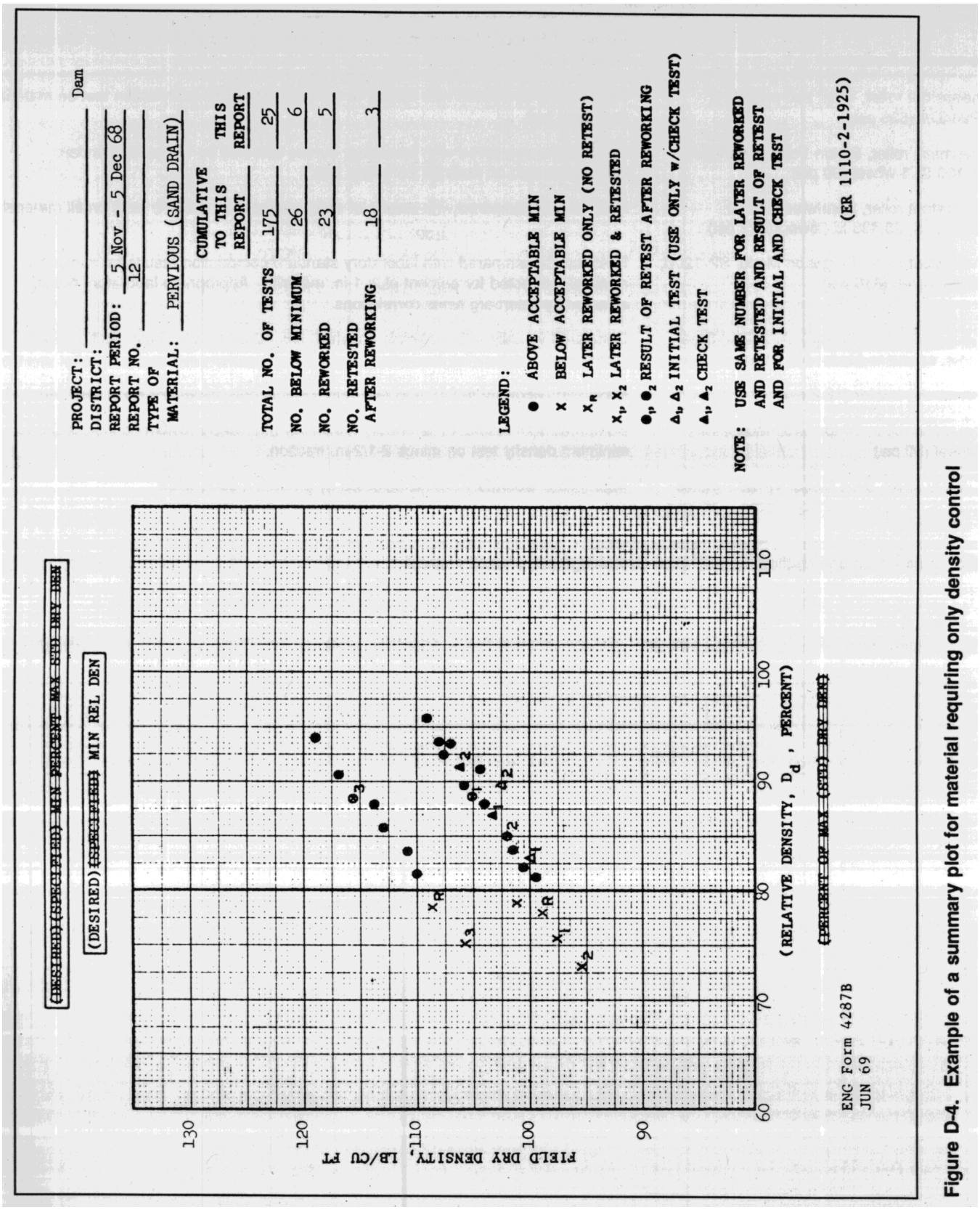

Figure D-4. Example of a summary plot for material requiring only density control

Table D-1
Samples of Appropriate Entries on Tabular Summary

Compaction Equipment	Method of Relating Field *w* to Standard Optimum *w* and Field Density to Maximum Dry Density or Relative Density
Sheepsfoot roller, Bros, self-propelled, SP244DA (636 psi)	Field results compared with results of complete standard compaction test on material from field test.
Pneumatic roller, 50-ton Ferguson Model RT-100 S, 4-wheel (80 psi)	Field results compared with laboratory curves selected by two-point standard compaction test on material from field test.
Sheepsfoot roller, Southwest Model 2DM-120S, 25,335 lb (towed)(527 psi)	Field results compared with results of rapid compaction (USBR) tests on fill material.
Sheepsfoot roller, Ferguson Model SP-120B, self-propelled (615 psi)	Field results compared with laboratory standard compaction results for minus 1-in. material, corrected for percent plus 1-in. material. Appropriate laboratory results selected by Atterberg limits correlations.
Sheepsfoot roller, (towed), American Steel Works, similar to Model ABD 120 (547 psi)	Compared visually with materials on which laboratory standard compaction tests were performed.
D-8 crawler tractor (12.2 psi)	Maximum (vibratory table)[1] and minimum density determined for each field density test.
Pneumatic roller, 50-ton Bros Model 450, 4-wheel (80 psi)	Compared with results of laboratory maximum (modified Providence vibrated) and minimum density test on minus 2-1/2-in. fraction.
Vibratory roller, Bros Model VP-20D (static weight = 10 tons; centrifugal force = 20 tons at 1,300 rpm)	Appropriate laboratory results selected by gradation correlation.

Note: if more than one method is used, show percentage use of each method.

[1] Use care to confirm reliability of maximum density as determined on the vibratory table. See the caution in Appendix B, paragraph B-4*a*.