Index 17745 Mast Arm Assemblies (Rev. 11/16)

Design Criteria

AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LRFDLTS-1); ***Structures Manual*** Volume 3, FDOT Modifications to LRFDLTS-1; ***Structures Manual*** Introduction, I.6 References.

Design Assumptions and Limitations

See notes on the ***Design Standard*** and ***Structures Manual*** Volume 3.

See the ***PPM***, Volume 1, Chapter 29 for additional information.

Design all mast arm traffic signal assemblies with backplates in accordance with the ***PPM***, Volume 1, Chapter 7.

Custom Mast Arm Designs: Special Mast arms for unique loadings and/or geometric constraints that contain any component (arm or pole) that is outside the range of those in Index 17743.

The FDOT Mast Arm Program will provide the necessary variables to be shown in the "Special Mast Arm Assemblies Data Table" cell from the FDOT CADD Menu.

Plan Content Requirements

The signal designer completes the Mast Arm Tabulation Sheet, and the structures designer completes the Special Mast Arm Assemblies Data Table, both of which will be included in the plans. These are the only plan sheets required for mast arm assemblies which meet the Department's Standard. The structures data table may be placed on a signal plan sheet, if space permits. See Introduction I.3 for more information regarding use of Data Tables.

The following instructions are for use with the Mast Arm Tabulation Sheet:

1. Each mast arm assembly is identified by a unique ID number.
2. Dimensions 1-5 are for signals and dimensions A-E are for signs. Record the distance from the edge of the pole, at ground level, to the center of the signal or sign.
3. Signals may be mounted vertically or horizontally. Indicate the mounting in the appropriate column in the table.
4. The entire line for arm #2 and the space for the angle between dual arms are left blank for single arm assemblies.
5. All arms and poles will be galvanized. If a color is required, indicate the color in the table, otherwise leave blank.
6. Starting at the pole, select the signals and/or signs that match the configuration you are tabulating. The spaces representing the signs or signals not used will be blank.

Example 1: If no sign is located between the pole and signal 1, the spaces for Sign A would be blank. Example 2: A configuration for three signals and one sign between signal 1 and signal 2 - Only the spaces for signals 1, 2, 3 and sign B would be completed; the others will be blank.

7. Record the number of sections in each signal head in the space following the distance to that head.

8. Record the height and width of each sign in the space following the distance to the sign.

9. When double arm poles are used for a skewed intersection, the standard design should be used whenever possible. The standard orientation for arm #2 is 90 or 270 degrees measured in a counter clockwise direction from arm #1. The normal orientation of the mast arm is perpendicular to the roadway. Adjustments in mounting hardware can compensate for a skew angle of approximately 15 degrees or more from the normal, depending upon the attachment method. The designer should verify the mounting hardware capability before specifying an arm with a skew greater than 15 degrees.

10. The arm mounting height should be calculated to provide a minimum vertical clearance of 17'-6" from the roadway crown elevation to the lowest sign or signal. A standard signal section is approximately 14" square. Therefore the length of a 3-section head is about 42" and a 5-section is about 70". The use of back plates will add about 6" to each side of the signal head. Additionally, approximately 3" should be added to the end of the signal head to compensate for the attachment hardware. This information may be used to determine the arm mounting height. The designer should coordinate with the maintaining agency to insure the signal assembly and all appropriate hardware has been considered in determining the vertical clearance. The maintaining agency can also provide guidance on the vertical or horizontal mounting of the signal assemblies.

11. The standard handhole location is 90 degrees from arm #1. Other handhole locations must be noted in the Special Instructions.

12. A free swinging internally illuminated street name sign may be attached to the pole by an independent bracket arm if the sign area does not exceed 18 square feet and weigh more than 144 pounds. The Structures Design Engineer must review other signs attached to the pole or any size sign of this type attached to the signal mast arm.

13. The "Special Instructions" Table is used to tabulate pedestrian buttons and pedestrian signal locations and handhole locations when the handholes are not in the standard location. Tabulate the ID No. and the orientation of the pedestrian buttons and signals in degrees measured counter clockwise from arm #1. The handhole location should be left blank if the handhole is in the standard location (see note 11).

14. Arm #1 is the arm for a single arm assembly or the longer arm for a double arm assembly. If the arms are equal length, arm #1 is over the project roadway.

SPECIAL MAST ARM ASSEMBLIES DATA TABLE																									Table Date 01-01-12
NUMBER OF LOCATIONS	STRUCTURE NUMBER	FIRST ARM				FIRST ARM EXTENSION				SECOND ARM				SECOND ARM EXTENSION				POLE						
		FA(ft)	FB(in)	FC(in)	FD(in)	FE(ft)	FF(in)	FG(in)	FH(in)	SA(ft)	SB(in)	SC(in)	SD(in)	SE(ft)	SF(in)	SG(in)	SH(in)	UA(ft)	UB(ft)	UC(in)	UD(in)	UE(in)	UF(deg)	UG(ft)

SPECIAL MAST ARM ASSEMBLIES DATA TABLE (CONT.)																						Table Date 01-01-12
STRUCTURE NUMBER	FIRST ARM CONNECTION (in) First Arm Camber Angle = 2 Degrees											SECOND ARM CONNECTION (in) Second Arm Camber Angle = 2 Degrees										
	#Bolts	HT	FJ	FK	FL	FN	FO	FP	FR	FS	FT	#Bolts	HT	SJ	SK	SL	SN	SO	SP	SR	SS	ST

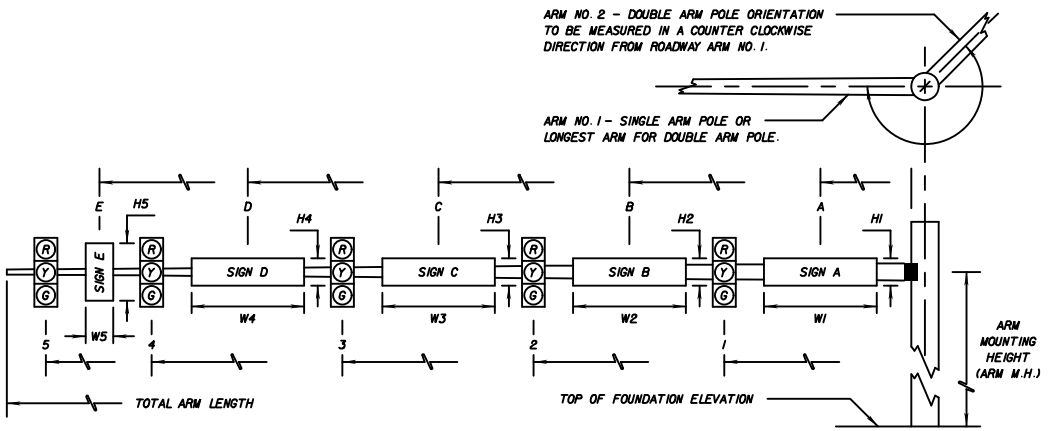
SPECIAL MAST ARM ASSEMBLIES DATA TABLE (CONT.)																							Table Date 07-01-15
STRUCTURE NUMBER	POLE BASE CONNECTION (in)					SHAFT AND REINF.								LUMINAIRE AND LUMINAIRE CONNECTION										
	#Bolts	BA	BB	BC	BF	DA(ft)	DB(ft)	RA	RB	RC	RD(in)	RE	RF(in)	LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)

NOTES [Notes Date 07-01-13]:
1. Work with Index 17745.
2. Design Wind Speed = mph

FOUNDATION NOTES [Notes Date 01-01-12]:
1. Design based on Borings taken
   sealed by
2. Assumptions and Values used in design:
   Soil Type
   Soil Layer Thickness = ft.
   Soil Friction Angle = deg.
   Soil Weight = pcf
   Design Water Table is ft. below surface

Mast Arm Tabulation Sheet 1 of 2

SPECIAL INSTRUCTIONS					
ID NO.	PED. BUTTON		PED. SIGNALS		HANDHOLE LOCATION



* DENOTES NUMBER OF SECTIONS IN SIGNAL HEAD ASSEMBLY

						SIGNAL DATA															SIGN DATA																
									DISTANCE FROM POLE												DISTANCE FROM POLE / HEIGHT AND WIDTH OF SIGN																
ID NO.	SHEET NO.	LOCATION BY STA.	TOP OF FOUNDATION ELEVATION	RDWY ARM NO.	CROWN ELEV.	SIGNAL V/H	BACK PLATES Y/N	PED. SIGNAL Y/N	1	*	2	*	3	*	4	*	5	*	TOTAL ARM LENGTH	ARM M.H.	∠ BETWEEN DUAL ARMS 90/270	A	H1	W1	B	H2	W2	C	H3	W3	D	H4	W4	E	H5	W5	PAINT COLOR
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Mast Arm Tabulation Sheet 2 of 2

* DENOTES NUMBER OF SECTIONS IN SIGNAL HEAD ASSEMBLY

						SIGNAL DATA																	SIGN DATA																
ID NO.	SHEET NO.	LOCATION BY STA.	TOP OF FOUNDATION ELEVATION	RDWY ARM NO.	CROWN ELEV.	SIGNAL V/H	BACK PLATES Y/N	PED. SIGNAL Y/N	DISTANCE FROM POLE												TOTAL ARM LENGTH	ARM W.H.	∠ BETWEEN DUAL ARMS 90/270	DISTANCE FROM POLE / HEIGHT AND WIDTH OF SIGN																PAINT COLOR
									1	*	2	*	3	*	4	*	5	*				A	H1	W1	B	H2	W2	C	H3	W3	D	H4	W4	E	H5	W5	
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SPECIAL INSTRUCTIONS					
ID NO.	PED. BUTTON		PED. SIGNALS		HANDHOLE LOCATION

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Payment

Item number	Item description	Unit Measure
649-3A-BCC	Steel Mast Arm Assembly	EA