TMMOB
ELEKTRİK
MÜHENDİSLERİ
ODASI

1954

T. P. 2. 5. 2.

DEMİR DİREK RESİM ve HESAP HÜLÂSASI

II. BUZ YÜKÜ BÖLGESİ

3 x 1/0 RAWEN

15 - 34.5 kV

II. BUZ YÜKÜ BÖLGESİ

3x1/0 RAWEN DEMİR DİREK PROJESİ
AÇIKLAMA RAPORU

1 II. BUZ YÜKÜ BÖLGESİ İÇİN YAPILAN HESAPLARIN ÖZETİ DİREK RESİMLERİNİN BAŞINDA VERİLMİŞTİR. BÖYLECE, UZUN HESAPLARI TETKİK ETMEDEN ENERJİ NAKİL HATTI PROFİLİNİ İŞLEMEK VE KEŞFİNİ YAPMAK MÜMKÜN OLACAKTIR.

2. BİR ENERJİ NAKİL HATTI, DİREK ARASI MESAFESİ NE KADAR FAZLA OLURSA O KADAR EKONOMİK OLUR. ELEKTRİKLİ DDY ATLAMASI İÇİN DE YÜKSEK DİREĞE İHTİYAÇ VARDIR. BU BAKIMDAN 20 m. BOYA KADAR DİREK HESAP EDİLMİŞTİR.

3. TAŞIYICI VE DURDURUCU TRAVERSLER İÇİN DÜZ TERTİP BEŞ ADET VE ÜÇGEN TERTİP İÇİN 2 TRAVERS HESAP EDİLMİŞTİR. TAŞIYICI TRAVERSLERDE MESNET, DURDURUCU TRAVERSLERDE İSE ZİNCİR İZOLATÖR KULLANILACAKTIR.

4. NORMAL TAŞIYICI DİREKLERİN RÜZGAR MENZİLLERİ DEĞİŞİKTİR. TAŞIYICI DİREKLERDE RÜZGAR MENZİLİNE GÖRE TEMEL TİPİ SEÇİLECEKTİR.

5 DURDURUCU VE NİHAYET DİREKLERİN KÖŞEDE KULLANILMA AÇILARI LİSTELERDE VERİLMİŞTİR.

90°'ye KADAR KULLANILABİLECEK BİR (Z) DİREĞİ HESAP EDİLMİŞTİR.

(Z) direği 120°'ye KADAR AYRI, 90°'YE KADAR AYRI TEMEL KULLANILACAKTIR.

6. KÖŞEDE TAŞIYICI DİREĞİN RÜZGAR MENZİLİ HER DERECE AÇI İÇİN 7 m KISALMAKTADIR.

7 GEREK TAŞIYICI TRAVERSLERİN VE GEREKSE DURDURUCU TRAVERSLERİNİN TEK TARAFLI MAXIMUM AÇIKLIĞI AÇI DARALDIKÇA AZALMAKTADIR. BU KATSAYI HESAP ÖZETİNDE VERİLMİŞTİR.

8. NORMAL ARAZİ, KAYALIK ARAZİ VE ÇÜRÜK ARAZİ İÇİN TEMEL HESABI YAPILMIŞTIR. KAYALIK ARAZİ TEMELLERİNDE TEMEL DERİNLİĞİ AZALTILMIŞ BAZEN ÇÜRÜK ARAZİ TEMELLERİNDE TEMEL ARTIRILMIŞTIR. PROFİL İŞLENİRKEN BU HUSUSA DİKKAT EDİLECEKTİR.

SAYGILARIMLA

Elk. Y. Müh. Hüseyin BODUR

Oda no: 343 Diploma no: 2193

II. BÖLGE 3Xrawen St-Al İLETKENLİ DEMİR DİREKLERİN KULLANMA İMKANLARI

TAŞIYICI DİREKLER : Direklerin karakteristikleri aşağıda verilmiştir.

	a_w	a_g	$KT_{(*)}$	İletken Toprak Mesafesi	Profilde 1/400	Ağırlık	NORMAL ARAZİ TEMELİ							
					(***)		TİPİ	Derinlik	a (Temel Genişliği)			a (Temel Genişliği)		
	(m)	(m)	α°	(m)	mm	(kg)		(m)	a_w	a (m)	V (m^3)	a_w	a (m)	V (m^3)
T-10	400	300	164°	8.75	22	268	BLOK	1.6	140 182	0.8 0.9	1.030 1.300	2.26 3.78	1.0 1.1	1.600 1.936
T-12	303	300	165°	10.75	27	331	BLOK	1.6	121 157	0.9 1.0	1.300 1.600	2.83 3.43	1.1 1.2	1.936 2.304
T-14	274	300	166°	12.75	32	393	BLOK	1.6	105 212	1.0 1.1	1.600 1.936	2.63 3.19	1.2 1.3	2.304 3.550
T-16	270	300	166°	14.75	37	476	BLOK	1.6	155 200	1.1 1.2	1.936 2.304	2.48 3.04	1.3 1.4	3.550 4.116
T-18	195	300	166°	16.75	42	552	BLOK	1.6	119 155	1.2 1.3	2.304 3.550	1.96 241	1.4 1.5	4.116 4.725
T-20	195	300	166°	18.75	47	631	BLOK	1.6	117 154	1.3 1.4	3.550 4.116	1.95 2.39	1.5 1.6	4.725 5.376

(*) KÖŞE TAŞIYICI (KT) Halinde a_w değeri herbir derece için 7.00 m. kısalır

(**) h=H-1.5 TEMEL+0.25 (İzolatör Boyu)

(***) Kayalık Temelde 1 mm artırılır. Çürük arazide 1 mm azaltılır. Üçgen tertibde 7.50 mm azaltılır.

	KAYALIK ARAZİ TEMELİ			BETON HACMİ	ÇÜRÜK ARAZİ TEMELİ					BETON HACMİ
	TİPİ	DERİNLİK t (m)	GENİŞLİK a (m)	V (m3)	TİPİ	DERİNLİK t (m)	a (m)	b (m)	t_1 (m)	V (m3)
T-10	BLOK	1	aw=150 m. için a=0.9 m aw=200 m. için a=1.0 m	0.81 1.00	KADEMELİ	1.9	1.3	2.0	0.5	4.343
T-12	BLOK	1	aw=150 m. için a=1.0 m aw=200 m. için a=1.2 m aw=250 m. için a=1.3 m	1.00 1.44 1.69	KADEMELİ	1.9	1.3	2.0	0.5	4.343
T-14	BLOK	1	aw=150 m. için a=1.2 m aw=200 m. için a=1.3 m	1.44 1.69	KADEMELİ	1.9	1.3	2.0	0.5	4.343
T-16	BLOK	1	a_w=200 m. için a=1.3 m a_w=200 m. için a=1.5 m	1.69 2.25	KADEMELİ	1.9	1.3	2.0	0.5	4.343
T-18	BLOK	1	aw=200 m. için a=1.5 m aw=140 m. için a=1.7 m	2.25 2.83	KADEMELİ	1.9	1.3	2.0	0.5	4.343
T-20	BLOK	1	aw=200 m. için a=1.7 m aw=186 m. için a=1.8 m	2.83 3.24	KADEMELİ	1.9	1.3	2.0	0.5	4.343

TAŞIYICI TRAVERSLER

	a max (m) 34.5 kV	15 kV	a_g (m)	Ağırlık (kg)		
T-200	115	136	300	35		
T-250	155	176	300	41		
T-300	195	216	300	48		
T-350	228	238	300	59		
T-400	246	256	300	71		
TÜ-300	300	300	300	49		
TÜ-400	350	350	300	72		

TAŞIYICI DİREKLERİN DİĞER KARAKTERİSTİKLERİ

	TEPE GENİŞLİĞİ (mm)	DİP GENİŞLİĞİ (mm)	DİREK BOYU (m)	DİKMELER	ÇAPRAZLAR	EK CİVATASI	EK LAMASI		
T-10	250	600	10	50x50x5	40x40x4	EK-1 4xM12	50x6		
T-12	250	670	12	50x50x5	40x40x4	EK-1 4xM12	50x6		
T-14	250	740	14	50x50x5	40x40x4	EK-2 4xM12	50x6		
T-16	250	810	16	50x50x5 50x50x7	40x40x4	EK-2 4xM12	50x8		
T-18	250	880	18	50x50x5	40x40x4	EK-2 4xM12	50x8		
T-20	250	950	20	50x50x5	40x40x4	EK-3 4xM12	50x8		

DURDURUCU DİREKLER: Durdurucu direkler gergi izolatörlüdür.

	a_g (m)	KD α°	KT (*) α	İLETKEN-TOPRAK MESAFESİ (m) x -	İLETKEN-TOPRAK MESAFESİ (m) x GERGİ İZO.	PROFİL'de(**) 1/400 (mm) -	PROFİL'de(**) 1/400 (mm) GERGİ İZO.	Ağırlığı Kg	NORMAL ARAZİ TEMELLERİ TİPİ	Genişlik (a)	t	Beton m3
D-10	250	170°	EN SON 142°	-	8.2	-	20	376	BLOK	1.4	1.9	3.724
D-12	250	170°	"	-	10.2	-	25	465	BLOK	1.6	1.9	4.864
D-14	250	176°	"	-	12.2	-	30	566	BLOK	1.8	1.9	6.156
D-16	250	176°	"	-	14.2	-	35	667	BLOK	1.9	1.9	6.858
D-18	250	176°	"	-	16.2	-	40	764	BLOK	2.0	1.9	7.600
D-20	250	178°	"	-	18.2	-	45	880	BLOK	2.1	1.9	8.379

h=H-1.80 (Gergi İzolatörü) Kayalık Temelde 2 mm ilave edilecektir. Üçgen Tertipde 6.25 mm azaltılır.

	KAYALIK TEMELİ				ÇÜRÜK ARAZİ TEMELİ					
	TİPİ	t (m)	a (m)	Beton m3	TİPİ	t (m)	t1 (m)	a (m)	b (m)	Beton m3
D-10	BLOK	1.5	1.2	2.1160	KADEMELİ	1.9	0.5	1.6	2.3	6.202
D-12	BLOK	1.5	1.3	2.535	KADEMELİ	1.9	0.5	1.7	2.4	6.898
D-14	BLOK	1.5	1.5	3.375	KADEMELİ	1.9	0.5	1.9	2.6	8.403
D-16	BLOK	1.5	1.6	3.840	KADEMELİ	1.9	0.5	2.1	2.8	10.060
D-18	BLOK	1.5	1.7	4.335	KADEMELİ	1.9	0.5	2.2	2.9	10.946
D-20	BLOK	1.5	1.9	5.415	KADEMELİ	1.9	0.5	2.4	3.1	12.831

(*) İZOLATÖR DEMİRİNİN DAYANACAĞI AÇI GÖZÖNÜNDE TUTULACAKTIR.

K.T. HALİNDE TRAVERSLER TAŞIYICI, İZOLATÖRLER MESNET TİPİ OLACAKTIR.

DURDURUCU TRAVERSLER : KÖŞEDE (T) VE (D) TRAVERSLERDE TRAVERSLERİN a_{max} DEĞERLERİ AŞAĞIDAKİ KATSAYILARLA ÇARPILARAK AZALTILACAKTIR

TRAVERS TİPİ	a_{max}(m) 345kV	15kV	a_s (M)	AĞIRLIĞI Kg (*)
D-200	115	136	300	42
D-250	155	176	300	47
D-300	195	216	300	56
D-350	226	238	300	67
D-400	246	256	300	88
DÜ-300	300	300	300	57
DÜ-400	35	350	300	89

α°	K	α°	K	α°	K	α°	K
169	0 99	144	0.95	120	0 86	95	0 74
160	0 98	136	0 93	116	0.85	94	0.73
152	0 97	128	0 90	113	0 83	92	0 72
148	0.96	123	0 88	102	0 78	90	0 709

N (SON) VE Z (ZAVIYE) DİREKLERİ HER İKİ DİREKTEDE a_s=300 m DIR

ALT İLETKEN TOPRAKLI MESAFESİ (D) DİREKLERİ GİBİDİR

(Z) DİREĞİ KÖŞEDE DURDURUCU OLARAK 90° KULLANILABİLİR. (Z) DİREĞİNİN TEMEL EBATLARI α=120° VE α=90° AYRI AYRI VERİLMİŞTİR.

	Ağırlık	KD	NORMAL ARAZİ TEMELİ			KAYALIK ARAZİ TEMELİ				ÇORUK ARAZİ TEMELİ					
	(kg)	α°	t (m)	a (m)	Beton m3	TİPİ	t (m)	a (m)	Beton (m3)	TİPİ	t (m)	t1 (m)	a (m)	b (m)	Beton m3
N-10	400	130°	19	17	5491	BLOK	15	14	294	KADEMELİ	19	05	18	25	7631
N-12	486	146°	19	19	6858	BLOK	15	16	384	KADEMELİ	19	05	21	28	1006
N-14	600	154°	19	20	7600	BLOK	15	18	486	KADEMELİ	19	05	23	30	11.86
N-16	656	"	19	22	9200	BLOK	15	19	5415	KADEMELİ	19	05	24	31	1263
N-18	794	"	19	22	9200	BLOK	15	20	6	KADEMELİ	19	05	26	33	1486
N-20	900	"	19	kademeli a=20 b=27	9212	BLOK	15	22	726	KADEMELİ	19	05	27	34	16
Z-10 120°	498	90°	19	19	6558	BLOK	15	16	384	KADEMELİ	19	05	21	28	1006
Z-12 120°	609	"	19	21	8379	BLOK	15	19	486	KADEMELİ	19	05	23	30	11868
Z-14 120°	742	"	19	22	9196	BLOK	15	20	6	KADEMELİ	19	05	26	33	14868
Z-16 120°	874	Kademeli	19	a=21 b=28	10080	BLOK	15	22	726	KADEMELİ	19	05	27	34	16
Z-18 120°	1031	"	19	a=22 b=29	10949	BLOK	15	23	7935	KADEMELİ	19	05	29	36	18208
Z-20 120°	1187	"	19	a=23 b=30	11868	BLOK	15	25	9375	KADEMELİ	19	05	30	37	194

(*) Z DİREK AĞIRLIKLARI 120° VE 90° İÇİN DEĞİŞMEYECEKTİR.

α=90° İÇİN (Z) DİREĞİNİN TEMEL EBATLARI

	NORMAL ARAZİ TEMELİ				KAYALIK ARAZİ TEMELİ				KAYALIK ARAZİ TEMELİ					
	TİP	t (m)	a (m)	Beton m3	TİP	t (m)	a (m)	Beton m3	TİP	t (m)	a (m)	e (m)	b (m)	Beton m3
Z-10	BLOK	19	19	6858	BLOK	150	17	4335	KADEMELİ	19	05	22	28	11000
Z-12	BLOK	19	21	8349	BLOK	150	19	5495	KADEMELİ	19	05	25	30	13400
Z-14	BLOK	19	22	9195	BLOK	150	21	6815	KADEMELİ	19	05	27	33	16000
Z-16	KADEMELİ	19	a=21 b=28	10080	BLOK	150	23	7985	KADEMELİ	19	05	29	34	18450
Z-18	KADEMELİ	19	a=22 b=29	10946	BLOK	150	24	[illegible]	KADEMELİ	19	05	30	36	19400
Z-20	KADEMELİ	19	a=23 b=30	11868	BLOK	150	26	1014	KADEMELİ	19	05	32	37	20000

(D), (N) VE (Z) DİREKLERİNİN DİĞER KARAKTERİSTİKLERİ

	D-10	D-12	D-14	D-16	D-18	D-20	N-10	N-12	N-14	N-16	N-18	N-20
TEPE GENİŞLİĞİ (mm)	500	500	500	500	500	500	500	500	500	500	500	500
DİP GENİŞLİĞİ (mm)	980	1040	1130	1200	1310	1400	1100	1220	1340	1460	1580	1700
TAM BOY (mm)	10	12	14	16	18	20	10	12	14	16	18	20

	Z-10	Z-12	Z-14	Z-16	Z-18	Z-20
TEPE GENİŞLİĞİ (mm)	500	500	500	500	500	500
DİP GENİŞLİĞİ (mm)	1200	1340	1480	1620	1760	1900
TAM BOY (mm)	10	12	14	16	18	20

İZOLATÖR DEMİRLERİNİN KULLANILIŞLARI

34.5 kV TAŞIYICI α=162°

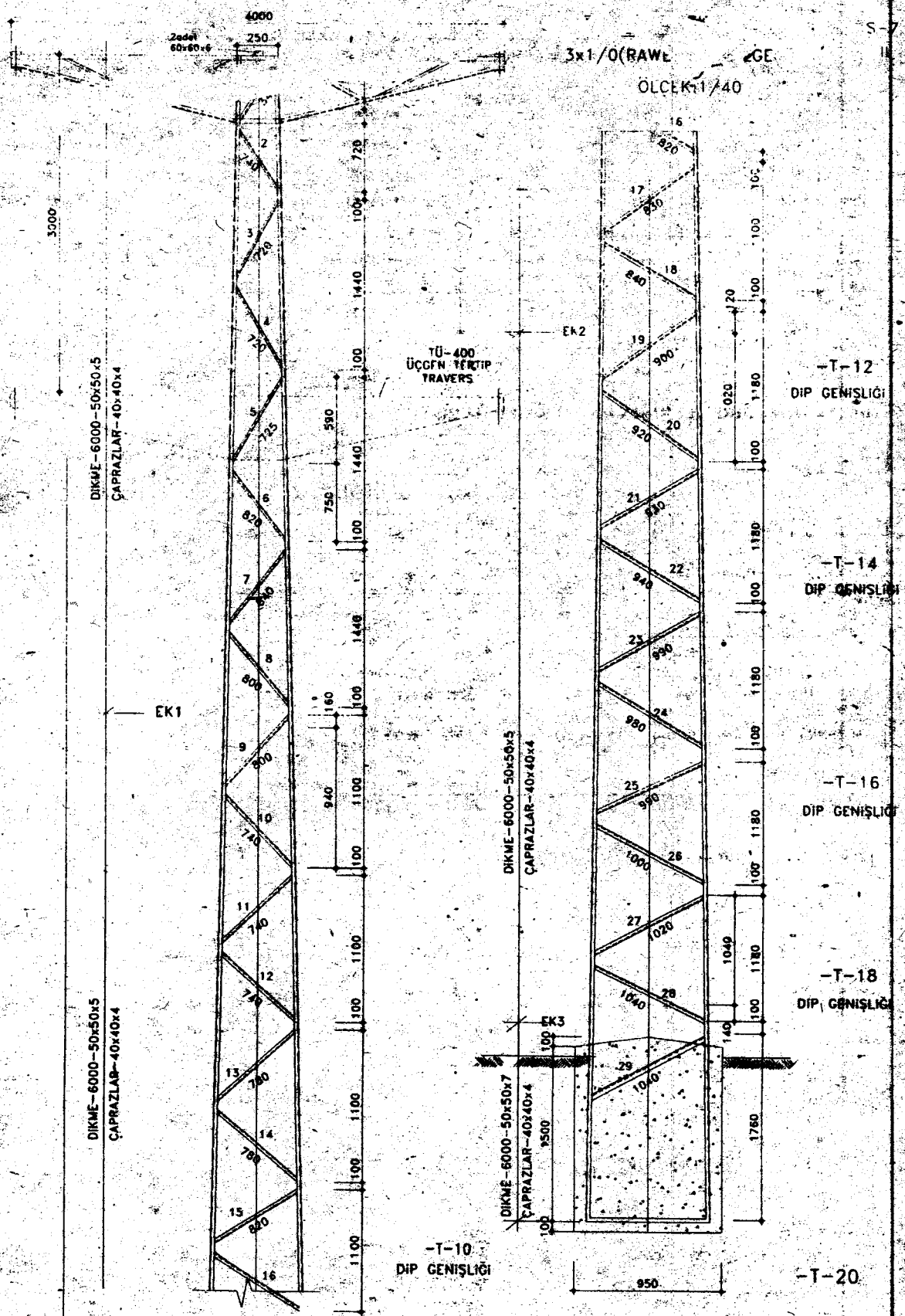
34.5 kV DURDURUCU α=142°

34.5 kV ÇİFT DURDURUCU α=99°

15 kV TAŞIYICI α=164°

15 kV DURDURUCU α=152°

15 kV ÇİFT DURDURUCU α=147°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250
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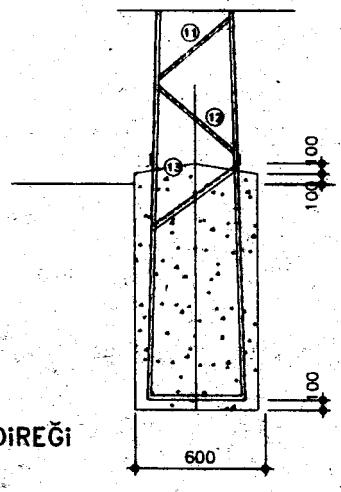
3000
DİKME-6000-50x50x5
ÇAPRAZLAR-40x40x4
EK1
TÜ-400
ÜÇGEN TERTİP
TRAVERS
EK2
DİKME-6000-50x50x5
ÇAPRAZLAR-40x40x4
EK3
DİKME-6000-50x50x7
ÇAPRAZLAR-40x40x4
-T-10
DİP GENİŞLİĞİ
-T-12
DİP GENİŞLİĞİ
-T-14
DİP GENİŞLİĞİ
-T-16
DİP GENİŞLİĞİ
-T-18
DİP GENİŞLİĞİ
-T-20
950

S-8
II

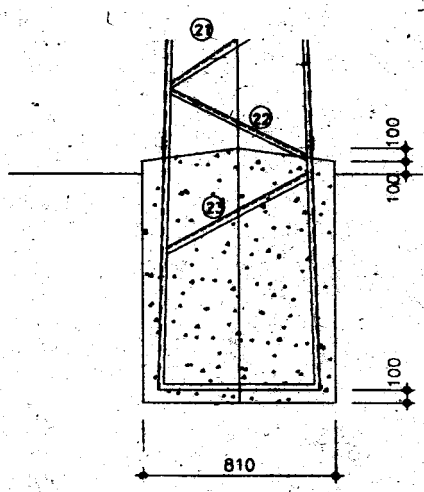
TAŞIYICI DİREKLERİN TEMELE GİREN KISIMLARI

ÖLÇEK: 1/40

NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HULASINDAN ALINACALKTIR



T-10 DİREĞİ



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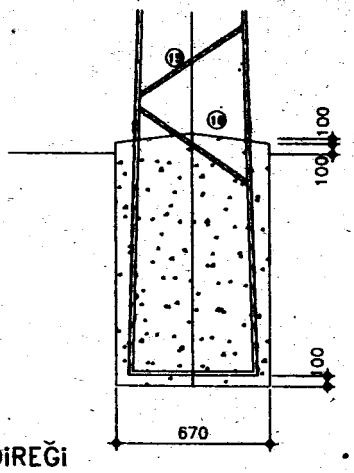

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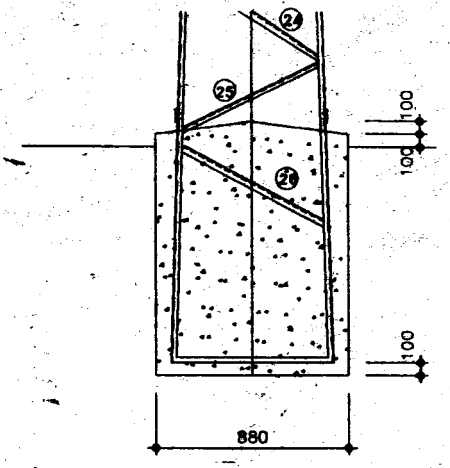

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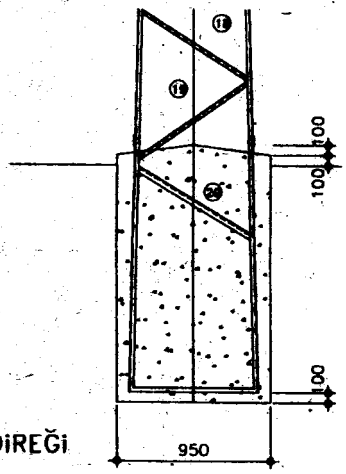

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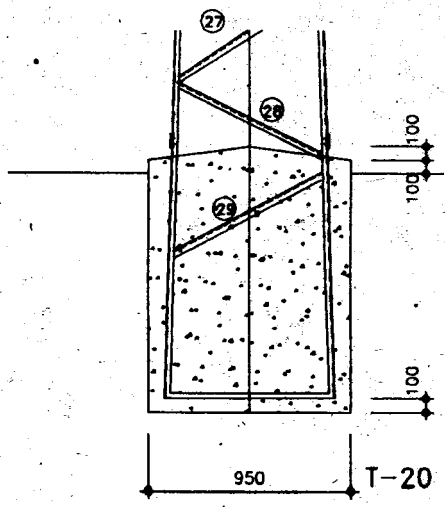


T-20 DİREĞİ

DURDURUCU DİREK
3x1/D(RAWEN)-II.BÖLGE
ÖLÇEK:1/40

DİKME_5000_60x60x6-KALINLAŞMA_0,045
ÇAPRAZLAR-40x40x4

DİKME-6000-85x85x7
ÇAPRAZLAR-40x40x4

DİKME-2000-70x70x7
ÇAPRAZLAR-40x40x4

DİKME-2000-70x70x7
ÇAPRAZLAR-40x40x4

DU-400
UÇGEN TESTİP
TRAVERS

EK1

EK2

EK3

-D-10
DİP GENİŞLİĞİ

-D-12
DİP GENİŞLİĞİ

-D-14
DİP GENİŞLİĞİ

-D-16
DİP GENİŞLİĞİ

-D-18
DİP GENİŞLİĞİ

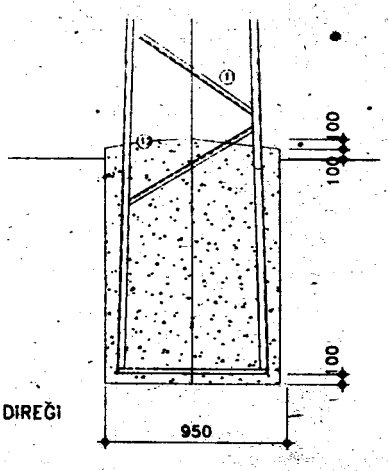
-D-20-

S-10
II

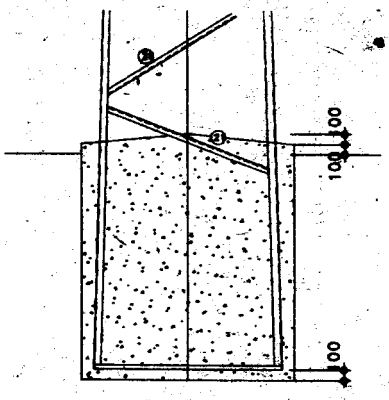
DURDURUCU DİREKLERİN TEMELE GİREN KISIMLARI

ÖLÇEK: 1/40

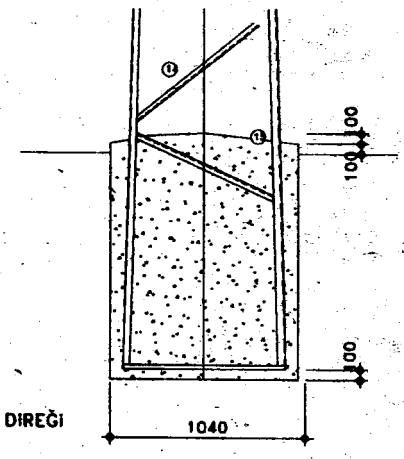
NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜLASINDAN ALINACAKTIR



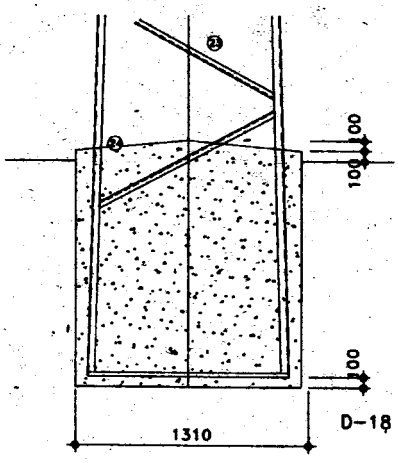
D-10 DİREĞİ



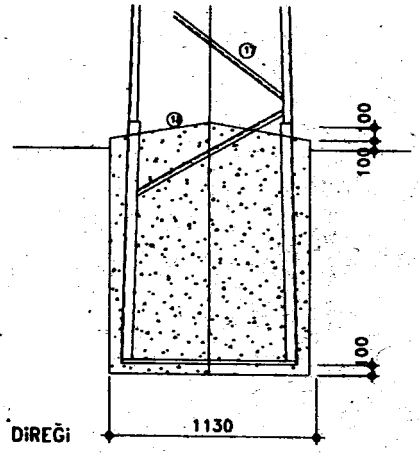
D-16 DİREĞİ



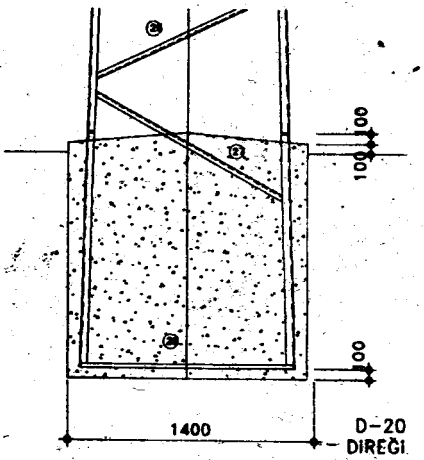
D-12 DİREĞİ



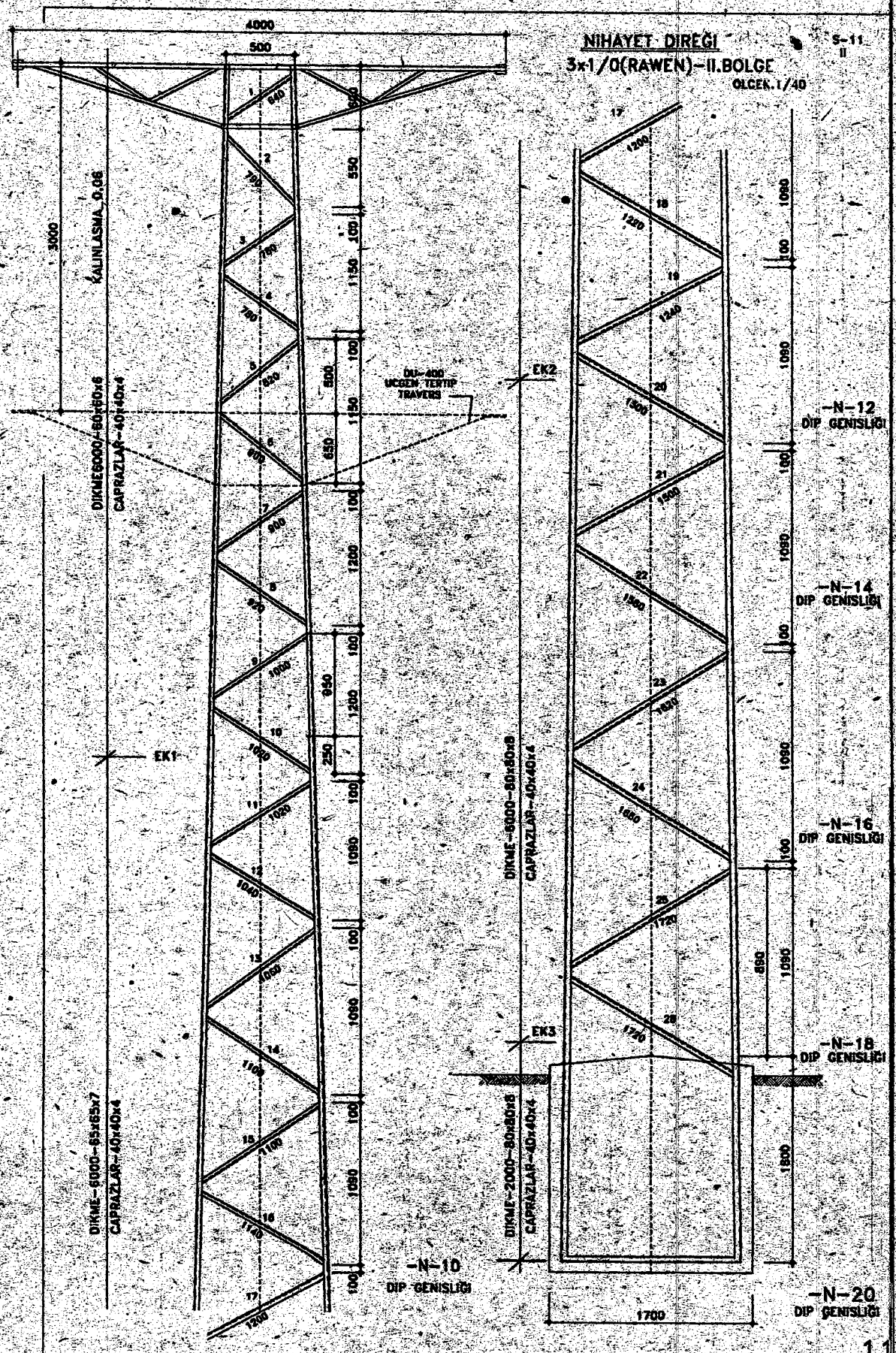
D-18 DİREĞİ



D-14 DİREĞİ



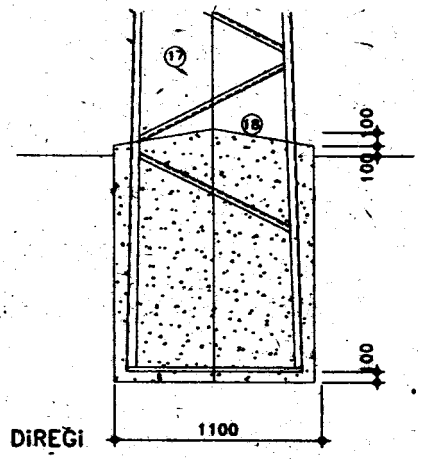
D-20 DİREĞİ


NİHAYET DİREĞİ
3x1/0(RAWEN)-II.BÖLGE
ÖLÇEK 1/40
S-11
II
4000
500
3000
KALINLAŞMA 0.06
DİKME 6000-60x60x6
ÇAPRAZLAR-40x40x4
DİKME-5000-65x65x7
ÇAPRAZLAR-40x40x4
DİKME-6000-80x80x8
ÇAPRAZLAR-40x40x4
DİKME-2000-80x80x8
ÇAPRAZLAR-40x40x4
DU-400 ÜÇGEN TERTİP TRAVERS
EK1
EK2
EK3
-N-10 DİP GENİŞLİĞİ
-N-12 DİP GENİŞLİĞİ
-N-14 DİP GENİŞLİĞİ
-N-16 DİP GENİŞLİĞİ
-N-18 DİP GENİŞLİĞİ
-N-20 DİP GENİŞLİĞİ
1700

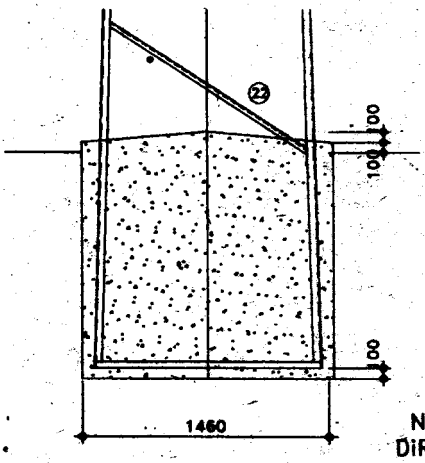
S/12
II

NİHAYET DİREĞİNİN TEMELE GİREN KISIMLARI ÖLÇEK: 1/40

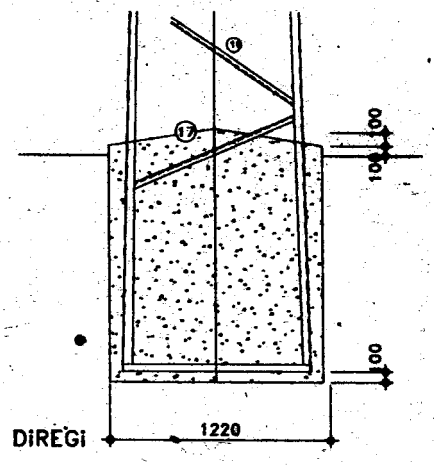
NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜLASINDAN ALINACALKTIR



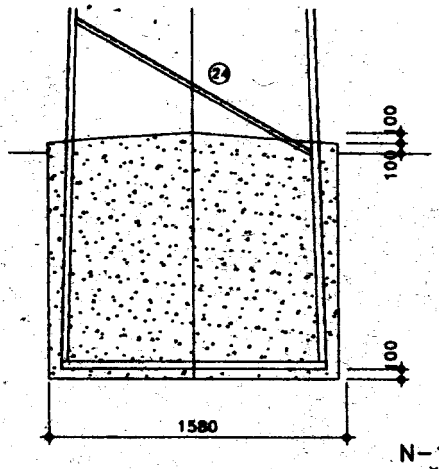
N-10 DİREĞİ



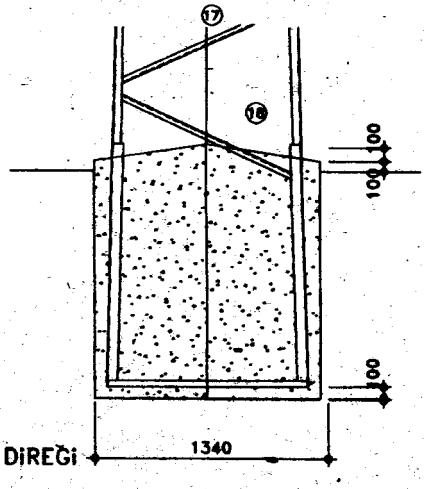
N-16 DİREĞİ



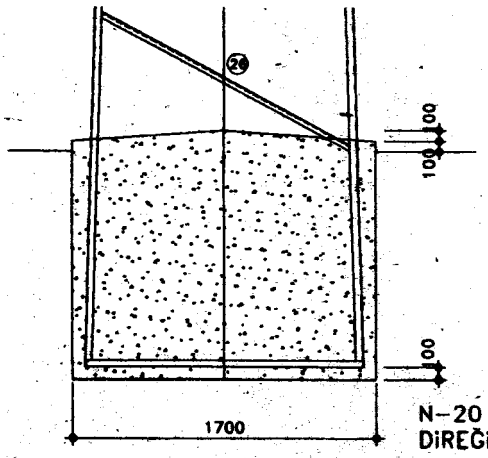
N-12 DİREĞİ



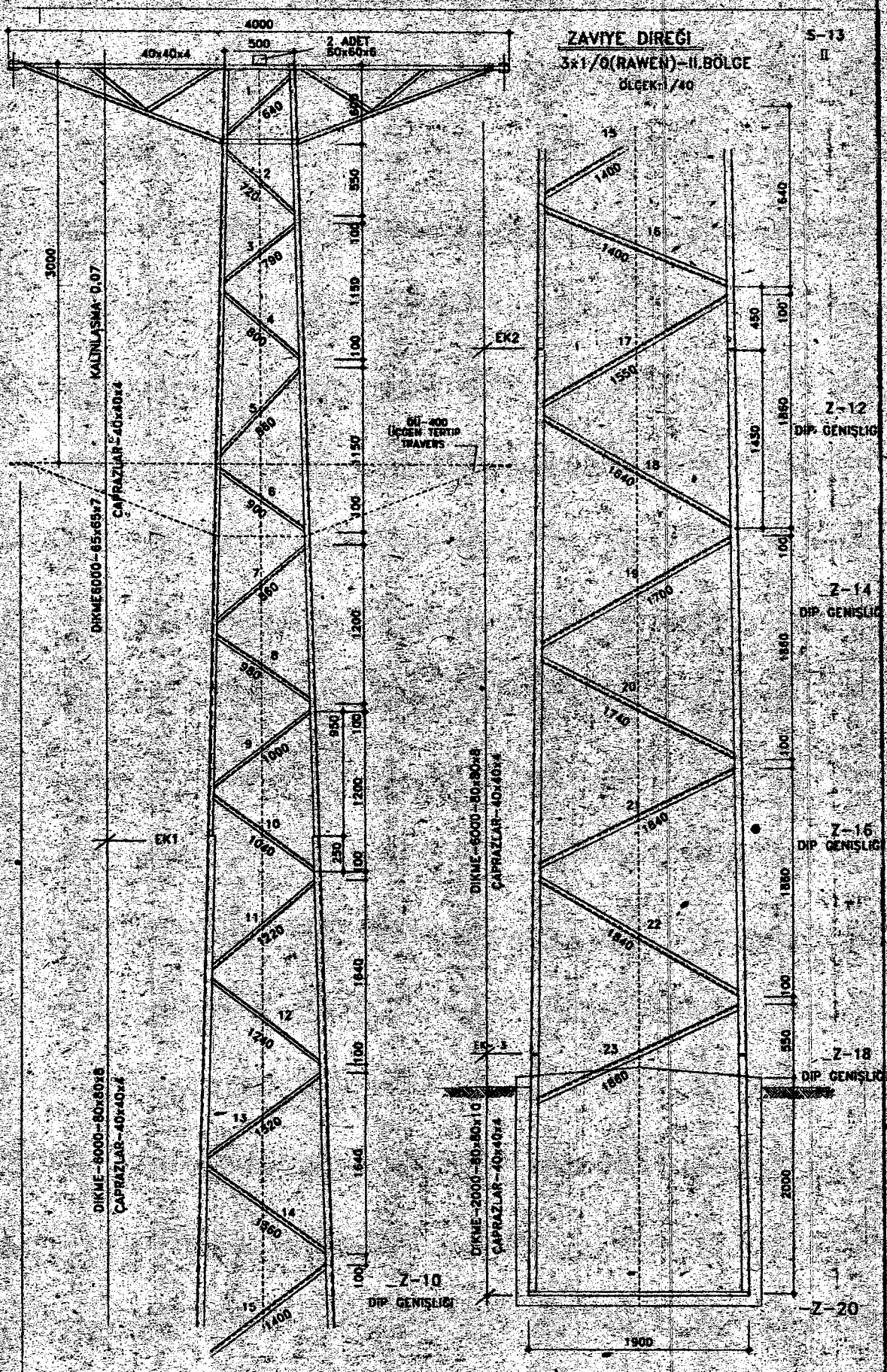
N-18 DİREĞİ



N-14 DİREĞİ



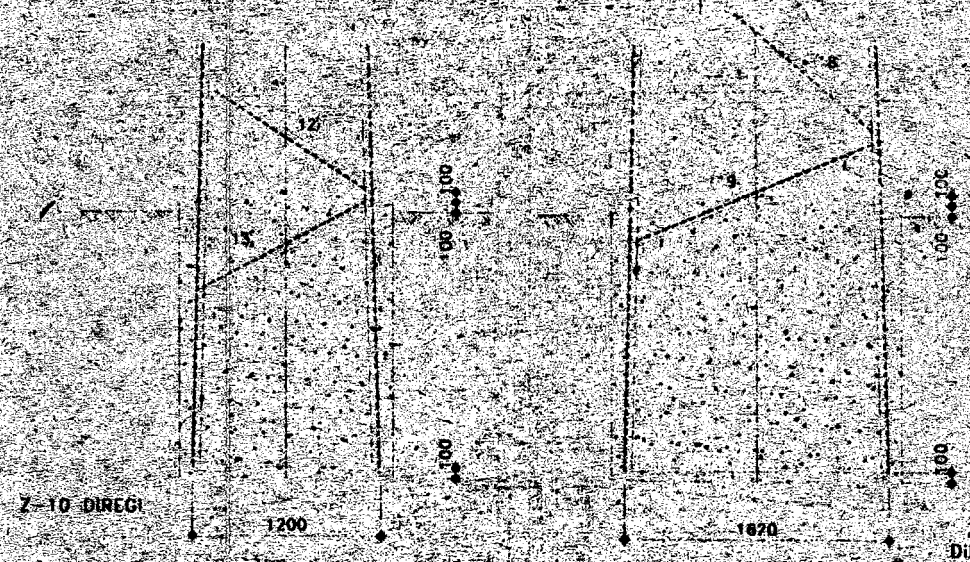
N-20 DİREĞİ

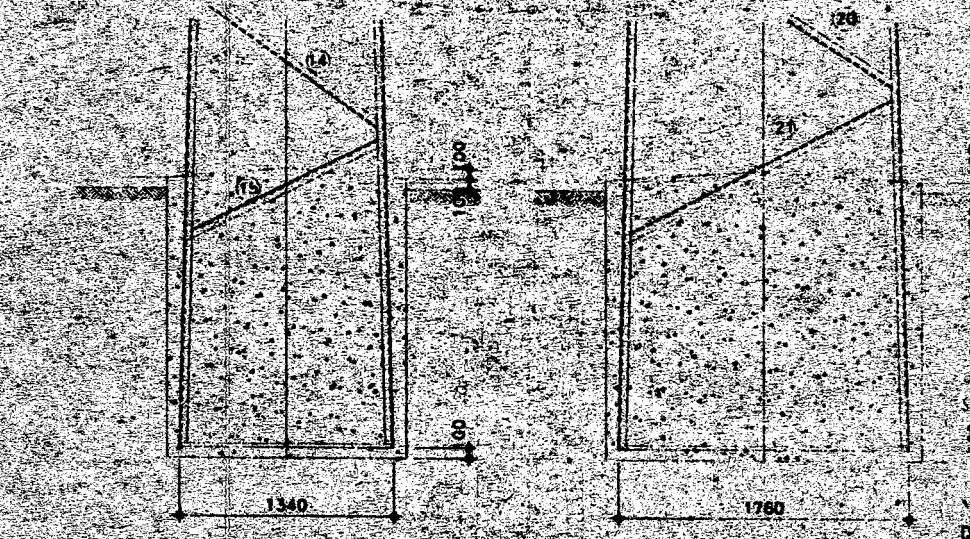

ZAVİYE DİREĞİ
3x1/0(RAWEN)-II.BÖLGE
ÖLÇEK:1/40
S-13
II
4000
500
2 ADET 50x60x6
40x40x4
3000
KALINLAŞMA 0,07
DİKME 8000-65x65x7
ÇAPRAZLAR-40x40x4
DİKME-8000-80x80x8
ÇAPRAZLAR-40x40x4
DİKME-6000-80x80x8
ÇAPRAZLAR-40x40x4
DİKME-2000-80x80x10
ÇAPRAZLAR-40x40x4
EK1
EK2
EK3
ÜÇGEN TERTİP TRAVERS
Z-10
DİP GENİŞLİĞİ
Z-12
DİP GENİŞLİĞİ
Z-14
DİP GENİŞLİĞİ
Z-16
DİP GENİŞLİĞİ
Z-18
DİP GENİŞLİĞİ
Z-20
1900

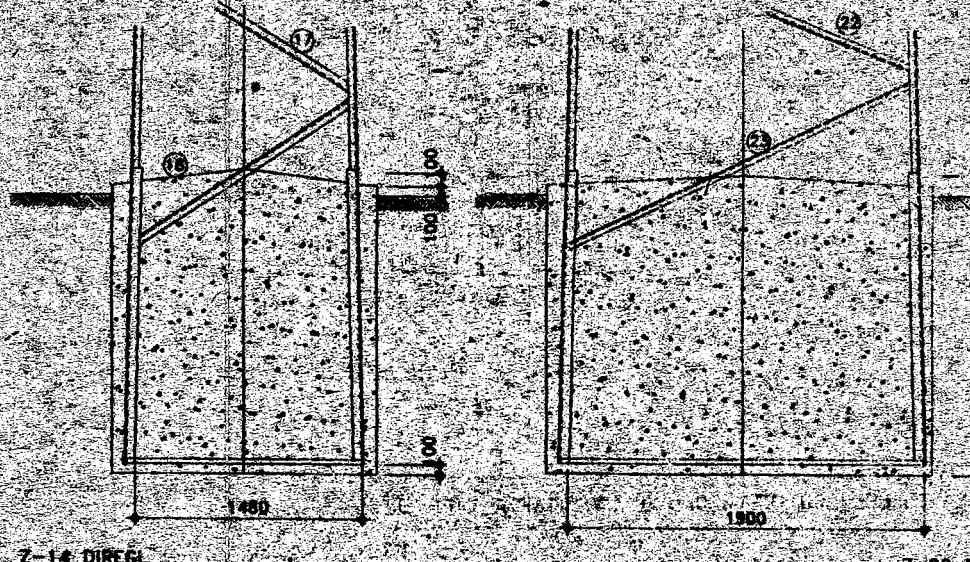
S-14
II

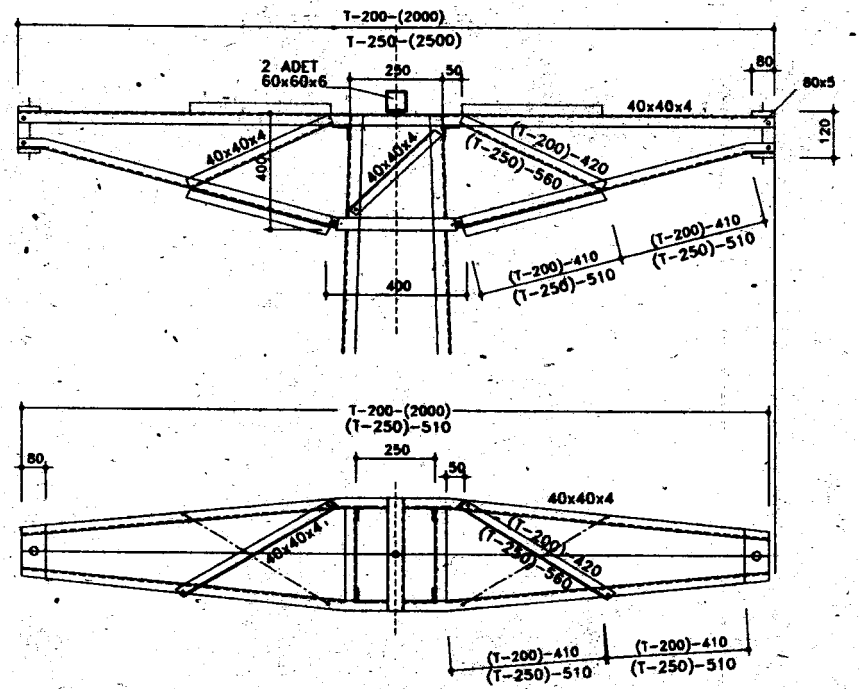
ZAVİYE DİREKLERİNİN TEMELE GİREN KISIMLARI

NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP MUKAYESİNDEN ALINACAKTIR ÖLÇEK: 1/40

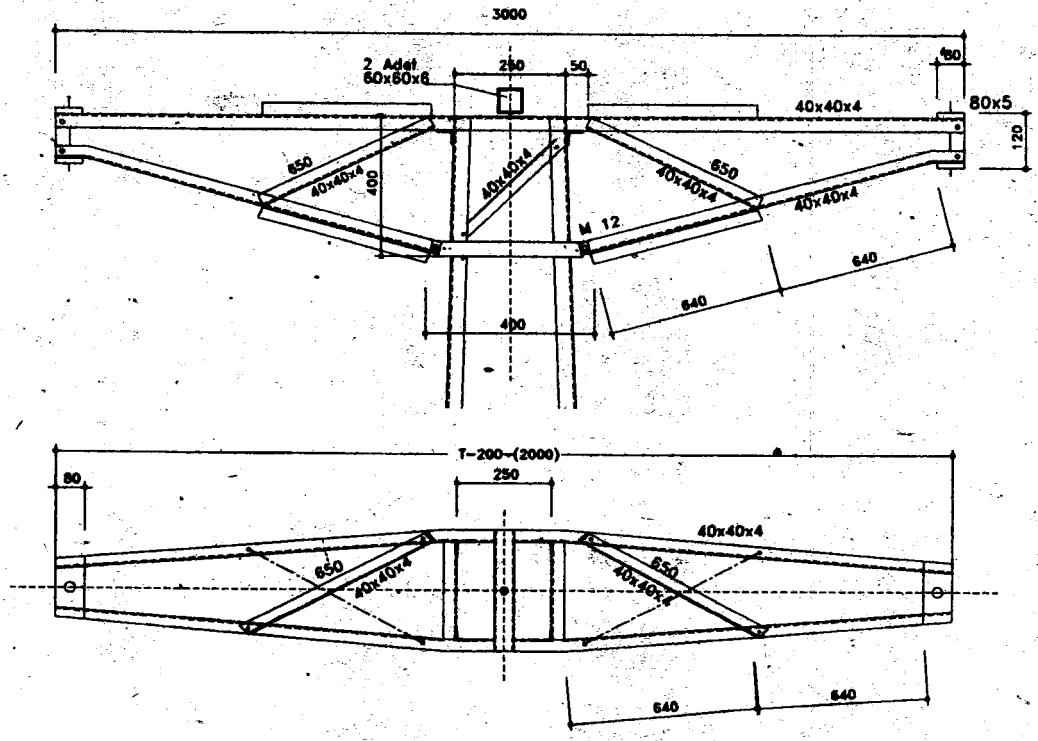






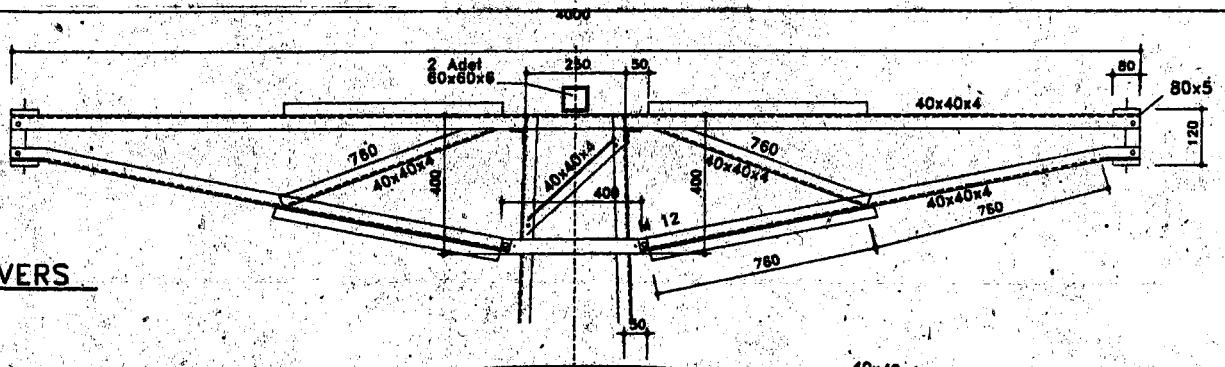


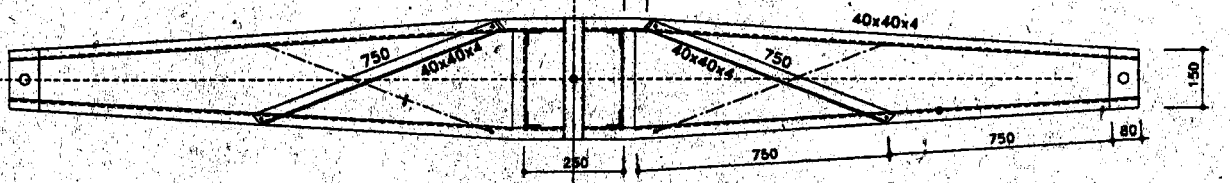
T-300 TiPi TRAVERS



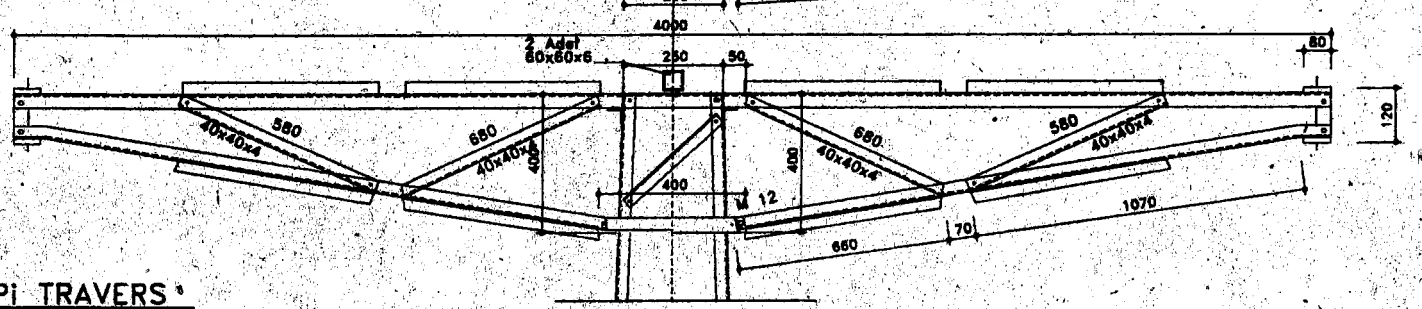
NOT:TRAVESLERE EGİM VERMEDEN DUZ OLARAKTA YAPILABİLİR

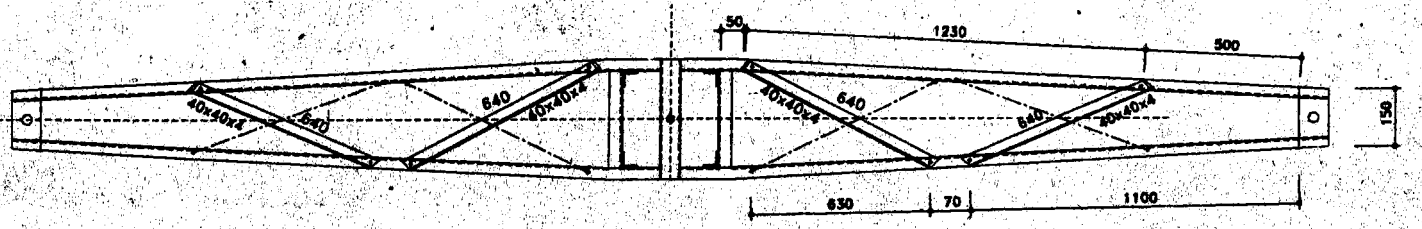
T-300 TİPİ TRAVERS

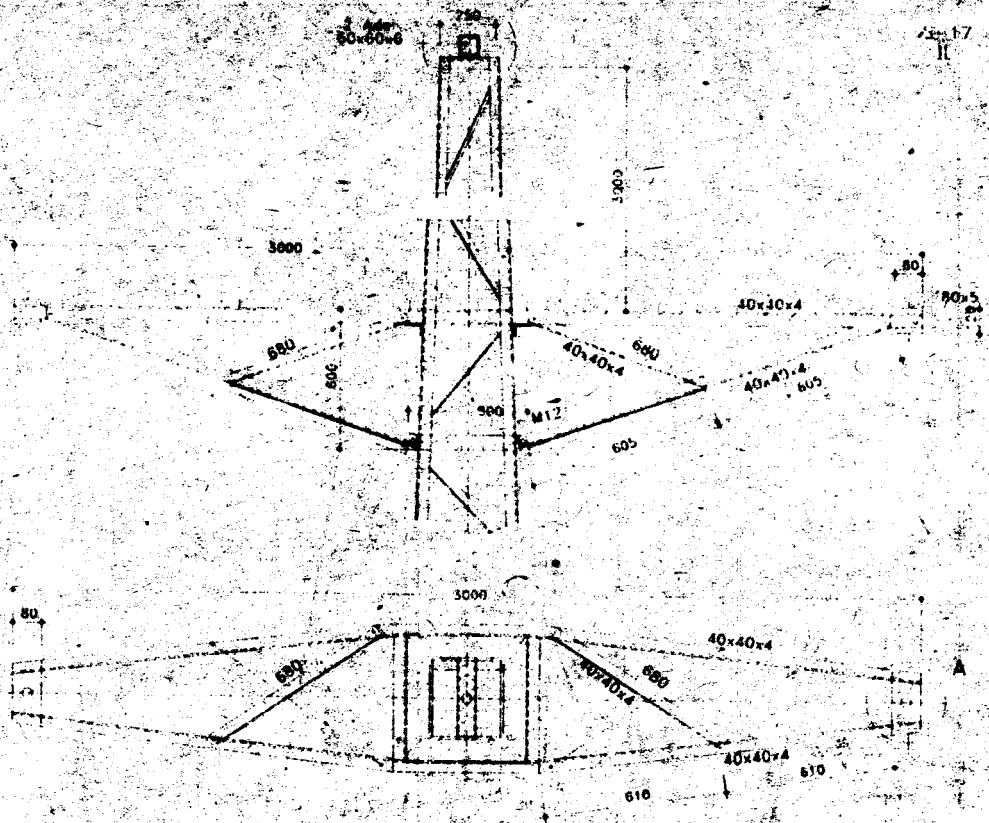




T-400 TİPİ TRAVERS

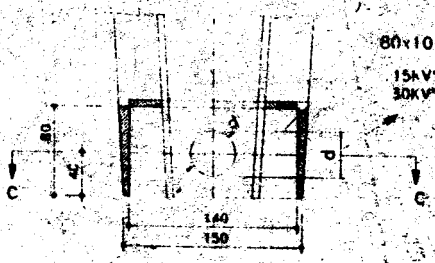


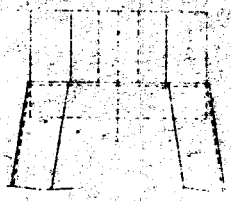




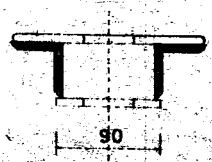
TU-300 TİPİ TRAVERS (ÜÇGEN TERTİP)
ÖLÇEK: 1/20

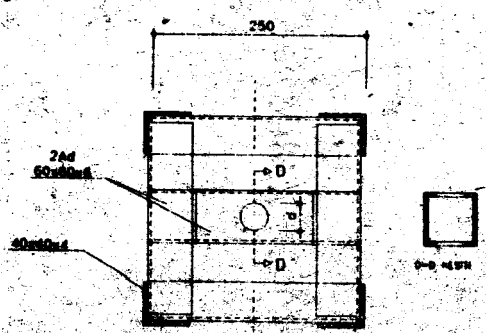
TAŞIYICI DİREKLERİN İZOLATÖR İRTİBATLARI





CC-KESİTİ



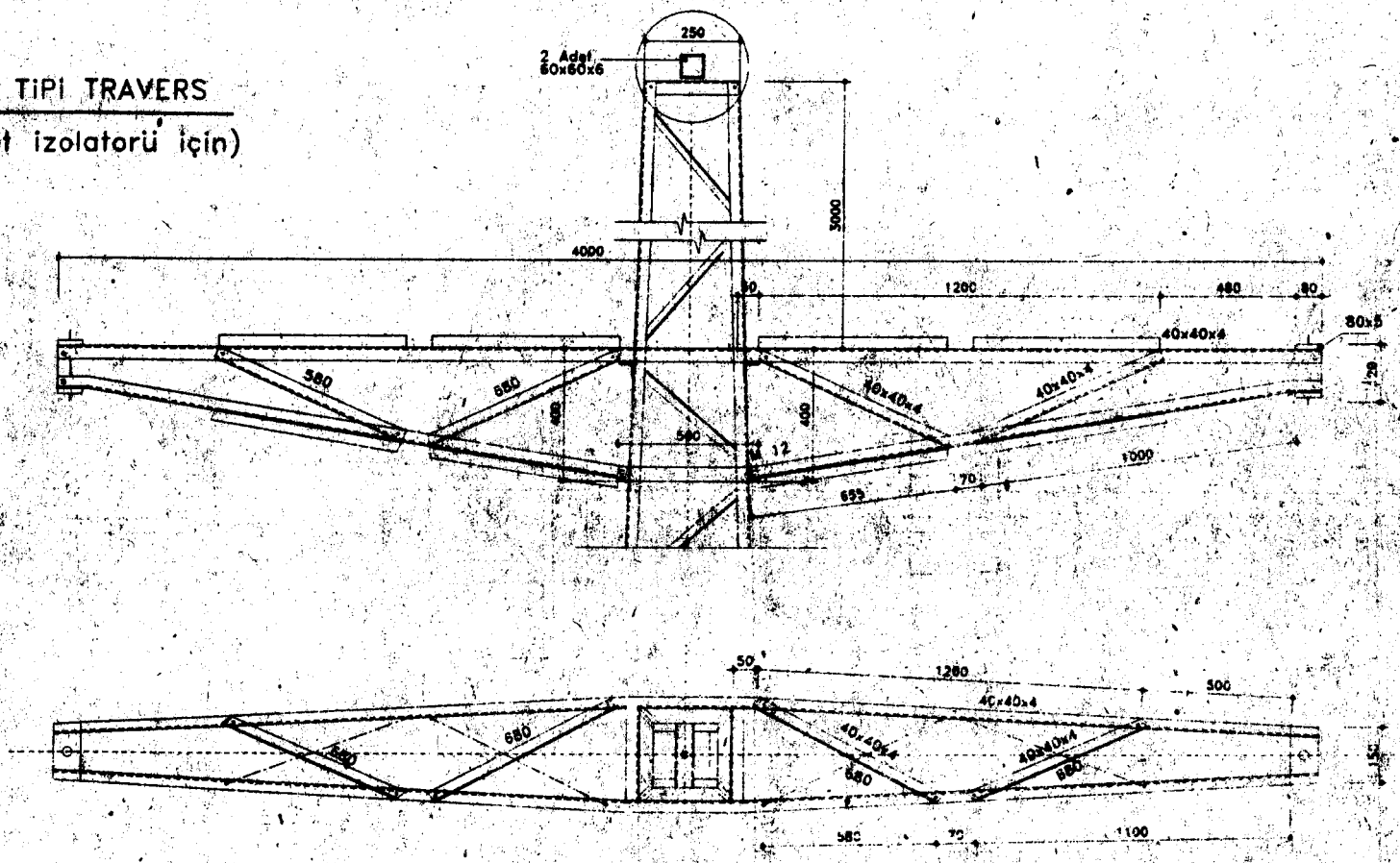


A TAFSİLATI
ÖLÇEK:1/5

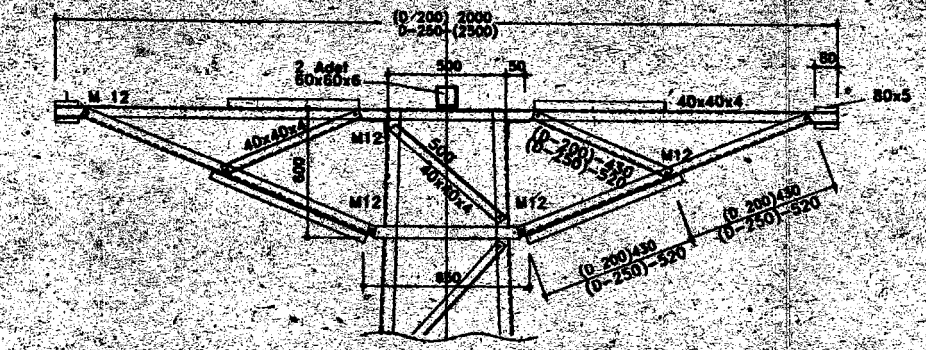
B TAFSİLATI
ÖLÇEK:1/5

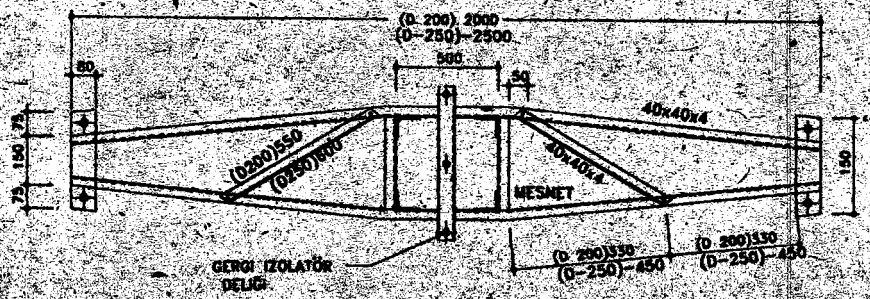
T-400 TİPİ TRAVERS

(Mesnet izolatörü için)

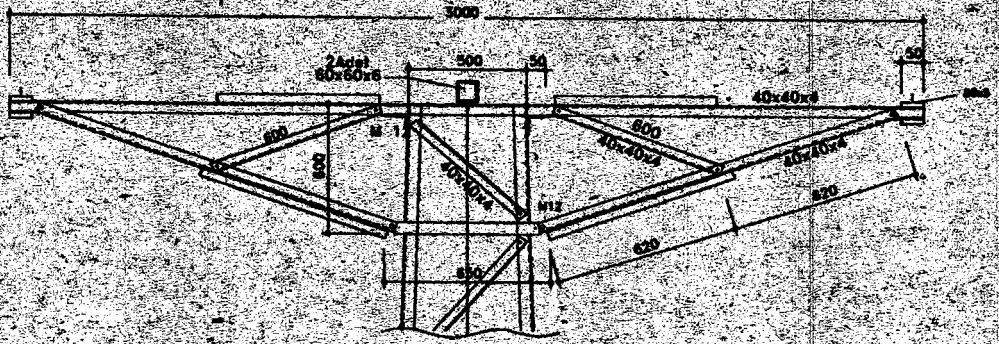


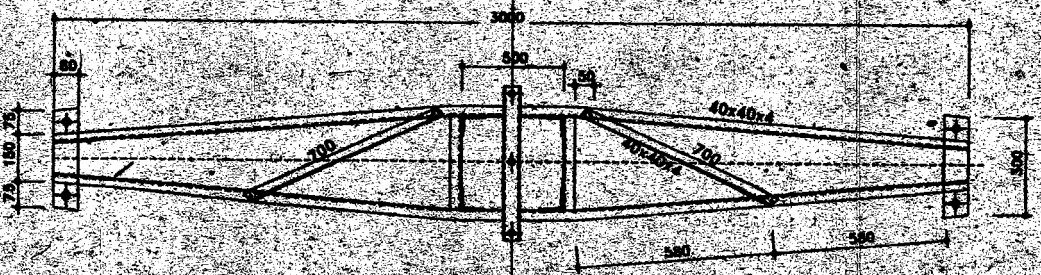
D-200 ve D-250 tipi TRAVERS (Gergi izolatör için)



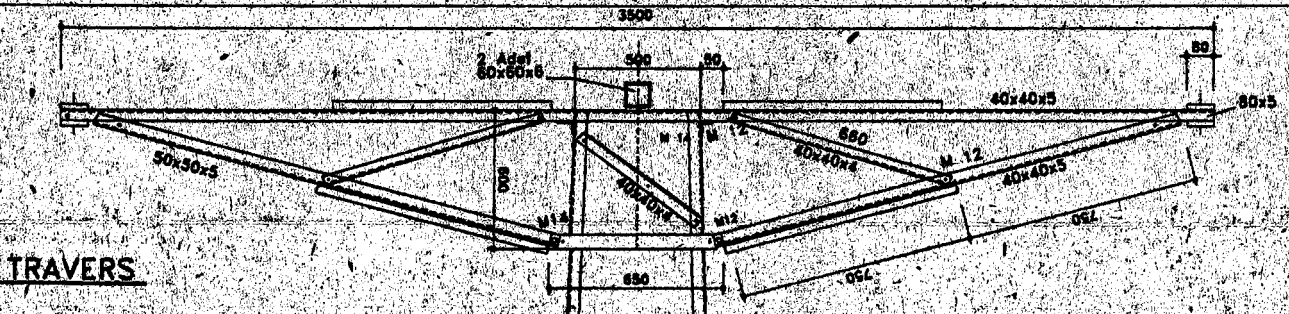


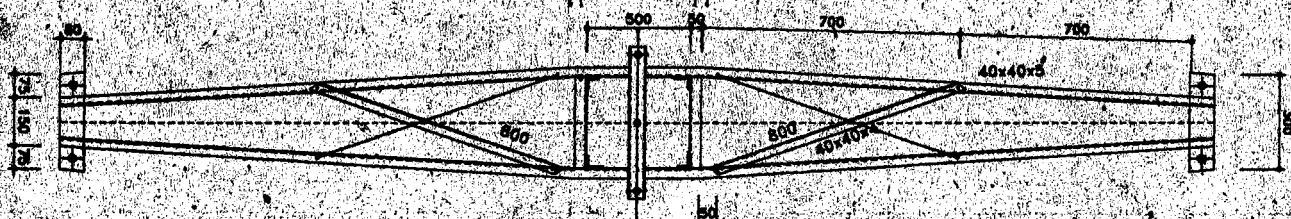
D-300 TIPI TRAVERS (Gergi izolatör için)



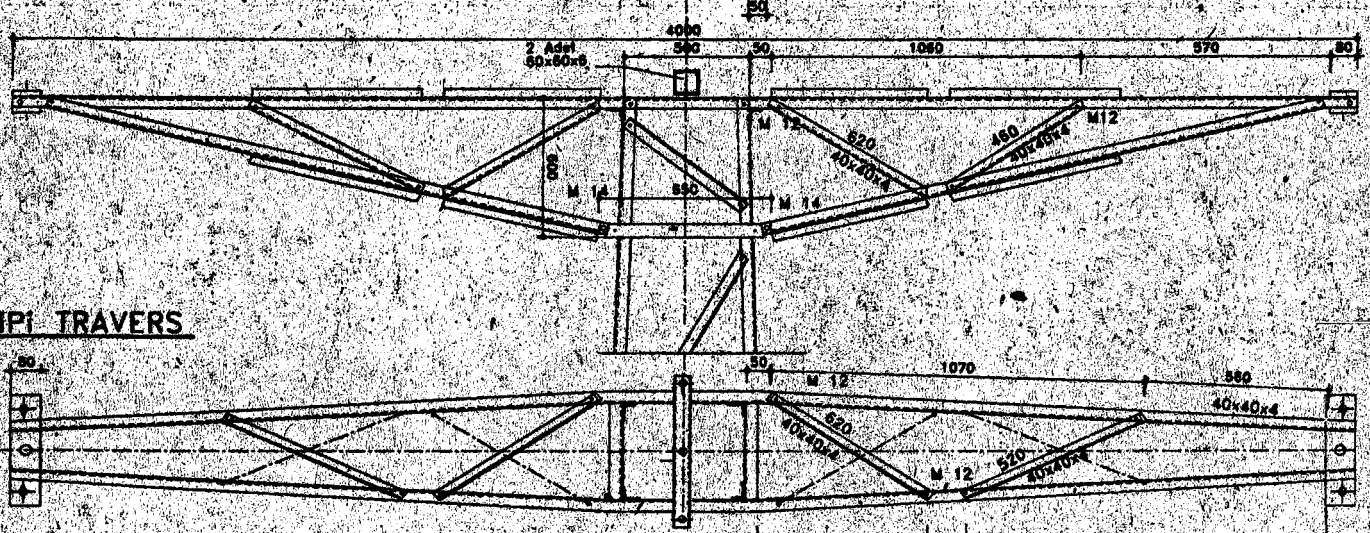


D-350 TIPI TRAVERS



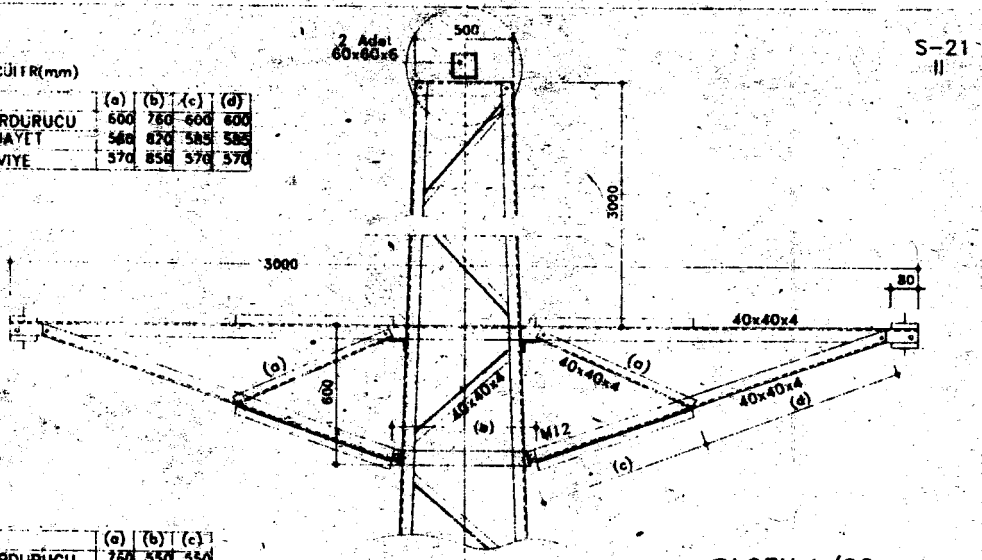


D-400 TIPI TRAVERS



ÖLÇÜLER(mm)

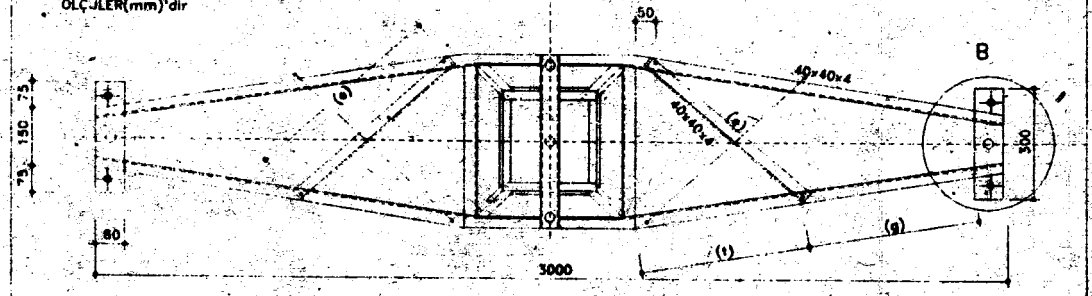
	(a)	(b)	(c)	(d)
DURDURUCU	600	760	600	600
NİHAYET	580	870	585	585
ZAVİYE	570	850	570	570



	(a)	(b)	(c)
DURDURUCU	760	550	550
NİHAYET	580	540	540
ZAVİYE	570	530	530

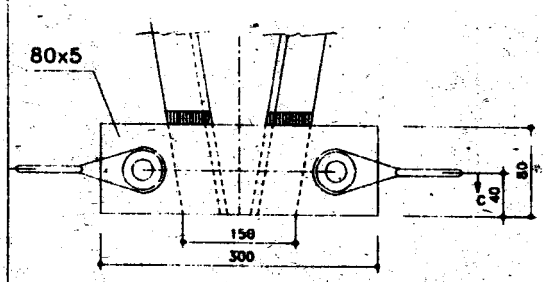
ÖLÇÜLER(mm)'dir

OLÇEK:1/20



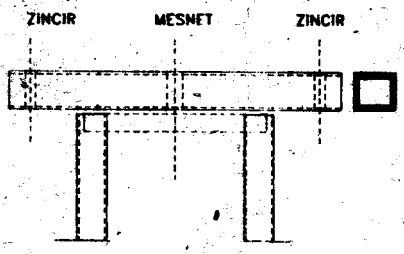
DÜ-300 TİPİ TRAVERS (ÜÇGEN TERTİP)

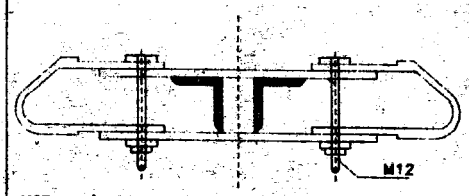
(Gergi izolatör için)



CC-KESİTİ

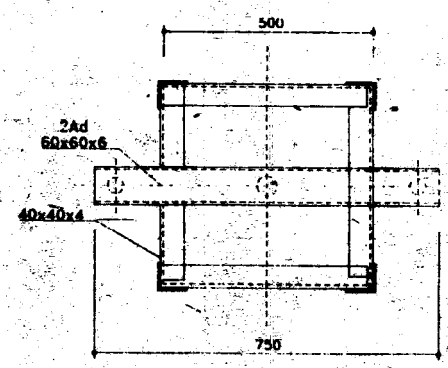
A DETAYI





NOT A)TAFSİLATINDAKİ GERGİ TAKIMININ AYNI OLDUĞUNDA AYRICA ÇİZİLMEMİŞTİR
B)TAFSİLATINDAKİ GERGİ TAKIMI

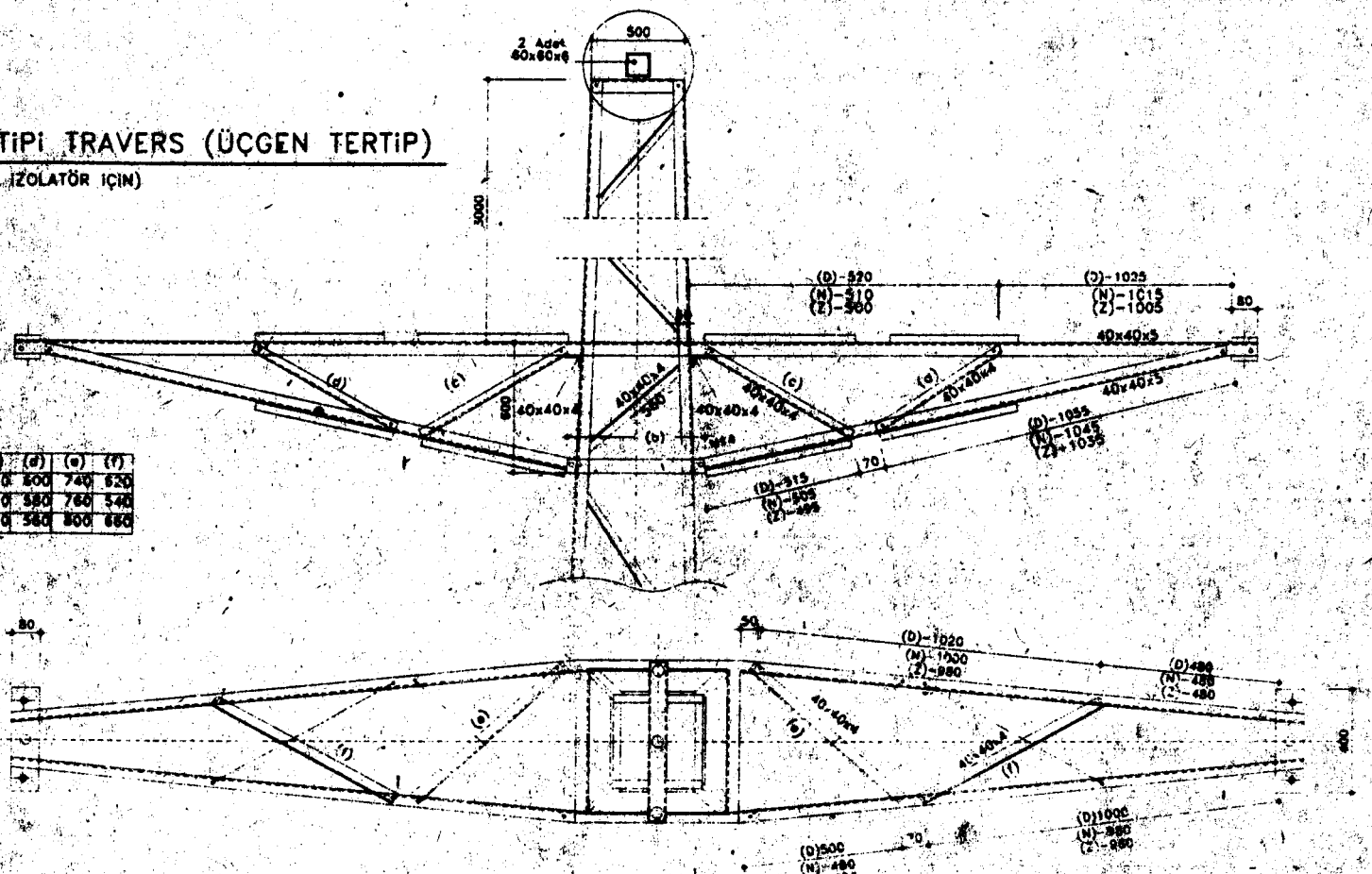
B DETAYI



BU IRTİBATLAR M12'LİK CIVATA İLEDE YAPILABİLİR

DÜ-400 TİPİ TRAVERS (ÜÇGEN TERTİP)

(GERGİ İZOLATÖR İÇİN)



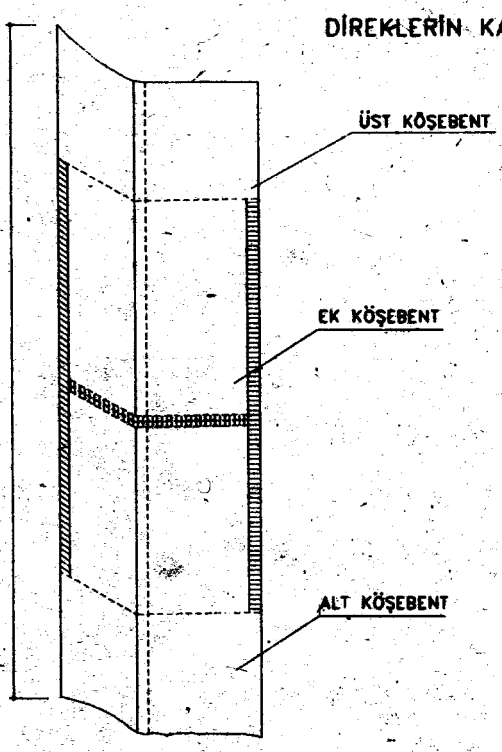
	(b)	(c)	(d)	(e)	(f)
DURDURUCU	760	660	800	740	620
NİHAYET	820	640	580	760	540
ZAVİYE	850	620	560	800	660

ÖLÇÜLER(mm)'dir

ÖLÇEK:1/20

DİREKLERİN KAYNAKLARLA İRTİBAT DETAYI

ÖLÇEK:1/25

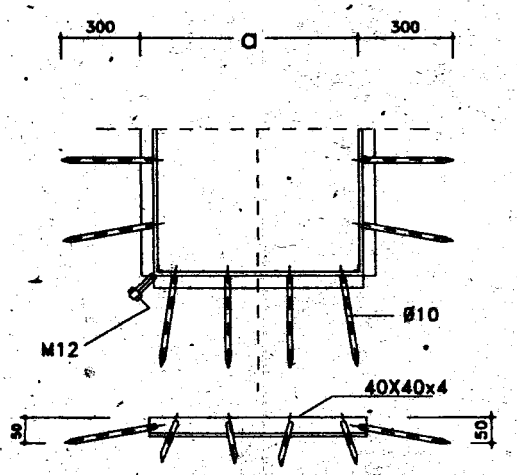


UST KÖŞEBENT (mm.)	ALT KÖŞEBENT (mm.)	EK KÖŞEBENTİ (mm.)	L (mm.)	KAYNAK KALINLIĞI (mm.)
50x50x5	50x50x5	50x50x5	200	3
50x50x5	50x50x5	50x50x5	250	3
60x60x6	60x60x6	60x60x6	250	4
65x65x7	65x65x7	65x65x7	350	4
80x80x8	80x80x8	80x80x8	350	5
80x80x8	100x100x10	80x80x8	400	7

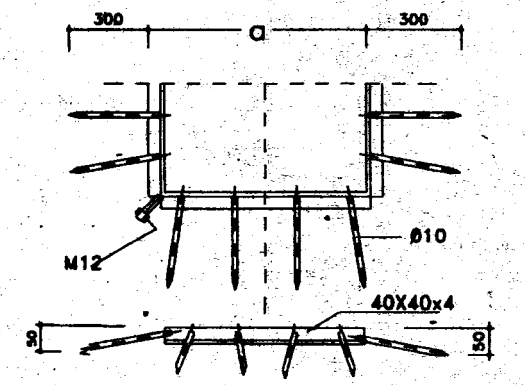
ÖLÇEK:1/20

KORKULUK DETAYI

DURDURUCU ve NİHAYET DİREKLER İÇİN



TAŞIYICI DİREKLER İCİN

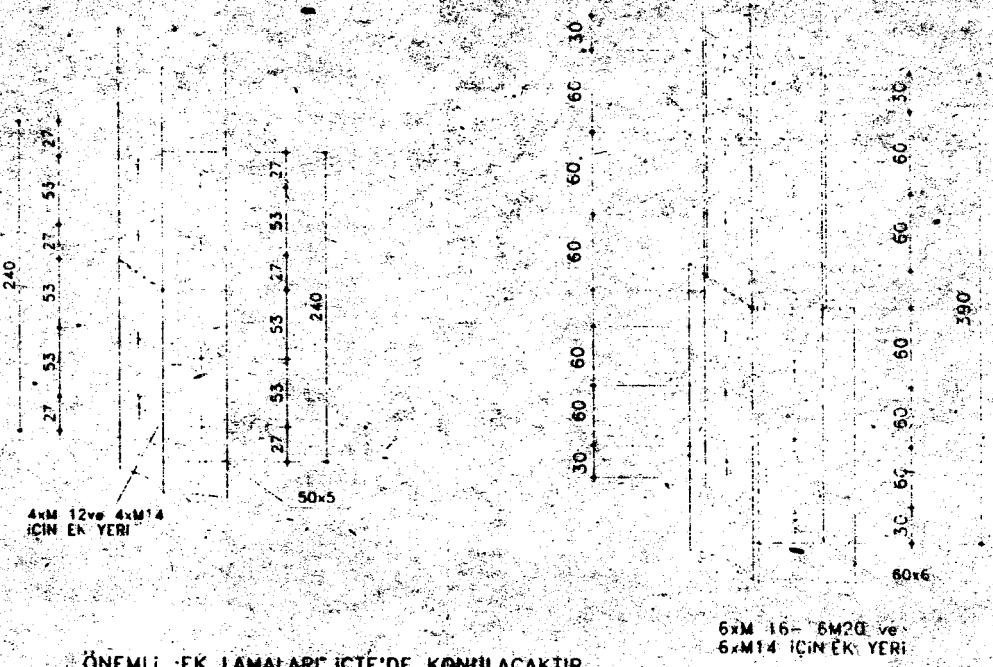


NOT :KORKULUKLAR YERDEN 5.5m MESAFEDE MONTE EDILECEGINE GORE (a) MESAFESI ALINACAKTIR.

S-24
II

DİKMELERİN İRTİBATI (CIVATALI)

ÖLÇEK:1/5

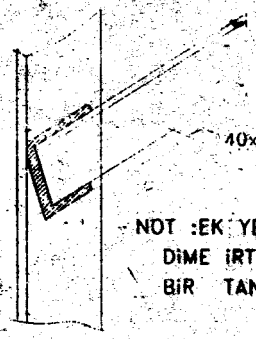


ÖNEMLİ :EK LAMALARI İCTE'DE KONULACAKTIR.

BİR ÇAPRAZLARIN BİR DİKMEYE İRTİBATI

ÖLÇEK:1/5

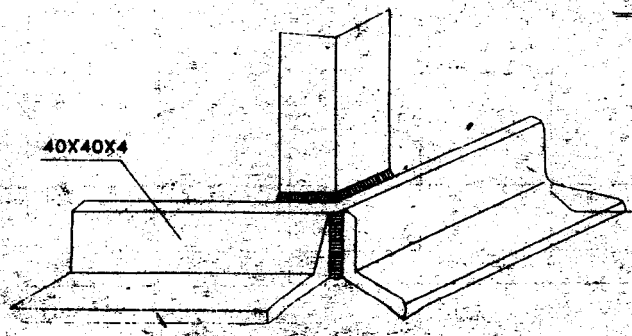
KAYNAK KALINLIĞI :3mm.
KAYNAK BOYU
1 TAŞIYICILARDA :80 mm.
2-DURDURUCULARDA :100mm
3-NİHAYETLERDE :100 mm.
4-ZAVİYELERDE :100mm
ÖZEL HALLERDE AYRICA
HESAP EDİLECEKTİR.



NOT :EK YERİNE GELEN ÇAPRAZLAR
DİME İRTİBAT CIVATALARINDAN
BİR TANESİYLE İRTİBATLANDIRILACAKTIR.

TABAN KÖŞEBENTİ İRTİBATI

ÖLÇEK:1/5



KAYNAK KALINLIĞI 3mm.
KAYNAK BOYU ŞEKİLDE
GÖSTERİLDİĞİ UZUNLUKTA
OLACAKTIR.

DİREK AĞIRLIK ANALİZLERİ (3 X 1 / 0)

			T-10		T-12		T-14		T-16		T-18		T-20	
		Kg/m	n	Kg	m	Kg	m	Kg	m	Kg				
DİKMELER	50x50x5	3.77	40	151	48	181	56	211	48	181	48	181	48	181
	50x50x7	5.38												
	65x65x7	6.83												
	70x70x7	7.38												
	80x80x8	9.15							16	83	24	124	32	165
ÇAPRAZLAR	40x40x4	2.42	41	100	54	131	65	157	76	184	89	216	102	247
	40x40x5	2.97												
	50x50x5	3.77												
	40x40x4	2.42	1	3	1	3	1	3	1	3	1	3	1	3
	Ø 10	0.617	4.8	3		3		3		3		3	3	3
EK	50x50x5	3.77	0.8	3	0.8	3	1.6	6	1.6	6	1.6	6	2.6	10
	60x60x6	5.4												
	60x6	2.81												
	70x8	4.42												
	80x8	5.05												
	80x10	6.32												
TOPLAM				260		321		381		462		536		612
KAYNAK	% 3			8		10		12		14		16		19
GENEL TOPLAM				268		331		393		476		552		631

			D-10		D-12		D-14		D-16		D-18		D-20	
		Kg/m	n	Kg	m	Kg	m	Kg	m	Kg				
DİKMELER	50x50x5	3.77												
	50x50x7	5.38	24	130	24	130	24	130	24	130	24	130	24	130
	65x65x7	6.83	16	109	24	164	32	219	24	164	24	164	24	164
	70x70x7	7.38							16	118	24	177	32	236
	50x50x7	5.15												
ÇAPRAZLAR	40x40x4	2.42	46	111	59	143	73	177	87	211	103	250	120	291
	40x40x5	2.97												
	50x50x5	3.77												
KORKULUK	40x40x4	2.42	2.2	6	2.5	6	2.9	7	3.3	8	3.6	9	3.9	10
	Ø 10	0.617	4.3	3		3		3		3		3		3
EK	50x5	1.96												
	50x6	2.37												
	65x65x7	6.83	0.8	6	0.8	6	0.8	6	0.8	6	0.8	6	0.8	6
	70x70x7	7.38					1	8	1	8	1	8	2	15
	80x8	5.05												
	80x10	6.32												
TOPLAM				365		452		550		648		744		855
KAYNAK	% 3			11		13		16		19		22		25
GENEL TOPLAM				376		465		566		667		764		880

DİREK AĞIRLIK ANALİZLERİ

		Kg/m	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg	
DİKMELER	50x50x5	3.77													
	50x50x7	5.18	24	130	24	134									
	65x65x7	6.83	16	110	24	164									
	70x70x7	7.38													
	80x80x6	7.42													
ÇAPRAZLAR	40x40x4	2.42	56	135	70	170	80	194	93	225	108	262	123	298	
	40x40x5	2.97													
	50x50x5	3.77													
KORKULUK	40x40x4	2.42	3	8	3	8	3	8	3	8	3	8	3	8	
	Ø10	0.617	48	3	3	2	3	2	3	2	3	2	3	2	
EK	50x5	3.77													
	50x6	5.42													
	65x65x7	6.83	1	7	1	7	1	7	1	7	1	7	1	7	
	70x70x7	7.38					1	8	1	8	1	8	2	16	
	80x8	5.05													
	80x10	6.32													
TOPLAM				389		492		582		691		771		873	
KAYNAK	%3			11		14		17		19		23		26	
GENEL TOPLAM				400		496		600		666		794		900	

			Z-10		Z-12		Z-14		Z-16		Z-18		Z-20	
		Kg/m	m	Kg	m	Kg	m	Kg	m	Kg				
DİREKLER	60x60x6	5.42												
	65x65x7	6.83	24	164	24	164	24	164	24	164	24	164	24	164
	80x80x8	9.66	16	155	24	232	32	310	24	232	24	232	24	232
	80x80x10	11.9							16	191	24	286	32	381
ÇAPRAZLAR	40x40x4	2.42	56	135	66	160	80	194	93	225	108	262	123	298
	40x40x5	2.97												
	50x50x5	3.77												
KORKULUK	40x40x4	2.42	3	8	3	8	3	8	4	11	4	12	5	13
	Ø10	0.617	48	3	3	2	3	2	3	2	3	2	3	2
EK	65x65x7	6.88	1	7	1	7	1	7	1	7	1	7	1	7
	80x80x8	9.66	16	16	16	16	16	16	16	16	16	16	16	16
	80x80x10	11.90					16	19	16	19	16	19	32	38
	70x8	4.42												
	80x8	5.05												
	80x10	6.32												
TOPLAM				496		591		720		868		1001		1152
KAYNAK	% 3			15		18		22		26		30		35
GENEL TOPLAM				496		609		742		874		1031		1187

3 x 1 / 0 İLETKENLİ TRAVERS AĞIRLIK ANALİZİ

			T 250		T-300		T-350		T-400		D-250		D-300	
		Kg/m	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg
	40x40x4	2.42	13	31.5	17	41	21	51	26	63	14	34	17	42
	50x50x5	3.77												
	60x60x6	5.42	0.65	3.5		3		3		3	1.3	7		7
LAMA	80x5	3.16	0.6	2		2		2		2	1.2	4		4
LAMA	40x40x5	2.97												
	40x5	1.58	0.6	0.8										
TOPLAM				37.8		46		56		68		45		53
CİVATA-KAYNAK	% 3			2		2		3		3		2		3
GENEL TOPLAM				40		48		59		71		47		56

			D-350 MES. İZO.		D-400 MES. İZO.		D-250 GER. İZO.		D-300 GER. İZO.		D-350 GER. İZO.		D-400 GER. İZO.	
		Kg/m	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg	m	Kg
	40x40x4	2.42	22	54	9	22	11	27	12	29				
	50x50x5	3.77												
	60x60x6	5.42	1.3	7		7	0.65	3.5	1.3	7				
LAMA	80x5	3.16	1.2	4		4	0.6	2	1.2	4				
LAMA	50x5	1.96				0.5								
	40x40x5	2.97			17	50								
	40x5	1.58					0.5	0.8						
TOPLAM				64		84		33		40				
CİVATA-KAYNAK	% 3			3		4		2		2				
GENEL TOPLAM				67		88		35		42				