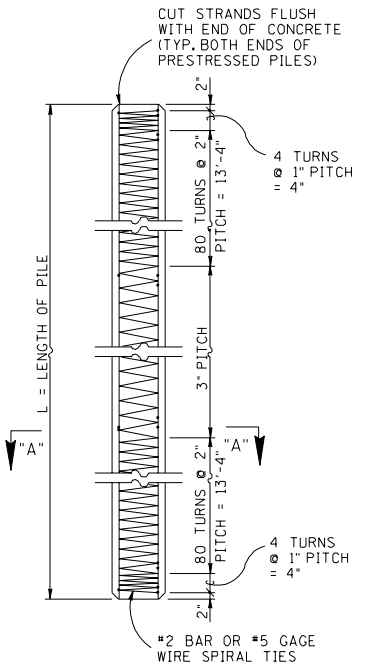
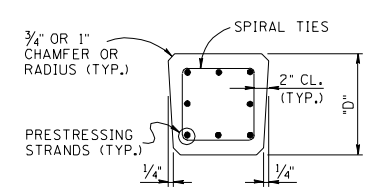


PROJECT NO.	YEAR	SHEET NO.	
	1990		
REVISIONS			
NO.	DATE	BY	BRIEF DESCRIPTION
1	11-27-90	MAH	REVISED SPIRAL TIE SPACING AND ADDED DWG. NO. M-174-150A
2	9-1-91	MAH	CHANGED DWG. NO. FROM M-174-150
3	10-26-92	MAH	REVISED PRESTRESSED SECTION "A"- "A" AND GENERAL NOTE #8.
4	10-25-93	MAH	REVISED PILE TIP NOTE

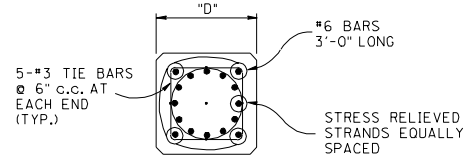


BURIED PILE DETAILS (SHOWING SPIRAL TIE SPACING) (TYPICAL FOR REINFORCED OR PRESTRESSED PILES)



SECTION "A"- "A"

STRAND LOCATION SHALL BE SYMMETRICAL ABOUT THE AXIS OF THE PILE WITH NO MORE THAN ONE STRAND DIFFERENCE BETWEEN ANY TWO ADJACENT SIDES.



(ALTERNATE) **SECTION "A"- "A"**

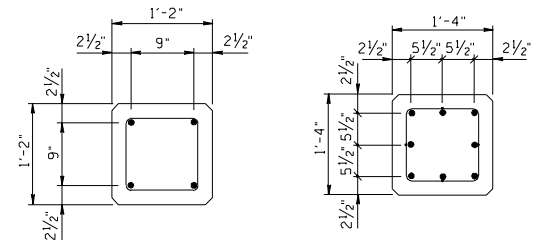
END REINFORCEMENT REQUIRED AT TIP END AND DRIVING END FOR ALL PILES WITH CIRCULAR STRAND PATTERN.

"PRESTRESSED PILE PROPERTIES"

ASTM GRADE	STRAND DIAMETER	* NUMBER OF STRANDS - PER PILE			MINIMUM ULTIMATE TENSILE STRENGTH PER STRAND (LBS.)	INITIAL PRESTRESSING FORCE PER STRAND (LBS)
		"D" = 14" SO.	"D" = 16" SO.	"D" = 18" SO.		
250	3/8"	14	16	22	20,000	13,982
	7/16"	10	12	16	27,000	19,057
	1/2"	8	10	12	36,000	25,165
270	3/8"	12	14	18	23,000	16,141
	7/16"	8	12	14	31,000	22,056
	1/2"	6	8	10	41,300	28,936
250	3/8"	12	14	18	20,000	14,981
	7/16"	8	12	14	27,000	20,418
	1/2"	6	8	10	36,000	26,963
270	3/8"	10	12	16	23,000	17,294
	7/16"	8	10	12	31,000	23,631
	1/2"	6	8	10	41,300	31,003

* DENOTES: NUMBER BASED ON FINAL PRESTRESSING FORCE OF 700 PSI. WHEN ADDITIONAL PRESTRESSING IS REQUIRED FOR DESIGN, THE CONTRACT PLANS SHALL SHOW THE NUMBER OF STRANDS.

PRECAST PRESTRESSED CONCRETE PILES



LENGTH OF PILE	LONGITUDINAL REINFORCEMENT			
	SIZE 1 PILE "D" = 14"		SIZE 2 PILE "D" = 16"	
	BAR SIZE	NO. REQ'D	BAR SIZE	NO. REQ'D
UP TO 35'	7	4	5	8
36' - 40'	8	4	6	8
41' - 45'			7	8
46' - 50'			8	8
51' - 55'			9	8
56' - 60'			10	8

PRECAST REINFORCED CONCRETE PILES

(MAXIMUM LENGTH = 60'-0")

general notes

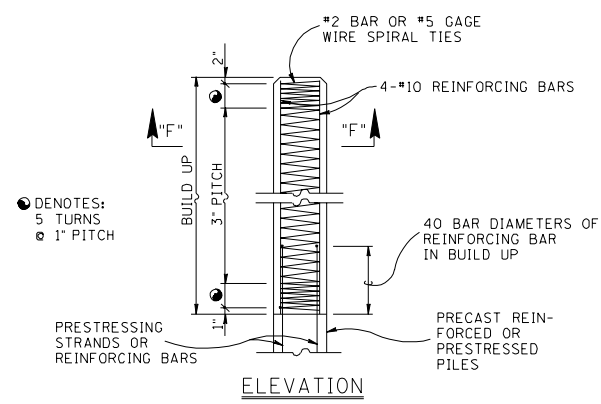
- SPECIFICATIONS: STANDARD ROAD AND BRIDGE SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.
- DESIGN SPECIFICATIONS: CURRENT EDITION OF AASHTO WITH ADDENDA.
- CHOICE OF PILES: TO BE SPECIFIED ON THE CONTRACT DRAWINGS OF EACH BRIDGE.
- REINFORCING STEEL: TO BE ASTM A615, GRADE 60; SPIRAL TIES SHALL BE TIED TO CORNER STRANDS AT INTERVALS ADEQUATE TO PREVENT EXCESSIVE MOVEMENT DURING VIBRATION.
- DRIVING FORMULA: PILES SHALL BE DRIVEN TO A MINIMUM CAPACITY AS SPECIFIED ON THE CONTRACT DOCUMENTS AS DETERMINED BY THE DRIVING FORMULAS STIPULATED IN THE SPECIFICATIONS.
- MILL TEST REPORTS: NOTARIZED MILL TEST REPORTS WILL BE REQUIRED FOR ALL STEEL PILES.
- WELDING SPECIFICATIONS: AASHTO STANDARD SPECIFICATIONS FOR WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES, CURRENT EDITION.
- STRUCTURAL STEEL: SHALL CONFORM TO ASTM A709 GRADE 36.
- PILE TIPS: WHEN CALLED FOR ON THE CONTRACT DOCUMENTS, STRUCTURAL STEEL FOR CAST POINTS SHALL CONFORM TO ASTM A-148 OR ASTM A-27. ATTACHMENT OF CAST STEEL POINTS SHALL BE BY WELDING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ANSI/AASHTO/AWS D 1.5-98 SPECIFICATIONS.
- CONCRETE IN THE PRECAST, PRESTRESSED AND PRECAST PILES SHALL BE CLASS P AND SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH (f'c) OF 5000 p.s.i. AT 28 DAYS. COMPRESSIVE CYLINDER STRENGTH AT TRANSFER OF THE PRESTRESSING FORCE SHALL NOT BE LESS THAN 4000 p.s.i. CONCRETE IN BUILD-UPS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE CYLINDER STRENGTH (f'c) OF 3500 p.s.i.
- PRESTRESSING REINFORCEMENT: SEVEN WIRE STRESS RELIEVED STRAND SHALL CONFORM TO THE GENERAL REQUIREMENTS OF ASTM A416. BROKEN WIRES WITHIN INDIVIDUAL STRANDS WILL BE PERMITTED UP TO 2% OF THE TOTAL NUMBER OF WIRES IN EACH PILE, PROVIDING THAT THERE IS NOT MORE THAN ONE BROKEN WIRE PER STRAND. TWO OR MORE BROKEN WIRES PER STRAND WILL BE CAUSE FOR REPLACEMENT OF THE STRAND, EVEN THOUGH THE TWO BROKEN WIRES ARE WITHIN THE 2% LIMITATION.
- BUILD-UPS: TO BE PROVIDED FOR BUILD-UPS OF PILES WHERE AUTHORIZED BY THE ENGINEER, CONCRETE SHALL BE CUT BACK TO EXPOSE THE STRANDS OR REINFORCING FOR A DISTANCE SUFFICIENT TO PROVIDE A LAP OF 40 DIAMETERS OF THE REINFORCING BARS IN THE BUILD-UP. REINFORCING FOR BUILD-UP SHALL HAVE MINIMUM AREA EQUAL TO 1/4% WITH 1/4%± OF THE GROSS SECTION OF PILE. PLACEMENT OF BARS SHALL BE IN A SYMMETRICAL PATTERN OF NOT LESS THAN FOUR BARS. SEE SECTION 606 OF THE STANDARD SPECIFICATIONS.
- IF SIZE 1 PILES ARE SPECIFIED IN THE CONTRACT DOCUMENTS AND IT BECOMES NECESSARY TO USE SIZE 2 PRECAST CONCRETE PILING BECAUSE OF LENGTHS IN EXCESS OF 40 FEET, THE CONTRACTOR WILL BE ALLOWED AN INCREASE IN THE SIZE 1 BID OF 25%. NO INCREASE WILL BE ALLOWED FOR PRESTRESSED CONCRETE PILES DUE TO EXTRA LENGTHS.
- IF SIZE 2 PILES ARE SPECIFIED IN THE CONTRACT DOCUMENTS, NO INCREASE IN COST WILL BE ALLOWED AND A PRECAST, PRESTRESSED PILE OF EQUAL DIMENSIONS MAY BE SUBSTITUTED.
- IF PRECAST, PRESTRESSED CONCRETE PILES ARE SPECIFIED IN THE CONTRACT DOCUMENTS, ALTERNATE PRECAST, CONCRETE PILE DETAILS MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

MINOR REVISION - FHWA APPROVAL NOT REQUIRED

DEPARTMENT OF TRANSPORTATION

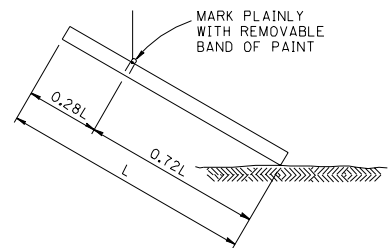
STANDARD PILE DETAILS 1990

CORRECT Edward P. Wasserman ENGINEER OF STRUCTURES

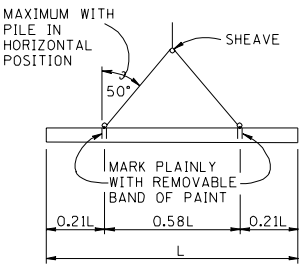


BUILD-UP DETAILS

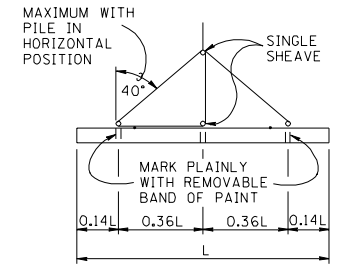
NOTE: DRIVING OF BUILT-UP PILES SHALL BE PERMITTED ONLY WITH THE APPROVAL OF THE ENGINEER.



ONE POINT PICK-UP (MAXIMUM L = 60'-0")



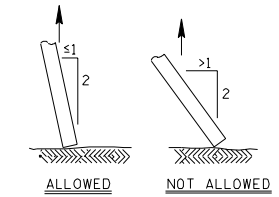
TWO POINT PICK-UP (MAXIMUM L = 85'-0")



THREE POINT PICK-UP (FOR GREATER THAN 85'-0")

PILE HANDLING DETAILS

NOTE: PILES TO BE MARKED AT PICK-UP POINTS WITH A REMOVABLE BAND OF PAINT TO INDICATE PROPER PLACE FOR ATTACHING HANDLING LINES. IN HANDLING THE PILES, THEY SHALL BE SUPPORTED ONLY AT THE POINTS INDICATED. PILES TO BE PICKED UP BY PULLING ON BOTH LINES UNIFORMLY.



ENDS OF PILES ARE NOT TO TOUCH GROUND UNLESS PILES INCLINED 1:2 OR STEEPER. (TO BE USED WITH TWO AND THREE POINT PICK-UP ONLY.)