

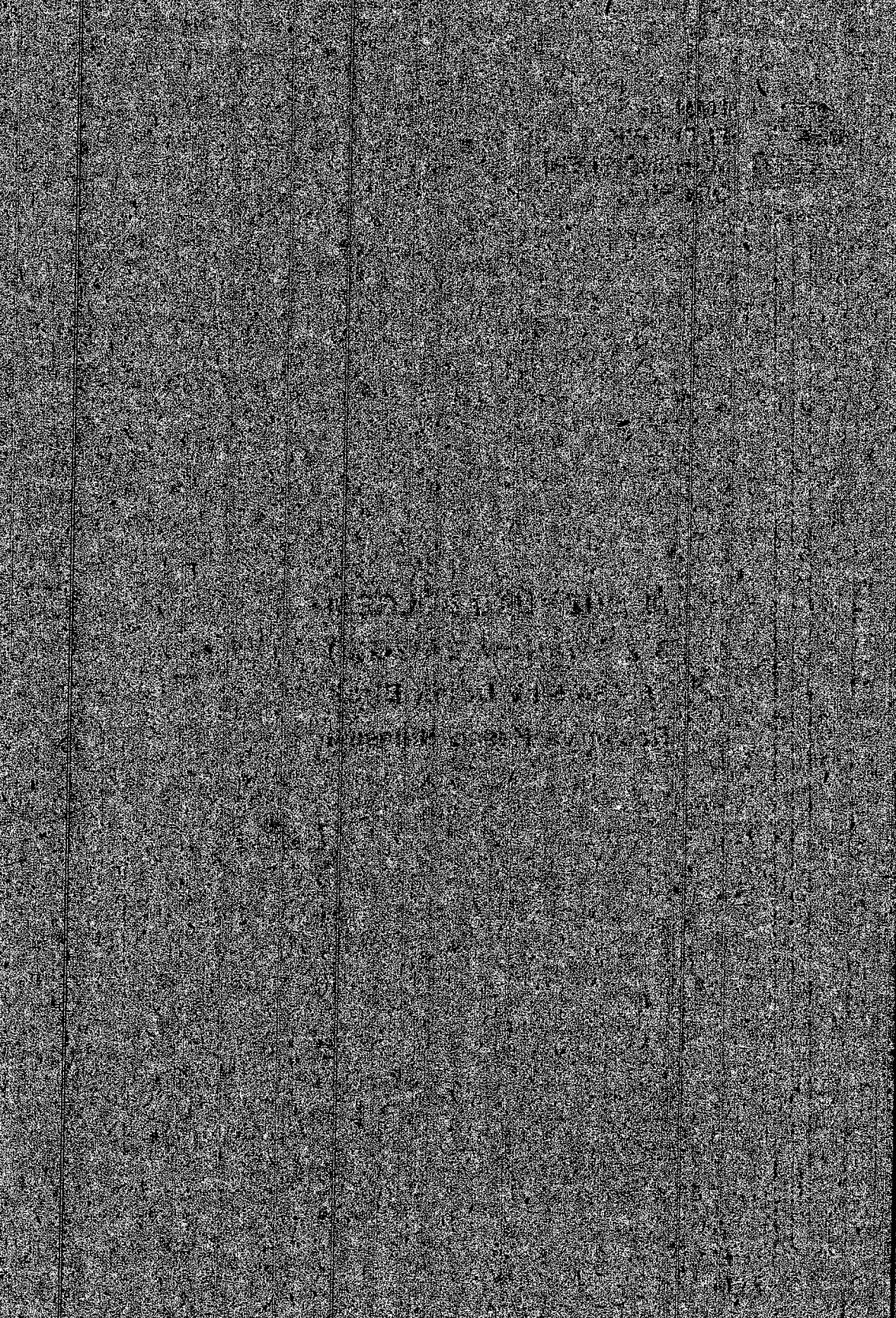


**TMMOB
ELEKTRİK
MÜHENDİSLERİ
ODASI**

1954

T.P. 2. 2. 3.

**III. BUZ YÜKÜ BÖLGESİ
3 x Swallow (AWG 3)
15 - 34.5 kV Demir Direk
Resim ve Hesap Hûlasası**



DEĞİŞİKLİK			TARİH	İMZA
III. BUZ YÜKÜ BÖLGESİ 3xSwallow (AWG 3) 15-34.5kV DEMİR DİREK RESİMLERİ VE HESAP HÜLÂSASI			ÖLÇEK 1/5 - 1/10 1/20 - 1/40	
			NO LU	
			PLÂN İPTÂL EDİLDİ	
			NO LU	
PLÂN İPTÂL EDİLDİ		PLÂN NO. 6/95	ARŞİV KAYIT NO:	
Proje yapının Dip No Ünvan: Adı Soyadı	İMZA	İMZA TARİHİ	İLLER BANKASI ENERJİ DAİRESİ BAŞKANLIĞI	
Elk y Muh. Hüseyin Badur Oda No 343 Dip No 2193				
Çizen: S. Özdemir				

2 25 m²

111/2

III. CÜ BUZ YÜKÜ BÖLGESİ - 3xSWALLOW DEMİR DİREK PROJESİ AÇIKLAMA RAPORU

- 1 - III CÜ BUZ YÜKÜ BÖLGESİ İÇİN YAPILAN HESAPLARIN ÖZETİ DİREK RESİMLERİNİN BAŞINDA VERİLMİŞTİR. BÖYLECE UZUN HESALARI TETKİK ETMEDEN PROFİLİ İŞLEMEN VE KEŞİF YAPMAK MÜMKÜN OLACAKTIR.
- 2 - BİR ENERJİ NAKİL HATTI, DİREK ARASI MESAFESİ NE KADAR FAZLA OLURSA O KADAR EKONOMİK OLUR. ELEKTRİKLİ D.D.Y ATLAMASI İÇİNDE YÜKSEK DİREĞE İHTİYAÇ YARDIR. BU BAKIMDAN 20 m. BOYA KADAR DİREK HESAP EDİLMİŞTİR.
- 3 - TAŞIYICI VE DURDURUCU TRAVERSLER İÇİN DÜZ TERTİP DÖRT, UÇGEN TERTİP BİR TRAVERS HESAP EDİLMİŞTİR. TAŞIYICI TRAVERSLER MESNET İZOLATÖRLÜ OLACAKTIR. DURDURUCU TRAVERSLER İÇİN İSTENİLDİĞİNDE MESNET VE İSTENİLDİĞİNDE ZİNCİR İZOLATÖRİ KULLANILARILACAKTIR. İKİ TİP DURDURUCU TRAVERS HESABI YAPILMIŞTIR.
- 4 - NORMAL TAŞIYICI DİREKLERİN RÜZGAR MENZİLLERİ 200 m ALINMIŞTIR. ANCAK BU DİREKLER 200 m. MENZİLDEN DAHA KÜÇÜK ARALIKLARLA KULLANILDIĞI TAKDİRDE DAHA KÜÇÜK TEMEL ALINACAK ŞEKİLDE HESAP YAPILMIŞTIR.
- 5 - DURDURUCU DİREĞİN K.D. OLUR KULLANILMA AÇISI DERECE NİHAYET " " " " " " 154 " DİR. 90 DERECEYE KADAR KULLANILACAK BİR Z DİREĞİ HESAP EDİLMİŞTİR. Z DİREĞİ 120 DERECEYE KADAR KULLANILDIĞI TAKDİRDE AYRI TEMEL KULLANILACAK. 90 DERECEDE AYRI TEMEL KULLANILACAKTIR.
- 6 - TAŞIYICI DİREK KÖŞEDE TAŞIYICI OLARAK MUHTELİF DERECEDE KULLANILMAKTA DİR. KÖŞEDE TAŞIYICI DİREĞİN RÜZGAR MENZİLİ HER DERECE AÇI İÇİN Z m. KISALMAKTADIR.
- 7 - GEREK TAŞIYICI TRAVERSLERİN VE GEREKSE DURDURUCU TRAVERSLERİN TEK TARAFLI MAX. 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
Etk. Y. Müh. Hüseyin BODUR
Oda No: 343 - Dip. No: 2193

III. BÖLGE 3xSWALLOW St -Al İLETKENLİ
DEMİR DİREKLERİN KULLANMA İMKANLARI

III/3

TASİYİCİ DİREKLER: DİREKLERİN KAREKTERİSTİKLERİ AŞAĞIDA VERİLMİŞTİR.

	a _w (m)	a _g (m)	K.T. (x) α°	İletken Topr. mesafe (m)	Profilde 1/400 (mm)	Ağırlık kg	NORMAL ARAZİ TEMELİ			BETON HACİMİ V(m ³)
							Tipi	Derinlik m	Genişlik (m)	
T-10	401	300	162°20'	8.75	22'	258	BLOK	1.6	a _w = 252m İÇİN 0.9	1701
									a _w = 200m " 0.8	1344
									a _w = 139m " 0.7	1023
									a _w = 394m " 1.1	2334
T-12	318	300	165°	10.75	27	306	"	"	a _w = 291m " 1	21
									a _w = 165m " 0.9	1701
									a _w = 117m " 0.8	1344
									a _w = 394m " 1.2	2334
T-14	261	300	165°20'	12.75	32	370	"	"	a _w = 291m " 1.1	1936
									a _w = 140m " 1	21
									a _w = 272m " 1.2	2302
									a _w = 200m " 1.1	1936
T-16	"	"	"	14.75	37	426	"	"	a _w = 341m " 1.3	3549
									a _w = 324m " 1.4	4112
									a _w = 200m " 1.2	2302
									a _w = 140m " 1.1	1936
T-18	177	"	"	16.75	42	473	"	"	a _w = 200m " 1.4	4112
									a _w = 186m " 1.3	3549
									a _w = 318m " 1.5	4728
									a _w = 200m " 1.2	2302
T-20	177	300	"	18.75	47	564	"	"	a _w = 200m " 1.3	3549
									a _w = 318m " 1.5	4728
									a _w = 200m " 1.4	4112
									a _w = 186m " 1.3	3549

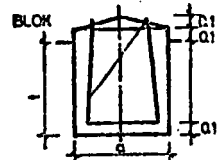
(x) KÖŞE TASİYİCİ (KT) HALİNDE a_w DEĞERİ HER BİR DERECE İÇİN 2m. KISALIR
(xx) h= H-15 TEMEL. 0.25 (İZOLATÖR BOYU) (xxx) KAYALIK TEMELDE 1mm ARTIRILIR.
ÇÜRÜK ARAZİDE 1mm AZALTILIR. ÜÇGEN TERTİPTE 6.25mm. AZALTILIR.
H= DİREĞİN TAM BOYUDUR. KÖŞEDE TASİYİCİ İZOLATÖR DEMİRLERİ 5.6 GİBİ KULLANILACAKTIR.

	KAYALIK ARAZİ TEMELİ			Beton Hacmi V(m ³)	ÇÜRÜK ARAZİ TEMELİ				Beton Hacmi V(m ³)	
	Tipi	Derinlik t(m)	GENİŞLİK a(m)		Tipi	Derinlik t(m)	a(m)	b(m)		t ₁ (m)
T-10	BLOK	1	a _w = 200m İÇİN a = 0.9m	0.81	Kademeli	1.9	1.3	2	0.5	4343
			a _w = 139m " a = 0.8m	0.64						
T-12	"	"	a _w = 200m " a = 1m	1	"	"	"	"	"	"
			a _w = 117m " a = 0.9m	0.81						
T-14	"	"	a _w = 200m " a = 1.3m	1.69	"	"	"	"	"	"
			a _w = 140m " a = 1.2m	1.44						
T-16	"	"	a _w = 200m " a = 1.3m	1.69	"	"	"	"	"	"
T-18	"	"	a _w = 200m " a = 1.5m	2.25	"	"	"	"	"	"
			a _w = 140m " a = 1.3m	1.69						
T-20	"	"	a _w = 200m " a = 1.6m	2.56	"	"	"	"	"	"
			a _w = 131m " a = 1.5m	2.25						

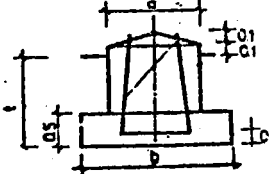
TASİYİCİ TRAVERSİLER

	a = max(m)		a _g (m)	Ağırlık (kg)	169° a = max(m)		152° a = max(m)	
	34.5kv	15kv			34.5kv	15kv	34.5kv	15kv
T-250	106	120	300	47	104	119	116	102
T-300	130	138	300	43	128	134	131	126
T-350	142	149	300	60	140	147	144	137
T-400	154	160	300	73	152	158	155	149
TU-300	200	200	300	43	128	134	131	126

TEMEL ŞEKİLLERİ



KADEMELİ



a) 200 m. HALİNDE a_w DEĞERİ PROFİLDEN MAX. BULUNACAK
VE a_w ≥ 0.6 · 80 = a_w TAKKİK EDİLECEK

TAŞIYICI DİREKLERİN DİĞER KAREKTERİSTİKLERİ

	TEPE GENİŞLİĞİ mm	DİP GENİŞLİĞİ mm	DİREK BOYU m(H)	DİKMELER	ÇAPRAZLAR	ER CİYAYIŞI	ER LAMASI
T-10	200	450	10	50.50.5	40.40.4	EK-1 4 M12	50x6
T-12	200	500	12	"	"	"	"
T-14	200	550	14	"	"	EK-2 4 M12	"
T-16	200	600	16	50.50.7	"	"	"
T-18	200	650	18	"	"	"	"
T-20	200	700	20	"	"	EK-3 4 M12	"

DURDURUCU DİREKLER: DURDURUCU DİREKLER GERGİ VEYA MESNET İZOLATÖRÜ OLABİLİR.

	DİP (m)	α (°)	(x) KT m°	İLETKEN TOPRAK MESAFESİ (m) x		PROFİLOE (x) x 1/600 (mm)		Ağırlığı kg	NORMAL ARAZİ TEMELLERİ			
				Mesnet izolatörü	Gergi izolatörü	Mesnet izolatörü	Gergi izolatörü		Tipi	Genişlik a	t (m)	Beton m ³
D-10	300	937	147°	8.45	3.2	21	20	279	BLOK	1	1.9	1.9
D-12	"	"	"	10.45	10.2	26	25	344	"	1.1	"	2.3
D-14	"	"	"	12.45	12.2	31	3.0	418	"	1.2	"	2.735
D-15	"	"	"	14.45	14.2	36	3.5	506	"	1.3	"	3.211
D-16	"	613	154°	16.45	16.2	41	4.0	591	"	1.4	"	3.724
D-20	"	"	"	18.45	18.2	46	4.5	671	"	1.5	"	4.275

(x) h=H-180+0.25 (MESNET İZOLATÖRÜ) h=H-1.80 (GERGİ İZOLATÖRÜ) KAYALIK TEMELDE 2 mm İLAVE EDİLECEKTİR. ÜÇGEN TERTİPTE 6.25 mm AZALTILIR.

	KAYALIK TEMELİ				ÇÜRÜK ARAZİ TEMELİ					
	TİPİ	t (m)	a (m)	BETON m ³	TİPİ	t (m)	t ₁ (m)	a (m)	b (m)	BETON m ³
D-10	BLOK	1.25	1.1	1.512	KADEMELİ	1.9	0.5	1.3	2	4.343
D-12	"	"	"	"	"	"	"	"	"	"
D-14	"	"	1.3	2.112	"	"	"	"	"	"
D-16	"	"	1.4	2.450	"	"	"	1.4	2.1	4.925
D-18	"	"	1.5	2.812	"	"	"	1.5	2.2	5.544
D-20	"	"	1.6	3.2	"	"	"	1.6	2.3	6.202

(x) KT HALİNDE TAŞIYICI TRAVERS VE MESNET İZOLATÖRÜ KULLANILACAK

DURDURUCU TRAVERSLER: KOŞE DURDURUCU DİREK HALİNDE

a_{max} AÇIKLIĞI AÇIYA ÇÖRE AŞAĞIDAKİ KATSAYILARLA ÇARPILARAK AZALTILIR

	a_{max} (m)		a_g (m)	AĞIRLIĞI kg
	34.5kV	15kV		
D-250	106	120	300	54 (51) (xx)
D-300	130	136	300	62 (59)
D-350	142	149	300	67 (64)
D-400	154	160	250 (*)	81 (79)
DU-300	200	200	300	62 (59)

α°	K	α°	K	α°	K	α°	K
169	0.99	144	0.95	120	0.85	95	0.74
150	0.98	136	0.93	116	0.85	94	0.73
152	0.97	128	0.90	113	0.83	92	0.72
148	0.95	123	0.88	102	0.78	90	0.709

(*) ALT PAYANGA 50/50 S OLUŞUĞU TAĞIRDE $a_g=300$ m ALINIR (xx) PARANTEZ İÇİNDEKİLER GERGI İZOLATORU İÇİNDİR N (Sarı) ve Z (Zaviye) DİREKLERİ; HER İKİ DİREKTEDE $a_g=300$ m. $a_w=200$ m DİR ALT İLETKEN TOĞRAKLI MESAFESİ (D) DİREKLE İZİBİDİR

(N) DİREĞİ KÖŞEDE DURDURUCU OLARAK 153° (Z) DİREĞİ KÖŞEDE DURDURUCU OLARAK 90° KULLANILABİLİR. (Z) DİREĞİNİN TEMEL EBATLARI $\alpha=120^\circ$ ve $\alpha=90^\circ$ AYRI AYRI VERİLMİŞTİR.

	NORMAL ARAZİ TEMELİ				KAYALIK ARAZİ TEMELİ				ÇÜRÜK ARAZİ TEMELİ						
	Ağırlık kg	Tipi	t(m)	a(m)	Beton m ³	Tipi	t(m)	a(m)	Beton m ³	Tipi	t(m)	t(m)	a(m)	b(m)	Beton m ³
N-10	293	BLOK	1.9	1.2	2.736	BLOK	1.25	1.2	1.8	Kademeli	1.9	0.5	1.3	2	4.343
N-12	365	"	"	1.3	3.211	"	"	1.4	2.450	"	"	"	1.4	2.1	4.925
N-14	442	"	"	1.5	4.275	"	"	1.5	2.812	"	"	"	1.5	2.1	5.544
N-16	542	"	"	1.6	4.864	"	"	1.6	3.2	"	"	"	1.7	2.4	6.898
N-18	633	"	"	1.7	5.491	"	"	1.8	4.05	"	"	"	1.8	2.5	7.631
N-20	739	"	"	1.8	6.156	"	"	1.8	"	"	"	"	1.9	2.6	8.403
Z-10 120°	338	"	"	1.3	3.211	"	"	1.4	2.45	"	"	"	1.4	2.1	4.925
Z-12 130°	420	"	"	1.5	4.275	"	"	1.5	2.812	"	"	"	1.6	2.3	6.202
Z-14 120°	510	"	"	1.6	4.864	"	"	1.7	3.612	"	"	"	1.7	2.4	6.898
Z-16 125°	600	"	"	1.8	6.156	"	"	1.8	4.05	"	"	"	1.9	2.6	8.403
Z-18 120°	709	"	"	1.9	6.99	"	"	2	5	"	"	"	2	2.7	9.212
Z-20 120°	809	"	"	2	7.5	"	"	2	6	"	"	"	2.2	2.9	10.945

$\alpha = 90^\circ$ İÇİN (Z) DİREĞİNİN TEMEL EBATLARI

	NORMAL ARAZİ TEMELİ				KAYALIK ARAZİ TEMELİ				ÇURUK ARAZİ TEMELİ					
	TİPİ	t (m)	a (m)	Beton m ³	TİPİ	t (m)	a (m)	Beton m ³	TİPİ	l (m)	t ₁	a (m)	b (m)	Beton m ³
Z-10	BLOK	1.9	1.4	3.724	BLOK	1.25	1.5	2.812	pademel	1.9	0.5	1.5	2.2	5.544
Z-12	"	"	1.6	4.654	"	"	1.6	3.2	"	"	"	1.7	2.4	6.838
Z-14	"	"	1.7	5.491	"	"	1.8	4.05	"	"	"	1.9	2.6	8.403
Z-16	"	"	1.9	6.858	"	1.5	2	6	"	"	"	2	2.7	9.212
Z-18	"	"	2	7.6	"	"	2	6	"	"	"	2.2	2.9	10.943
Z-20	"	"	2.1	8.379	"	"	2	6	"	"	"	2.3	3	11.968

(D), (N) ve (Z) DİREKLERİNİN KAREKTERİSTİKLERİ

	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)	350	350	350	350	350	350	350	350	350	350	350	350
DİP GENİŞLİĞİ (mm)	850	950	1050	1150	1250	1350	1000	1130	1260	1390	1520	1650
TAM BOY - H (m)	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)	400	400	400	400	400	400
DİP GENİŞLİĞİ (mm)	1100	1240	1380	1520	1660	1800
TAM BOY - H (m)	10	12	14	16	18	20

III. CÜ BÖLGEDE DİREKLER ARASINDA 68m. KOT FARKINDA KULLANILABİLİR

KÖŞEDE TAŞIYICI İZOLATÖRLERİN KULLANILISLARI

15 kV TAŞIYICI $\alpha = 169^\circ$

15 kV DURURUCU $\alpha = 161^\circ$

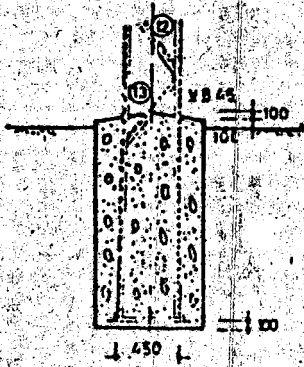
34.5kV TAŞIYICI $\alpha = 164^\circ$

34.5kV DURURUCU $\alpha = 155^\circ$

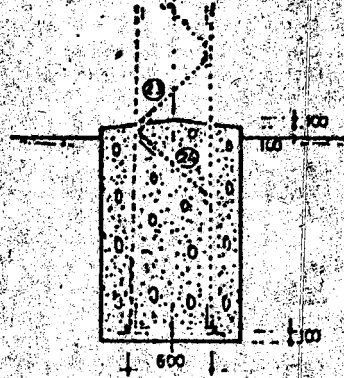
TAŞIYICI DİREKLERİN TEMELE GİREN KISIMLARI

NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP KULASINDA ALINACAKTIR.

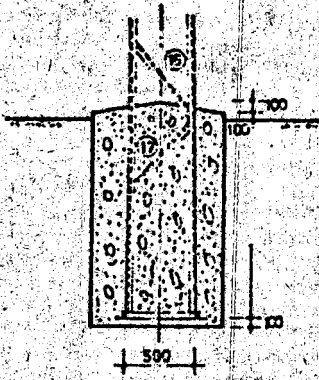
T-10 DİREĞİ



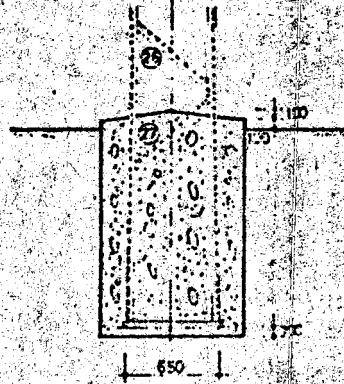
T-16 DİREĞİ



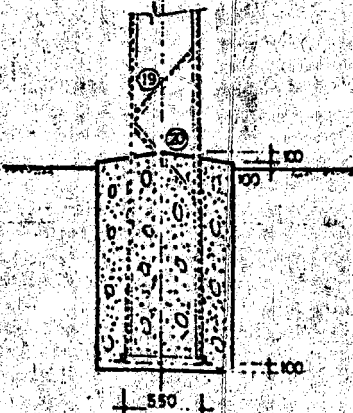
T-12 DİREĞİ



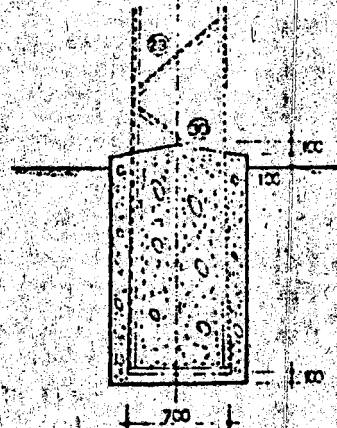
T-18 DİREĞİ



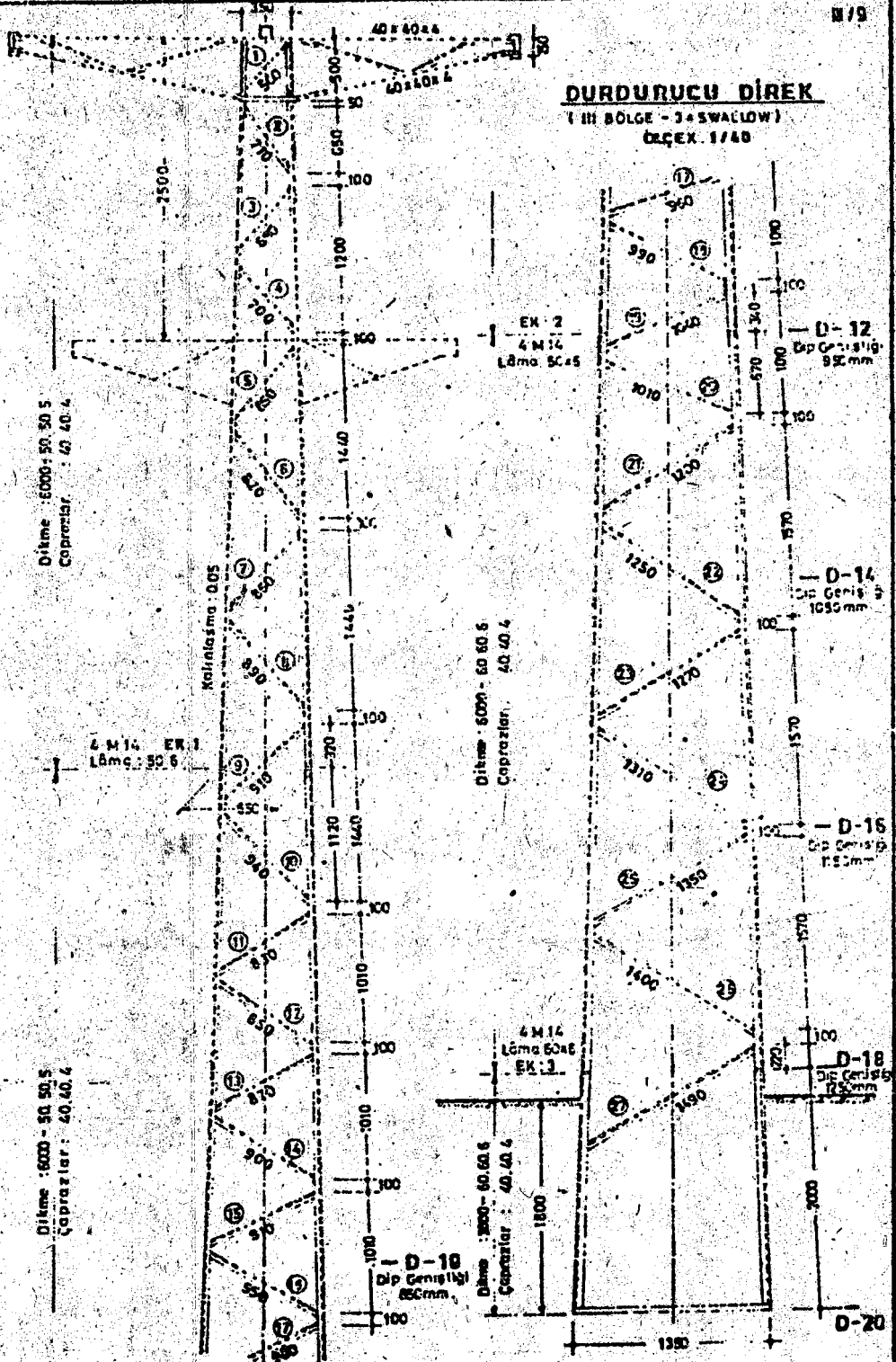
T-14 DİREĞİ



T-20 DİREĞİ



DURDURUCU DİREK
 (III BÖLGE - 3+ SWALLOW)
 ÇRÇEX. 1/40



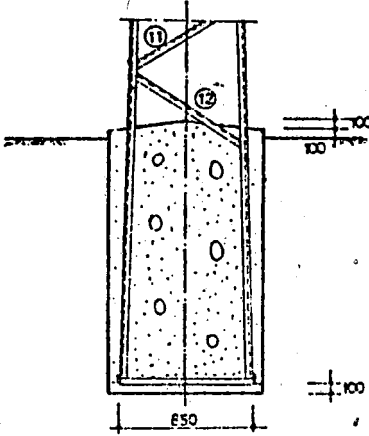
NOT: D-14 DİREĞİNİN SON İKİ METRELİK DİKME 50 50.5 OLACAKTIR.

11/10

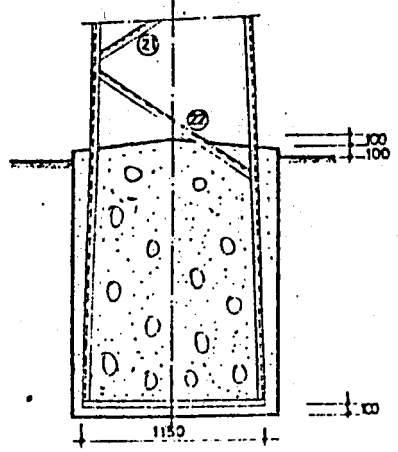
DURDURUCU DİREKLERİN TEMELE GİREN KISIMLARI

NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜLÂSASINDAN ALINACAKTIR.

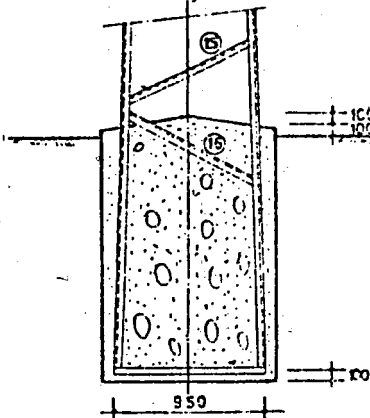
D-10 DİREĞİ



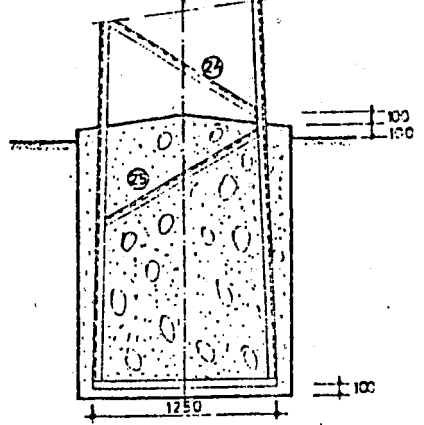
D-16 DİREĞİ



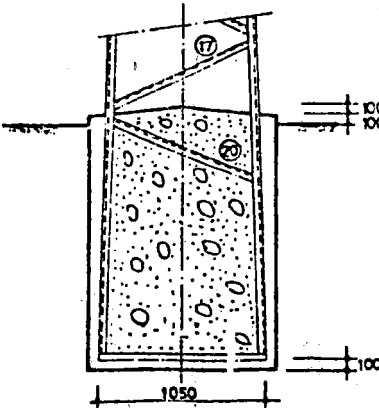
D-12 DİREĞİ



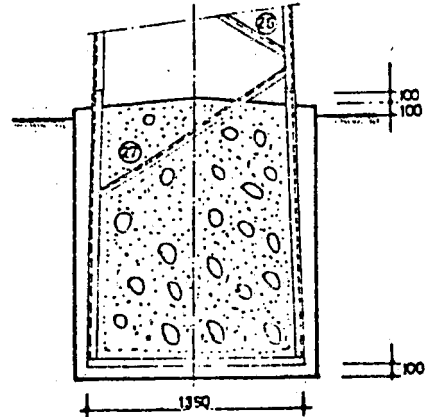
D-18 DİREĞİ



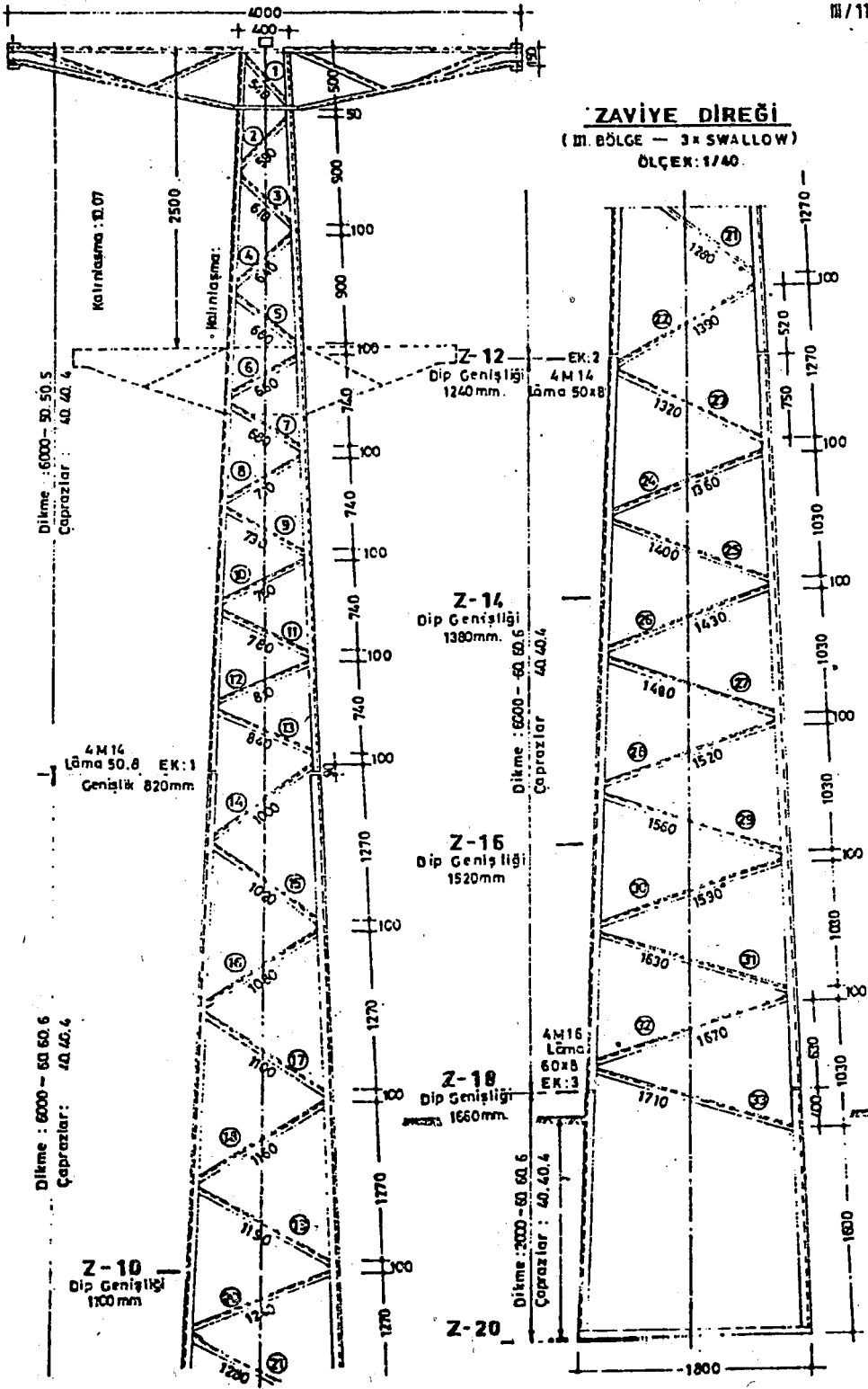
D-14 DİREĞİ



D-20 DİREĞİ



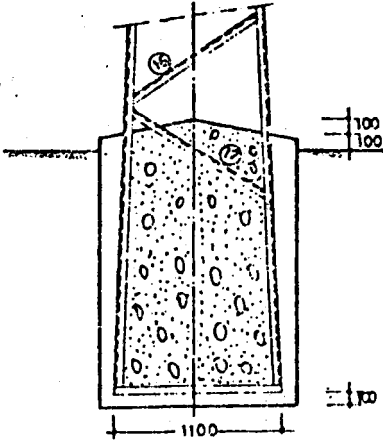
ZAVİYE DİREĞİ
(M. BÖLGE - 3x SWALLOW)
ÖLÇEK: 1/40.



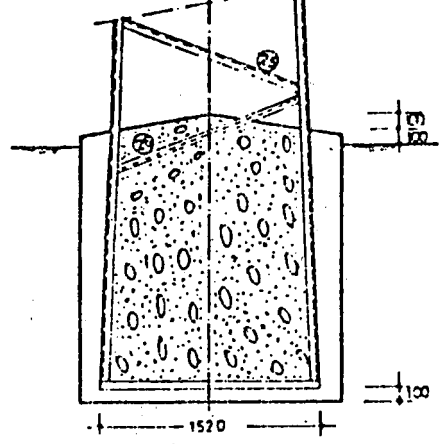
ZAVİYE DİREKLERİNİN TEMELE GİREN KISIMLARI

NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜKÜMSÜNDEN ALINACAKTIR.

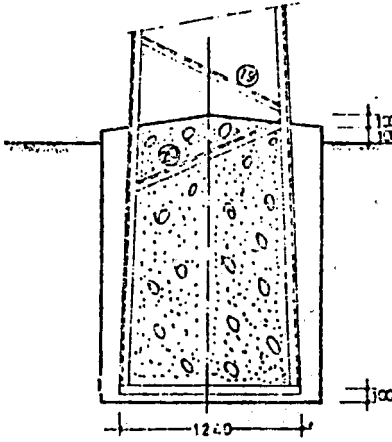
Z-10 DİREĞİ



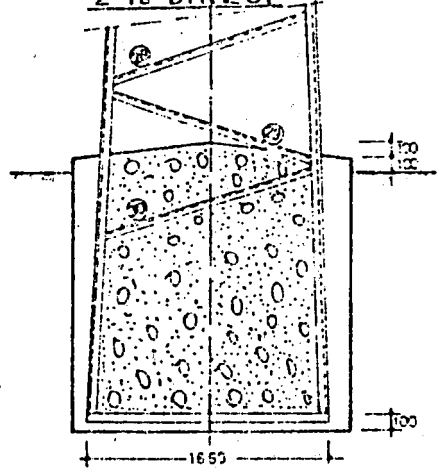
Z-16 DİREĞİ



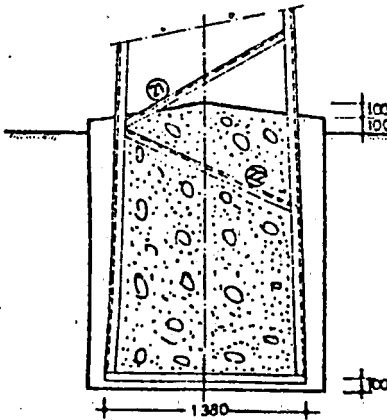
Z-12 DİREĞİ



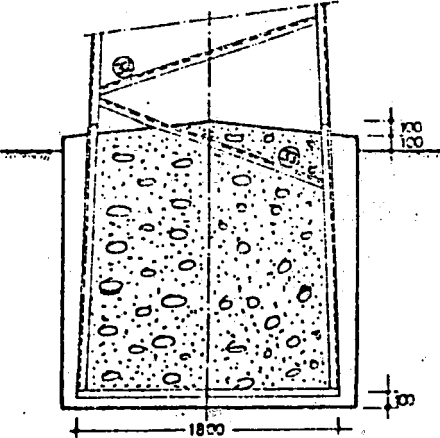
Z-18 DİREĞİ



Z-14 DİREĞİ

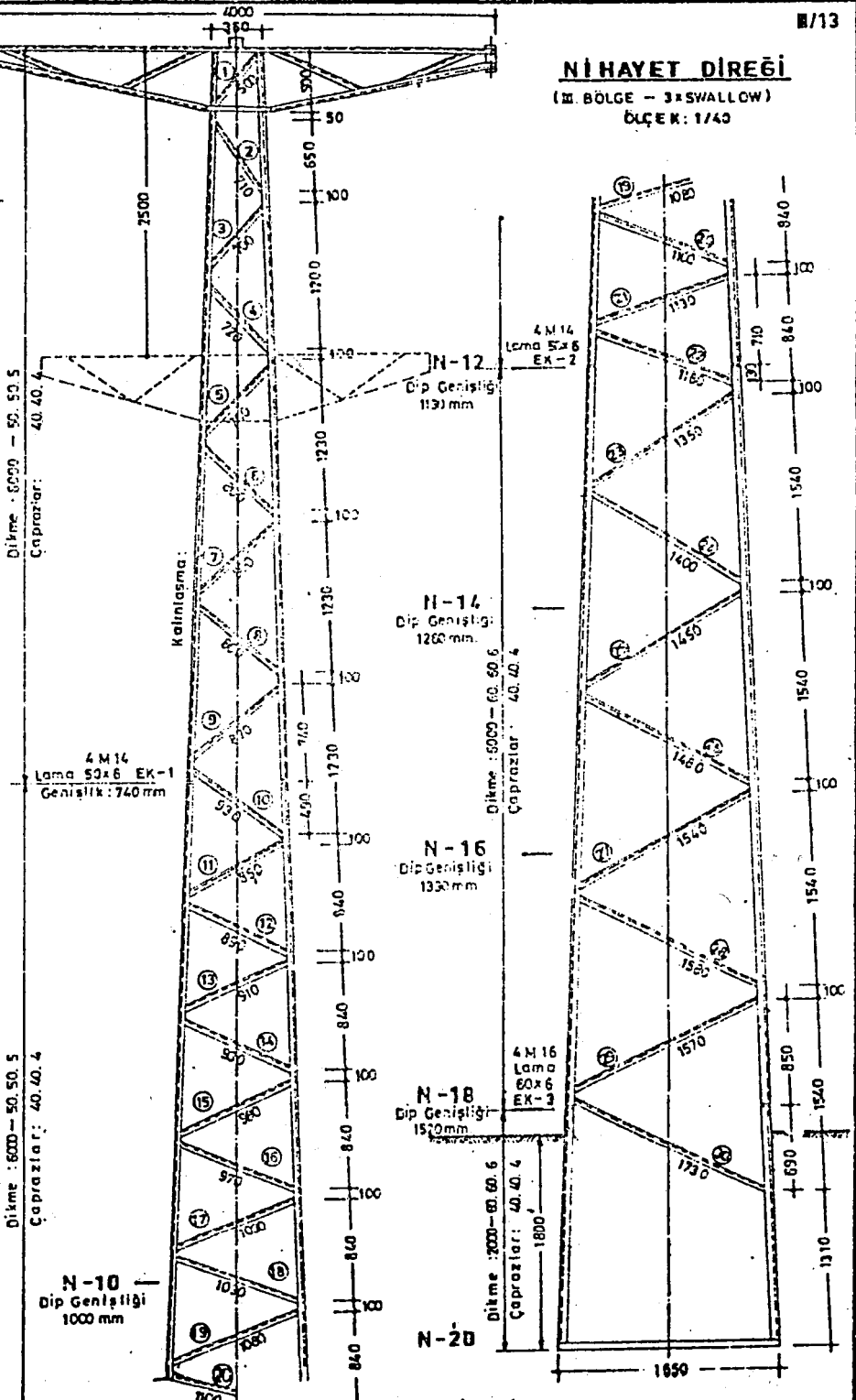


Z-20 DİREĞİ



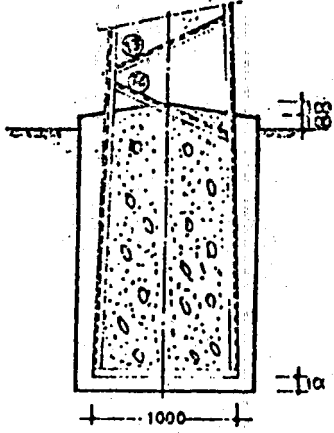
NİHAyet DİREĞİ

(II BÖLGE - 3xSWALLOW)
ÖLÇEK: 1/40

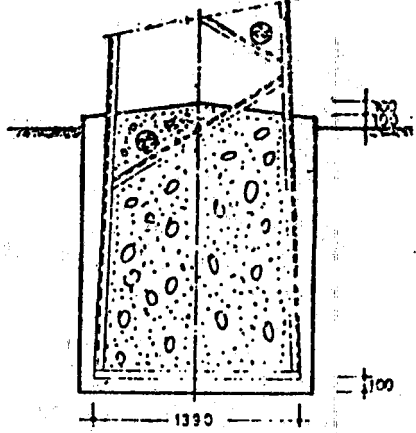


NOT: N-14 DİREĐİN İKİ METRELİK DİKMEŐİ 50.50.5 OLACAKTIR.

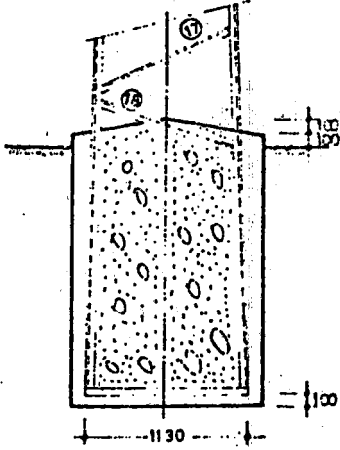
N-10 DİREĞİ



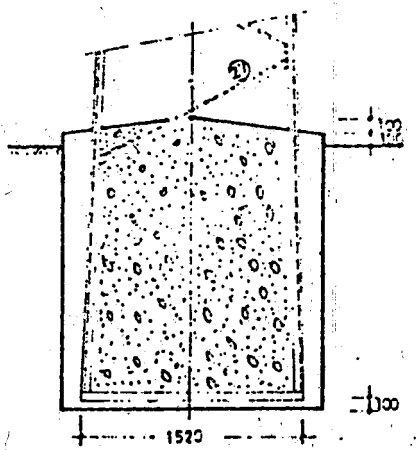
N-16 DİREĞİ



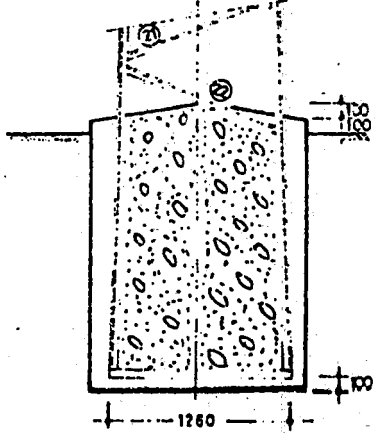
N-12 DİREĞİ



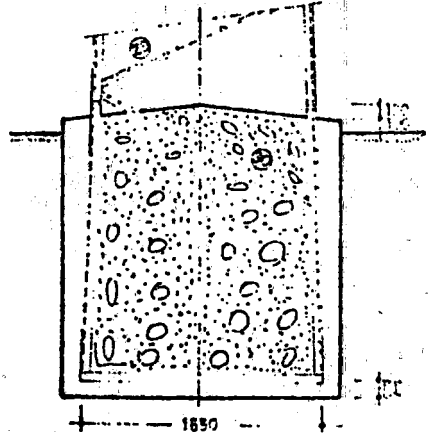
N-18 DİREĞİ



N-14 DİREĞİ



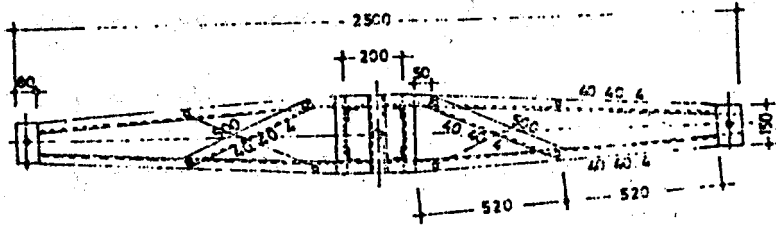
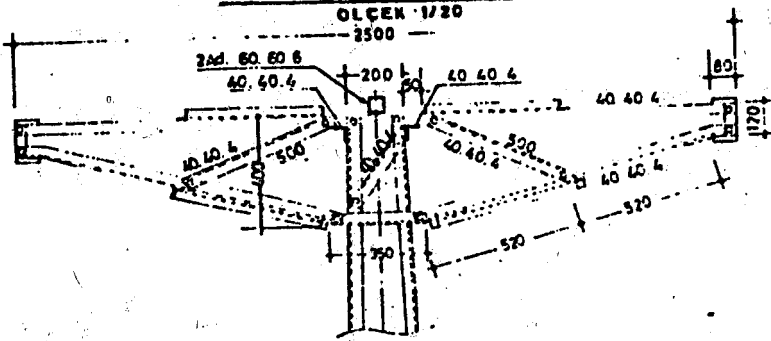
N-20 DİREĞİ



- NİHAYET DİREKLERİNİN TEMELE GİREN KISIMLARI

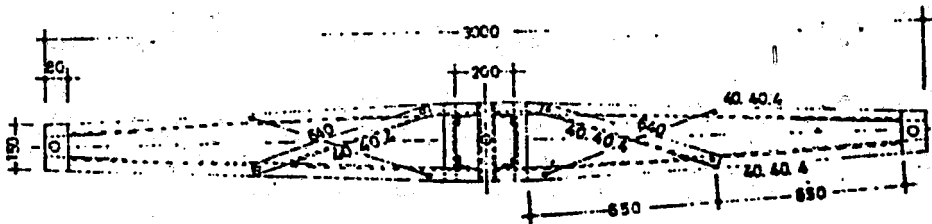
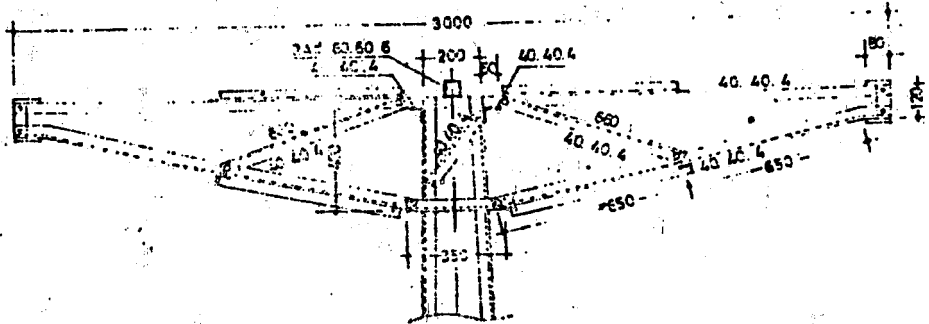
TASİYİCİ DİREK TRAVERSİLERİ

T-250 TİPİ TRAVERS

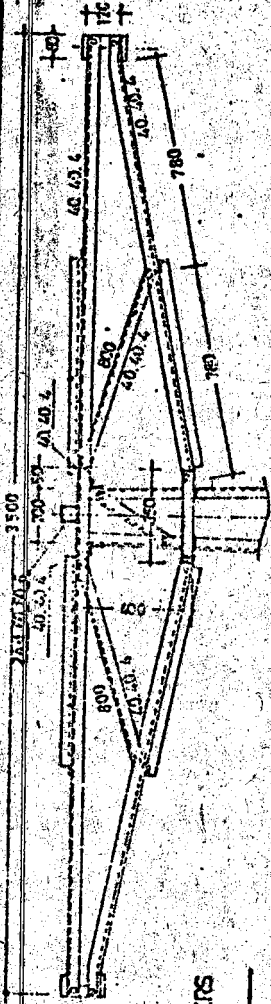


T-300 TİPİ TRAVERS

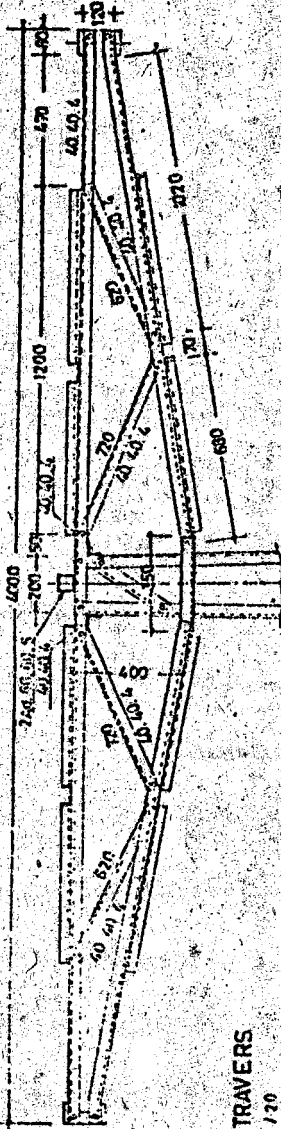
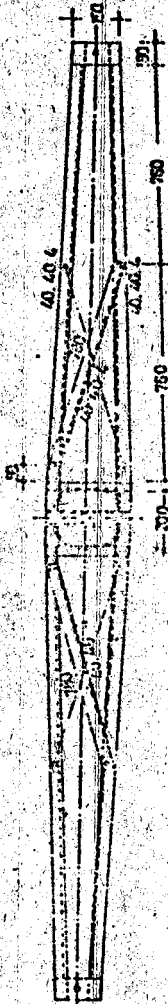
NOT: TRAVERSLERE EĞİM VERMEDEN DÜZ OLARAK YAPILABİLİR.



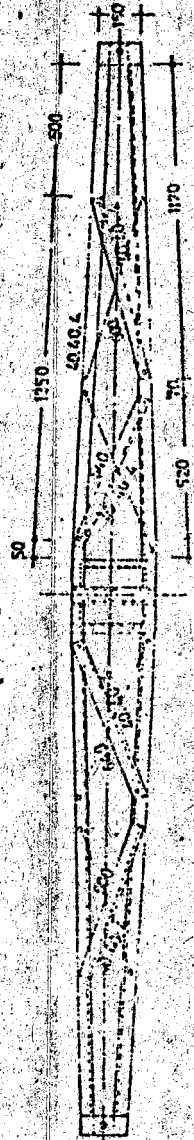
NOT: TRAVERSLERE EĞİM VERMEDEN DÜZ OLARAK YAPILABİLİR.

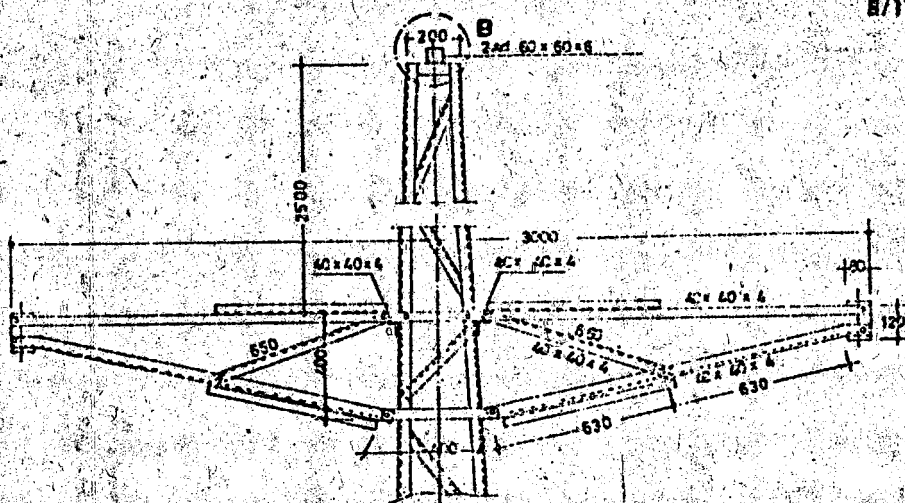


T-350 TİPİ TRAVERS
ÖLÇEK: 1/30

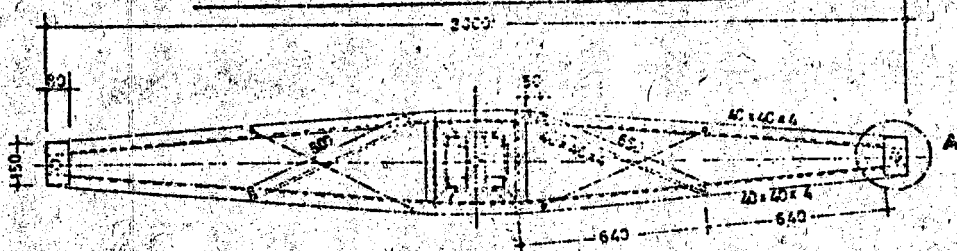


T-400 TİPİ TRAVERS
ÖLÇEK: 1/30

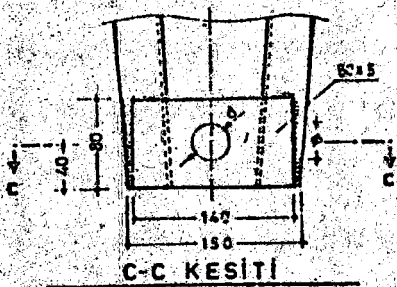




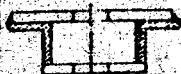
TÜ-300 TİPİ TRAVERS (ÜÇGEN TERTİP) ÖLÇEK:1/20



TASIYICI DİREKLERİN İZOLATÖR İRİBATLARI

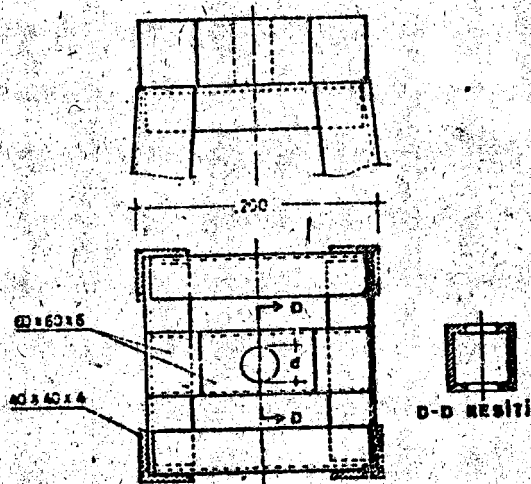


C-C KESİTİ



A TAFSİLATI ÖLÇEK:1/5

15 N. ta. $d = 24 \text{ mm.}$
30 N. ta. $d = 28 \text{ mm.}$

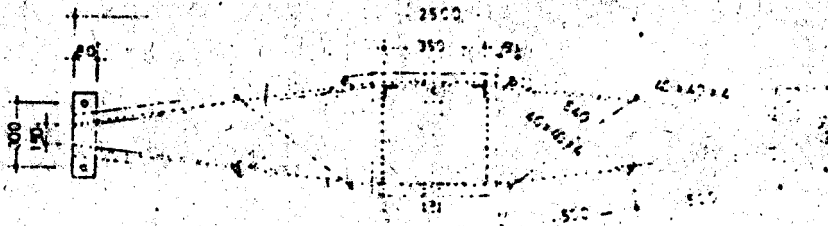
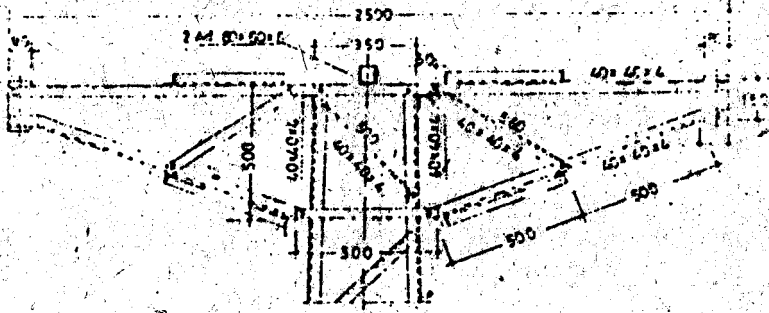


B-TAFSİLATI ÖLÇEK:1/5

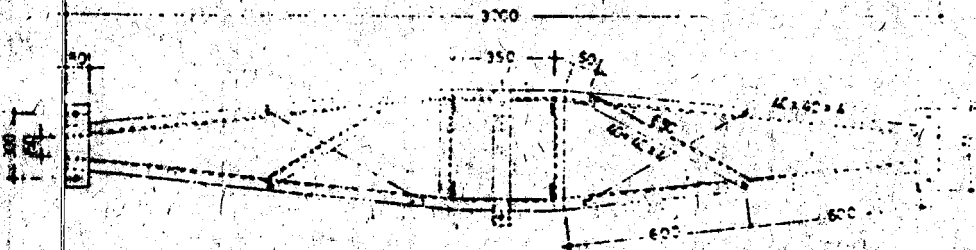
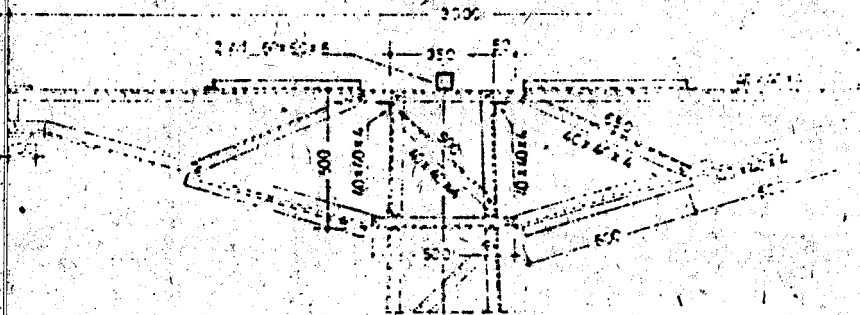
D-D KESİTİ

14/18

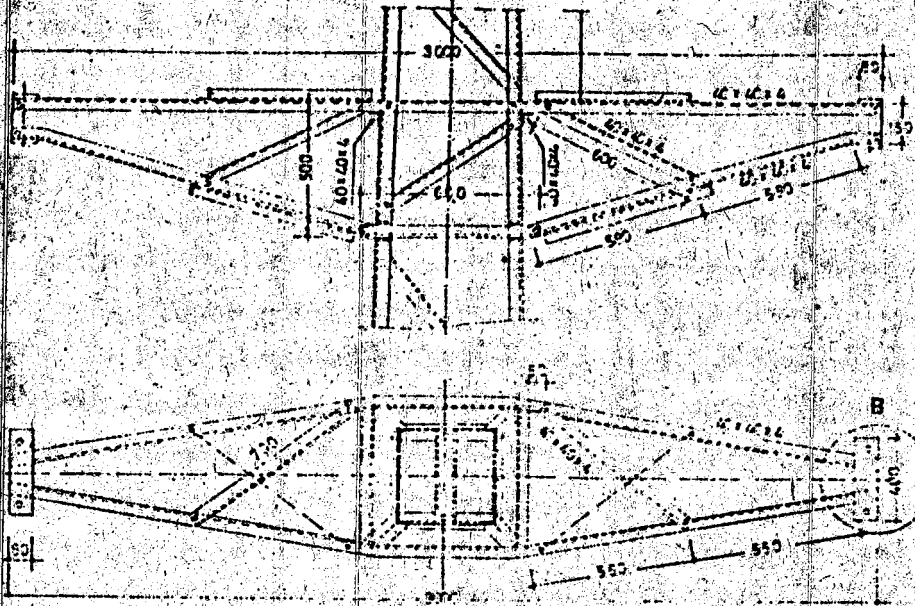
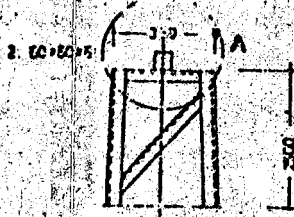
DÜZDURUCU DİREK TRAVERSİLERİ
 D-250 TİPİ TRAVERS (MESNET İZOLATOR İÇİN)



D-300 TİPİ TRAVERS (MESNET İZOLATOR İÇİN)
 ÖLÇER 1/200



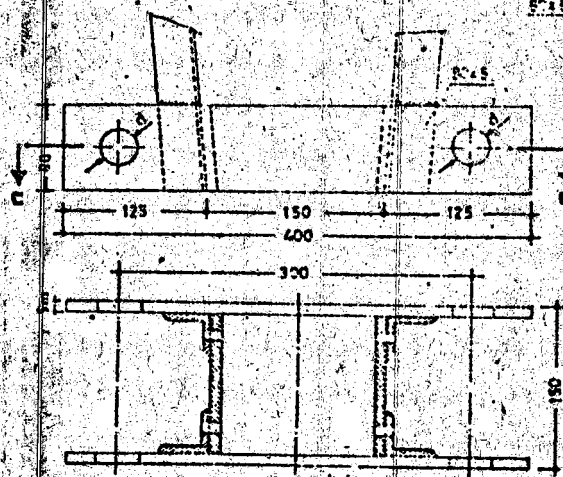
III/20



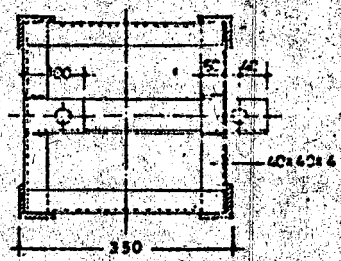
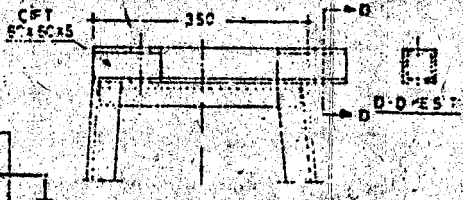
DU-300 TİPİ TRAVERS (ÜÇGEN İZERTİP)

(MESNET 170 AĞIR İÇİN) ÖLÇER: 1/20

15 kW için $d = 25$ mm
35 kW için $d = 34$ mm



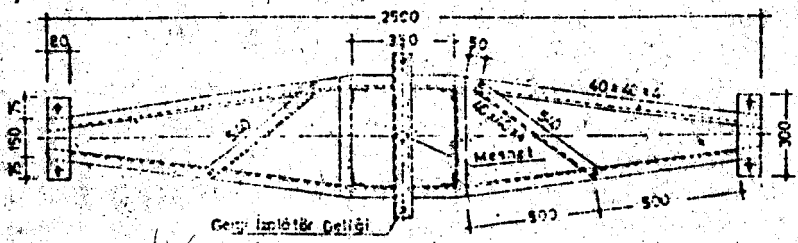
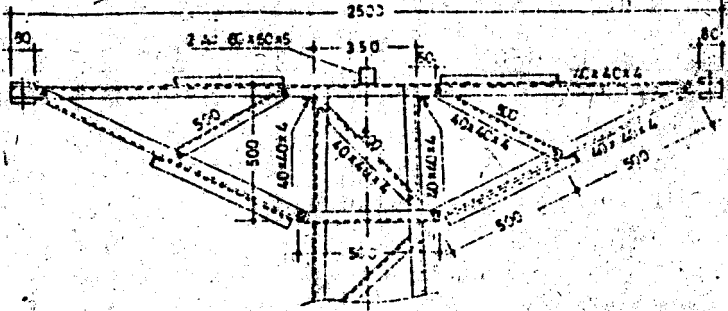
C-C KESİTİ
B TAFSİLATI
ÖLÇER: 1/5



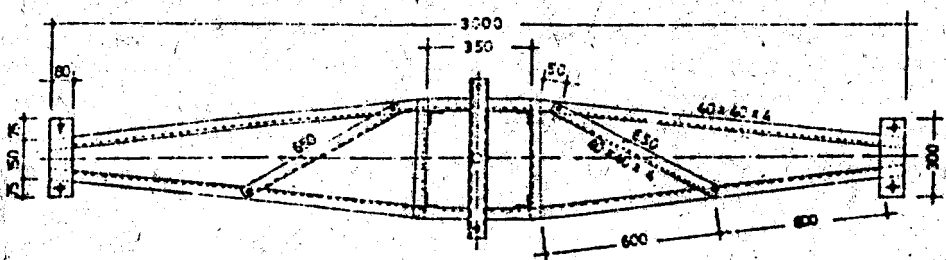
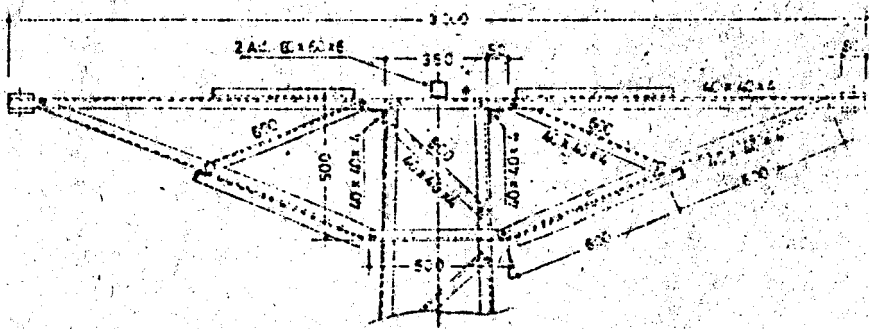
A TAFSİLATI
ÖLÇER: 1/10

D-250 TİPİ TRAVERS (GERGİ İZOLATOR İÇİN)

N/21



D-300 TİPİ TRAVERS (GERGİ İZOLATORU İÇİN)



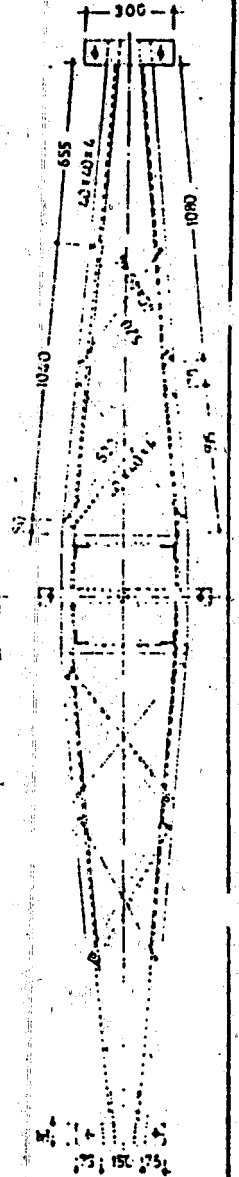
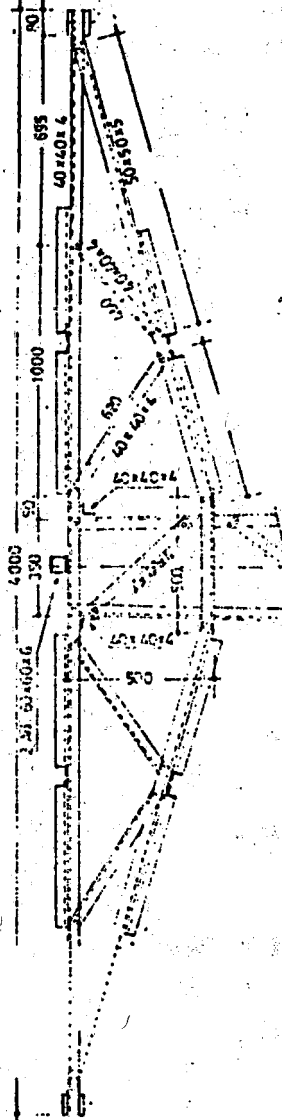
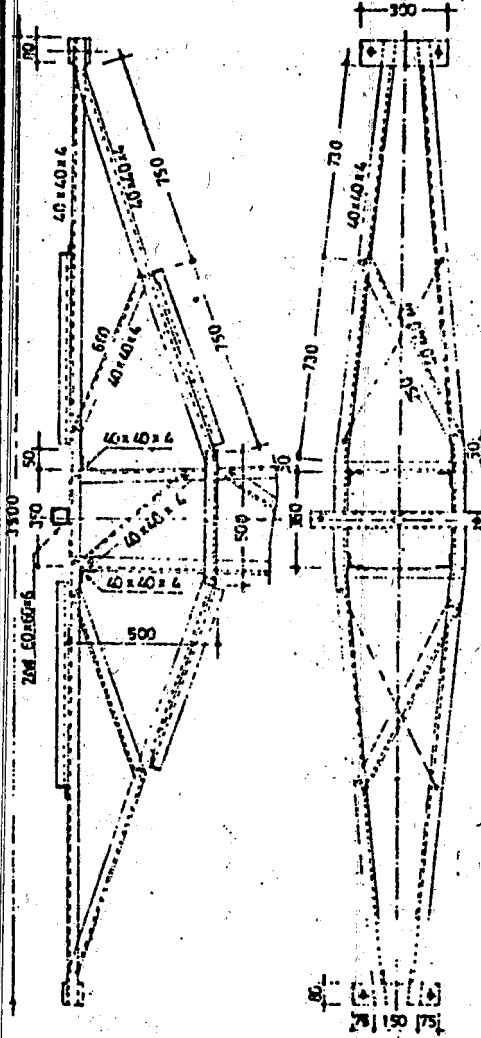
ÖLÇEK: 1/20

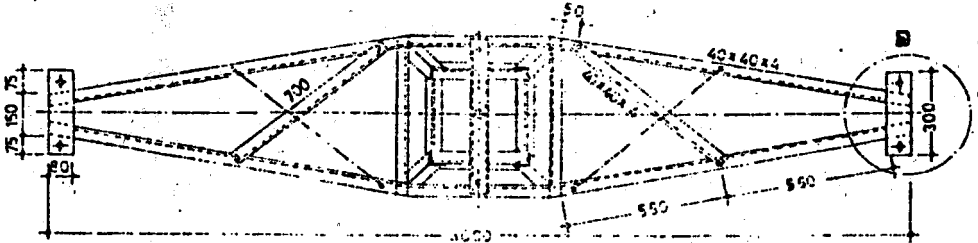
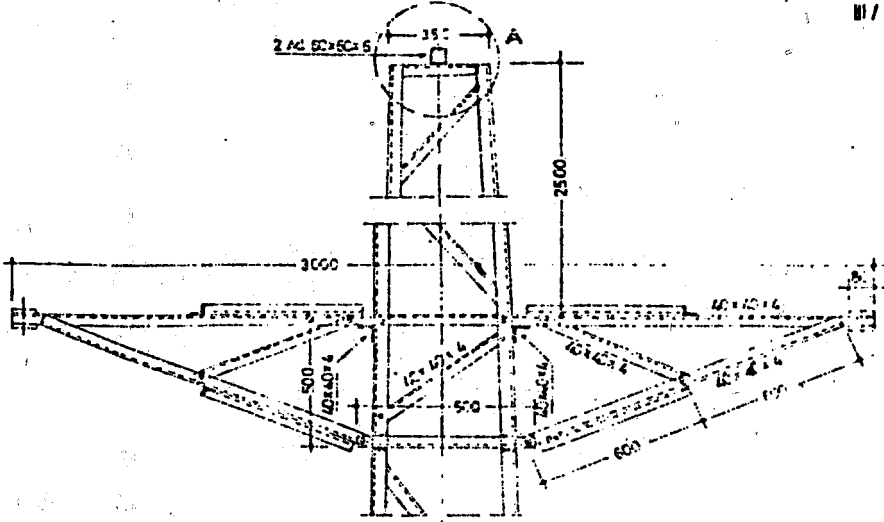
D-350 TİPİ TRAVERS

ÖLÇER: 1/20

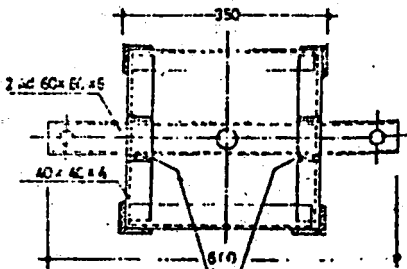
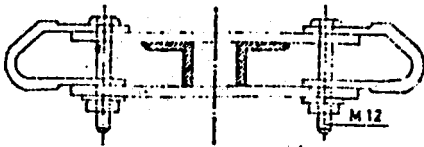
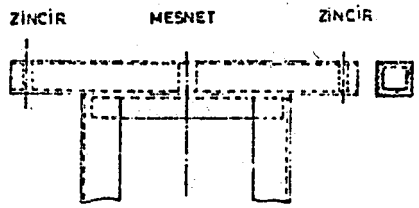
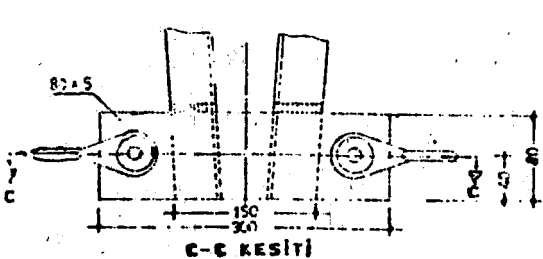
D-400 TİPİ TRAVERS

ÖLÇER: 1/20





DÜ-300 TİPİ TRAVERS (ÜÇGEN TERTİP)
(Gergi İzolatör için) ÖLÇEK: 1/20

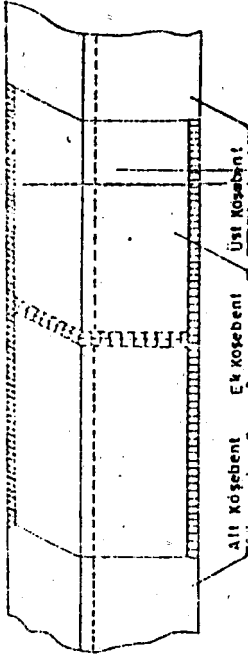


Not : B Yafallatındaki gergi takımı A Tafaletindeki gergi takımının aynı olduğundan ayrıca çizilmemiştir.

Bu İrtibatlar M 12 İR civata ilede yapılabilir.

DİREKLERİN KAYNAKLA İRTİBAT DETAYI

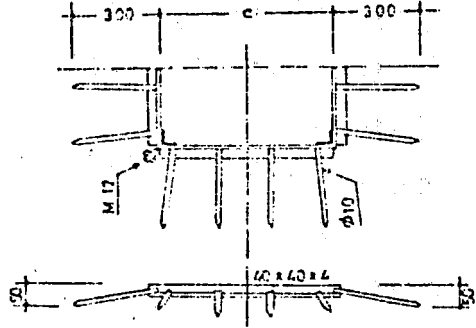
ÖLÇEK: 1/25



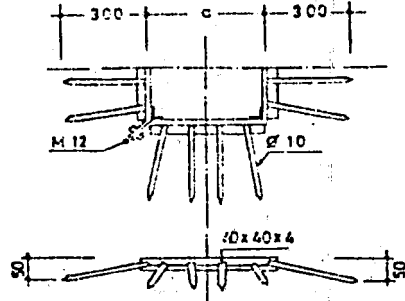
Üst Köşebent (mm)	Altı Köşebent (mm)	Ek Köşebentli (mm)	L (mm)	Kaynak kalınlığı (mm)
50x50x5	50x50x5	50x50x5	200	3
50x50x5	60x60x6	50x50x5	250	3
60x60x6	60x60x6	60x60x6	250	4

KORKULUK DETAYI

DURDURUCU VE NİHAyet DİREKLERİ İÇİN ÖLÇEK 1/20

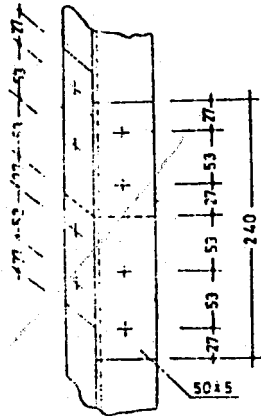


TAŞIYICI DİREKLER İÇİN

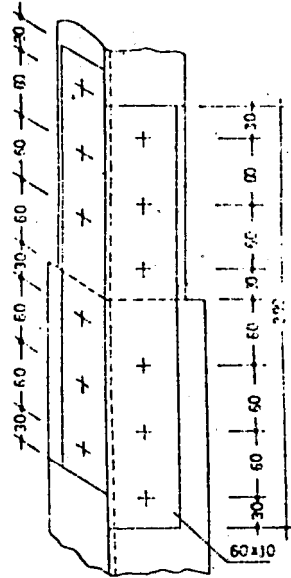


Not: Korkuluklar yerden 5.5m mesafede monte edileceğine göre (a) mesafesi alınacaktır.

BİDKEMELERİN İRTİBATI (CIVATALI) ÖLÇEK: 1/5



4xM12 ve 4xM14
İÇİN EK YERİ



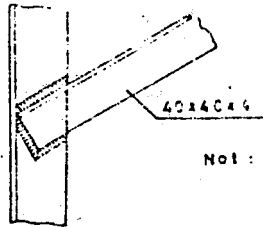
6xM14 İÇİN EK YERİ

BİR ÇAPRAZIN BİR DİKMEYE İRTİBATI ÖLÇEK: 1/5

KAYNAK KALINLIĞI: 3mm.

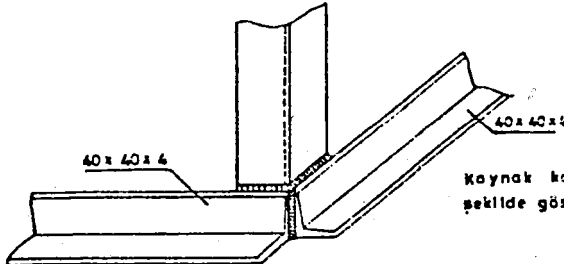
KAYNAK BOYU

- 1- Tesisyicilerde : 80 mm.
- 2- Durdurucularda : 100 mm.
- 3- Nihayetlerde : 100 mm.
- 4- Zaviyelerde : 100 mm.



Not: Ek yerine gelen çaprazlar dikme irtibat civatalarından bir tanesiyle irtibatlanacaktır.

TABAN KÖŞEBENTİ İRTİBATI ÖLÇEK: 1/5



Kaynak kalınlığı 3mm. Kaynak boyu şekilde gösterildiği uzunlukta olacaktır.

III CÜ BÖLGE ÖREK AĞIRLIK ANALİZLERİ

	kg/m	T-10		T-12		T-14		T-16		T-18		T-20		
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg	
DİKMELER	50x50x5	3.77	40	151	48	181	56	211	64	241	72	272	72	272
	50x50x7	6.56											8	53
	65x65x7	6.83												
	70x70x7	7.38												
ÇAPRAZLAR	40x40x4	2.47	37	90	44	107	56	136	66	160	76	184	85	206
	40x40x5	2.97												
	50x50x5	3.77												
KORKULUK	40x40x4	2.42	11	3	12	3	130	3	14	4	15	4	15	4
	φ10	0.617	4.9	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	2.5	10
	60x60x6	5.42												
	60x6	2.84												
	70x6	4.42												
	80x8	5.05												
	80x10	6.32												
TOPLAM			256		297		359		414		469		548	
KAYNAK %3			8		9		11		12		14		16	
GENEL TOPLAM			256		305		370		426		483		564	

	kg/m	D-10		D-12		D-14		D-16		D-18		D-20		
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg	
DİKMELER	50x50x5	3.77	40	151	48	181	56	211	64	241	72	272	72	272
	50x50x7	6.42											32	134
	65x65x7	6.83												
	70x70x7	7.38												
ÇAPRAZLAR	40x40x4	2.47	45	103	55	141	74	179	85	206	101	246	113	274
	40x40x5	2.97												
	50x50x5	3.77												
KORKULUK	40x40x4	2.42	2.1	5	2.4	6	2.6	7	3.2	8	3.5	9	3.8	9
	φ10	0.617	4.3	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	1.6	6
	60x60x6	5.42												
	60x6	2.84												
	70x6	4.42												
	80x8	5.05												
	80x10	6.32												
TOPLAM			271		334		406		491		574		651	
KAYNAK %3			8		10		12		15		17		20	
GENEL TOPLAM			279		344		418		506		591		671	

III. CÜ BÖLGE DİREK AĞIRLIK ANALİZLERİ

III/27

	kg/m	N-10		N-12		N-14		N-16		N-18		N-20	
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg
DİREKLER 50 x 50 x 5 60 x 60 x 6 65 x 65 x 7 70 x 70 x 7	3.77	40	151	48	181	56	211	48	181	48	181	48	181
	5.42							16	81	24	130	32	174
	6.83												
	7.38												
ÇAPRAZLAR 40 x 40 x 4 40 x 40 x 5 50 x 50 x 5	2.42	50	121	67	152	86	208	102	247	120	291	140	335
	2.97												
	3.77												
KORKULUK 40 x 40 x 4 φ 10	2.42	2.2	6	2.5	6	2.9	7	3.3	8	3.6	9	4	10
	0.617	4.8	3		3		3		3		3		3
EK 50 x 50 x 5 60 x 60 x 6 60 x 6 70 x 8 80 x 8 80 x 10	3.77	0.8	3	0.8	3	1.6	6	1.6	6	1.6	6	1.6	6
	5.42											0.8	4
	2.84												
	4.42												
	5.05												
	6.32												
TOPLAM		284		355		435		526		620		717	
KAYNAK -%3		9		11		13		16		19		22	
GENEL TOPLAM		293		366		448		542		639		739	

	kg/m	Z-10		Z-12		Z-14		Z-16		Z-18		Z-20	
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg
DİREKLER 50 x 50 x 5 60 x 60 x 6 65 x 65 x 7 70 x 70 x 7	3.77	24	91	24	91	24	91	24	91	24	91	24	91
	5.42	16	87	24	130	32	173	40	217	48	260	56	304
	6.83												
	7.38												
ÇAPRAZLAR 40 x 40 x 4 40 x 40 x 5 50 x 50 x 5	2.42	57	138	72	173	88	213	105	254	130	315	150	368
	2.97												
	3.77												
KORKULUK 40 x 40 x 4 φ 10	2.42	2.5	6	3	8	3.5	9	4	10	4.4	11	6	12
	0.517	4.6	3		3		3		3		3		3
EK 50 x 50 x 5 50 x 50 x 5 60 x 6 70 x 8 80 x 8 80 x 10	3.77	0.8	3	0.8	3	1.6	6	0.8	3	0.8	3	0.8	3
	5.42							0.8	5	0.8	5	1.6	9
	2.84												
	4.42												
	5.05												
	6.32												
TOPLAM		328		405		495		583		688		785	
KAYNAK -%3		10		12		15		18		21		24	
GENEL TOPLAM		338		420		510		601		709		809	

III/28

TRAVERS AĞIRLIK ANALİZİ

	kg/m	T-250		T-300		T-350		T-400		D-250		D-300	
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg
40 x 40 x 4	2.48	14	34	17	41	21	51	25	68	15	36	18	44
50 x 50 x 5	3.77												
60 x 60 x 6	5.42	0.4	2		2		2		2		5		5
LAMA 80 x 10	6.32	0.6	4		4		4		4		10		10
LAMA 50 x 5	1.95	0.48	1		1		1		1		1		1
TOPLAM			41		48		58		70		52		60
CIYATA KAYNAK %3			1		1		2		2		2		2
GENEL TOPLAM			42		49		60		72		54		62

	kg/m	D-350		D-400		D-250		D-300		D-350		D-400	
		m	kg	m	kg	m	kg	m	kg	m	kg	m	kg
40 x 40 x 4	2.42	20	49	25	63		35		44		49		63
50 x 50 x 5	3.77												
60 x 60 x 6	5.42		5		5		5		5		5		5
LAMA 80 x 10	6.32		10		10		8		8		8		8
LAMA 50 x 5	1.95	0.5	1		1								
TOPLAM			55		78		49		57		62		76
CIYATA KAYNAK %3			2		2		2		2		2		3
GENEL TOPLAM			57		80		51		59		64		79

III. BÖLGE 3xSWALLOW (AWG-3)

$$\rho = 11 \text{ kg/mm}^2$$

ÖLÇEK : 1/400 – 1/ 2000

