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GENERAL

1. Purpose of Construction Standards

The Standards in this book have been prepared for the use of Ameren Corporation personnel concerned with the construction, operation and maintenance of the Company's electric distribution facilities. An understanding of the necessity for these system-wide construction standards is of the greatest importance to the continued expansion of Ameren's facilities.

Standards properly developed and applied accomplish the following objectives.

- a. Establish desired design criteria and performance levels.
- b. Insure uniform, safe and economical construction practices.
- c. Provide information on materials and their proper application.
- d. Minimize engineering and estimating time.
- e. Provide the basis for automated material and labor determination for work request and work order purposes.

2. Scope and Application

Ameren Corporation Standards cover the type of construction and the materials that shall be used for 4kV to 14.4kV distribution systems, outdoor lighting systems, and for 34kV and 69kV subtransmission systems.

The following guidelines shall be followed in applying these Standards.

- a. All new construction shall conform to these standards.
- b. When existing poles are replaced, all construction on the new poles shall conform to these standards.
- c. When additional circuits are installed, or circuits are replaced on existing poles, the arrangement shall conform to the standards as nearly as is reasonable and practical.
- d. Existing lines shall not be rebuilt for the sole purpose of conforming to these standards.

3. Conformance to National, State and Local Codes

Every effort has been made in the development of the Ameren Construction Standards to give proper recognition of and insure conformance to published codes of governmental bodies. All construction covered by the standards in this book meet the minimum requirements of the current edition of the National Electrical Safety Code.

4. Responsibility for Interpretation

Questions concerning the interpretation of these standards shall be directed to the Supervising Engineer in the Distribution Standards Group.

5. Standards Organization – Unitized Assemblies

This standards book is made up of various major sections, some providing basic units of assembly such as insulators, crossarms, guys, etc. Many of these basic units are then further employed as sub-assemblies in other sections, such as the configuration and switch sections of the book. However, there is a practical limit to the number of various combinations of these units for which standard drawings can be developed. As a result, several different standards are required to completely specify the construction for each pole.

6. Computerized Material and Labor Take-Off

Provisions have been incorporated into these standards which, when properly applied, will develop the associated materials, installation labor manhours and total costs by computer. This system of computerized materials take-off is now part of the DOJM system. In DOJM terminology, the Construction Standard bill-of-material is called a macro or supermacro. A major stock number or a labor code is called a comptable unit. Minor stock number for any particular macro are gathered together to form one compatible unit for all minor items on that Construction Standard. Some of the general provisions of the computerized material and labor take-off system are described in the following paragraphs.

a. Standards Numbering System

To provide for computerized material take-off, an eight digit standards numbering system has been developed. A separate number is assigned to each variation of construction and a complete bill of material is listed on the standard for each of the variations covered. This same number with an appropriate bill of materials and associated non-material operations, if any, are recorded on the computer. Specifying the proper eight-digit standard number will, in many instances, be all that is required to obtain the proper materials, labor and costs associated with the installation or removal of the standard. In other cases, one or more adders indicated in the Bill of Materials of the standard will have to be added separately.

b. Adder Items “@”

Where it is not practical to give all the variations of an assembly of different unit standards on one standard sheet, a reminder is given in the Bill of Materials that additional materials are required. This reminder is in the form of an “@” prefixing the standard number, stock number, or wire size specific item which must be specified separately.

c. Wire Size Variable “W”

In cases where the material required on a standard varies with the wire size, a system has been designed to indicate adders to be included with a wire size suffix. See Sheet 3 of this standard for appropriate wire size suffixes. This suffix will automatically provide the proper materials when an adder is called for. The computer selects from a wire size table such items as connectors, deadends, jumper and lead wire, ties, etc. If the adder is not suffixed with an acceptable wire size, DOJM will not allow the DOJM code to be entered.

d. Transformer Standards

Transformers are specified on work requests by their stock number. Materials which vary with the transformer size and type will be automatically specified along with the transformer by the computer. These items, such as leads, connectors and bolts, are indicated by the letter “T” on the transformer standard bill of materials. Other items must be specified by listing the Standard Number for mounting the transformer.

e. Additions and Deletions

Materials may be added to or deleted from a standard by listing them on the line construction work request (NTRY Screen). This may be done either by unit standard numbers or by stock numbers. This will be useful in cases such as where a different crossarm size is required, where wire sizes are different, where some items are already installed, etc.

GENERAL

ACCEPTABLE WIRE SIZE SUFFIXES

<u>NEUTRAL</u>			
WIRE	SIZE	SUFFIX	
#6	CU	Bare	6C
#4	CU	Bare	4C
#2	CU	Bare	2C
#1/0	CU	Bare	10C
#4	ACSR	Bare	4A
#1/0	AAAC	Bare	10A

<u>120/240 VOLTS OPEN WIDE SECONDARY</u>			
WIRE	SIZE	SUFFIX	
2-#6	CU	WP	6W
1-#6	CU	Bare	
2-4#	CU	WP	4W
1-#6	CU	Bare	
2-#2	CU	WP	2W
1-#4	CU	Bare	
2-#4/0	AA	Poly	40P
1-#1/0	AAAC	Bare	

STATIC WIRE		SUFFIX	
3#7	AW	Bare	37AW
110.8	ACSR	Bare	110A

COPPERWELD		SUFFIX	
#6A	CWC	Bare	6AC
#4A	CWC	Bare	4AC
#2A	CWC	Bare	2AC












<u>2.4kV through 69kV</u>			
WIRE	SIZE	SUFFIX	
#4	ACSR	Bare	4A
#2	ACSR	Bare	2A
#1/0	AAAC	Bare	10A
#3/0	ACSR	Bare	30A
#4/0	ACSR	Bare	40A
335.6	T-2ACSR	Bare	335T2
336.4	ACSR	Bare	336A
477	ACSR	Bare	477A
556.5	AA	Bare	556A
795	AA	Bare	795A
954	AA	Bare	954A
#4	ACSR	Poly	4P
#2	ACSR	Poly	2P
#1/0	AAAC	Poly	10P
336.4	AA	Poly	336P
556.5	AA	Poly	556P
#4	ACSR	TreeWire	4T
#2	ACSR	TreeWire	2T
#1/0	AAAC	TreeWire	10T
336.4	ACSR	TreeWire	336T
556.5	AA	TreeWire	556T
#6	CU	Bare	6C
#4	CU	Bare	4C
#2	CU	Bare	2C
#1/0	CU	Bare	10C
#4/0	CU	Bare	40C
350	CU	Bare	350C
500	CU	Bare	500C

GENERAL

<u>2.4kV through 69kV</u>			
WIRE	SIZE		SUFFIX
#6	CU	WP	6W
#4	CU	WP	4W
#2	CU	WP	2W
#1/0	CU	WP	10W
#4/0	CU	WP	40W
500	CU	WP	500W

1. For wire sizes and voltages not shown, material must be specified separately.

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>SYMBOL</u>	<u>DESCRIPTION</u>
	OPEN SOLID BLADE SWITCH (MO)		OPEN BREAKER
	CLOSED SOLID BLADE SWITCH (MO)		CLOSED BREAKER
	OPEN SOLID BLADE SWITCH (IL)		OPEN RECLOSER
	CLOSED SOLID BLADE SWITCH (IL)		CLOSED RECLOSER
	CLOSED FUSED SWITCH		OPEN SECTIONALIZER
	OPEN FUSED SWITCH		CLOSED SECTIONALIZER
	OPEN SPLIT		REGULATOR
	CLOSED SPLIT		GENERATOR
	OVERHEAD TRANSFORMER (1PH)		CAPACITOR
	OVERHEAD TRANSFORMER (3PH)		NETWORK PROTECTOR
	PADMOUNT TRANSFORMER (1PH)		KEY INTERLOCK
	PADMOUNT TRANSFORMER (3PH)		OPEN LOAD BREAK ELBOW
	SPACER CABLE		CLOSED LOAD BREAK ELBOW
	OPEN CIRCUIT SWITCH PAD		RADIO CONTROL SYMBOL
	SWITCH PAD (MO)		STEPDOWN TRANSFORMER
	SWITCH PAD (IL)		LIGHTING SUBSTATION
	MANHOLE		MAJOR CUSTOMER
	HANDHOLE		CUSTOMER SUBSTATION MANUAL
	JUNCTION BOX (4 WAY)		CUSTOMER SUBSTATION AUTOMATIC
	JUNCTION BOX (2 WAY)		PRIMARY METER

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>SYMBOL</u>	<u>DESCRIPTION</u>
	FEEDER ORIGIN		SUBSTATION
	FAULT INDICATOR		DOWN GUY
	CABLE TERMINATION		SPAN GUY
	COMPANY POLE		TRANSMISSION TOWER
	FOREIGN POLE		TRANSMISSION TOWER (FOREIGN)
	NETWORK BUS POSITION		DEADEND
	ENCLOSED ROOM		JUNCTION
	VAULT		CABLE SPLICE
	REACTOR		WIRE/PHASE CHANGE
	CT BANK		MUNICIPAL STREETLIGHT
	CT ATTACHMENT		OVERHEAD FED STREETLIGHT
	POTENTIAL TRANSFORMER		UNDERGROUND FED STREETLIGHT
	COUPLING CAPACITOR		SUBSTATION TRANSFORMER
	REACTOR		METER ATTACHMENT
	HIGH SPEED GROUND SWITCH		RELAY ATTACHMENT
	WAVE TRAP		MISC EQUIPMENT (REPEATER)
	LIGHTNING ARRESTER		MISC EQUIPMENT (MCC /CRM)
	GROUND		AIRCRAFT WARNING MARKER
	DISTRICT TIE		