

Virginia's Drilled Shaft Project Experiences, Best Practices and Lessons Learned

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Steps in a Drilled Shaft Installation

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**This has been a presentation
of your nightly news.**



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ADSC VIDEO

Concrete Placement

12

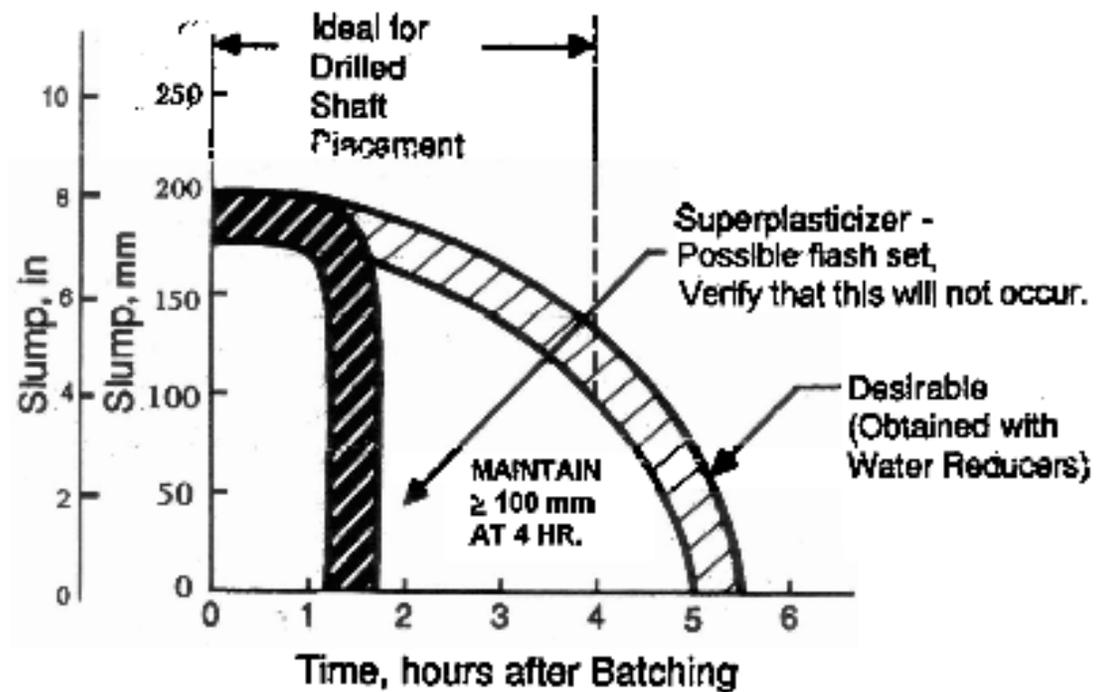


Figure 8.1. Slump loss relationship from a trial mix design

FHWA-IF-99-025

**This has been a presentation
of your nightly news.**

Now let's look at what I didn't
show.



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**How do we design, inspect and prevent
what we have just seen?**

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How do we design, inspect and prevent what we have just seen?

- Have adequate rebar spacing.

How do we design, inspect and prevent what we have just seen?

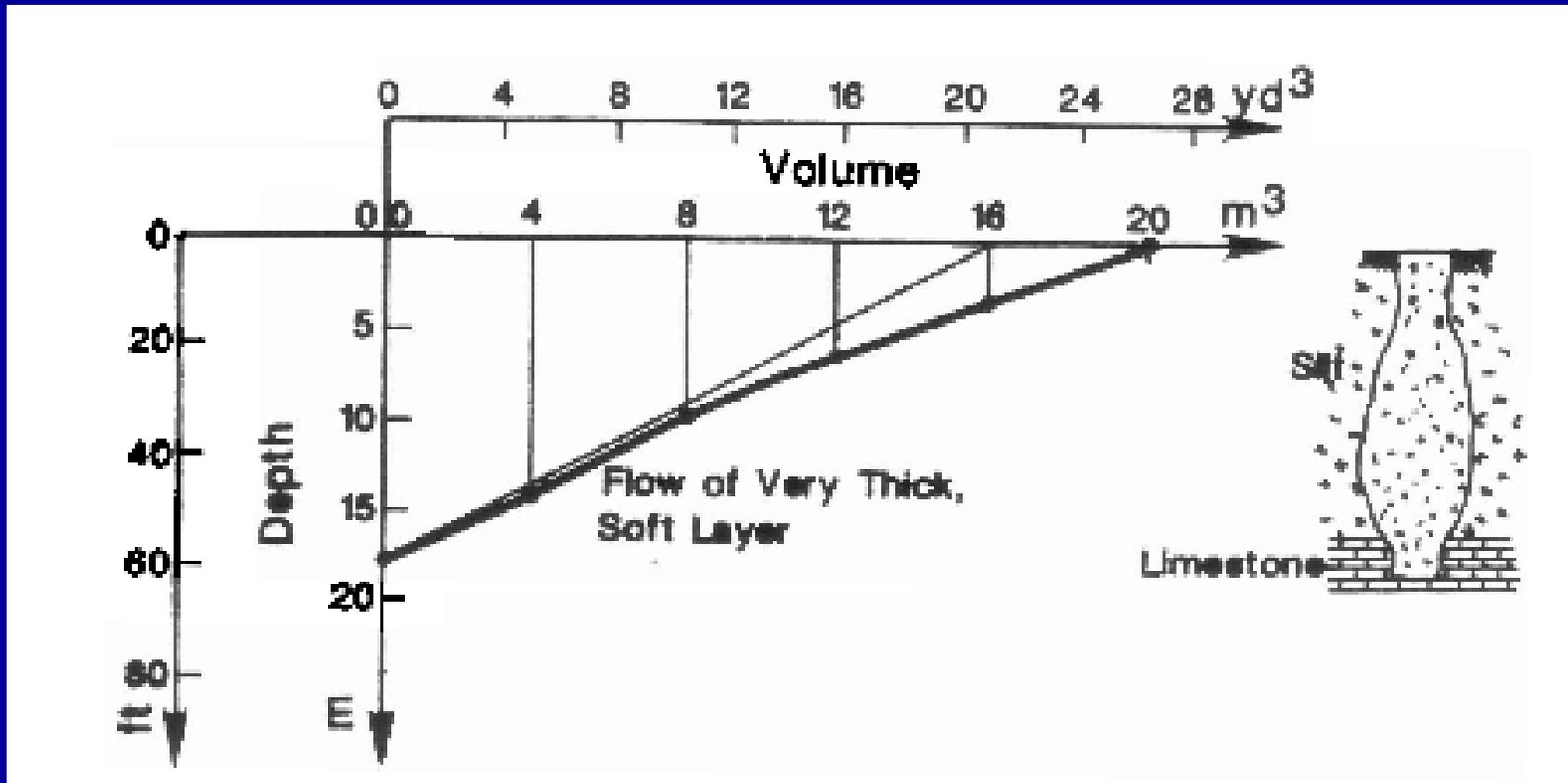
- Have adequate rebar spacing.
- Use appropriate slump.

How do we design, inspect and prevent what we have just seen?

- Have adequate rebar spacing.
- Use appropriate slump.
- Plot concrete volume curve.



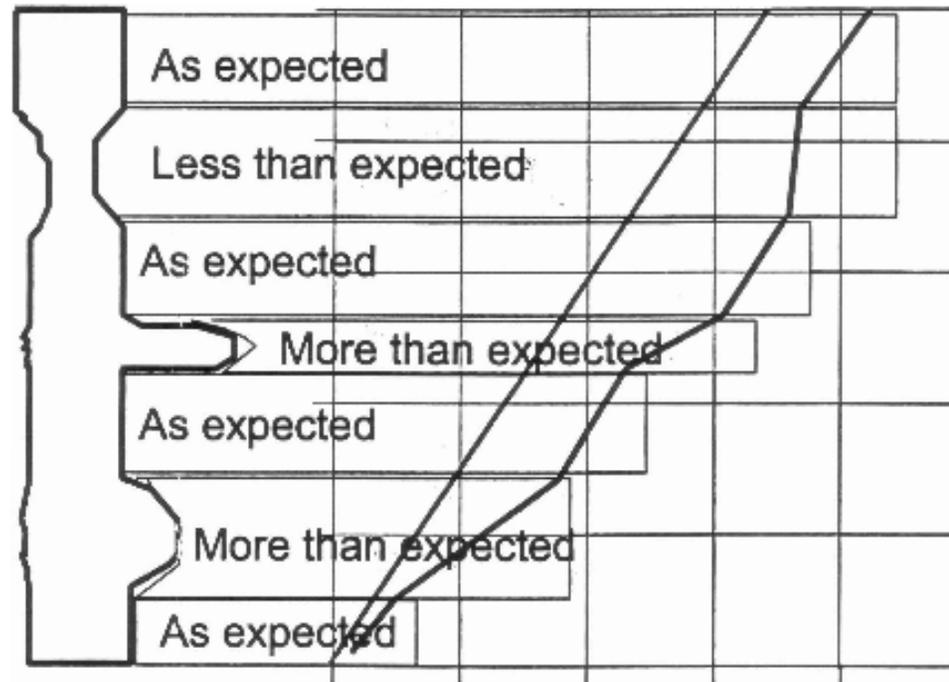
Concrete Volume Curves



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Concrete Volume Curve

Possible Causes of Curve Irregularities



NIII Course No. 132070
Drilled Shaft Foundation Inspection

13-55

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Self Consolidating Concrete

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SAMPLE DRILLED SHAFT INSPECTOR'S CHECKLIST

The following is a general checklist to be used when conducting a Drilled Shaft. The answer to each of these should be "yes" unless plans, specifications or specific special instructions state otherwise. CONSULT WITH RESPONSIBLE ENGINEER FOR YOUR SPECIFIC PROJECT REQUIREMENTS.

	Yes	No	N/A
Contractor & Equipment Arrive On-Site			
1. Has the Contractor submitted his drilled shaft installation plan (per xxx.12, Submittals)?	21	22	23
2. Has the Drilled Shaft Installation Plan been approved?	24	25	26
3. Does the Contractor have an approved concrete mix design (xxx.60, Concrete Placement)?	27	28	29
4. Has the Contractor run the required Trial Mix and slump test for his drilled shaft mix design (xxx.60, Concrete Placement)?	30	31	32
5. If concreting is estimated to take over two hours, has the Contractor performed a satisfactory slump loss test for the extended time period in accordance with xxx.60, Concrete Placement?	33	34	35
6. If the Contractor proposed a blended mineral polymer or a polymer slurry, do they have an approved Slurry Management Plan (xxx.35, Slurry)?	36	37	38
7. Is the Contractor strapped to take soil samples or rock cores on the bottom of the shaft in accordance with xxx.35.5, Excavations?	39	40	41
8. Has the Contractor met the requirements of xxx.30.1, Protection of Existing Structures?	42	43	44
9. Has the site preparation been completed for footing in accordance with xxx.20.2, Construction Sequence?	45	46	47
10. If a cotter data is required, does the Contractor have a qualified diver and safety diver in accordance with xxx.35, Excavations?	48	49	50
11. Does the Contractor have all of the equipment and tools shown in his drilled shaft installation plan to install the drilled shaft?	51	52	53
12. If casing is to be used, is it the correct size in accordance with xxx.36, Casing?	54	55	56
13. If the Contractor plans on using a manufactured slurry, do they have the equipment to mix it?	57	58	59
14. Is a tender required (xxx.38, Slurry)?	60	61	62
15. If a tender is required, does the Contractor have it on site and operational?	63	64	65
16. Does the Contractor's tender meet the requirements of xxx.38.1, Tenders?	66	67	68
17. Do you have the required drilled shaft forms that need to be filled out during shaft construction?	69	70	71
18. Do you understand the forms (if not, contact the responsible Engineer for help)?	72	73	74
Trial Shaft			
19. Is the Trial Shaft positioned away from the excavation shafts or as in the contract documents (xxx.13 Trial Shaft Installation)?	75	76	77
20. Has the Contractor performed a successful test hole in accordance with xxx.31, Trial Shaft Installation?	78	79	80
21. Did the Contractor cut off the shaft 2 feet (0.6 m) below grade in accordance with xxx.15, Trial Shaft Installation?	81	82	83
22. Has the Contractor revised his technique and equipment (and the revision is approved) to successfully construct a shaft?	84	85	86
Shaft Excavation & Cleaning			
23. Is the shaft being constructed in the correct location & within tolerances (xxx.41, Tolerances)?	87	88	89
24. Does the Contractor have a bench mark so the shaft can be constructed and inspected to the proper elevations?	90	91	92
25. If a core hole is required, has the Contractor taken them in accordance with xxx.35.5, Excavations?	93	94	95
26. If a core hole was performed, was the Rock Core Form completed and the Contractor maintained a log (xxx.35, Excavations)?	96	97	98
27. If the Contractor is using slurry, do they perform tests and report the results in accordance with xxx.38, Slurry?	99	100	101
28. Is the slurry level being properly maintained in accordance with xxx.38, Slurry?	102	103	104
29. Is the proper type and mixture of facts being run on the slurry in accordance with xxx.38, Slurry?	105	106	107
30. Are you filling out the Soil/Rock Excavator forms?	108	109	110
31. If permanent casing is used, does it meet xxx.36 & 36.2, Casing?	111	112	113
32. If temporary casing is being used, does it meet xxx.36.1, Temporary Casing?	114	115	116
33. If bellows is required, does it meet the requirements of xxx.35, Excavations?	117	118	119
34. Is the Contractor maintaining a excavation log in accordance with xxx.35, Excavations?	120	121	122
35. Is the shaft within allowable Vertical alignment tolerances (xxx.41, Construction Tolerances)?	123	124	125
36. Is the shaft of proper depth?	126	127	128
37. Does the shaft excavation time meet the specified time limit (xxx.34, Excavation & Drilling Equipment)?	129	130	131
38. If the shaft required over reaming, was it performed in accordance with xxx.34, Excavation & Drilling Equipment?	132	133	134
39. Does the shaft bottom meet the requirements of xxx.40, Excavation Inspection?	135	136	137
40. Did you complete the Shaft Inspection Form?	138	139	140

NHT Course No. 152-070
Drilled Shaft Foundation Inspection

SAMPLE DRILLED SHAFT INSPECTOR'S CHECKLIST

The following is a general checklist to follow when inspecting a D-and-Shaft. The answers to each of these should be "yes" unless plans, specifications or contract documents say otherwise. CONSULT WITH RESPONSIBLE ENGINEER FOR YOUR SPECIFIC PROJECT REQUIREMENTS.

	Yes	No	NA
Reinforcing Cage			
41. Is the steel the correct size and configured in accordance with the project plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Is the steel properly tied in accordance with xxx.50, Reinforcing Steel Cage Construction & Placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Does the Contractor have the proper spacers for the steel cage in accordance with xxx.51, Reinforcing Steel Cage Construction & Placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Does the Contractor have the proper amount of spacers for the steel cage in accordance with xxx.50, Reinforcing Steel Cage Construction & Placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. The caps in place, are they in accordance with the contract documents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Is the steel cage secured from settling and from floating during concrete placement caps sometimes rise w/ the concrete? (xxx.50, Reinforcing Steel Cage Construction & Placement)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Is the top of the steel cage at the proper elevation in accordance with xxx.41, Construction Tolerances?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concreting Operations			
48. Prior to concrete placement, has the slurry (both manufactured & natural) been tested in accordance with xxx.58, Slurry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. If required, was casing removed per xxx.36.1 Temporary Casings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Was the discrete end of the tremie stabilized in the concrete mass with proper concrete head above it xxx.61, Tremies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. If free fall placement (dry shaft only), was concrete placed in accordance with xxx.60, Concrete Placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Did the placement occur within the time limit specified (xxx.60, Concrete Placement)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Are you filling out the concrete placement and volume forms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. When placing concrete, did the contractor overflow the shaft until good concrete flowed (xxx.60, Concrete Placement)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Were concrete acceptance tests performed as required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Installation			
56. If shaft is constructed in open water, is the shaft protected for seven days or until the concrete strength reaches a minimum of 2,250 psi (15.17MPa) in accordance with xxx.62, Casing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Is all casing removed to the proper elevation in accordance with xxx.36.2, Permanent Casing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Has the Contractor complied with xxx. 64, Interference Evaluation, if required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Is the shaft within the applicable construction tolerances (xxx. 41, Construction Tolerances)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Has the Drilled Shaft Log been completed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Have you documented the Pay Items?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes/Comments			

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And We're Finished

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