

MODIFIED ERECTICON SUBSTATION STRUCTURES
BY
V & S SCHULER ENGINEERING, INC.

Modified Erecticon Substation Structures:

- Standardized Elements – Three basic welded trusses, related members and fittings provide the building blocks for all structures. The design allows for almost unlimited variations and is adaptable to virtually any size or capacity.
- Easier Assembly – Columns and trusses are welded, eliminating the bolting of lacing members. All boltholes in trusses, plates, brackets and fixtures are punched on three-inch centers for exacting fit and interchangeability. All of the assembly is done on the ground and all parts are identified by stamped numbers.
- Easy Expansion – Boltholes match up, eliminating field drilling or burning which can cause destruction of the galvanizing bond. Pre-engineered components can be warehoused for later use.
- Complete Salvageability – A substation can be taken down and re-erected at a new site or warehoused for future use. Also, the parts from one station can be used to modify another.

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The Details of Modified Erecticon:

The detail and perspective drawings on the following sheets are prepared to aid you in designing your *Modified Erecticon* substation structures. Before starting to design a structure it may be helpful to familiarize yourself with the basic standard elements available. Subsequent pages listing these basic elements are indexed as follows:

- Sheets 1 thru 3 list the available standard components. Also noted are the piece mark, item shape, length, galvanized weight and the sheet number showing the referenced part.
- Sheets 4 thru 6 show the three basic truss shapes, mark number, basic dimensions and galvanized weight.
- Sheets 7 thru 11 list the calculated allowable loads and deflection figures for each size of the three basic welded trusses. Also given are calculated allowable stresses for *Modified Erecticon* trusses in bending and compression. You will need to refer to these tables in determining which trusses to use under any given set of conditions.
- Sheets 12 thru 16 are perspective drawings, which give you the most commonly used combinations of trusses and columns, and illustrate some of the methods of joining trusses to columns.

Upon examination of the detail drawings of the welded trusses on sheets 4, 5 and 6 you will note that all truss members are dimensioned one inch less than their assembled length – i.e. a 20 foot truss is actually 19 feet 11 inches long. When assembled in a structure this truss will provide 20 feet of total length due to a gain of one inch through the addition of connecting plates.

All chord angles of all trusses are punched throughout their length, on both faces, at precise 3-inch intervals, so that attachment can be made at any dimension divisible by three. All miscellaneous steel members are also punched on this 3-inch module, so that parts may be assembled in virtually any combination.

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The Designing of Your Modified Erecticon Substation Structure:

In starting to design a substation structure, your attention can be concentrated on two of the most important factors – the wiring diagram and the site – with little thought required on the actual structural engineering aspects of the structure. *Modified Erecticon* trusses of the proper strength may be selected from the charts provided, thus eliminating the structural detailing. Once you have determined the basic configuration of the structure, which will serve your wiring, plan and site, engineering consists merely of specifying the necessary parts from the bill of materials contained in this set of plans.

Most engineers find it sufficient to roughly sketch the structure they need to carry their wiring, and which structure can be accommodated on the available site. From this the detailed parts list can be assembled. Such tasks as specifying the connecting plates, number of bolts, etc., can be handled quickly and easily once the basic columns and trusses are determined and the general configuration of the structure is decided.

Frequently the strongest determining factor affecting the over-all dimensions of the structure is the site. Before starting to lay out a structure, it is necessary, of course, to determine the location of the incoming and outgoing lines as well as the general terrain.

After a structure has been designed, the most appropriate ground anchoring system can then be determined. With *Modified Erecticon* you have the choice of three methods for anchoring columns to the foundation. The calculated overturning moment is, of course, the big factor here. The three systems offered utilize conventional anchor bolts set in concrete.

All that remains after a structure is designed with *Modified Erecticon* is to detail the mounting brackets and fittings to carry the necessary switchgear and similar equipment. Frequently the base mountings for such equipment can be punched by the switchgear manufacturer for bolting to *Modified Erecticon*, without the necessity of designing special mounting brackets. The *Modified Erecticon* 3-inch modular punching makes it unnecessary for field drilling for the mounting of switchgear.

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From time to time, special fixtures may be required by various utilities for use with *Modified Erecticon*. As we have done in the past with other *Modified Erecticon* users, **V & S Schuler Engineering, Inc.** will assist on the development of such elements, which can then be given part numbers and designated as standard *Modified Erecticon* parts for your particular requirements.

STANDARD 'A' TRUSSES

PIECE MARK	ITEM	SIZE	LENGTH	GALV WEIGHT	SHEET
S4A	WELDED TRUSS	12" x 30"	3' - 11"	120 LBS	4
S6A	WELDED TRUSS	12" x 30"	5' - 11"	188 LBS	4
S8A	WELDED TRUSS	12" x 30"	7' - 11"	255 LBS	4
S10A	WELDED TRUSS	12" x 30"	9' - 11"	322 LBS	4
S12A	WELDED TRUSS	12" x 30"	11' - 11"	390 LBS	4
S14A	WELDED TRUSS	12" x 30"	13' - 11"	458 LBS	4
S16A	WELDED TRUSS	12" x 30"	15' - 11"	524 LBS	4
S18A	WELDED TRUSS	12" x 30"	17' - 11"	593 LBS	4
S20A	WELDED TRUSS	12" x 30"	19' - 11"	659 LBS	4
S22A	WELDED TRUSS	12" x 30"	21' - 11"	728 LBS	4
S24A	WELDED TRUSS	12" x 30"	23' - 11"	795 LBS	4
S26A	WELDED TRUSS	12" x 30"	25' - 11"	862 LBS	4
S28A	WELDED TRUSS	12" x 30"	27' - 11"	929 LBS	4

STANDARD 'B' TRUSSES

PIECE MARK	ITEM	SIZE	LENGTH	GALV WEIGHT	SHEET
S4B	WELDED TRUSS	12" x 12"	3' - 11"	93 LBS	5
S6B	WELDED TRUSS	12" x 12"	5' - 11"	141 LBS	5
S8B	WELDED TRUSS	12" x 12"	7' - 11"	189 LBS	5
S10B	WELDED TRUSS	12" x 12"	9' - 11"	236 LBS	5
S12B	WELDED TRUSS	12" x 12"	11' - 11"	285 LBS	5
S14B	WELDED TRUSS	12" x 12"	13' - 11"	333 LBS	5
S16B	WELDED TRUSS	12" x 12"	15' - 11"	380 LBS	5
S18B	WELDED TRUSS	12" x 12"	17' - 11"	428 LBS	5
S20B	WELDED TRUSS	12" x 12"	19' - 11"	475 LBS	5
S22B	WELDED TRUSS	12" x 12"	21' - 11"	523 LBS	5
S24B	WELDED TRUSS	12" x 12"	23' - 11"	571 LBS	5
S26B	WELDED TRUSS	12" x 12"	25' - 11"	619 LBS	5
S28B	WELDED TRUSS	12" x 12"	27' - 11"	665 LBS	5

STANDARD 'C' TRUSSES

PIECE MARK	ITEM	SIZE	LENGTH	GALV WEIGHT	SHEET
S4C	WELDED TRUSS	30" x 30"	3' - 11"	126 LBS	6
S6C	WELDED TRUSS	30" x 30"	5' - 11"	203 LBS	6
S8C	WELDED TRUSS	30" x 30"	7' - 11"	280 LBS	6
S10C	WELDED TRUSS	30" x 30"	9' - 11"	358 LBS	6
S12C	WELDED TRUSS	30" x 30"	11' - 11"	435 LBS	6
S14C	WELDED TRUSS	30" x 30"	13' - 11"	513 LBS	6
S16C	WELDED TRUSS	30" x 30"	15' - 11"	590 LBS	6
S18C	WELDED TRUSS	30" x 30"	17' - 11"	667 LBS	6
S20C	WELDED TRUSS	30" x 30"	19' - 11"	745 LBS	6
S22C	WELDED TRUSS	30" x 30"	21' - 11"	822 LBS	6
S24C	WELDED TRUSS	30" x 30"	23' - 11"	899 LBS	6
S26C	WELDED TRUSS	30" x 30"	25' - 11"	977 LBS	6
S28C	WELDED TRUSS	30" x 30"	27' - 11"	1054 LBS	6

STANDARD COMPONENTS

PIECE MARK	ITEM	SHAPE	LENGTH	GALV WEIGHT (LBS)	SHEET
M52	CLIP ANGLE	L 3 x 3 x 1/4	8"	4	17
M50A (79-19)	COLUMN BASE	C 9 x 23.9	1' - 7"	39	17
M50AS	COLUMN BASE	C 9 x 23.9	3' - 1"	76	17
M167 (17-16)	COLUMN BASE ANGLE	L 6 x 4 x 5/8	1' - 4"	28	18
2BA	COLUMN BASE	PL 3/4" x 4"	10"	12	18
		PL 3/8" x 2 7/8"	9"		
C1A	'B' TRUSS CROSS	PL 1/4" x 2 1/2"	11"	13	19
		PL 1/4" x 8"	11"		
		PL 1/4" x 5 1/4"	11"		
C2A	'A' TRUSS CROSS	PL 1/4" x 8"	11"	13	19
		PL 1/4" x 8"	8 1/4"		
		PL 1/4" x 2 1/2"	8"		
C3A	KNEEBRACE CROSS	PL 1/4" x 7 1/4"	8"	8	19
		PL 1/4" x 4 1/2"	8"		
		PL 1/4" x 2 7/16"	8"		
C4A	'A' TRUSS CROSS	PL 1/4" x 8"	11"	13	19
		PL 1/4" x 8"	8 1/4"		
		PL 1/4" x 2 1/2"	8"		
P40	KNEEBRACE PLATE	PL 1/4" x 7 1/4"	8"	5	20
P41	'A' TRUSS PLATE	PL 1/4" x 8"	11"	7	20
P42	'B' TRUSS PLATE	PL 1/4" x 8"	11"	7	20
P43	'A' TRUSS PLATE	PL 1/4" x 8"	2' - 5"	17	20
P44	'A' TRUSS PLATE	PL 1/4" x 8"	3' - 11"	28	20
P45	'A' TRUSS PLATE	PL 1/4" x 8"	1' - 8"	12	20
P46	'A' TRUSS PLATE	PL 1/4" x 8"	3' - 2"	23	20
P47	'B' TRUSS PLATE	PL 1/4" x 11"	1' - 11"	19	21
P48	'B' TRUSS PLATE	PL 1/4" x 11"	3' - 5"	33	21
P49	'B' TRUSS PLATE	PL 1/4" x 11"	2' - 11"	28	21
P50	'B' TRUSS PLATE	PL 1/4" x 11"	1' - 5"	14	21
P51	'A' TRUSS PLATE	PL 1/4" x 8"	11"	7	21
P52	'A' TRUSS PLATE	PL 1/4" x 5"	8"	3	21
MS1	'B' TRUSS DIAPHRAM	L 2 1/2 x 2 x 1/4	1' - 3 3/16"	5	22
		PL 3/8" x 2 1/8"	2 1/2"		
MS2	'C' TRUSS DIAPHRAM	L 2 1/2 x 2 x 1/4	3' - 4 9/16"	13	22
		PL 3/8" x 2 1/8"	2 1/2"		
MS3	'A' TRUSS DIAPHRAM	L 2 1/2 x 2 x 1/4	2' - 6 9/16"	10	22
		PL 3/8" x 2 1/8"	2 1/2"		
S2	COLUMN SPLICE	L 2 1/2 x 2 1/2 x 3/8	2' - 11"	19	23
M48A	LIGHTNING ROD ASSEMBLY	2 1/2" PIPE	6' - 11 1/2"	83	23
		2" PIPE	6' - 3"		
		1 1/2" PIPE	6' - 3"		
M48AS	LIGHTNING ROD ASSEMBLY	2" PIPE	2' - 11 1/2"	40	23
		1 1/2" PIPE	6' - 3"		
		1" PIPE	6' - 3"		
M39A (77-51)	'A' TRUSS KNEEBRACE	L 3 x 3 x 1/4	4' - 1 3/8"	45	24
		PL 1/4" x 8"	2' - 6"		
		L 1 1/2 x 1 1/2 x 1/4	2' - 9 1/4"		

V & S SCHULER ENGINEERING INC.

2240 ALLEN AVE. CANTON, OHIO

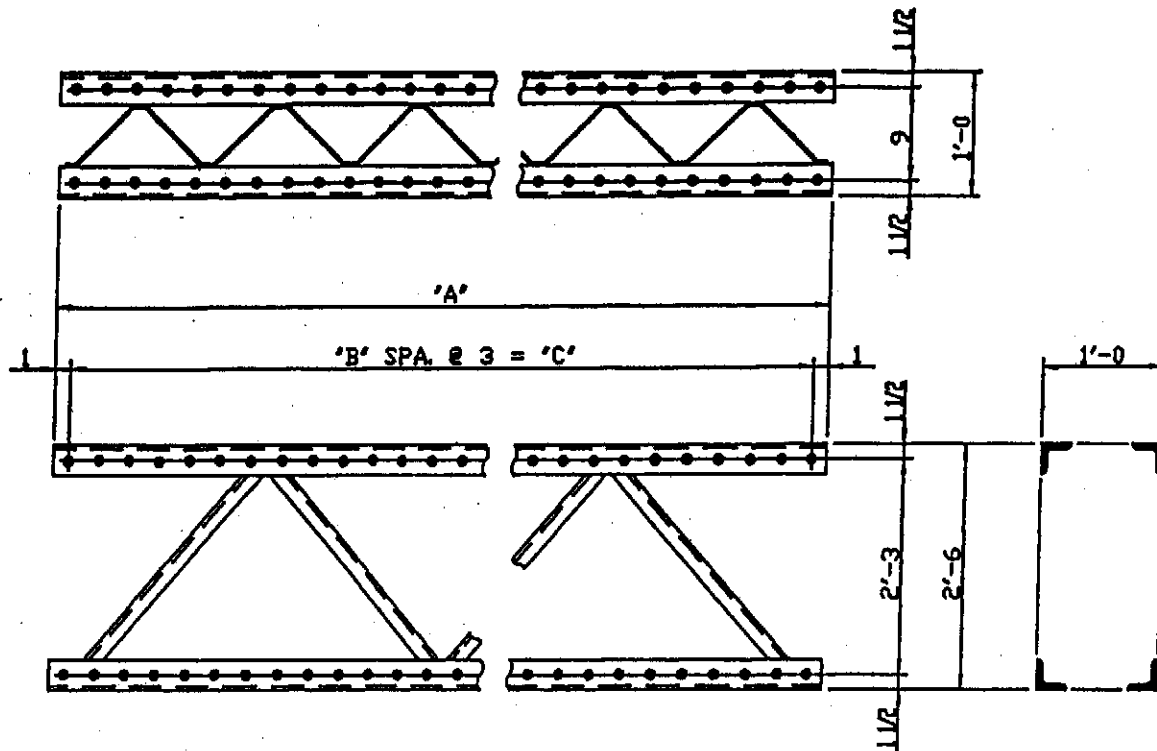
STANDARD COMPONENTS

PIECE MARK	ITEM	SHAPE	LENGTH	GALV WEIGHT (LBS)	SHEET
M40A (76-51)	'B' TRUSS KNEEBRACE	L 3 x 3 x 1/4	11"	12	24
		PL 1/4" x 8"	1' - 0"		
		ROD 1/2" DIAMETER	10 1/4"		
M42A (76-102)	'B' TRUSS KNEEBRACE	L 3 x 3 x 1/4	6 1/2"	10	24
		PL 1/4" x 8"	1' - 0"		
		ROD 1/2" DIAMETER	10 1/4"		
M43A (77-102)	'A' TRUSS KNEEBRACE	L 3 x 3 x 1/4	3' - 11"	44	24
		PL 1/4" x 8"	2' - 6"		
		L 1 1/2 x 1 1/2 x 1/4	2' - 9 1/4"		
S40	KNEEBRACE	L 3 x 3 x 1/4	4' - 3 5/8"	22	25
S42A	'B' TRUSS KNEEBRACE	L 3 x 3 x 1/4	8' - 6 5/8"	44	25
		ROD 1/2" DIAMETER	10 1/4"		
S43A	'A' TRUSS KNEEBRACE	L 3 x 3 x 1/4	8' - 6 5/8"	50	25
		L 1 1/2 x 1 1/2 x 1/4	2' - 9 1/4"		
A1	COLUMN CAP ANGLE	L 3 x 3 x 1/4	2' - 4 3/4"	13	26
A2	COLUMN CAP ANGLE	L 3 x 3 x 1/4	10 3/4"	5	26
A3	COLUMN CAP ANGLE	L 3 x 3 x 1/4	10 3/4"	5	26
A4	COLUMN CAP ANGLE	L 3 x 3 x 1/4	2' - 4 3/4"	13	26
M51 (4-5E)	CLIP ANGLE	L 2 1/2 x 2 1/2 x 1/4	5"	2	26
M53 (4-29E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	2' - 5"	11	26
M54 (4-59E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	4' - 11"	21	26
M83 (4-11E)	SEAT ANGLE	L 2 1/2 x 2 1/2 x 1/4	11"	4	26
M108 (4-47E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	3' - 11"	17	26
M123 (4-23E)	ROD GAP ANGLE	L 2 1/2 x 2 1/2 x 1/4	1' - 11"	9	26
M124 (4-17E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	1' - 5"	6	26
M141 (4-35E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	2' - 11"	13	26
M142 (4-71E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	5' - 11"	25	26
M144 (4-14E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	1' - 2"	5	26
M207 (4-41E)	RAILING SUPPORT PLATE	L 2 1/2 x 2 1/2 x 1/4	3' - 5"	15	26
M208 (13-65)	SWITCH SUPPORT PLATE	L 6 x 3 1/2 x 5/16	5' - 6"	56	26
M237 (4-2E)	CLIP ANGLE	L 2 1/2 x 2 1/2 x 1/4	2"	1	26
M238 (4-32E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	2' - 8"	12	26
M261 (4-20E)	SIDE ANGLE	L 2 1/2 x 2 1/2 x 1/4	1' - 8"	7	26
M263 (4-65E)	BARRIER SUPPORT	L 2 1/2 x 2 1/2 x 1/4	5' - 5"	23	26
M95 (41-6)	PULL OFF PLATE	PL 1/2" x 5"	6 1/2"	5	27
M166	PULL OFF ANGLE	L 5 x 3 1/2 x 1/2	11"	13	27
M177	INSULATOR SUPPORT PLATE	PL 1/2" x 5"	1' - 0"	9	27
M190S	L ROD ADAPTER PLATE	PL 1/2" x 11"	2' - 5"	47	27
M193	INSULATOR SUPPORT PLATE	PL 1/2" x 6"	1' - 0"	11	27
M200	INSULATOR SUPPORT PLATE	PL 1/2" x 6"	2' - 6"	27	27
M63	INSULATOR PLATE	PL 1/2" x 5"	10"	8	28
M74S	INSULATOR SUPPORT	WT 3 x 6	5"	3	28
M75 (39-26)	LADDER BRACKET	PL 1/4" x 5"	2' - 2 1/2"	10	28
M202A	PULL OFF ASSEMBLY	L 6 x 3 1/2 x 3/8	5 1/2"	7	28
		PL 1/4" x 3"	5 1/2"		

V & S SCHULER ENGINEERING INC.

2240 ALLEN AVE. CANTON, OHIO

TYPE 'A' TRUSS



MARK NUMBER	DIMENSIONS			GALVANIZED WEIGHT
	"A"	"B"	"C"	
S4A	3'-11"	15	3'-9"	120 LBS
S6A	5'-11"	23	5'-9"	188 LBS
S8A	7'-11"	31	7'-9"	255 LBS
S10A	9'-11"	39	9'-9"	322 LBS
S12A	11'-11"	47	11'-9"	390 LBS
S14A	13'-11"	55	13'-9"	458 LBS
S16A	15'-11"	63	15'-9"	524 LBS
S18A	17'-11"	71	17'-9"	593 LBS
S20A	19'-11"	79	19'-9"	659 LBS
S22A	21'-11"	87	21'-9"	728 LBS
S24A	23'-11"	95	23'-9"	795 LBS
S26A	25'-11"	103	25'-9"	862 LBS
S28A	27'-11"	111	27'-9"	929 LBS

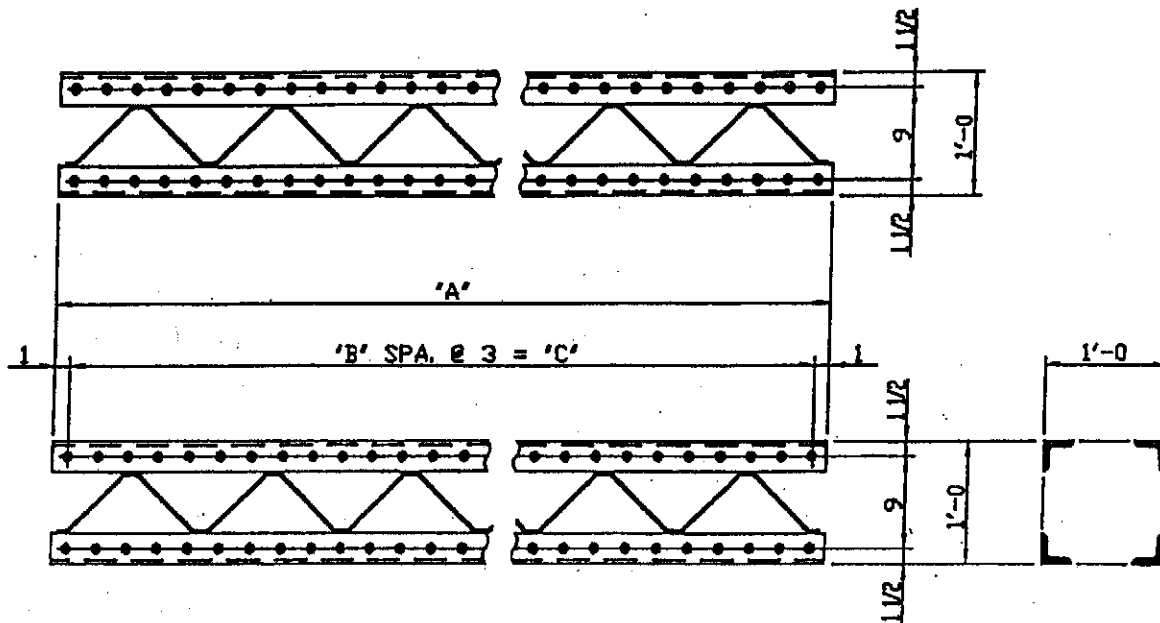
NOTES

- ALL MATERIAL ASTM A36
- HOT DIPPED GALVANIZED PER ASTM A123
- CHORD ANGLE L 3 x 3 x 5/16
- LACING ANGLE L 1 1/2 x 1 1/2 x 1/4
- BENT ROD 1/2" DIAMETER
- ALL HOLES 11/16" DIAMETER ON 3" CENTERS

V & S SCHULER ENGINEERING INC.

2240 ALLEN AVE. CANTON, OHIO

TYPE 'B' TRUSS

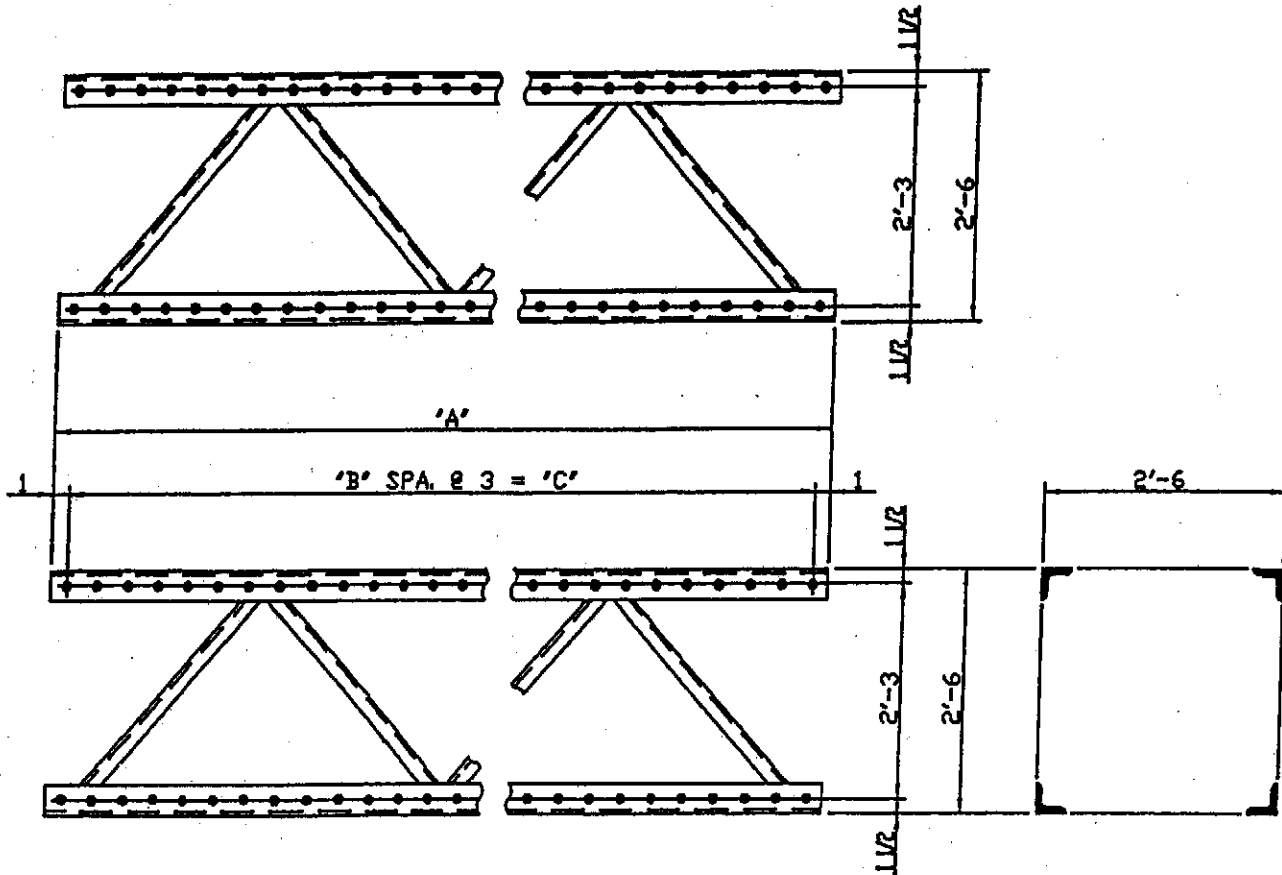


MARK NUMBER	DIMENSIONS			GALVANIZED WEIGHT
	"A"	"B"	"C"	
S4B	3'-11"	15	3'-9"	93 LBS
S6B	5'-11"	23	5'-9"	141 LBS
S8B	7'-11"	31	7'-9"	189 LBS
S10B	9'-11"	39	9'-9"	236 LBS
S12B	11'-11"	47	11'-9"	285 LBS
S14B	13'-11"	55	13'-9"	333 LBS
S16B	15'-11"	63	15'-9"	380 LBS
S18B	17'-11"	71	17'-9"	428 LBS
S20B	19'-11"	79	19'-9"	475 LBS
S22B	21'-11"	87	21'-9"	523 LBS
S24B	23'-11"	95	23'-9"	571 LBS
S26B	25'-11"	103	25'-9"	619 LBS
S28B	27'-11"	111	27'-9"	665 LBS

NOTES

- ALL MATERIAL ASTM A36
- HOT DIPPED GALVANIZED PER ASTM A123
- CHORD ANGLE L 3 x 3 x 1/4
- BENT ROD 1/2" DIAMETER
- ALL HOLES 11/16" DIAMETER ON 3" CENTERS

TYPE 'C' TRUSS



MARK NUMBER	DIMENSIONS			GALVANIZED WEIGHT
	"A"	"B"	"C"	
S4C	3'-11"	15	3'-9"	128 LBS
S6C	5'-11"	23	5'-9"	203 LBS
S8C	7'-11"	31	7'-9"	280 LBS
S10C	9'-11"	39	9'-9"	358 LBS
S12C	11'-11"	47	11'-9"	435 LBS
S14C	13'-11"	55	13'-9"	513 LBS
S16C	15'-11"	63	15'-9"	590 LBS
S18C	17'-11"	71	17'-9"	667 LBS
S20C	19'-11"	79	19'-9"	745 LBS
S22C	21'-11"	87	21'-9"	822 LBS
S24C	23'-11"	95	23'-9"	899 LBS
S26C	25'-11"	103	25'-9"	977 LBS
S28C	27'-11"	111	27'-9"	1054 LBS

NOTES

ALL MATERIAL ASTM A36
 HOT DIPPED GALVANIZED PER ASTM A123
 CHORD ANGLE L 3 x 3 x 5/16
 LACING ANGLE L 1 1/2 x 1 1/2 x 1/4
 ALL HOLES 11/16" DIAMETER ON 3" CENTERS

ALLOWABLE LOADS AND DEFLECTIONS

12" X 30" TYPE 'A' TRUSS

12" SIDE VERTICAL

SPAN FEET	ALLOWABLE LOADS				DEFLECTION IN INCHES			
	LATERALLY SUPPORTED ($l/b < 15$)		LATERALLY UNSUPPORTED ($l/b > 15$)		WEIGHT OF BEAM ONLY	100 LBS. PER FOOT UNIFORM LOAD	1000 LBS. CONCENTRATED LOAD AT CENTER OF SPAN	(2) 1000 LBS. LOAD SYMMETRICALLY LOCATED
	UNIFORM LOAD	LOAD AT CENTER OF SPAN	UNIFORM LOAD	LOAD AT CENTER OF SPAN				
	LBS PER FOOT	LBS	LBS PER FOOT	LBS				
4	2705	10650	2705	10650	0.00006	0.00014	0.00057	
6	1790	10815	1790	10815	0.00029	0.00071	0.0019	
8	1335	10780	1335	10780	0.0009	0.00234	0.0045	
10	1055	10745	1055	10745	0.0022	0.0055	0.0088	
12	875	10710	875	10710	0.0048	0.0114	0.0152	
14	745	10675	745	10675	0.0085	0.0211	0.0241	
16	650	10060	650	10060	0.013	0.036	0.0359	
18	574	8885	574	8885	0.0207	0.0575	0.0512	
20	512	7930	512	7930	0.0305	0.0876	0.0702	
22	462	7145	462	7145	0.0461	0.128	0.0934	
24	421	6470	421	6470	0.066	0.182	0.122	
26	386	5915	386	5915	0.09	0.25	0.154	
28	356	5420	356	5420	0.122	0.337	0.193	
30	330	4995	330	4995	0.16	0.444	0.237	
32	288	4610	288	4610	0.207	0.574	0.288	
34	251	4275	251	4275	0.264	0.732	0.345	
36	220	3970	220	3970	0.331	0.92	0.409	
38	194	3695	158	3075	0.412	1.143	0.482	
40	172	3440	141	2830	0.508	1.403	0.561	

$I = 141.76 \text{ IN}^4$

$S = 23.63 \text{ IN}^3$

$F = 21,000 \text{ LBS} / \text{IN}^2$ FOR $l/b < 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

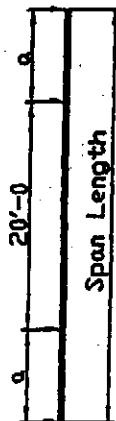
$F = 20,000 - 130 * l/b \text{ LBS} / \text{IN}^2$ FOR $l/b > 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

MAXIMUM ALLOWABLE SHEAR = 5460 LBS

LOADS GIVEN ABOVE DOTTED LINES ARE DETERMINED BY SHEAR.

VALUES GIVEN ARE FOR LIVE LOADS ONLY. WEIGHT OF BEAM NOT INCLUDED.

ALLOWABLE LOADS AND DEFLECTIONS
12" X 30" TYPE 'A' TRUSS
30° SIDE VERTICAL

SPAN FEET	ALLOWABLE LOADS				DEFLECTION IN INCHES				
	LATERALLY SUPPORTED (l/b < 15)		LATERALLY UNSUPPORTED (l/b > 15)		WEIGH OF BEAM ONLY	100 LBS. PER FOOT UNIFORM LOAD	1000 LBS. CONCENTRATED LOAD AT CENTER OF SPAN	(2) 1000 LBS. LOAD SYMMETRICALLY LOCATED	
	UNIFORM LOAD LBS PER FOOT	LOAD AT CENTER OF SPAN LBS	UNIFORM LOAD LBS PER FOOT	LOAD AT CENTER OF SPAN LBS					
4	6950	27870	6950	27870	0.000008	0.000019	0.000076		
6	4621	27835	4621	27835	0.000039	0.000096	0.000216		
8	3457	27800	3457	27800	0.00012	0.0003	0.000605		
10	2759	27765	2759	27765	0.0003	0.00074	0.00118		
12	2290	27730	2290	27730	0.0006	0.0015	0.00204		
14	1960	27695	1960	27695	0.0012	0.0028	0.00325		
16	1710	27660	1710	25850	0.0018	0.0048	0.00484		
18	1515	26865	1515	22535	0.0028	0.0077	0.0069		
20	1360	24095	1360	19950	0.0043	0.0118	0.0095		
22	1235	21055	1235	17775	0.0063	0.0173	0.0128		
24	1129	19960	1229	15980	0.0089	0.0245	0.0164		
26	1040	18365	1040	14465	0.0121	0.0337	0.0208		
28	963	16990	938	13120	0.0164	0.0454	0.026		
30	897	15775	799	11975	0.022	0.06	0.032		0.031
32	839	14730	686	10990	0.028	0.077	0.039		0.042
34	787	13795	592	10085	0.036	0.098	0.047		0.055
36	720	12960	517	9300	0.045	0.124	0.055		0.069
38	641	12215	451	8565	0.056	0.154	0.065		0.086
40	576	11520	396	7930	0.068	0.189	0.076		0.104
42	519	10915	350	7345	0.083	0.23	0.088		0.125
44	470	10350	309	6790	0.1	0.277	0.101	0.149	
46	427	9825	274	6305	0.119	0.331	0.115	0.175	
48	389	9350	243	5830	0.142	0.393	0.131	0.203	
50	356	8915	217	5415	0.166	0.462	0.148	0.234	

$I = 1048.68 \text{ IN}^4$

$S = 69.91 \text{ IN}^3$

$F = 21,000 \text{ LBS} / \text{IN}^2$ FOR $l/b < 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

$F = 20,000 - 130 * l/b \text{ LBS} / \text{IN}^2$ FOR $l/b > 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

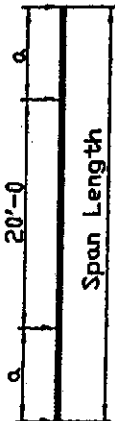
MAXIMUM ALLOWABLE SHEAR = 13970 LBS

LOADS GIVEN ABOVE DOTTED LINES ARE DETERMINED BY SHEAR.

VALUES GIVEN ARE FOR LIVE LOADS ONLY. WEIGHT OF BEAM NOT INCLUDED.

ALLOWABLE LOADS AND DEFLECTIONS

12" X 12" TYPE 'B' TRUSS

SPAN FEET	ALLOWABLE LOADS				DEFLECTION IN INCHES			
	LATERALLY SUPPORTED ($l/b < 15$)		LATERALLY UNSUPPORTED ($l/b > 15$)		WEIGHT OF BEAM ONLY	100 LBS. PER FOOT UNIFORM LOAD	1000 LBS. CONCENTRATED LOAD AT CENTER OF SPAN	(2) 1000 LBS. LOAD SYMMETRICALLY LOCATED
	UNIFORM LOAD LBS PER FOOT	LOAD AT CENTER OF SPAN LBS	UNIFORM LOAD LBS PER FOOT	LOAD AT CENTER OF SPAN LBS				
4	2710	10860	2710	10860	0.00006	0.00017	0.00058	
6	1795	10830	1795	10830	0.00025	0.00086	0.0023	
8	1340	10800	1340	10800	0.00081	0.00244	0.0055	
10	1060	10770	1060	10770	0.00222	0.00666	0.0107	
12	880	10740	880	10740	0.0046	0.0138	0.0184	
14	750	9500	750	9500	0.0085	0.0256	0.0293	
16	660	8290	660	7050	0.0113	0.0436	0.0436	
18	584	7315	584	6125	0.0182	0.0698	0.0621	
20	522	6540	522	5380	0.0277	0.1065	0.0853	
22	472	5895	433	4765	0.0408	0.156	0.114	
24	426	5360	354	4250	0.0575	0.221	0.147	
26	377	4895	293	3815	0.079	0.304	0.187	
28	321	4500	245	3430	0.107	0.409	0.234	
30	277	4145	206	3095	0.141	0.539	0.285	
32	240	3840	175	2805	0.182	0.698	0.349	
34	210	3565	149	2535	0.231	0.889	0.418	
36	184	3320	128	2305	0.291	1.119	0.497	
38	163	3095	110	2085	0.362	1.39	0.584	
40	144	2890	95	1895	0.444	1.707	0.682	

$I = 116.44 \text{ IN}^4$

$S = 19.41 \text{ IN}^3$

$F = 21,000 \text{ LBS/IN}^2$ FOR $l/b < 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

$F = 20,000 - 130 * l/b \text{ LBS/IN}^2$ FOR $l/b > 15$ (WHERE l = LENGTH OF MEMBER; b = WIDTH OF MEMBER)

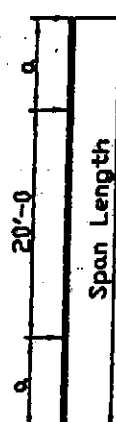
MAXIMUM ALLOWABLE SHEAR = 5480 LBS

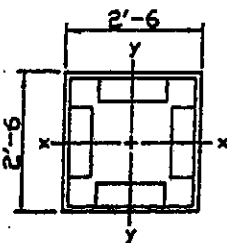
LOADS GIVEN ABOVE DOTTED LINES ARE DETERMINED BY SHEAR.

VALUES GIVEN ARE FOR LIVE LOADS ONLY. WEIGHT OF BEAM NOT INCLUDED.

ALLOWABLE LOADS AND DEFLECTIONS

30" X 30" TYPE 'C' TRUSS

SPAN FEET	ALLOWABLE LOADS				DEFLECTION IN INCHES			
	COLUMNS $l/r < 30 ; F=24000 \text{ psi}$ $l/r > 30 ;$ $F = 28000 - 130 (l/r)$		BEAMS $F = 20000 - 130 (l/b)$		WEIGHT OF BEAM ONLY	100 LBS. PER FOOT UNIFORM LOAD	1000 LBS. LOAD AT CENTER OF SPAN	(2) 1000 LBS. SYMMETRIC LOADS
	ABOUT AXIS X - X OR Y - Y		UNIFORM LOAD	LOAD AT CENTER OF SPAN				
l/r	F LBS PER FOOT	LBS PER FOOT	LBS					
4		24000	890	27240	0.000008	0.000019	0.000078	
6		24000	820	27000	0.000039	0.000098	0.000218	
8		24000	750	26800	0.00012	0.0003	0.000605	
10		24000	680	26500	0.00031	0.00074	0.00118	
12		24000	610	26200	0.00061	0.0015	0.00204	
14		24000	540	25900	0.0013	0.0028	0.00325	
16		24000	470	25600	0.0019	0.0048	0.00484	
18		24000	400	25300	0.0029	0.0077	0.0069	
20		24000	330	25000	0.0044	0.0118	0.0095	
22		24000	260	24600	0.0064	0.0173	0.0128	
24		24000	190	24200	0.009	0.0245	0.0164	
26		24000	120	23800	0.0122	0.0337	0.0208	
28		24000	50	23400	0.0166	0.0454	0.026	
30		24000	950	14300	0.023	0.06	0.032	
32		24000	830	13200	0.03	0.077	0.039	0.042
34	28.8	24000	730	12400	0.038	0.098	0.047	0.055
36	30.8	24000	640	11600	0.047	0.124	0.055	0.069
38	32.2	23800	580	11000	0.058	0.154	0.065	0.086
40	33.9	23600	520	10400	0.07	0.189	0.078	0.104
42	35.6	23400	470	9800	0.085	0.23	0.088	0.125
44	37.3	23200	420	9300	0.102	0.277	0.101	0.149
46	39	22900	380	8800	0.121	0.331	0.115	0.175
48	41.7	22700	350	8400	0.144	0.393	0.131	0.203
50	42.4	22500	320	8000	0.168	0.462	0.148	0.234



F = ALLOWABLE STRESS IN LBS PER SQUARE INCH

l = LENGTH OF MEMBER IN INCHES

b = WIDTH OF MEMBER IN INCHES

MAXIMUM ALLOWABLE SHEAR = 13970 LBS.

LOADS GIVEN ABOVE DOTTED LINE DETERMINED BY SHEAR
LIVE LOADS GIVEN. BEAM WEIGHT NOT INCLUDED

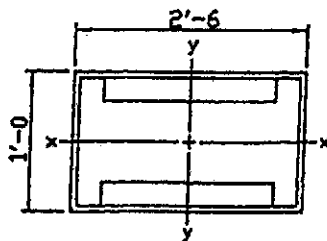
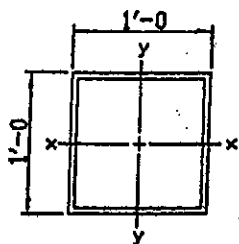
$I = 1048.7 \text{ IN}^4$

$S = 69.9 \text{ IN}^3$

$r (x-x \text{ or } y-y) = 14.15 \text{ IN.}$

ALLOWABLE STRESSES IN BENDING AND COMPRESSION

SPAN FEET		BENDING (PSI) (FOR TRUSSES)		COMPRESSION (PSI) (FOR COLUMNS)					
		(b = 12") F	(b = 30") F	$l/r < 30; F = 24000$ psi $l/r > 30; F = 28000 - 130 (l/r)$ WHERE: F = ALLOWABLE STRESS r = RADIUS OF GYRATION l = UNSUPPORTED SPAN					
				12" x 12" about axis x - x or y - y		12" x 30" about axis x - x		12" x 30" about axis y - y	
				l/r	F	l/r	F	l/r	F
4		21000	21000		24000		24000		24000
6		21000	21000		24000		24000		24000
8		21000	21000		24000		24000		24000
10		21000	21000		24000		24000		24000
12		21000	21000	27.4	24000	27.7	24000		24000
14		21000	21000	32.0	23830	32.3	23800		24000
16		17920	21000	36.6	23235	36.9	23200		24000
18		17660	21000	41.2	22640	41.5	22600		24000
20		17400	21000	45.8	22045	46.2	22000		24000
22		17140	21000	50.4	21450	50.7	21400		24000
24		16880	21000	55.0	20855	55.4	20800		24000
26		16620	21000	59.5	20260	59.9	20200		24000
28		16360	21000	64.1	19665	64.6	19600		24000
30		16100	21000	68.8	19070	69.2	19000		24000
32		15840	21000	73.2	18475	73.8	18400		24000
34		15580	21000	77.8	17880	78.4	17800	28.8	24000
36		15320	21000	82.4	17285	83.0	17200	30.6	24000
38		15060	18024	87.0	16690	87.7	16600	32.2	2.812
40		14800	17920	91.5	16095	92.3	16000	33.9	23592
42		14540	17816	96.2	15500	96.9	15400	35.6	23372
44		14280	17712	100.8	14905	101.5	14800	37.3	23151
46		14020	17608	105.3	14310	106.0	14200	39.0	22931
48		13760	17504	110.0	13715	110.8	13600	41.7	22710
50		13500	17400	114.5	13120	115.3	13000	42.4	22490



**BENDING AND COMPRESSION
FACTORS FOR THE 30" x 30"
TRUSS ARE SHOWN ON SHT.10
COLUMNS ONE AND TWO.**

TYPICAL TRUSS AND COLUMN COMBINATIONS

On sheets 13 through 16 are schematic drawings showing representative combinations of trusses and columns. Either 'A', 'B', or 'C' members can be used as trusses or columns, depending upon the physical loading which will be required on any given structure.

For clarity, no bolts have been indicated on these drawings, but it is recommended that all bolt holes on all connecting plates be filled with the proper size bolts. The use of "shelf brackets" on columns at the junction point of trusses and columns, such as M53 and M83, are optional, depending to some extent on the physical strength required. It is sometimes helpful during erection to attach these shelf brackets to columns on the ground, as an aid to positioning trusses after the columns are raised. Not shown on the schematic drawings are connecting plates P43, P44, P45, P46, P47, P48, P49 and P50, which are used where it is desirable to tie together bolt chords of a truss or column member under conditions of extreme physical loading.

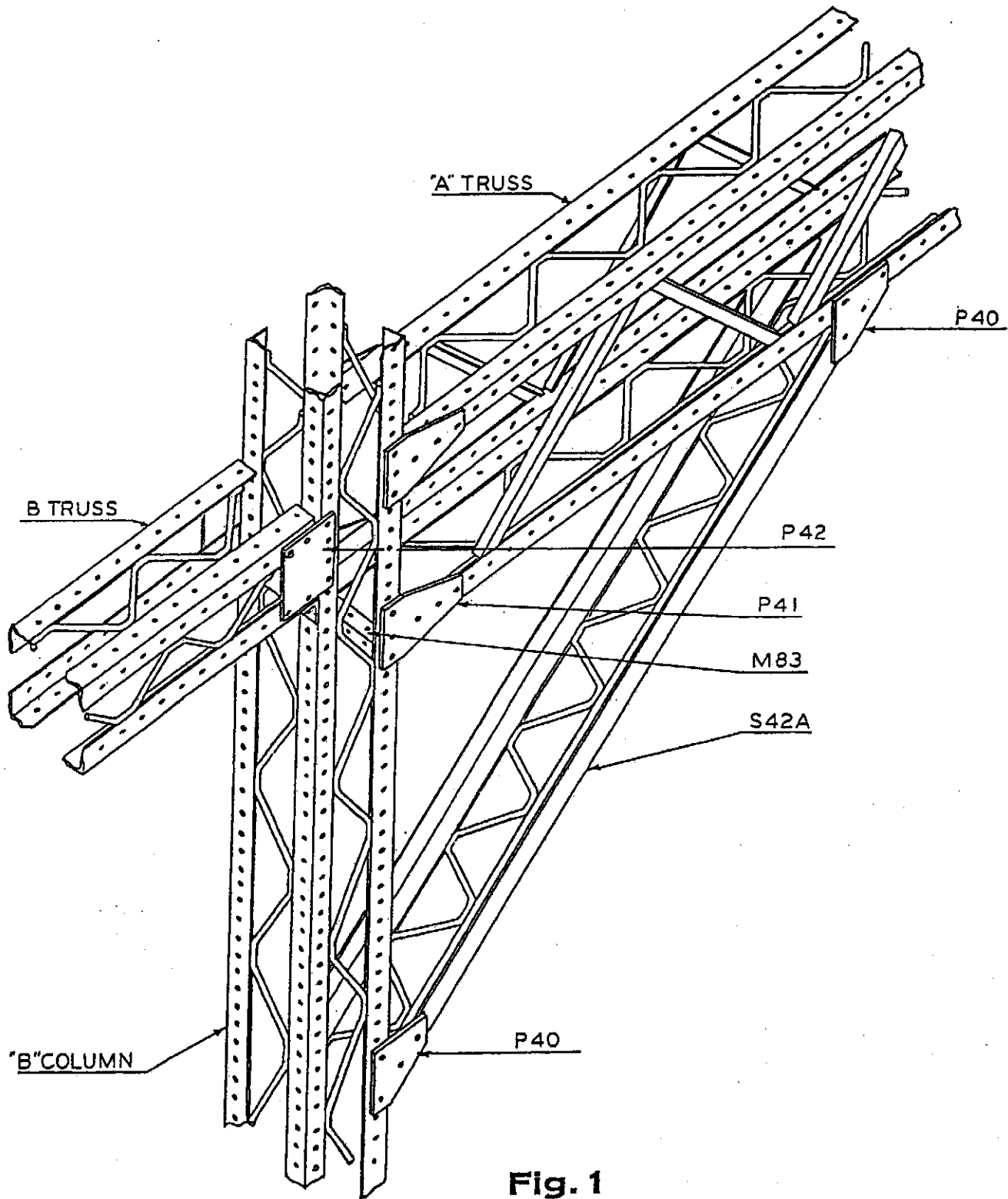


Fig. 1

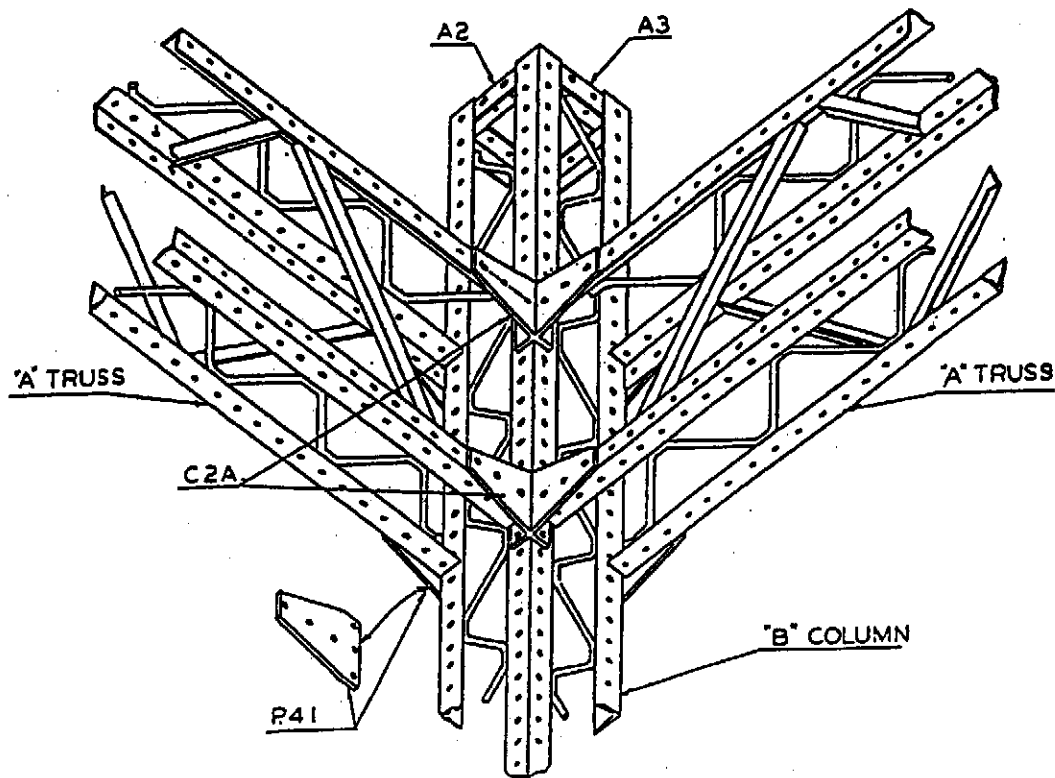


Fig. 2

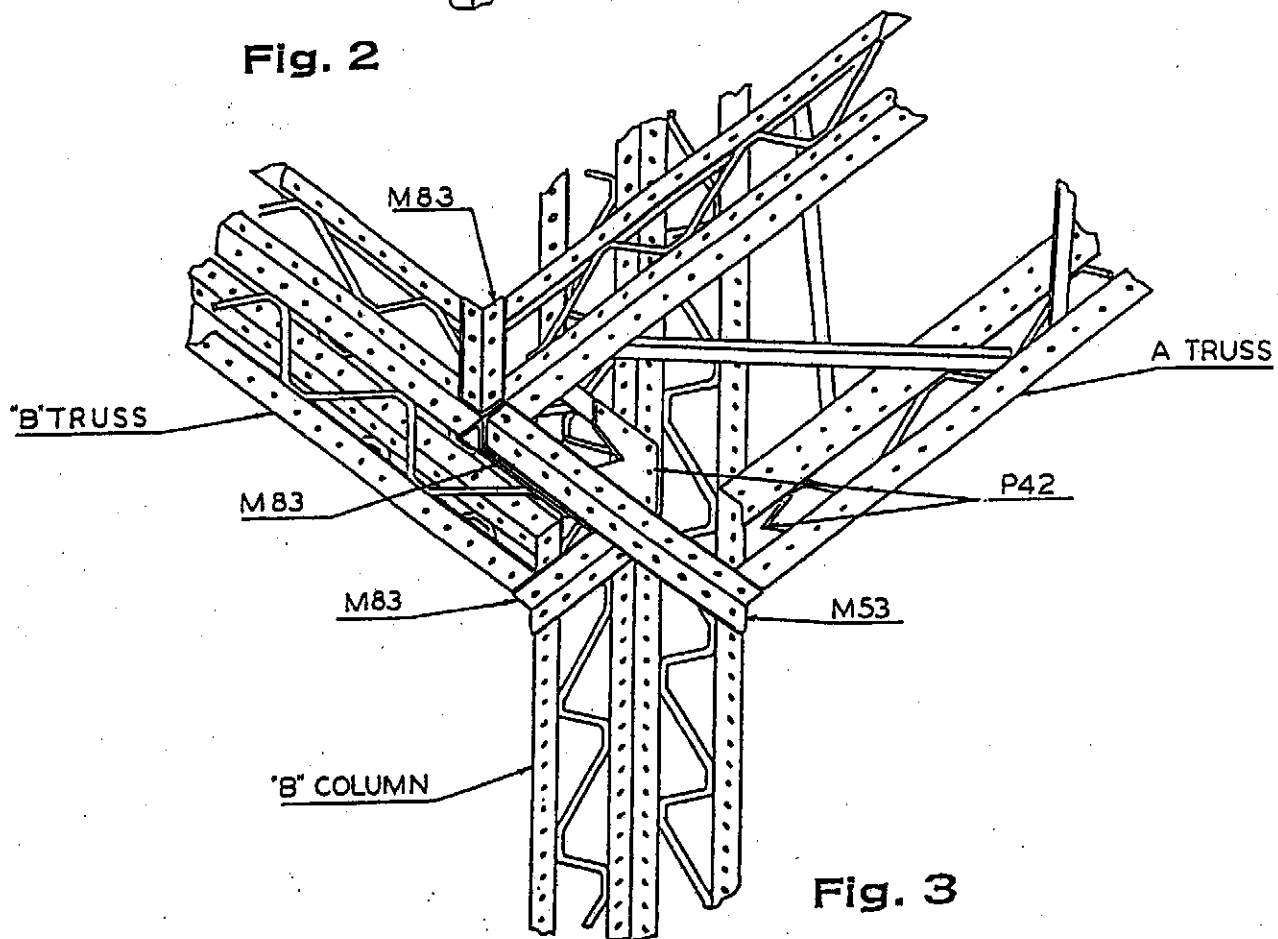


Fig. 3

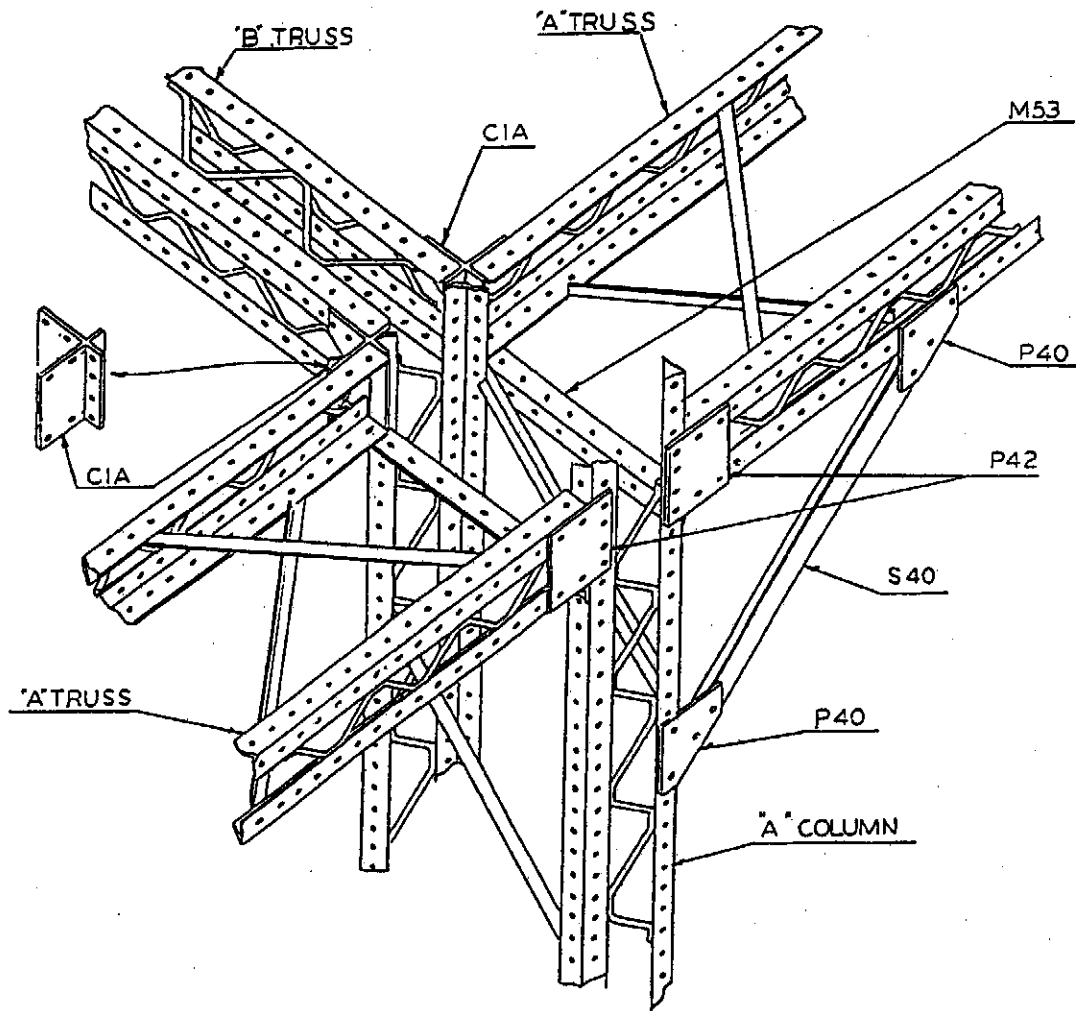


Fig. 4

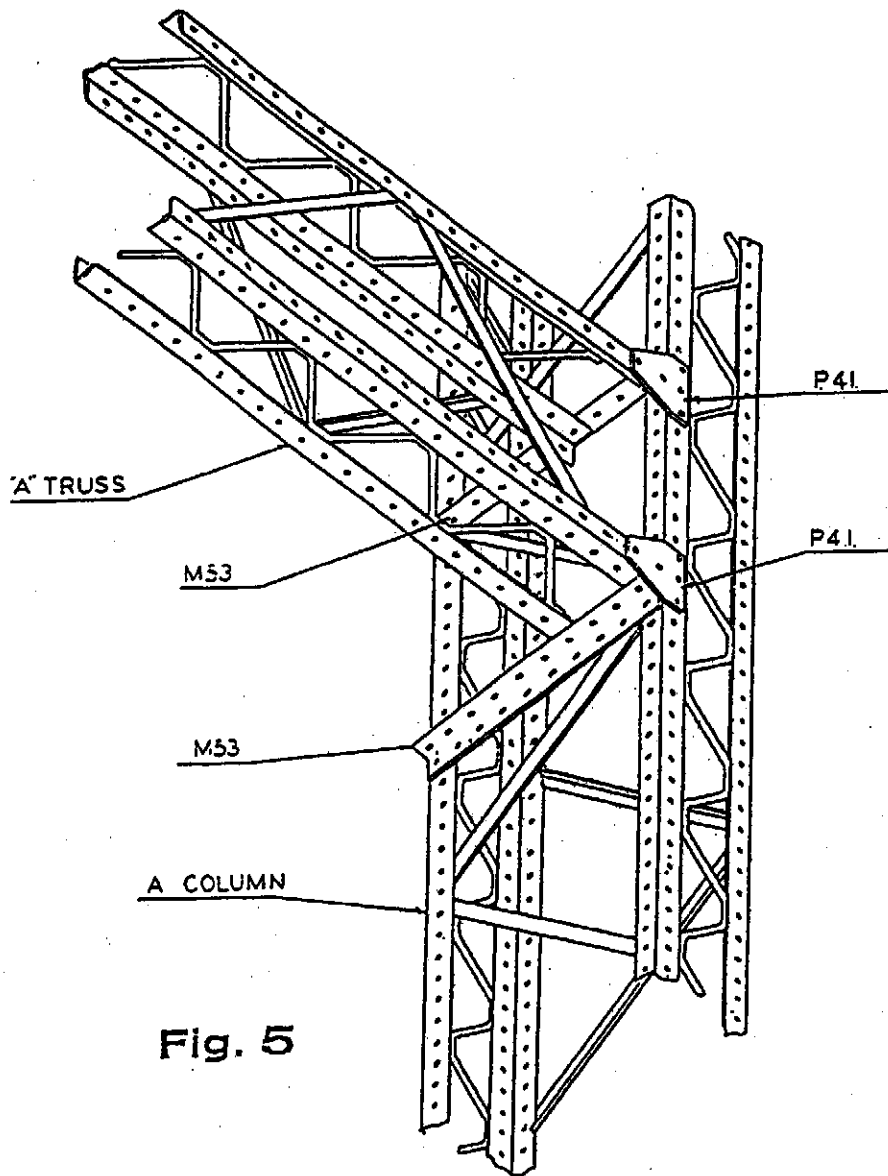
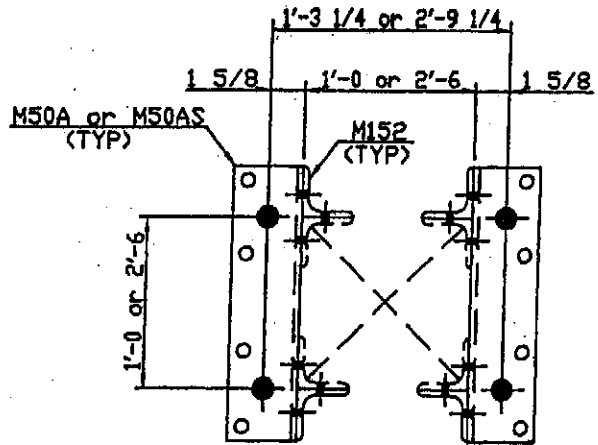
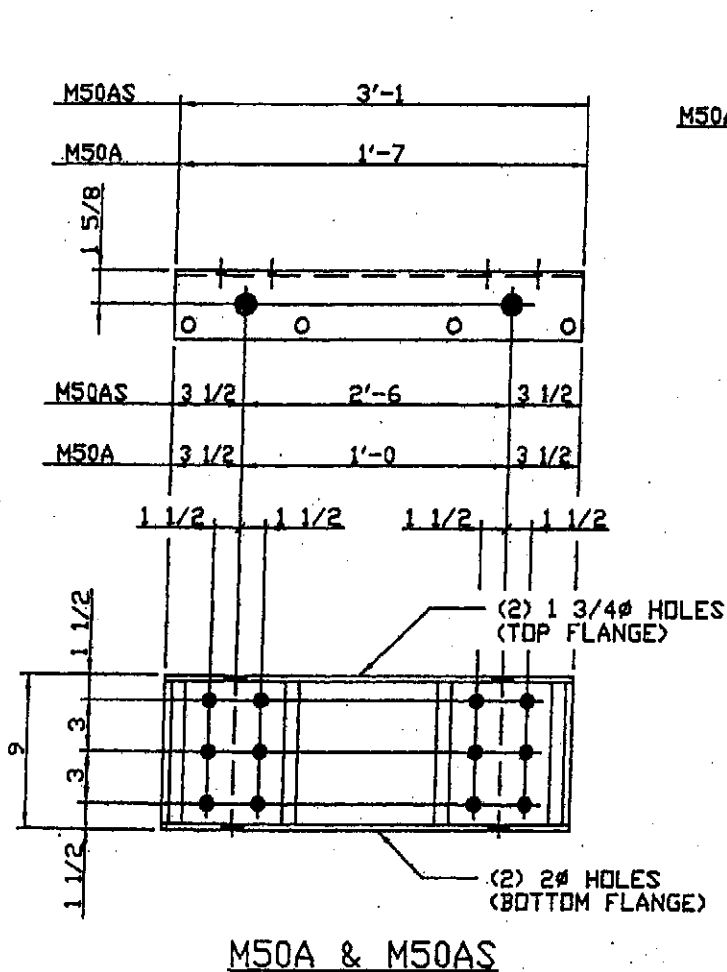


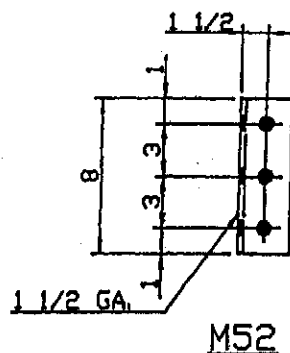
Fig. 5

BASE DETAILS

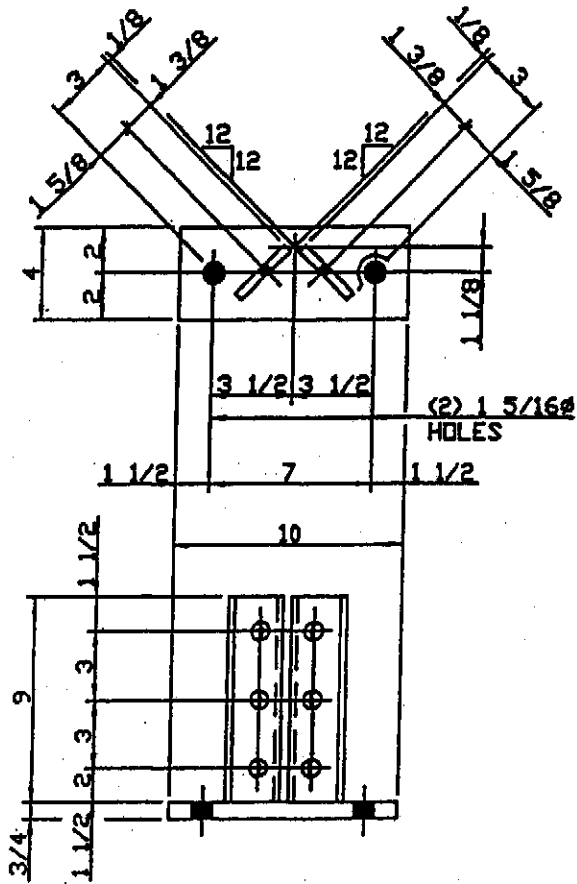
Four standard column base assemblies are offered. Part M50A is available in a length for "A" and "B" columns, and M50AS is for "C" columns. Part M167 is offered where lighter loadings do not require a heavy base mounting. Part 2BA is offered for all types of columns. Four are required per column. This part is an alternate for part M50A and M50AS.



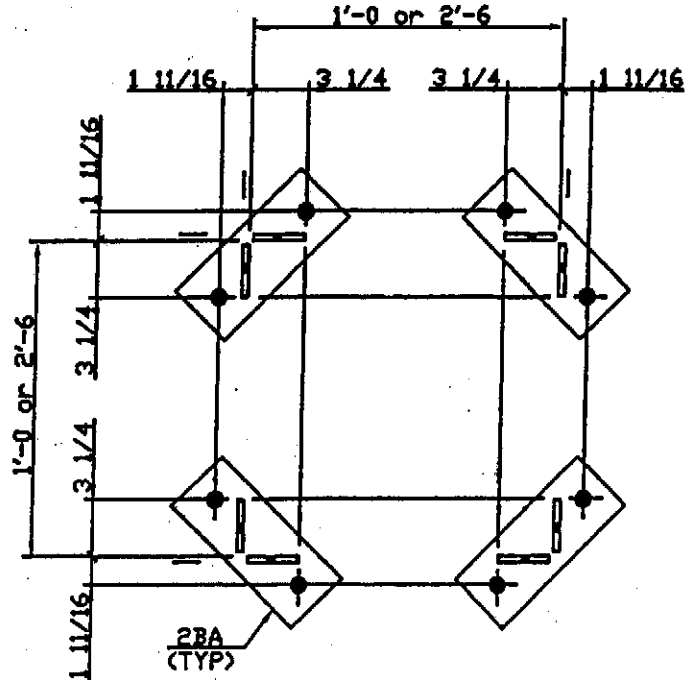
ANCHOR BOLT PLAN
(M50A & M50AS)
(USE 1 1/2" Ø ANCHOR BOLTS)



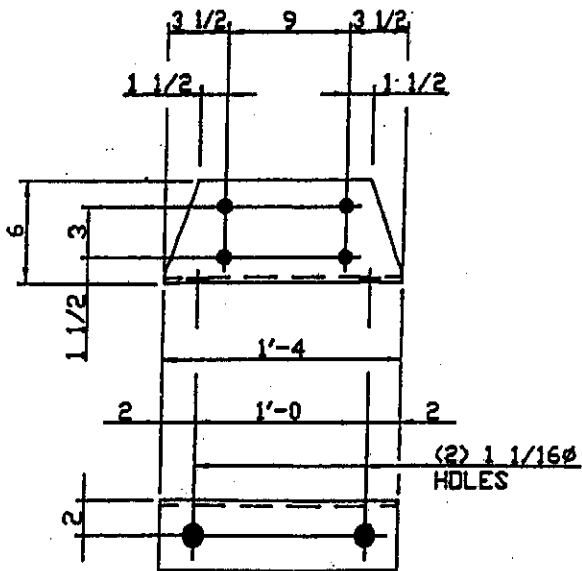
COLUMN BASE DETAILS



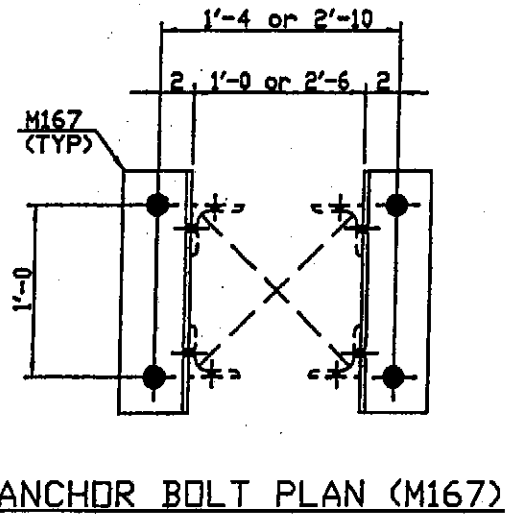
BASE ASSEMBLY - 2BA



ANCHOR BOLT PLAN (2BA)

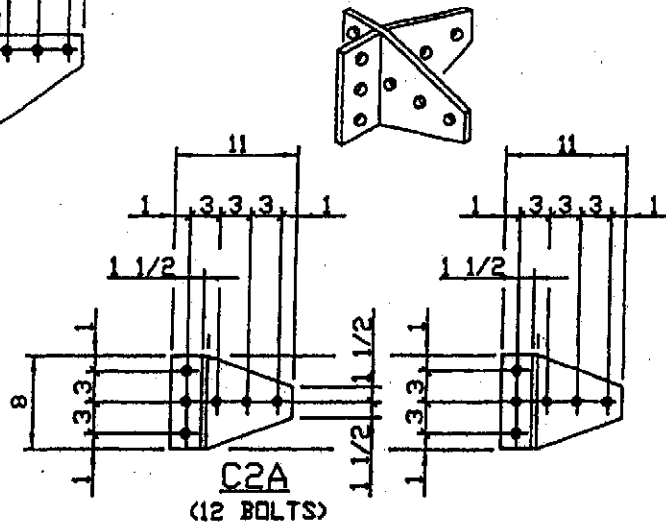
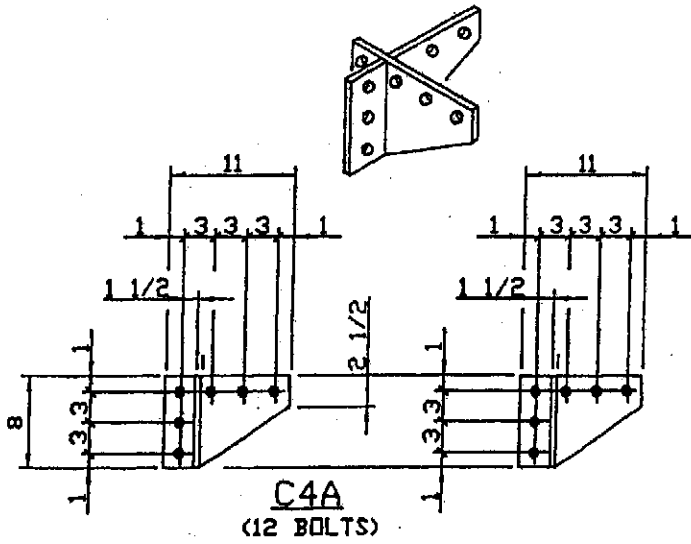
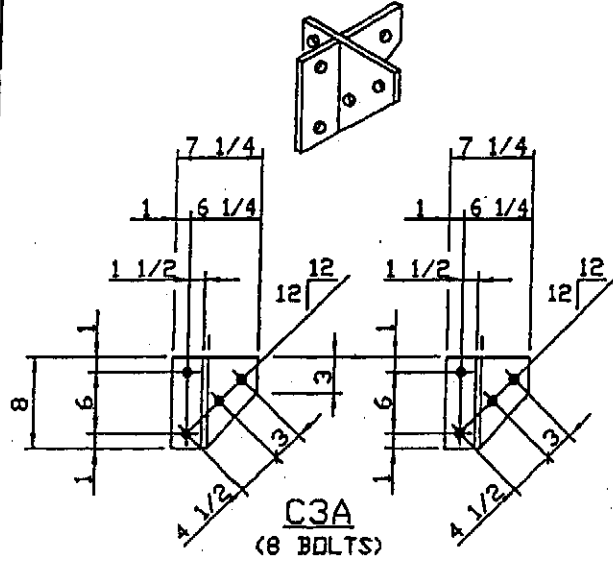
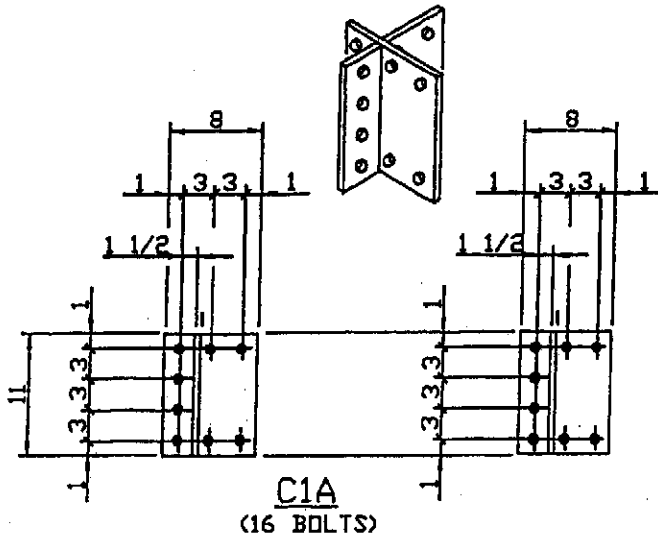


M167

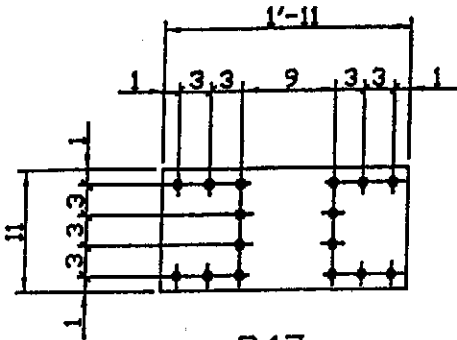


ANCHOR BOLT PLAN (M167)

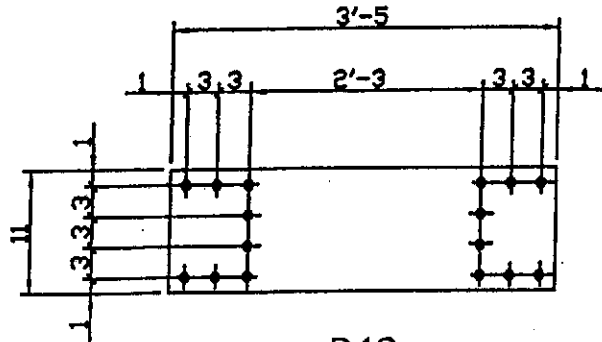
CONNECTION PLATES



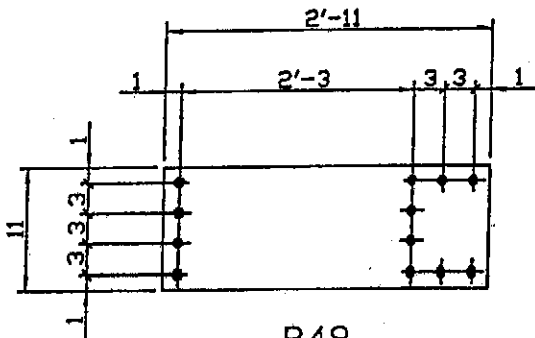
CONNECTION PLATES



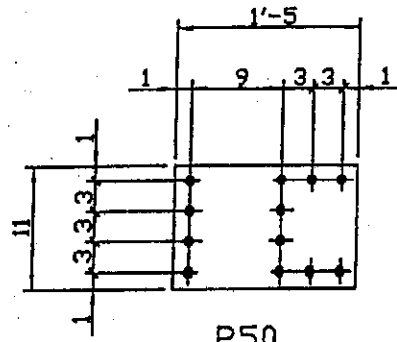
P47
(16 BOLTS)



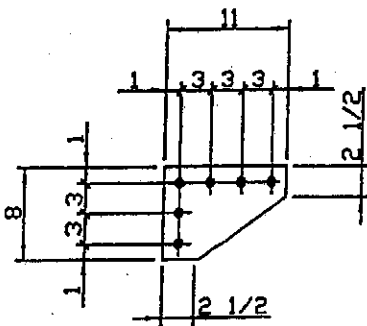
P48
(16 BOLTS)



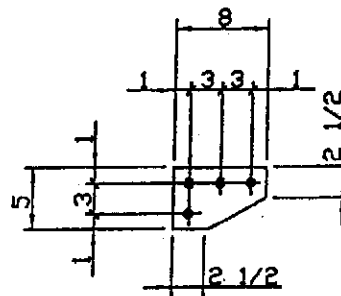
P49
(12 BOLTS)



P50
(12 BOLTS)

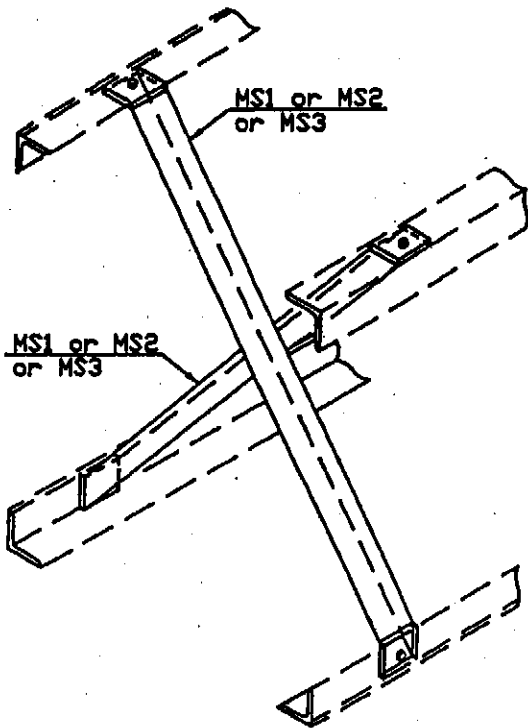


P51
(6 BOLTS)

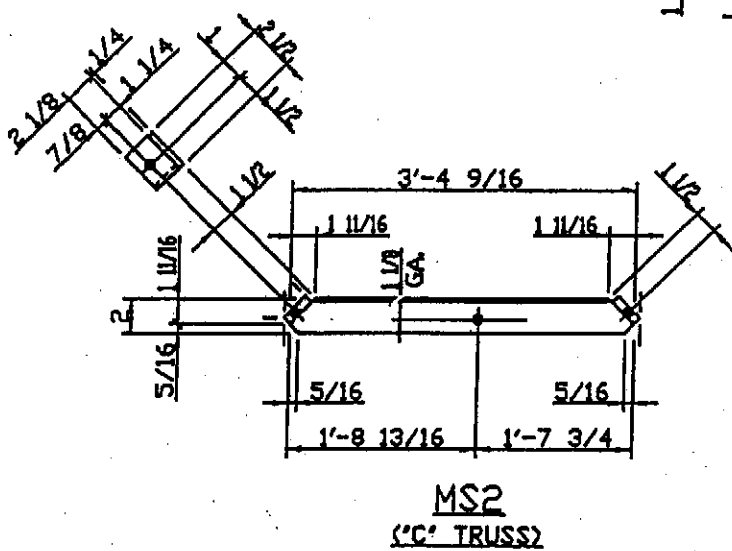
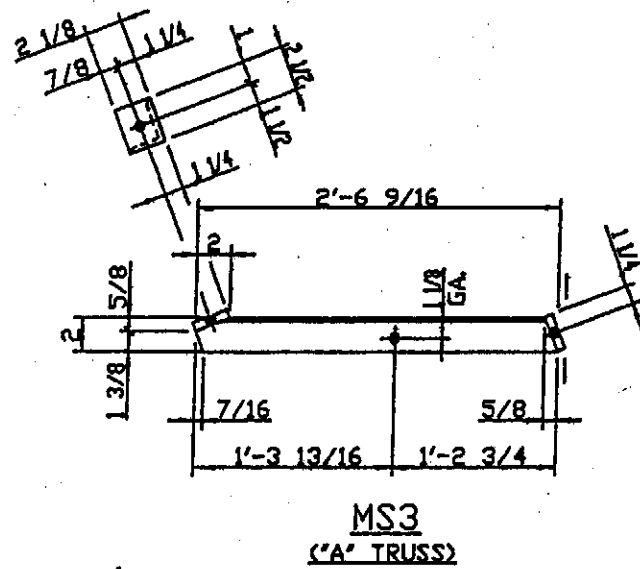
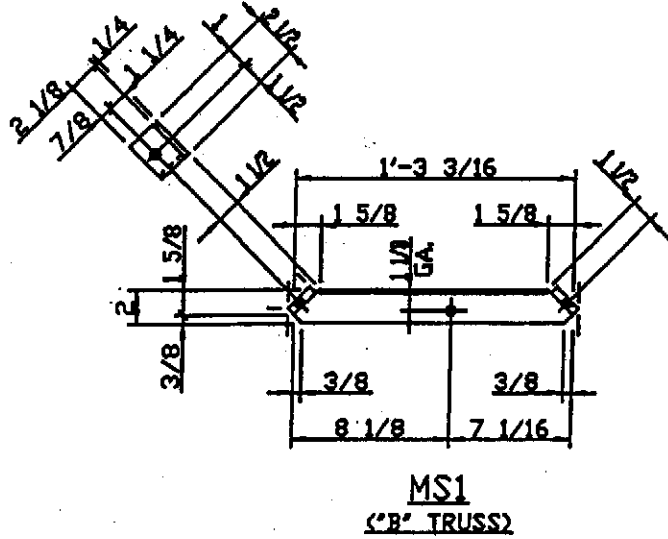


P52
(4 BOLTS)

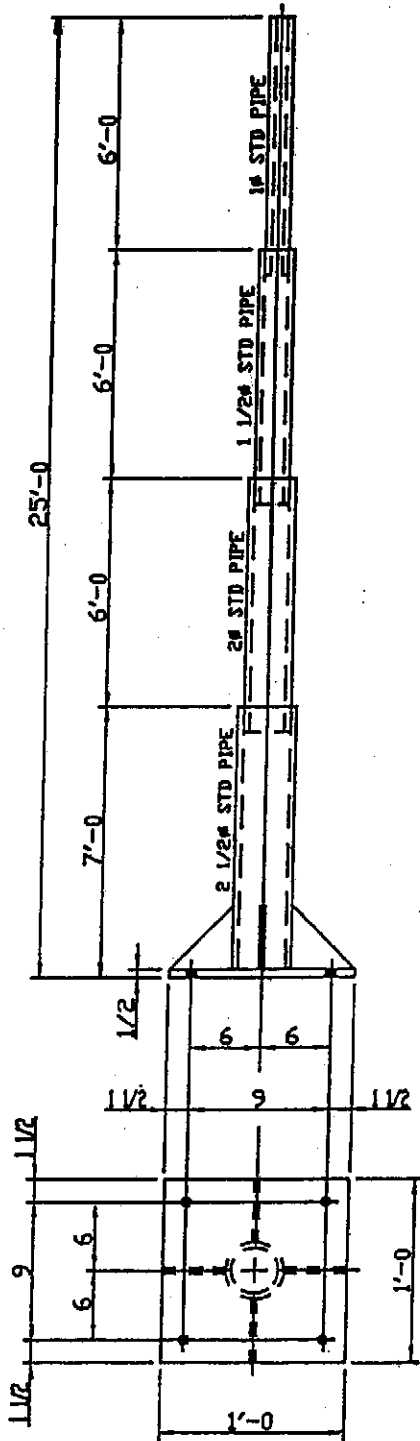
TRUSS DIAPHRAMS



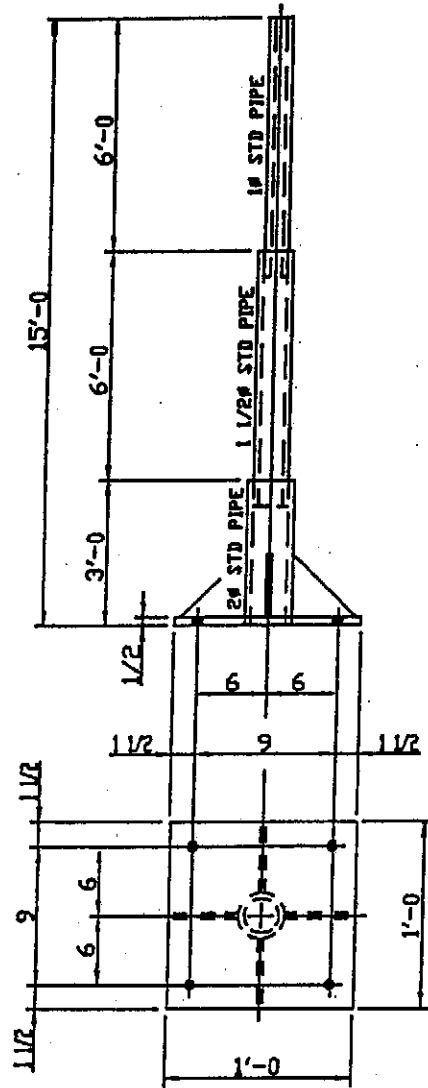
DIAPHRAM ASSEMBLIES



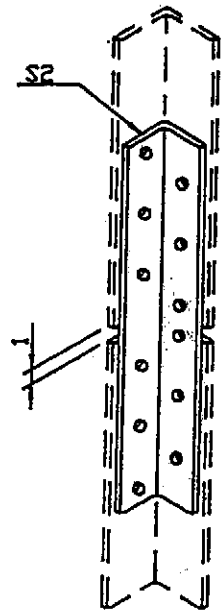
MISCELLANEOUS STEEL DETAILS



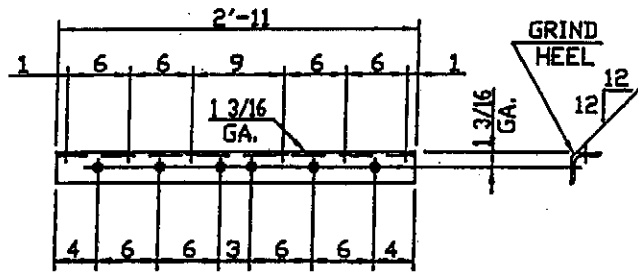
M48A



M48AS

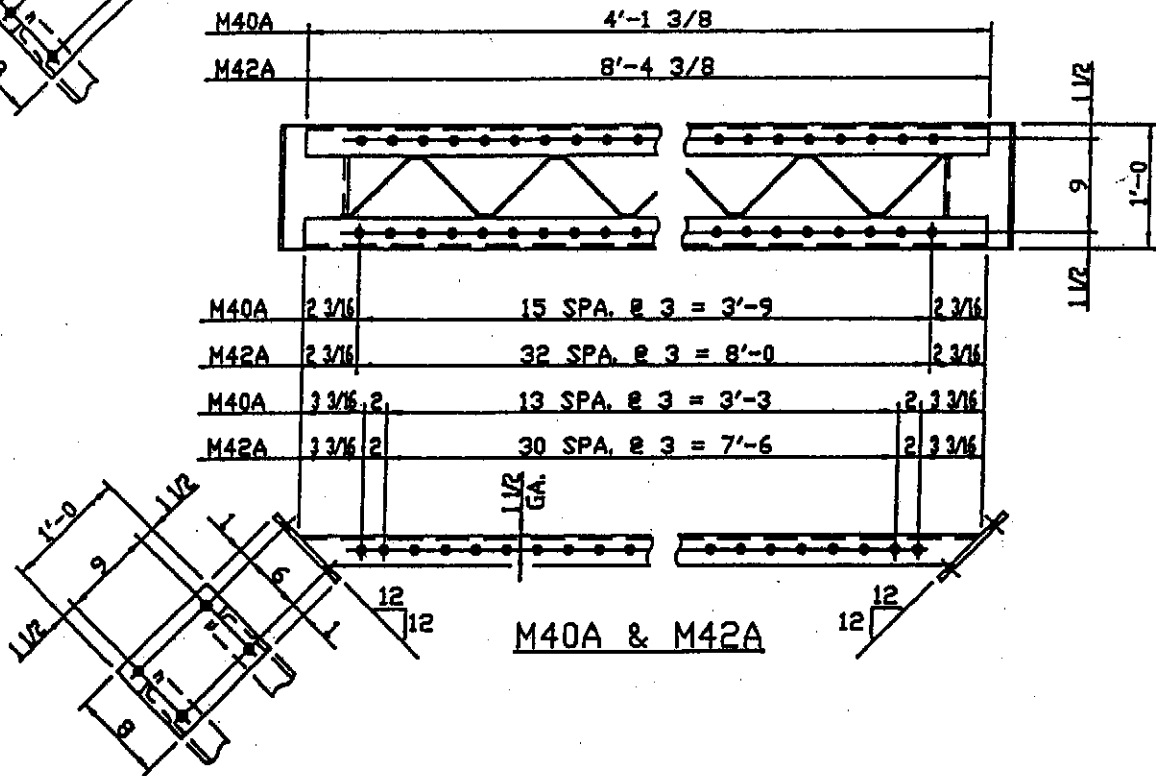
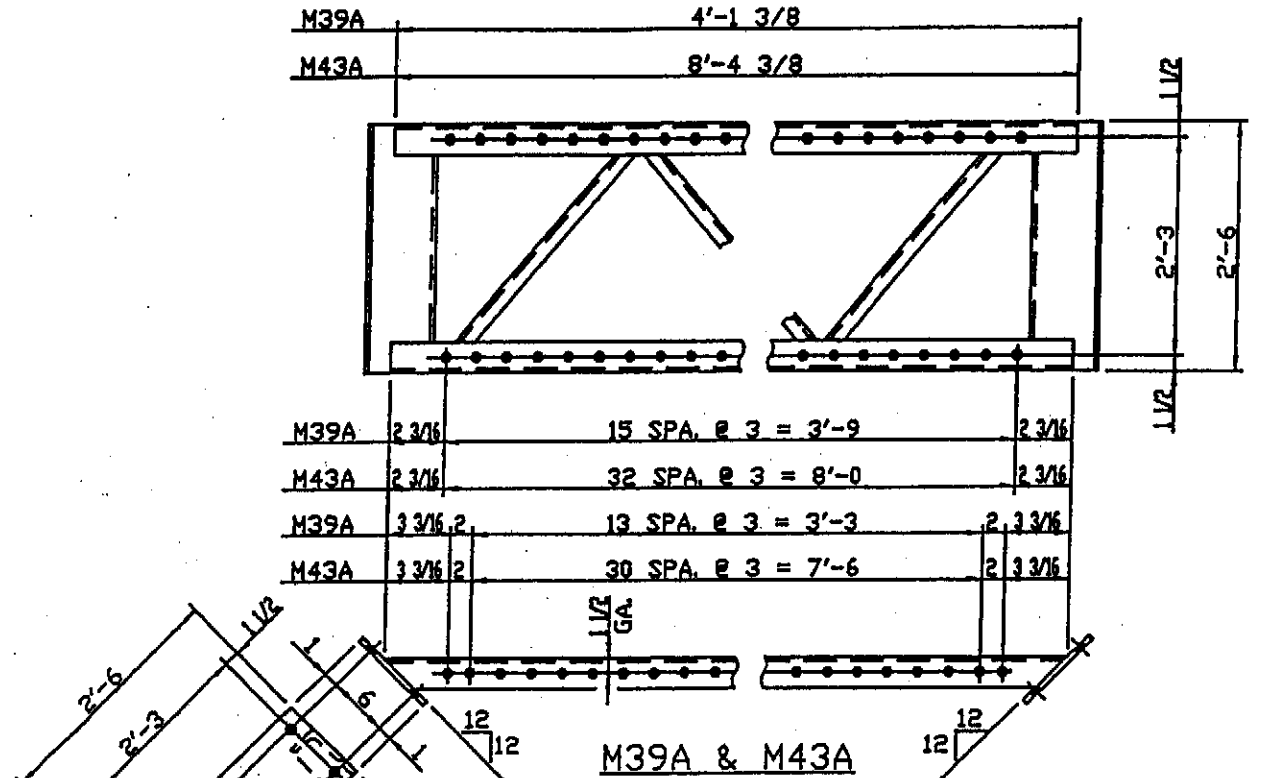


SPLICE DETAIL



S2

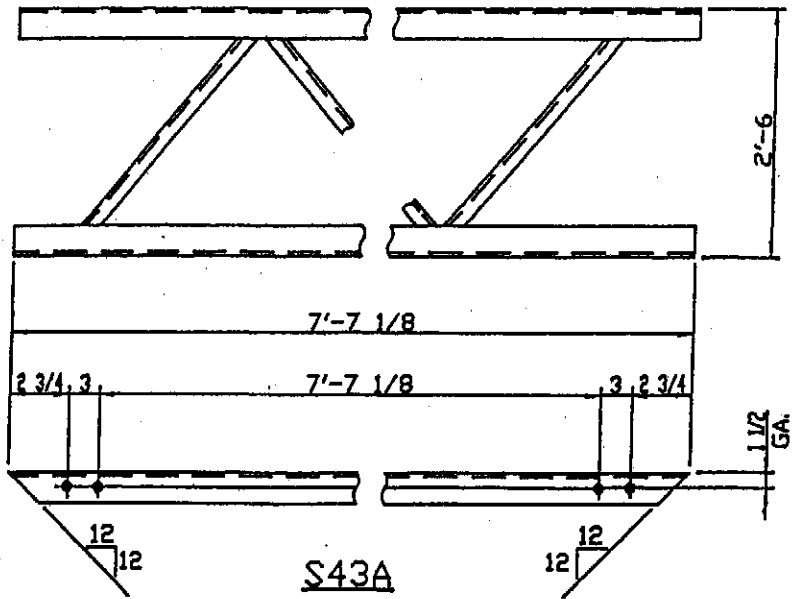
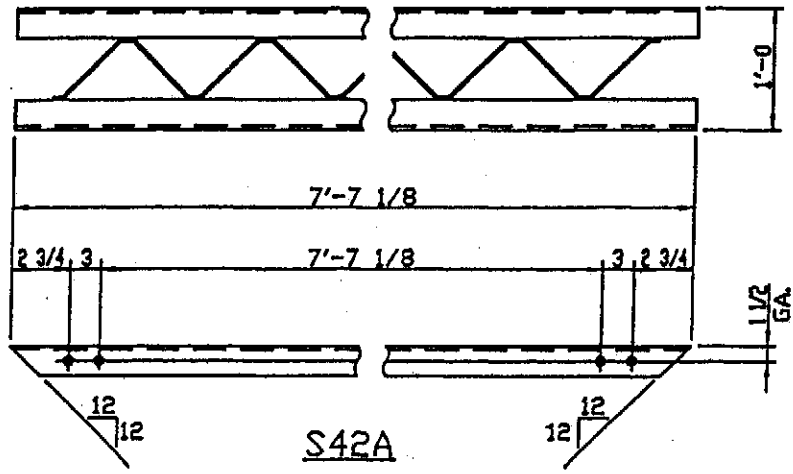
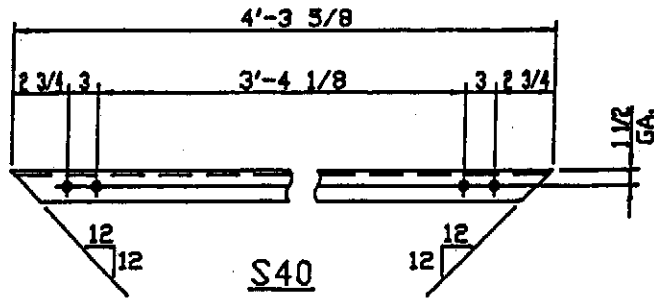
MISCELLANEOUS STEEL DETAILS



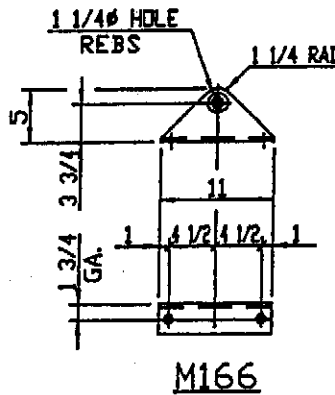
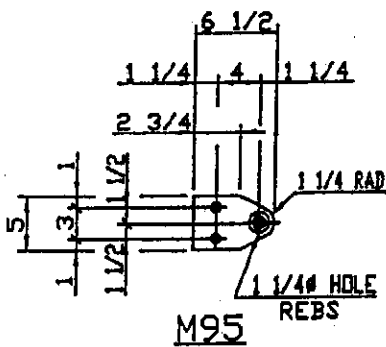
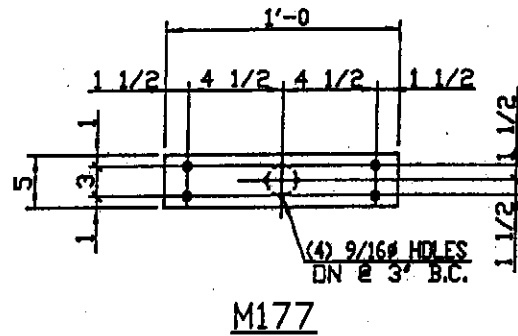
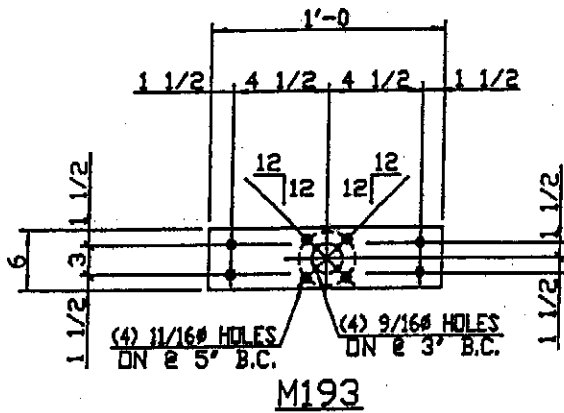
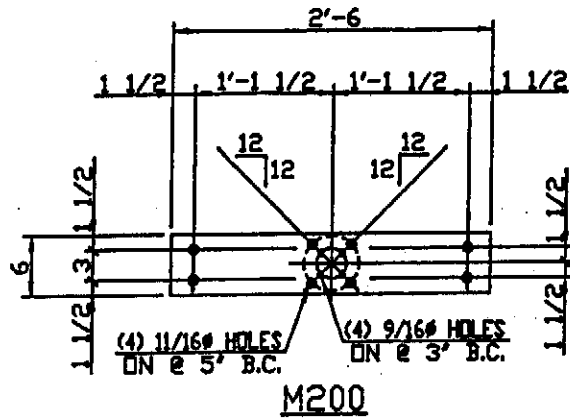
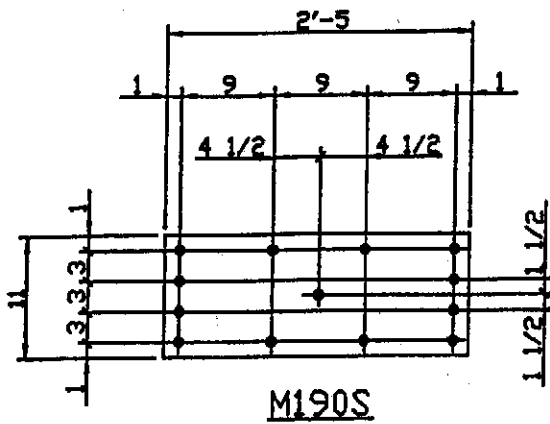
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