

Pre-Design, Geotechnical Reports, Design Phase

Compaction Design Report XYZ Engineering Consultants, Inc. Los Angeles, CA 90017

Report Produced By
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Report Number: 0029804

Project Number: CE00127-17
Project Name: Springfield Creek Spillway
Project Owner: USACE

Fill: Bank Section 1
Project Phase: Design-QA
Remarks:

Control Specifications and References

Min % of Max Dry Density 92%
Lab Reference Standard ASTM D 698 (SP)
Resilient Modulus Method AASHTO

Compacted Fill Property Requirements

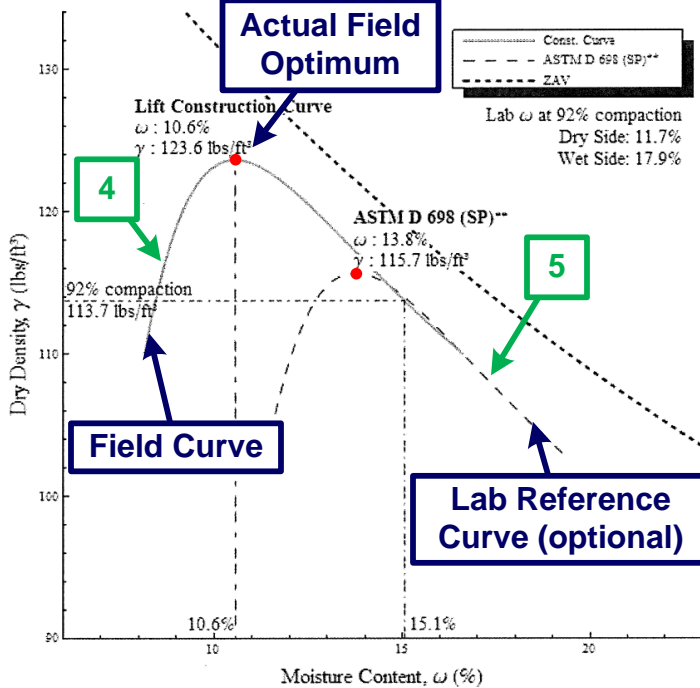
Unconfined Compression Strength 3,100 lbs/ft²
Factor of Safety 1.8

Design Compaction Conditions

Loose Lift Thickness (in) 10
Compactor CAT 815
USCS Classification CL Ranges
Specific Gravity 2.68 2.68 - 2.68
Liquid Limit (%) 34 29 - 38
Plasticity Index (%) 19 17 - 25
Plastic Limit (%) 15
% Fines (Passing #200) 77 64 - 90
% Gravel (Retained #4) 1 0 - 2
% Sand (Passing #4) 22 16 - 25

Lift Properties at 92% Compaction on Construction Curve †

	Dry Side ¹	Wet Side ¹	Tolerance
ω (%)	8.5	15.1	$\pm 1\%$ MC
γ (lbs/ft ³)	113.7	113.7	$\pm 1.8\%$
S (%)	48.1	85.8	$\pm 3\%$
e	0.47	0.47	$\pm 3\%$
Na (%)	16.6	4.5	$\pm 3\%$
ω Potential (%)	+9.1	+2.5	$\pm 3\%$
UCS (lbs/ft ²)	ASTM D 2166	x	$\pm 20\%$
c (lbs/ft ²)	ASTM D 2850	x	$\pm 10\%$
ϕ (°)	ASTM D 2850	x	$\pm 10\%$
Free Swell (%)	ASTM D 4546	7.6	$\pm 10\%$
CBR* (%)	Soaked	1.1	$\pm 10\%$
CBR* (%)	Unsoaked	35.3	$\pm 10\%$
Res Mod (lbs/in ²)	Soaked	1,650	$\pm 10\%$
Res Mod (lbs/in ²)	Unsoaked	25,002	$\pm 10\%$



Construction Control Specifications

Minimum % of Maximum Dry Density
Construction Curve 92%
ASTM D 698 (SP) 98%

Wet-of-Optimum Moisture Range for 92%
10.6% - 15.1% ($\pm 1\%$ MC)

Minimum # of Roller Passes
11 (Equiv. 6 roundtrip passes, full lift coverage required)

Compaction curves should be obtained regularly with changes in material index properties and upon change in color or texture for effective construction control.

M-D probe depths should be centered on the center of the compacted lift.

† c and ϕ - Unsaturated triaxial test, total soil parameter.
UCS - Unconfined Compressive Strength.
Measured values include ω , γ , UCS, c, ϕ , Free Swell, and CBR (soaked and unsoaked). Calculated values include S, e, Na, ω Potential, and Resilient Modulus (soaked and unsoaked).
Wet side permeability in field not factored in Free Swell test condition.

* CBR based on field compacted state.
1 Properties represent average values.
x Strength property values available upon request.

Soil Sample Date: 12/20/2017
Loc: Fosters Field
Desc: Reddish Brown Lean Clay

Authorization By: _____
Print Name: _____
Date: _____ Firm Reg. #: _____

** ASTM D 698 (SP) equivalent, corrected to control relative moisture standard in construction. Graphics powered by Mathematica

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1. Input: Required min. % density compaction standard for selected compactor + optional lab curve reference standard (corrected)
2. Input: Minimum governing design criteria for fill (can be more than 1 property requirement)
3. Input: Assumed or specified compactor - soil - lift combination (soil properties based on known, estimated or required soil property ranges)
4. Output: Site-Specific Compaction Curve (SSCC®) in construction, on the site-specific field line-of-optimums, with minimum % density intercepts
5. Output: Soil-specific lab curve reference, corrected according to standard dry-unit weight relations and the corresponding lab line-of-optimums (close to line-of-opts in construction, as verified on report)
6. Output: Compacted lift properties at minimum % density intercepts (for design)
7. Output: Lift-specific compaction controls for full compaction