



1954

**TMMOB
ELEKTRİK
MÜHENDİSLERİ
ODASI**

T.P. 2. 2. 4.

IV. BUZ YÜKÜ BÖLGESİ

3 x Swallow (AWG. 3) 15 - 34,5 kV

DEMİR DİREK RESİMLERİ ve

HESAP HÜLÂSASI

DEĞİŞİKLİK

TARİH

İMZA

IV.BUZ YÜKÜ BÖLGESİ 3xSwallow (AWG.3)
15 - 34,5 kV DEMİR DİREK
RESİMLERİ ve HESAP HÜLÂSASI

ÖLÇEK: 1/5 - 1/10
1/20 - 1/40

NO.LU
PLÂN İPTAL EDİLDİ

NO.LU
PLÂN İPTAL EDİLDİ

PLÂN NO:

6/97

ARŞİV KAYIT NO:

PROJEYİ YAPANIN DİP.
NO. ÜNVANI ADI SOYADI

İMZA

İMZA
TARİHİ

ELK.YÜK. MÜH.
HÜSEYİN BODUR
ODA NO: 43
DİPL. NO: 193

10. 7. 1990

İLLER BANKASI
ENERJİ DAİRESİ
BAŞKANLIĞI

ÇİZEN : İLK NUR ÜLGEN

L. Ü. Ü. Ü.

IV. BUZ YÜKÜ BÖLGESİ - 3x SWALLOW - DEMİR DİREK PROJESİ AÇIKLAMA RAPORU

- 1 - IV Cİ BUZ YÜKÜ BÖLGESİ İÇİN YAPILAN HESAPLARIN ÖZETİ DİREK RESİMLERİNİN BAŞINDA VERİLMİŞTİR. BÖYLECE UZUN HESAPLARI TETKİK ETMEDEN PROFİLİ İŞLEMELİK VE KEŞFİ YAPMAK MÜMKÜN OLACAKTIR.
- 2 - BİR ENERJİ NAKİL HATTI DİREK ARASI MESAFESİ NE KADAR FAZLA OLURSA O KADAR EKONOMİK OLUR ELEKTRİK D.D.Y ATLAMASI İÇİN DE YÜKSEK DİREĞE İHTİYAC VARDIR. BU BAKIMDAN 20 m. BOYA KADAR DİREK HESAP EDİLMİŞTİR.
- 3 - TAŞIYICI VE DURDURUCU TRAVERSİLER İÇİN DÜZ TERTİP DÖRT ÜÇGEN TERTİP İKİ TRAVERS HESAP EDİLMİŞTİR. TAŞIYICI TRAVERSİLER MESNET İZOLATÖRLÜ OLACAKTIR. DURDURUCU TRAVERSİLER İÇİN İSTENİLDİĞİNDE MESNET VE İSTENİLDİĞİNDE ZİNCİR İZOLÂTÖR KULLANILABİLECEKTİR. İKİ TİP DURDURUCU TRAVERS HESABI YAPILMIŞTIR.
- 4 - NORMAL TAŞIYICI DİREKLERİN RÜZGAR MENZİLLERİ 200 m. ALINMIŞTIR. ANCAK BU DİREKLER 200 m MENZİLDEN DAHA KÜÇÜK ARALIKLARDA KULLANILDIĞI TAKDİRDE DAHA KÜÇÜK TEMEL ALINACAK ŞEKİLDE HESAP YAPILMIŞTIR.
- 5 - DURDURUCU DİREĞİN K.D. OLARAK KULLANILMA AÇISI - DERECE
NİHAİYET DİREĞİN K.D. " " " 154 DERECE 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 KULLANILMAKTADIR. KÖŞEDE TAŞIYICI DİREĞİN RÜZGAR MENZİLİ HER DERECE AÇI İÇİN 1,22 m. KISALMAKTADIR.
- 7 - GEREK TAŞIYICI TRAVERSİLERİN VE GEREKSE DURDURUCU TRAVERSİLERİNİN 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 ÖKKAT EDİLECEKTİR.

SAYGILARIMLA
ELK.Y. MÜH.
HÜSEYİN BODUR
ODA NO: 343
DİPL. NO: 2193

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

TAŞIYICI DİREKLER : DİREKLERİN KARAKTERİSTİKLERİ AŞAĞIDA VERİLMİŞTİR.

	a _w (m.)	a _y (m.)	K.T. (x) α°	(h) ALT İLET. KEN TOP. MESAFESİ (m.)	PROFİLE 1/400 mm.	AĞIRLIK kg.	NORMAL ARAZİ TEMELİ			BETON HACİM V (m ³)
							TİPİ	DERİNLİK m	GENİŞLİK (m.)	
T_10	401	200	162° 20'	8.75	22	258	BLOK	1.6	aw = 252 m için 0.9 aw = 200 m için 0.8 aw = 139 m için 0.7	1.201 1.344 1.029
T_12	316	200	165°	10.75	27	306	"	"	aw = 394 m için 1.1 aw = 216 " " 1 aw = 165 " " 0.9 aw = 117 " " 0.8	1.936 2.1 1.701 1.344
T_14	261	200	165° 20'	12.75	32	370	"	"	aw = 364 " " 1.2 aw = 291 " " 1.1 aw = 140 " " 1	2.304 1.936 2.1
T_16	261	200	"	14.75	37	426	"	"	aw = 272 m için 1.2 aw = 200 " " 1.1 aw = 140 " " 1.3	2.3 1.936 3.549
T_18	177	200	"	16.75	42	473	"	"	aw = 327 m için 1.4 aw = 200 " " 1.2 aw = 140 " " 1.1	4.112 2.304 1.936
T_20	177	200	"	18.75	47	564	"	"	aw = 200 m için 1.4 aw = 196 " " 1.3 aw = 318 " " 1.5	4.116 3.549 4.725

(x) KÖŞE TAŞIYICI (KT) HALİNDE a_w DEĞERİ HER BİR DERECE İÇİN 1,22 m. KISALIR.

(xx) - h = H - 1.5 TEMEL + 0.25 (İZOLATÖR BOYU) (xxx) KAYALIK TEMELDE 1mm. ARTIRILIR.

ÇÜRÜK ARAZİDE 1mm. AZALTILIR. ÜÇGEN TERTİBE 6,25 mm. AZALTILIR. KÖŞEDE TAŞIYICI

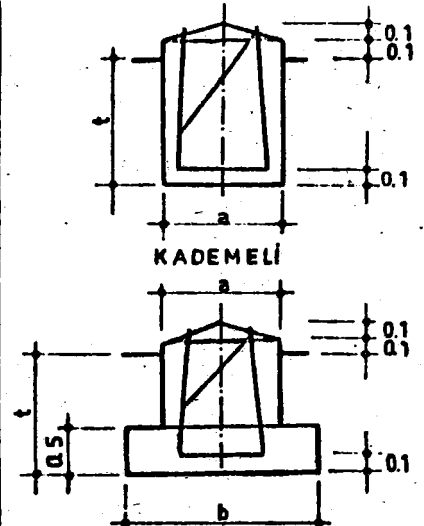
İZOLATÖR DEMİRLERİ 5.6 DAKİ AÇILARDA KULLANILACAKTIR.

	KAYALIK ARAZİ TEMELİ			BETON HACMİ V(m ³)	ÇÜRÜK ARAZİ TEMELİ				BETON HACMİ V(m ³)
	TİPİ	DERİNLİK t (m)	GENİŞLİK a (m)		TİPİ	DERİNLİK t (m)	a (m)	b (m)	
T_10	BLOK	1	aw = 200 m için a = 0.9 m aw = 139 m. " a = 0.8 m.	0.81 0.64	KADEME II	1.9	1.3	2	4.343
T_12	"	"	aw = 200 m. " a = 1 m. aw = 117 m. " a = 0.9 m.	1 0.81	"	"	"	"	"
T_14	"	"	aw = 200 m. " a = 1.3 m. aw = 140 m. " a = 1.2 m.	1.69 1.44	"	"	"	"	"
T_16	"	"	aw = 200 m. " a = 1.3 m.	1.69	"	"	"	"	"
T_18	"	"	aw = 200 m. " a = 1.5 m. aw = 140 m. " a = 1.3 m.	2.25 1.69	"	"	"	"	"
T_20	"	"	aw = 200 m. " a = 1.6 m. aw = 131 m. " a = 1.5 m.	2.56 2.25	"	"	"	"	"

TAŞIYICI TRAVERSİLER

	a Max (m.)		a _g (m)	ağırlık (kg)	α = 169° de a _{max} (m.)		α = 152° de a _{max} (m.)	
	34.5 kV	15 kV			34.5 kV	15 kV	34.5 kV	15 kV
T_250	84	95	200	42	83	94	81	92
T_300	100	106	200	49	99	105	97	102
T_350	128	139	200	60	126	137	124	134
T_400	119	124	200	72	117	122	115	120
TU_300	153	153	200	49	151	151	148	148
TU_400	170	170	200	73	168	168	164	164

TEMEL ŞEKİLLERİ



	TEPE GENİŞLİĞİ mm.	DİP GENİŞLİĞİ mm.	DİREK BOYU m.	DİKMELER	ÇAPRAZLAR	EK CİVATASI	EK LÂMASI		
T_10	200	450	10	50x50x5	40x40x4	EK_1 4xM12	50x6		
T_12	200	500	12	"	"	"	"		
T_14	200	550	14	"	"	EK_2 4xM12	"		
T_16	200	600	16	"	"	"	"		
T_18	200	650	18	"	"	"	"		
T_20	200	700	20	"	"	EK_3 4xM12	"		

DURDURUCU DİREKLER: DURDURUCU DİREKLER GERGİ VEYA MESNET İZOLATÖRLÜ OLABİLİR.

	a _g (m)	a _w (m)	(x) KT α°	LETKEN TOPRAK MESAFESİ (m) x		PROFİLE (xx) 1/400 (mm)		AĞIRLIK Kg.	NORMAL ARAZİ TEMELLERİ			
				MESNET İZOLA.	GERGİ İZOLA.	MESNET İZOLA.	GERGİ İZOLA.		TİPİ	GENİŞLİK	t (m)	BETON m ³
D_10	300	937	136	8.45	8.2	21	20	278	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	30	418	"	1.2	"	2.736
D_16	"	"	"	14.45	14.2	36	35	506	"	1.3	"	3.211
D_18	"	613	140	16.45	16.2	41	40	591	"	1.4	"	3.724
D_20	"	"	"	18.45	18.2	46	45	671	"	1.5	"	4.275

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

	KAYALIK TEMELİ				ÇÜRÜK ARAZİ TEMELİ					
	TİPİ	t (m)	a (m)	BETON m ³	TİPİ	t (m)	t (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	4.363
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 TAŞIYICI MESNET İZOLATÖR KULLANILIR.

DURDURUCU TRAVERSLER : KÖŞE DURDURUCU DİREK HALİNDE α_{max} AÇIKLIĞI
AÇIYA GÖRE AŞAĞIDAKİ KATSAYILARLA ÇARPILARAK AZALTILIR.

	a max (m)		ag (m)	Ağırlığı kg.
	34.5 kV	15 kV		
D_250	84	95	200	54 (xx) (51)
D_300	100	106	200	62 (59)
D_350	120	139	200	67 (64)
D_400	119	124	200	81 (79)
DU_300	153	153	200	62 (59)
DU_400	170	170	200	82 (80)

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

(xx) PARANTEZ İÇİNDEKİLER GERGİ İZOLATÖRÜ İÇİNDİR.

N (SON) VE Z (ZAVİYE) DİREKLERİ : HER İKİ DİREKTE $ag = 200$ m. $aw = 200$ m. DİR.
 ALT İLETKEN TOPRAKLI MESAFESİ (D) DİREKLERİ GİBİDİR. (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.	TİPİ	t (m)	a (m)	beton m	TİPİ	t (m)	a (m)	beton kg.	TİPİ	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	Kade meli	1.9	0.5	1.3	2	4.343
N_12	366	"	"	1.3	3.211	"	"	1.4	2.450	"	"	"	1.4	2.1	4.925
N_14	440	"	"	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	639	"	"	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_12 120°	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_16 120°	600	"	"	1.8	6.156	"	"	1.8	4.05	"	"	"	1.9	2.6	8.403
Z_18 120°	709	"	"	1.9	6.858	"	"	2	6	"	"	"	2	2.7	9.212
Z_20 120°	809	"	"	2	7.6	"	"	2	6	"	"	"	2.2	2.9	10.945

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

	NORMAL ARAZİ TEMELİ				KAYALIK ARAZİ TEMELİ				ÇÜRÜK ARAZİ TEMELİ					
	TİPİ	t (m)	a (m)	Beton(m ³)	TİPİ	t (m)	a (m)	Beton(m ³)	TİPİ	t (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	Kade meli	1.9	0.5	1.5	2.2	5.544
Z_12	"	"	1.6	4.064	"	"	1.6	3.2	"	"	"	1.7	2	6.098
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	11.868

(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.)	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 (m.)	10	12	14	16	18	20	10	12	14	16	18	20

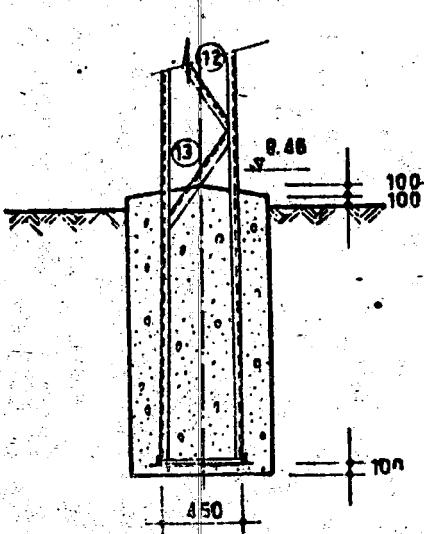
	Z_10	Z_12	Z_14	Z_16	Z_18	Z_20
TEPE GENİŞLİĞİ (mm.)	400	400	400	400	400	400
DİP GENİŞLİĞİ (mm.)	1100	1240	1380	1520	1660	1800
TAM BOY (m.)	10	12	14	16	18	20

BU BÖLGEDE İLETKENLERİN KOT FARKI EN ÇOK 12 m. OLACAKTIR.
DAHA BÜYÜK KOT FARKLARINA DAHA KALIN İLETKEN KULLANILACAKTIR.

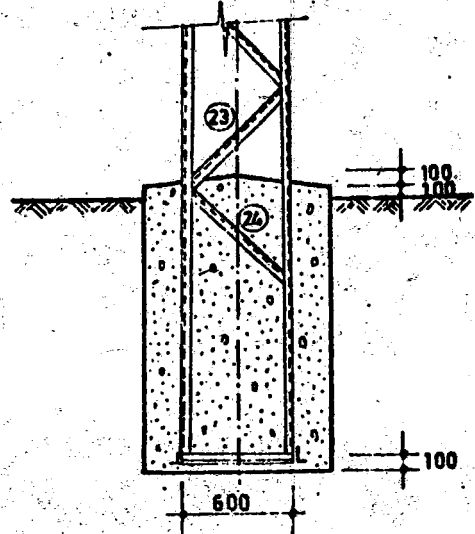
 İZOLATÖR DEMİRLERİNİN KÖŞEDE TAŞIYICI
OLARAK KULLANILMALARI

15 KV TAŞIYICI	$\alpha = 169^\circ$
15 KV DURDURUCU	$\alpha = 161^\circ$
34.5 KV TAŞIYICI	$\alpha = 164^\circ$
34.5 KV DURDURUCU	$\alpha = 155^\circ$

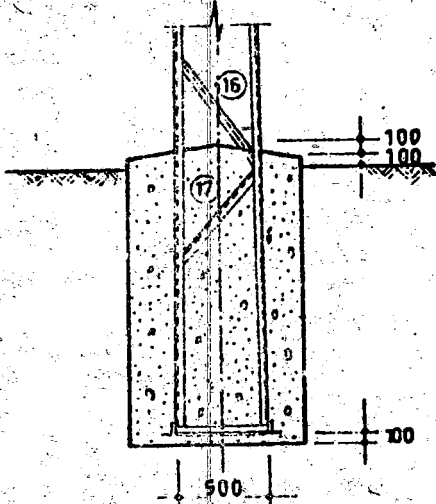
TAŞIYICI DİREKLERİN TEMELE GİREN KISIMLARI
NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜLÂSASINDAN ALINACAKTIR.



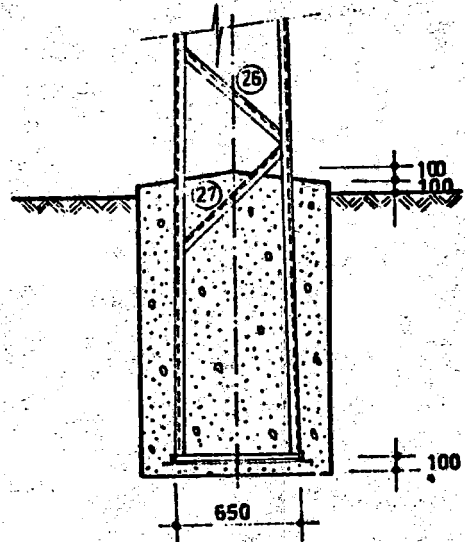
T.10 DİREĞİ



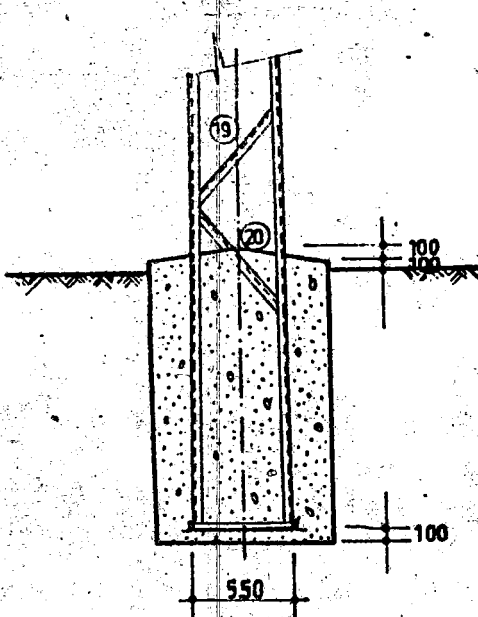
T.16 DİREĞİ



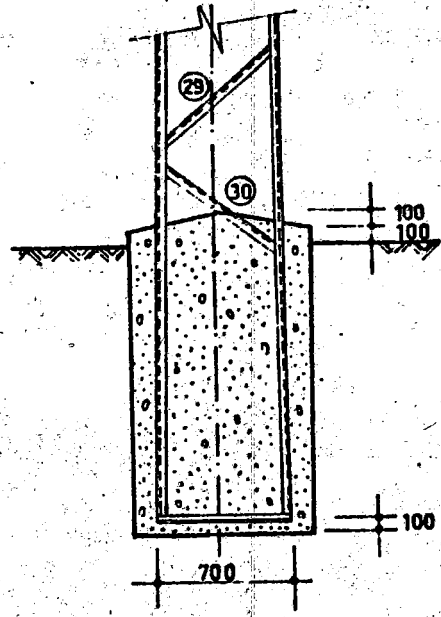
T.12 DİREĞİ



T.18 DİREĞİ



T.14 DİREĞİ



T.20 DİREĞİ

DURDURUCU DİREK **IV/9**
3xSWALLOW- IV. BÖLGE
ÖLÇEK: 1/40

DİKME : 6000 - 50x50x5
 ÇAPRAZLAR : 40x40x4

DİKME : 6000 - 50x50x5
 ÇAPRAZLAR : 40x40x4

KALINLAŞMA : 0.05

DİKME : 6000 - 60x60x6
 ÇAPRAZLAR : 40x40x4

DİKME : 2000 - 50x50x5
 ÇAPRAZ : 40x40x4

EK:2
 4 M x 14
 LAMA 50x6

EK:3
 4 M x 14
 LAMA 60x6

D.12
 DİP GENİŞLİĞİ
 950 mm.

D.14
 DİP GENİŞLİĞİ
 1050 mm.

D.16
 DİP GENİŞLİĞİ
 1150 mm.

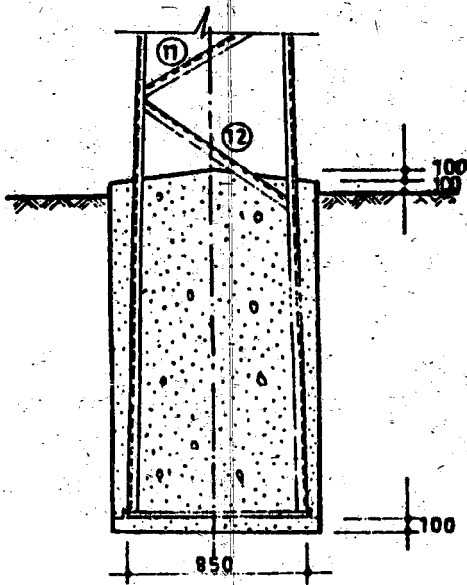
D.18
 DİP GENİŞLİĞİ
 1250 mm.

D.10
 DİP GENİŞLİĞİ
 950 mm.

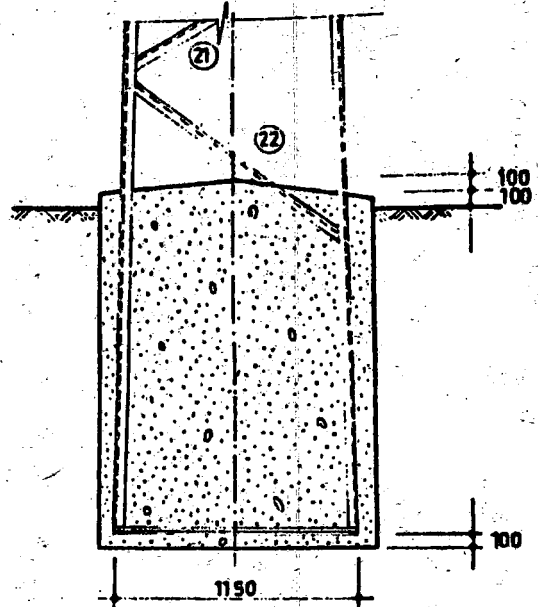
D.20

NOT: D.14 DİREĞİNİN SON İKİ METRELİK
 DİKME 50x50x5 OLACAKTIR.

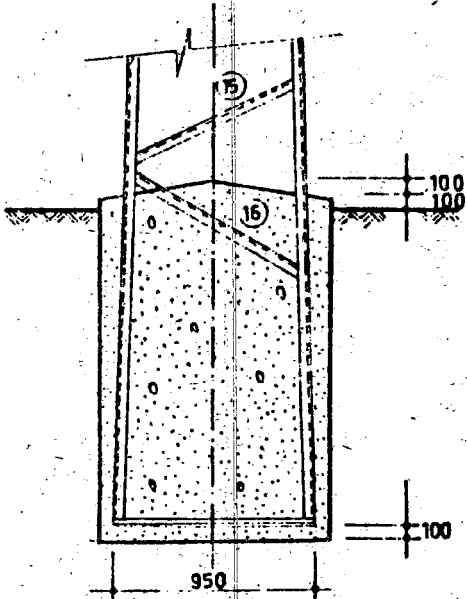
NOT. TEMEL EBATLARI TEMEL LİNSİNE GÖRE HESAP HÜLÂSASINDAN ALINACAKTIR.



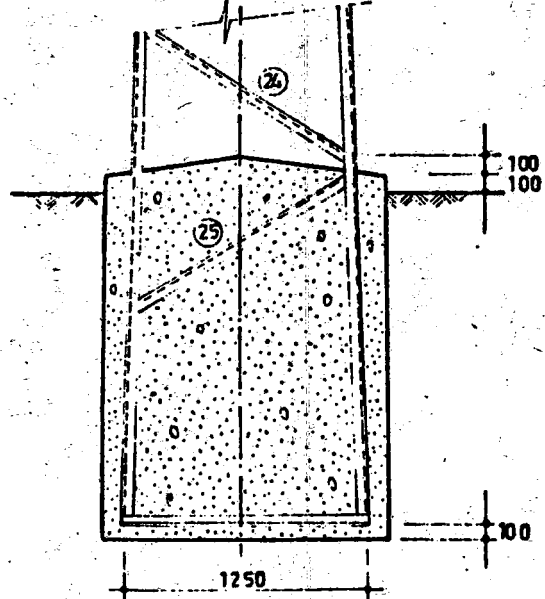
D-10 DİREĞİ



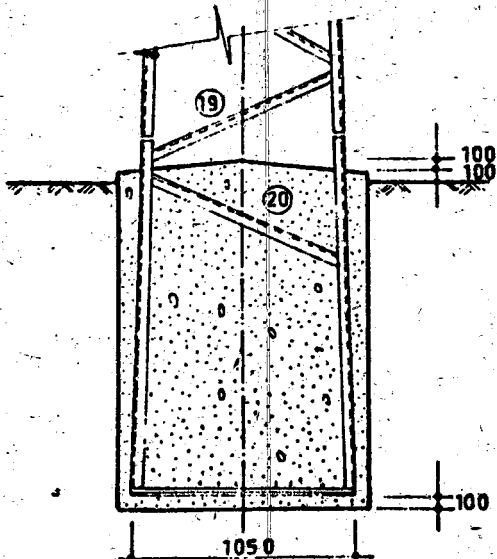
D-16 DİREĞİ



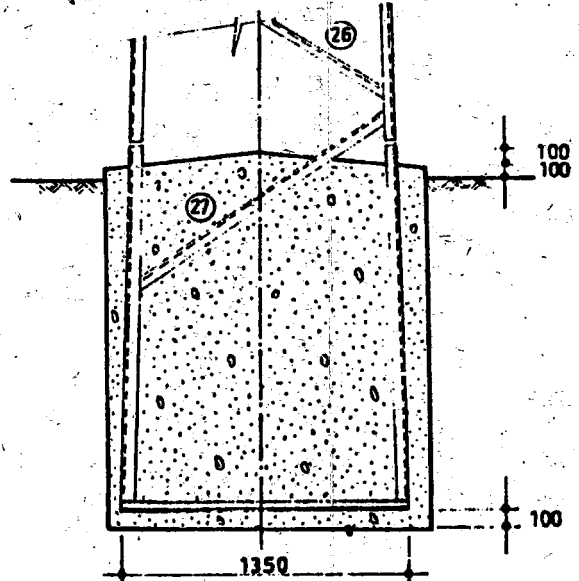
D-12 DİREĞİ



D-18 DİREĞİ



D-14 DİREĞİ



D-20 DİREĞİ

ZAVİYE DİREĞİ
3xSWALLOW-IV BÖLGE
ÖLÇEK: 1/40

DİKME: 6000 - 50x50x5
ÇAPRAZLAR: 40x40x4

KALINLAŞMA: 0.07

4 M 14
LAMA 50x8 EK.1
GENİŞLİK: 820 mm.

DİKME: 6000 - 60x60x6
ÇAPRAZLAR: 40x40x4

Z-10
DİP GENİŞLİĞİ
1100 mm.

Z-12
DİP GENİŞLİĞİ
1240 mm.

EK.2
4xM14
LAMA
50x8

Z-14
DİP GENİŞLİĞİ
1390 mm.

DİKME: 6000 - 60x60x6
ÇAPRAZLAR: 40x40x4

Z-16
DİP GENİŞLİĞİ
1520 mm.

Z-18
DİP GENİŞLİĞİ
1660 mm.

EK.3
4xM16
LAMA
60x8

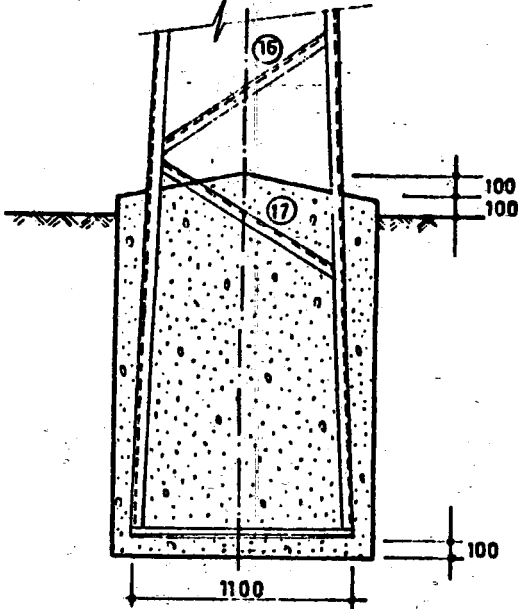
DİKME: 2000 - 60x60x6
ÇAPRAZLAR: 40x40x4

Z-20

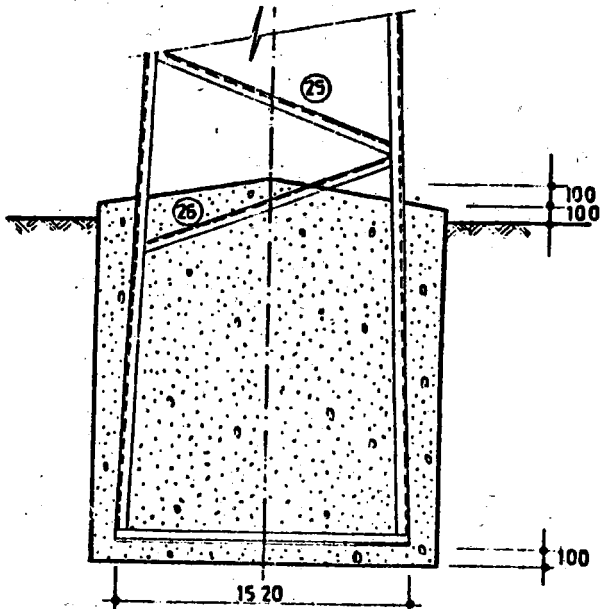
1800

ZAVİYE DİREKLERİNİN TEMELE GİREN KISIMLARI

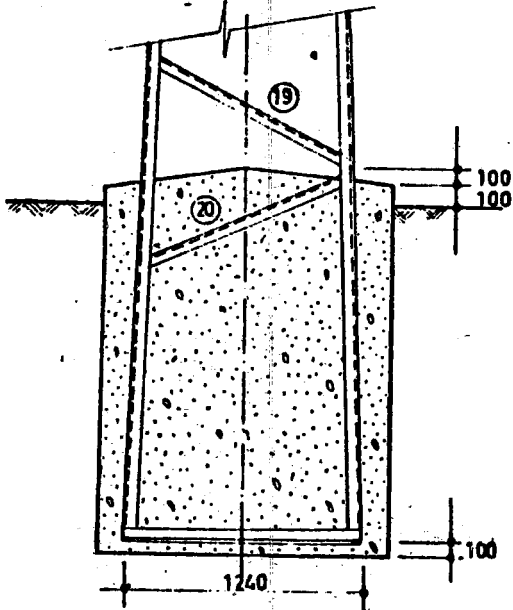
NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HÜLASASINDAN ALINACAKTIR.



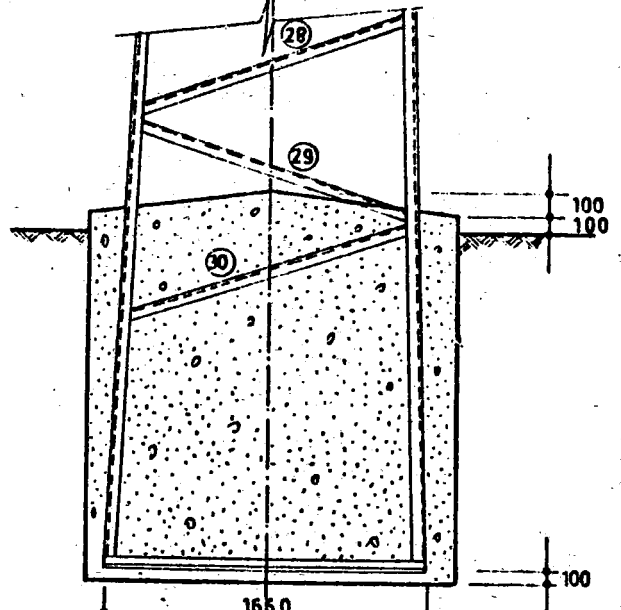
Z_10 DİREĞİ



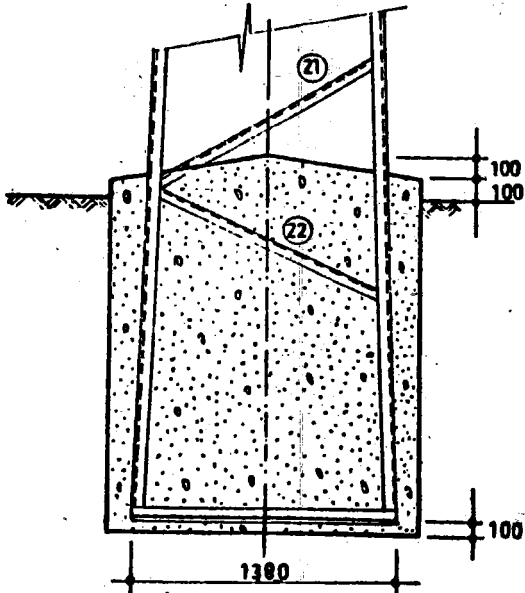
Z_16 DİREĞİ



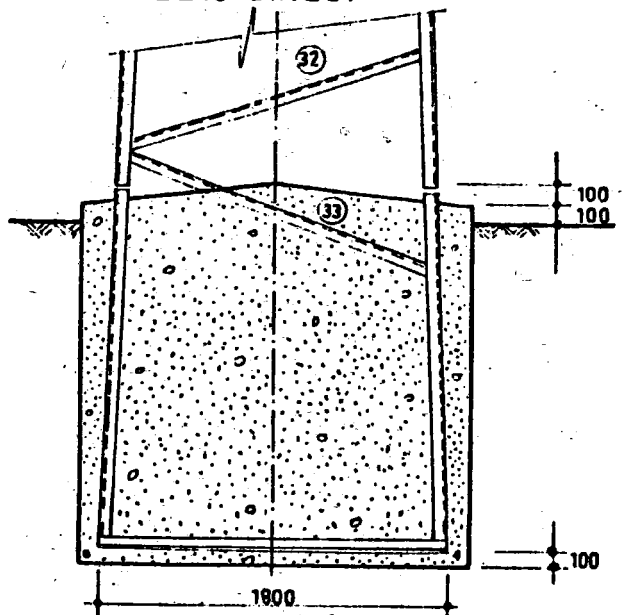
Z_12 DİREĞİ



Z_18 DİREĞİ

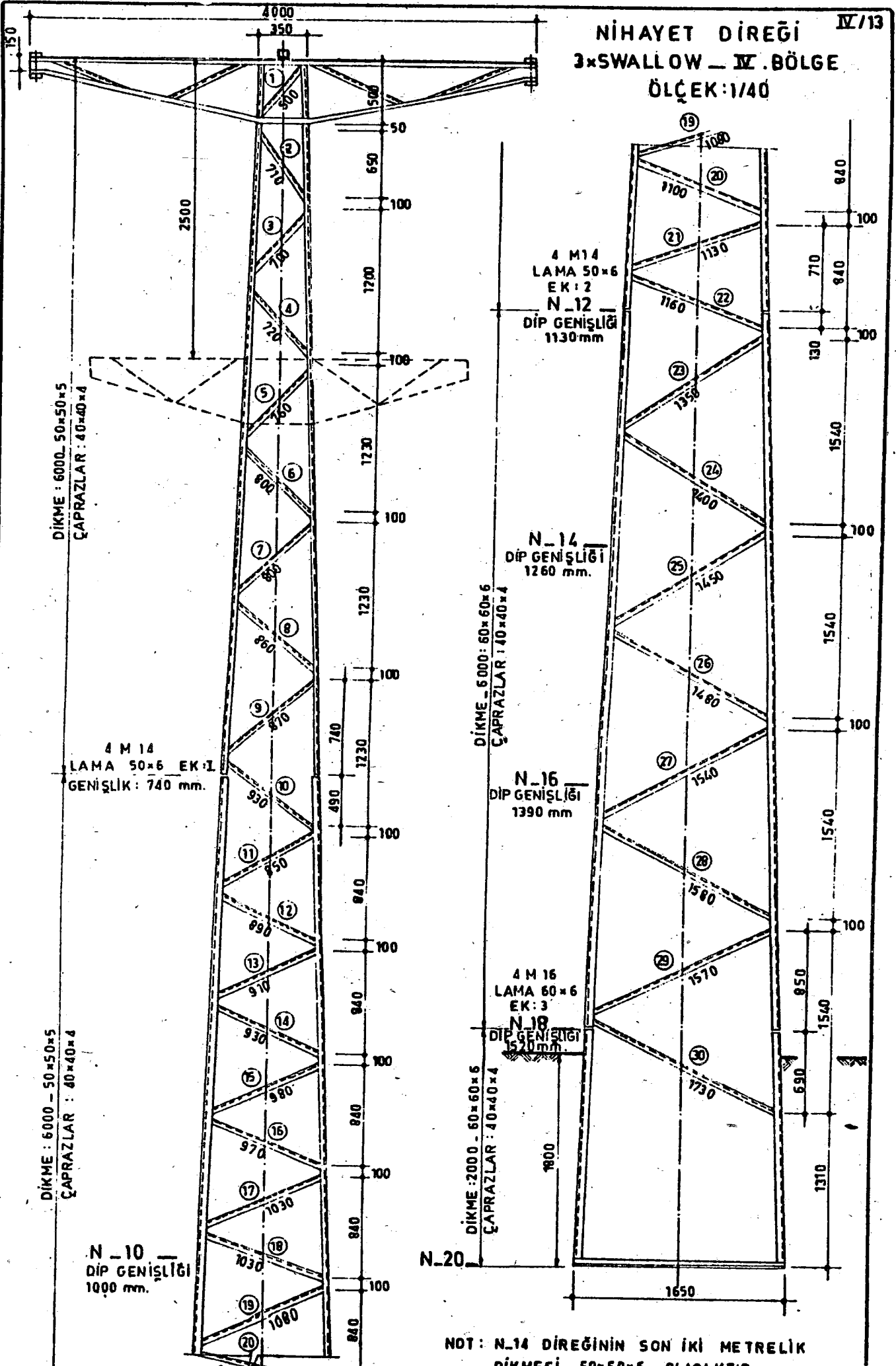


Z_14 DİREĞİ

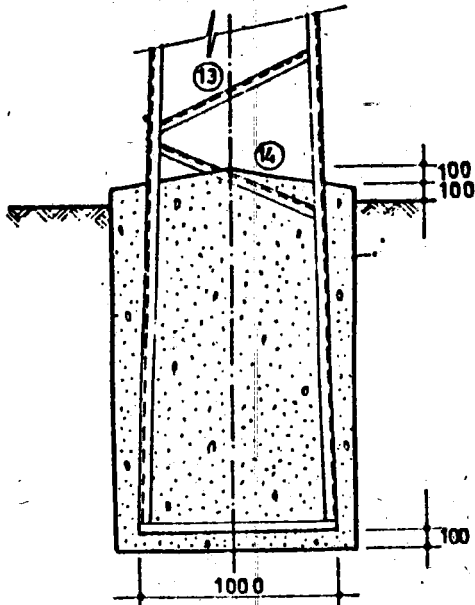


Z_20 DİREĞİ

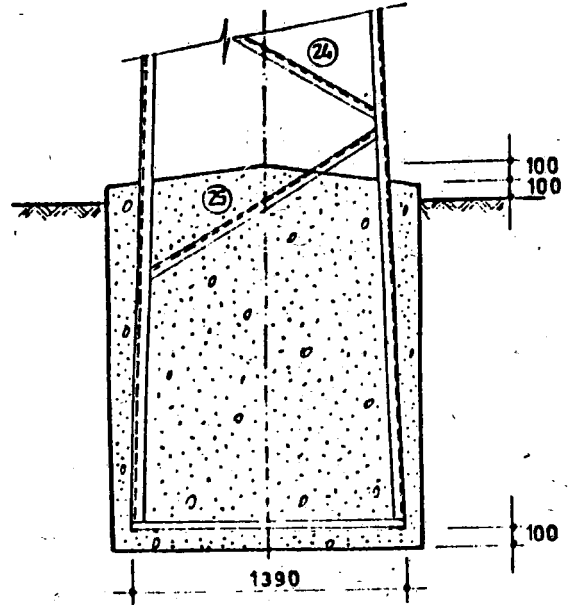
NIHAYET DİREĞİ IV/13
3xSWALLOW - IV. BÖLGE
ÖLÇEK: 1/40



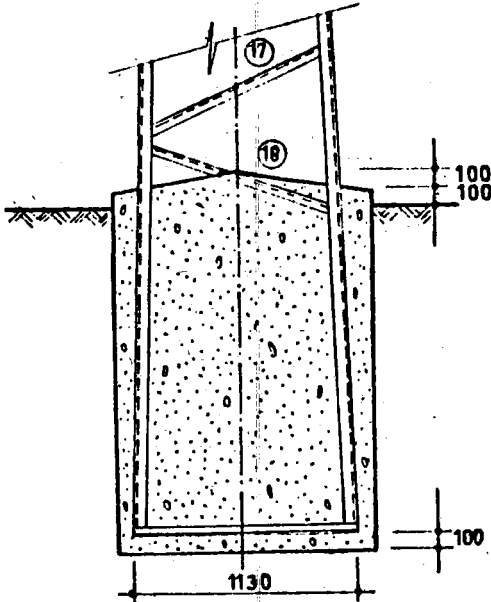
NİHAyet DİREKLERİNİN TEMELE GİREN KISIMLARI.
 NOT: TEMEL EBATLARI TEMEL CİNSİNE GÖRE HESAP HULASASINDAN ALINACAKTIR.



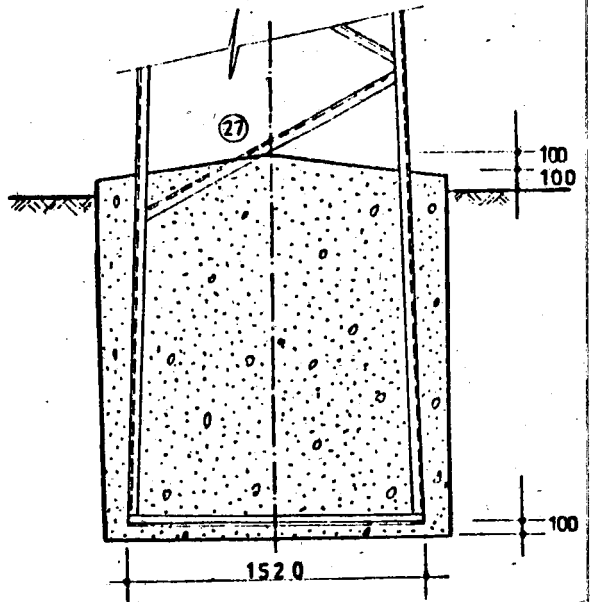
N-10 DİREĞİ



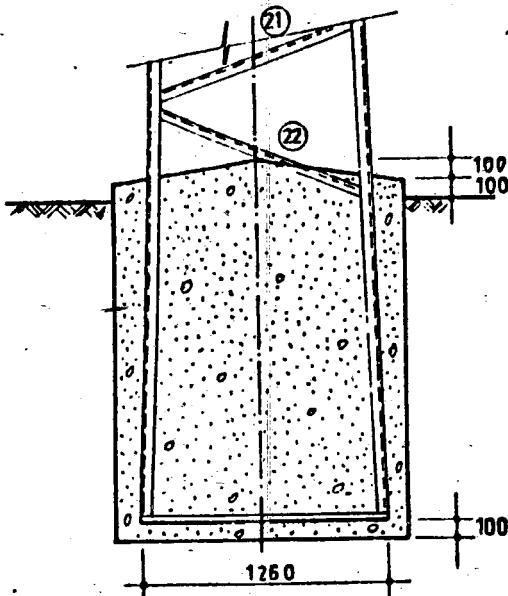
N-16 DİREĞİ



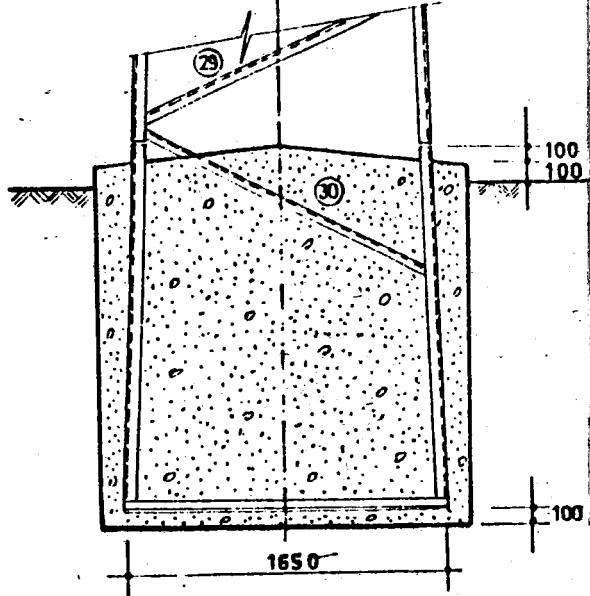
N-12 DİREĞİ



N-18 DİREĞİ

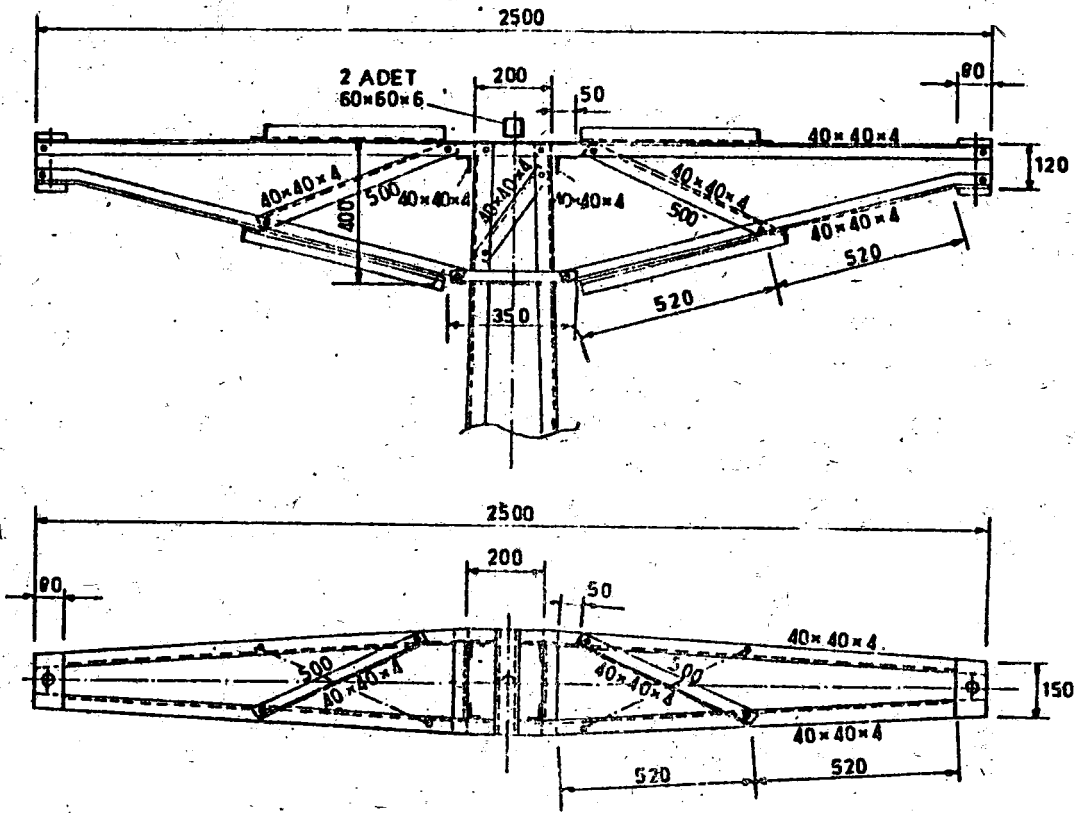


N-14 DİREĞİ

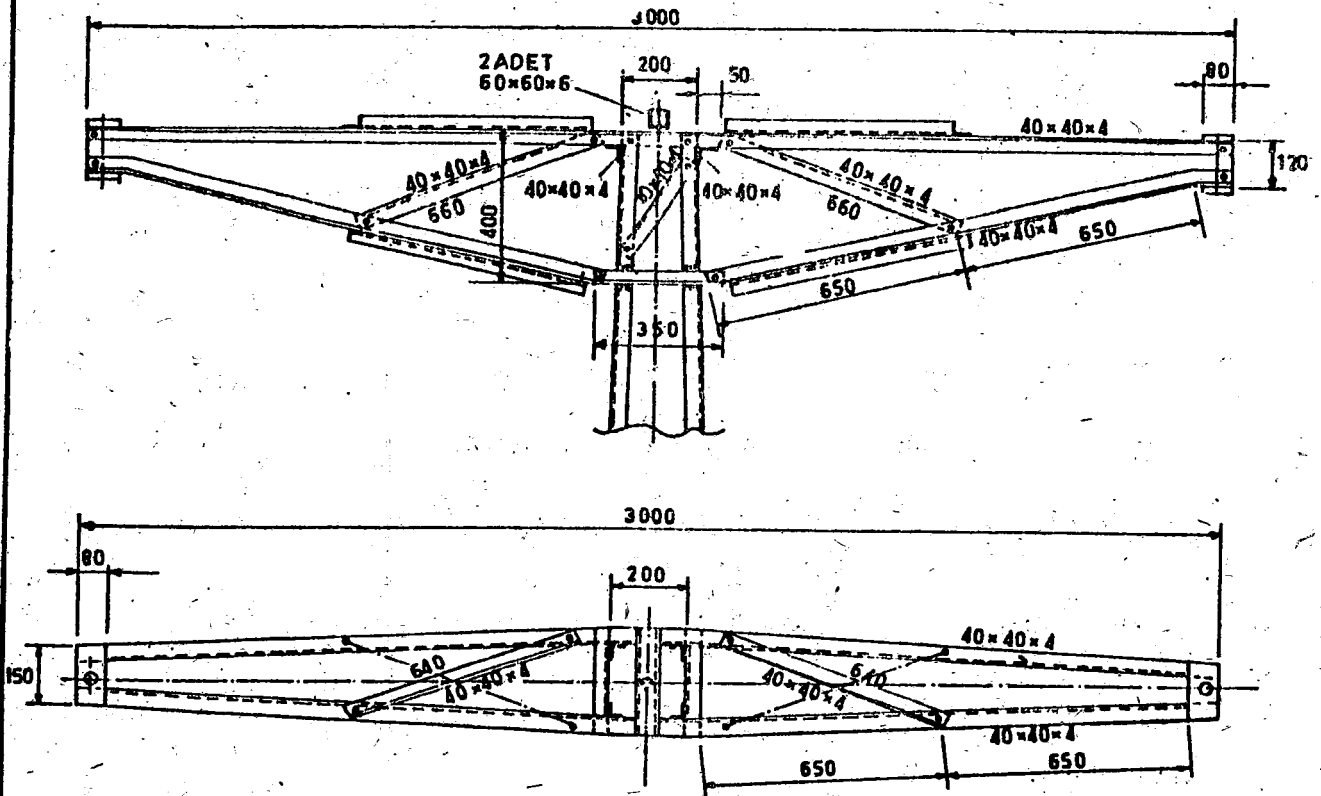


N-20 DİREĞİ

TAŞIYICI DİREK TRAVERSİLERİ T.250 TİPİ TRAVERS



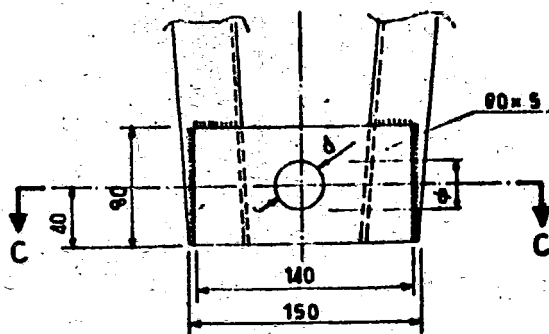
T.300 TİPİ TRAVERS



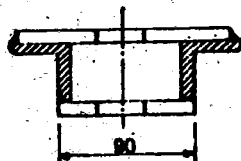
NOT: TRAVERSİLER EĞİM VERMEDEN DÜZ OLARAKTA YAPILABİLİR.

[illegible]

Technical drawing of a ship's hull cross-section, showing structural details and dimensions. The drawing includes a longitudinal section view of the hull, with various structural components labeled and dimensions indicated. Key dimensions include a total length of 1250, a width of 500, and a height of 150. The hull is divided into sections with different structural details, including a central section with a width of 40 and a height of 40, and a side section with a width of 10 and a height of 10. The drawing also shows a cross-section of the hull with a width of 1120 and a height of 520. The hull is shown with a complex internal structure, including a central longitudinal beam and various transverse and diagonal bracing members. The drawing is a technical illustration of a ship's hull, showing the internal structure and dimensions.

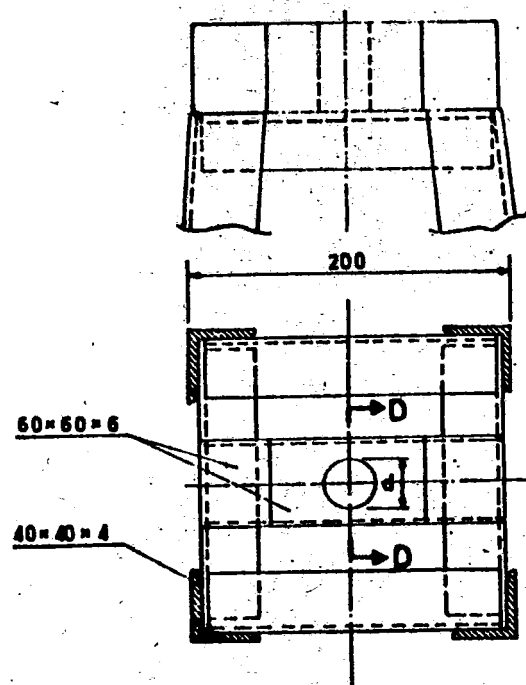


C-C KESİTİ



15 kV ta d = 24 mm.
30 kV ta d = 28 mm.

A TAFSILATI

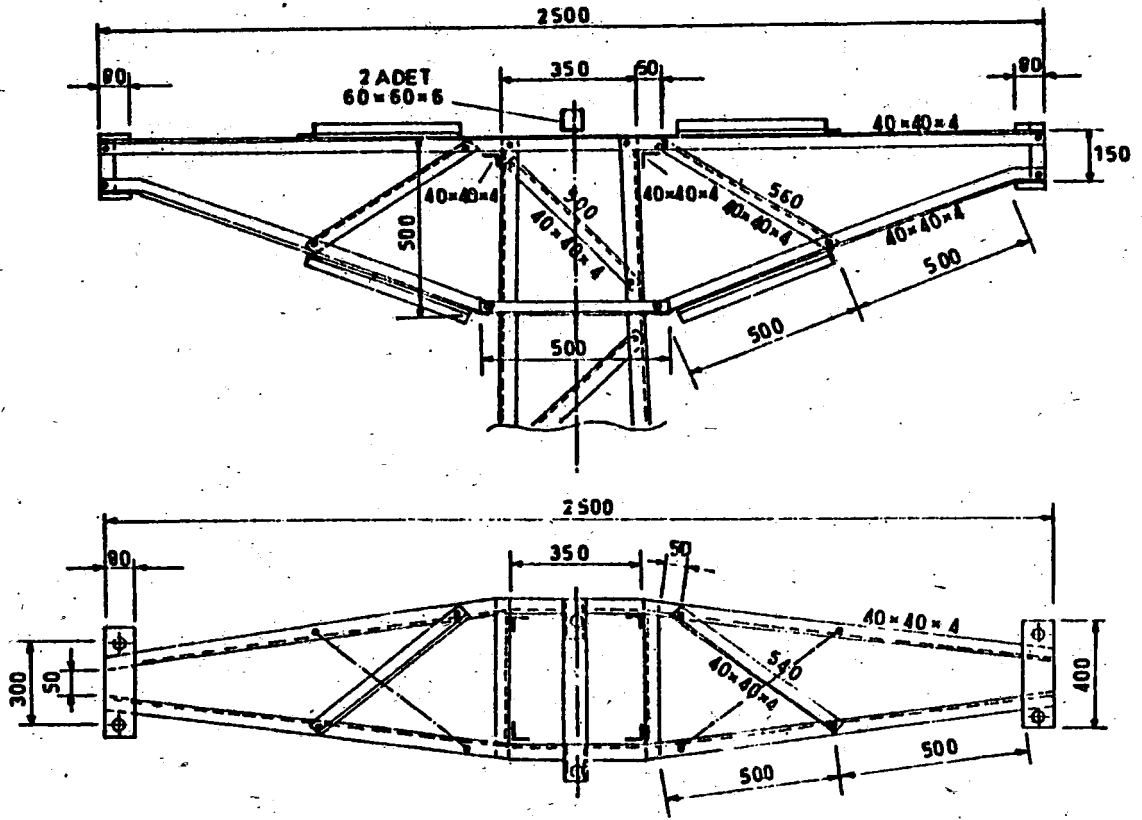


D.D KESİTİ

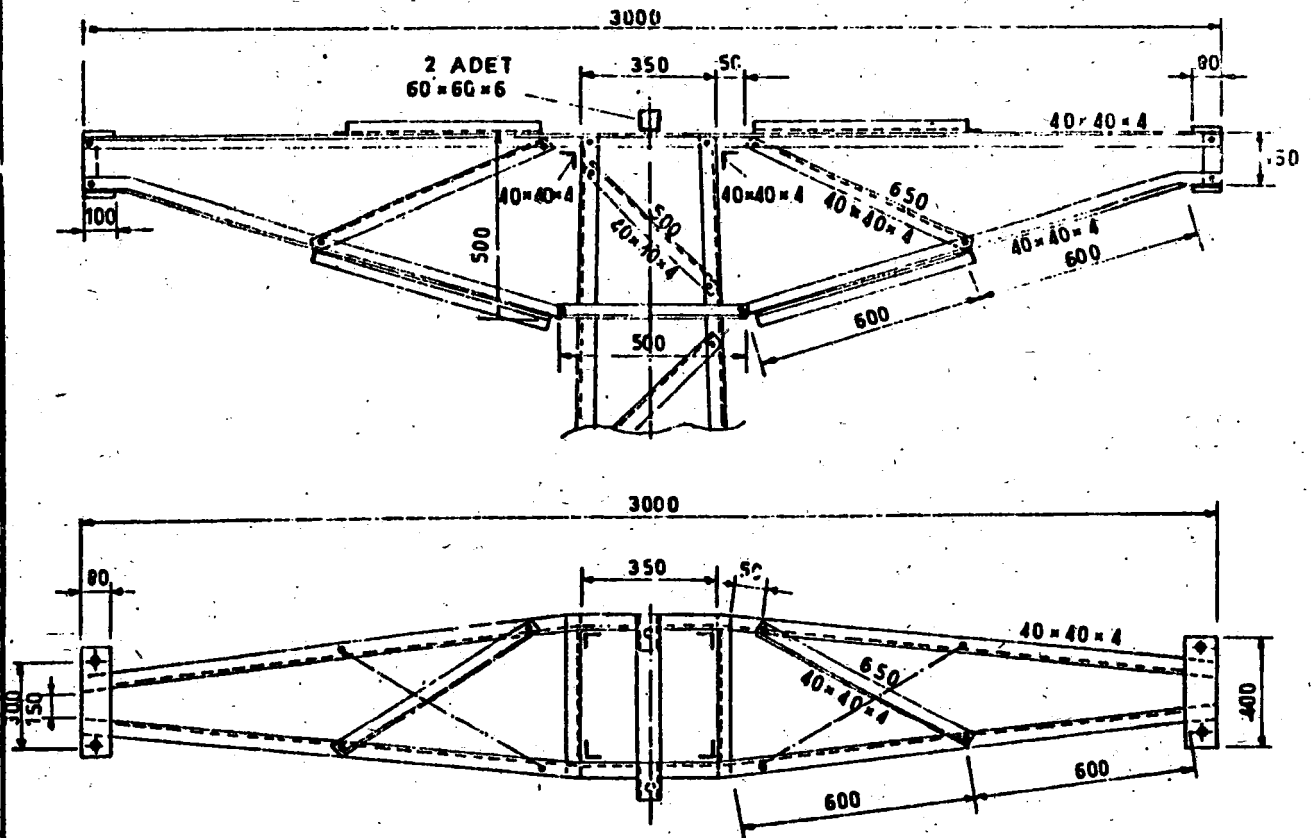
B TAFSILATI

OLCEK-1/5

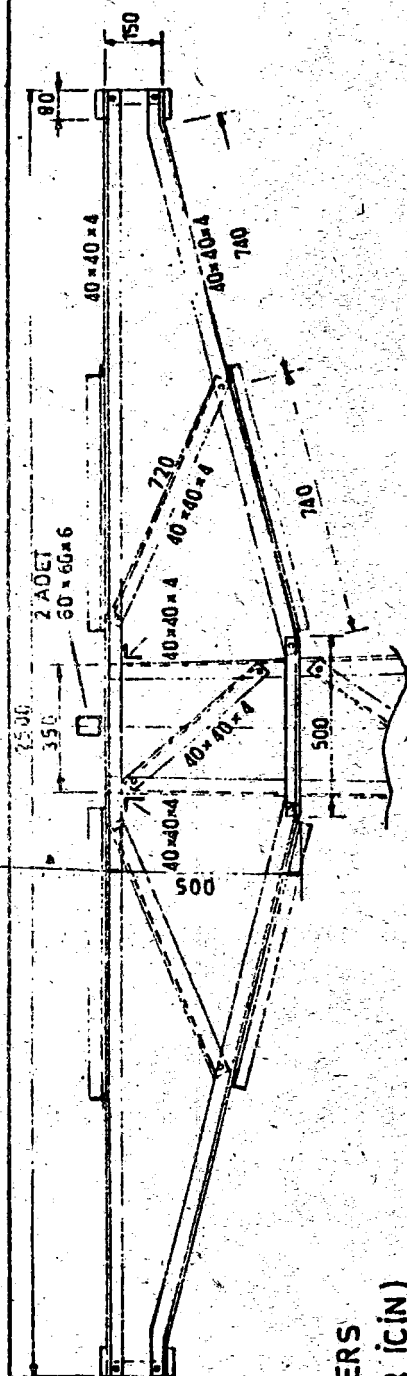
DURDURUCU DİREK TRAVERSİLERİ
D-250 TİPİ TRAVERS (MESNET İZOLATÖR İÇİN)



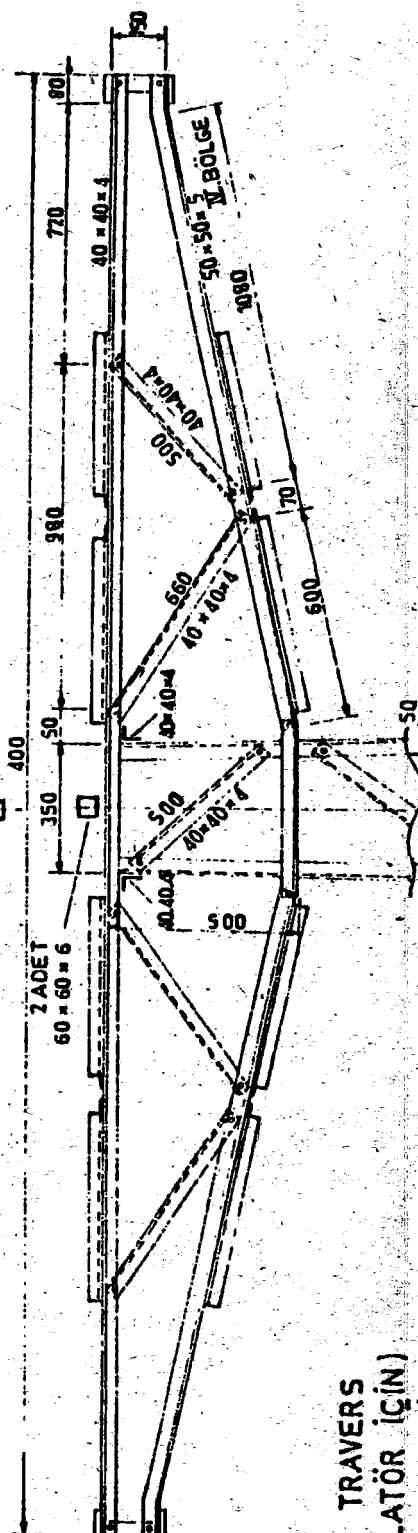
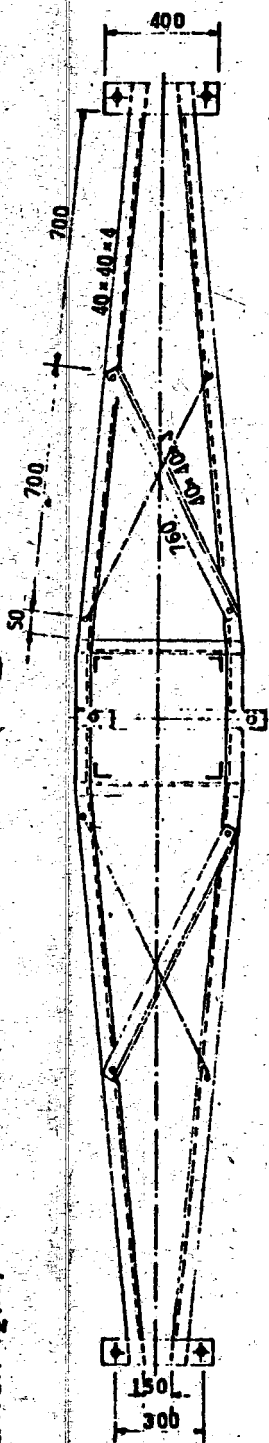
D-300 TİPİ TRAVERS (MESNET İZOLATÖR İÇİN)



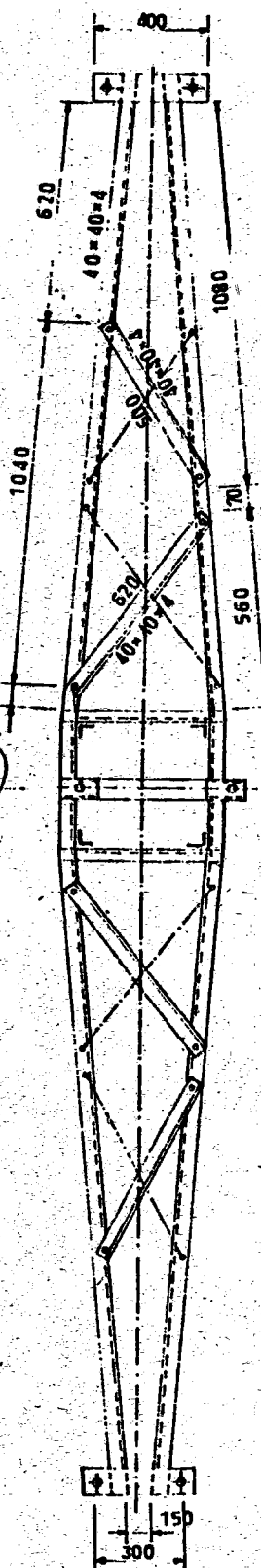
ÖLÇEK: 1/20

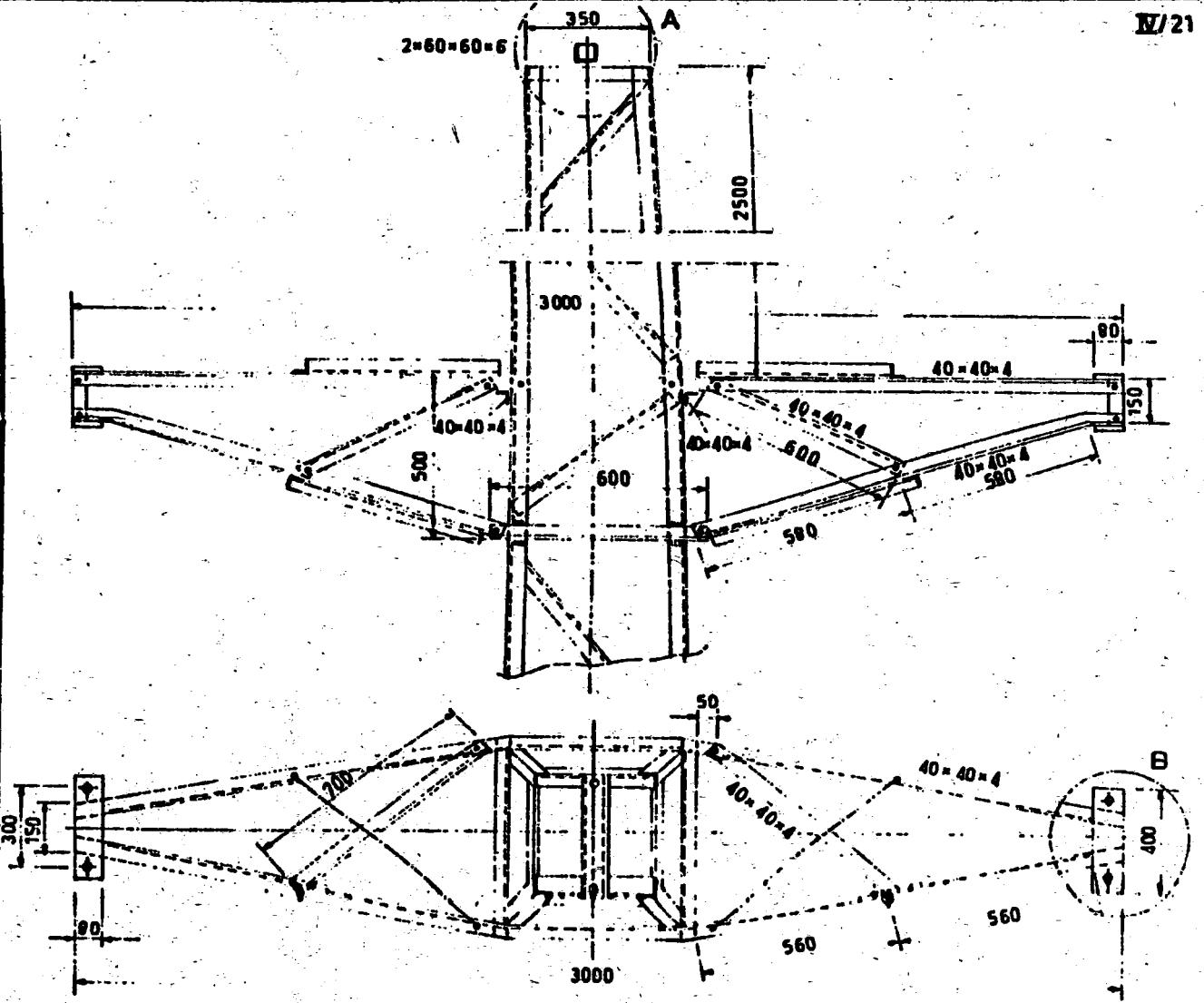


**D_350 TİPİ TRAVERS
(MESNET · İZOLATÖR İÇİN)**



**D_400 TİPİ TRAVERS
(MESNET İZOLATÖR İÇİN)**



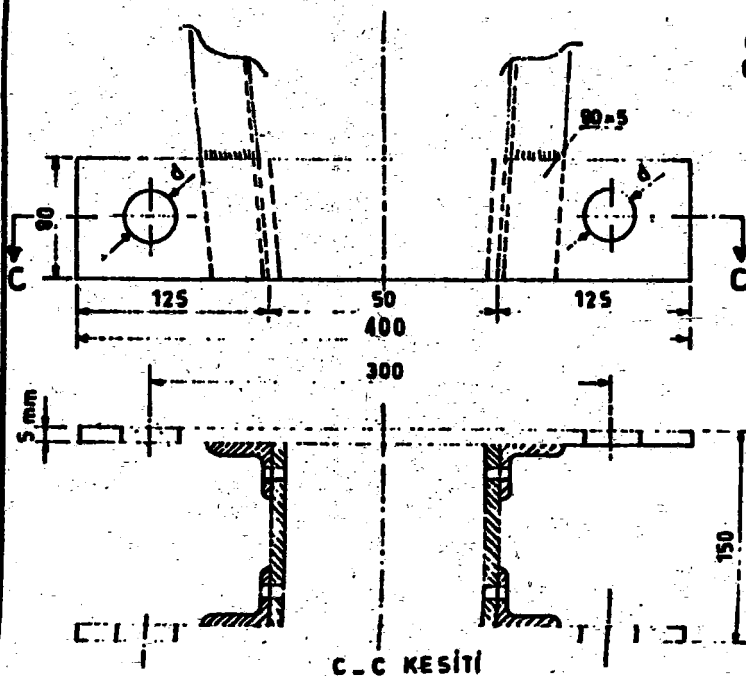


**DÜ - 300 TİPİ TRAVERS (ÜÇGEN TERTİP)
(MESNET İZOLATÖR İÇİN)**

ÖLÇEK: 1/20

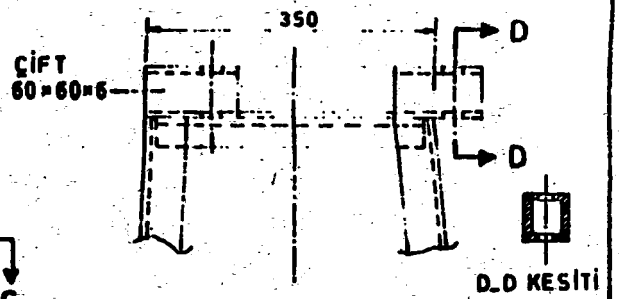
15 KV ta d = 26 mm.

35 KV ta d = 34 mm.

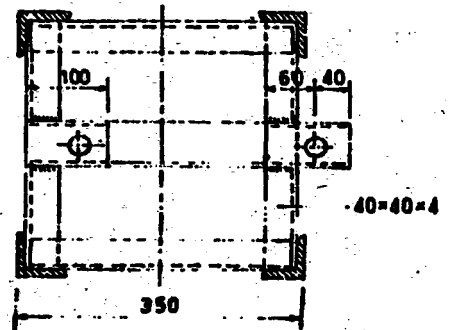


C - C KESİTİ

B - TAFSİLATI
ÖLÇEK: 1/5

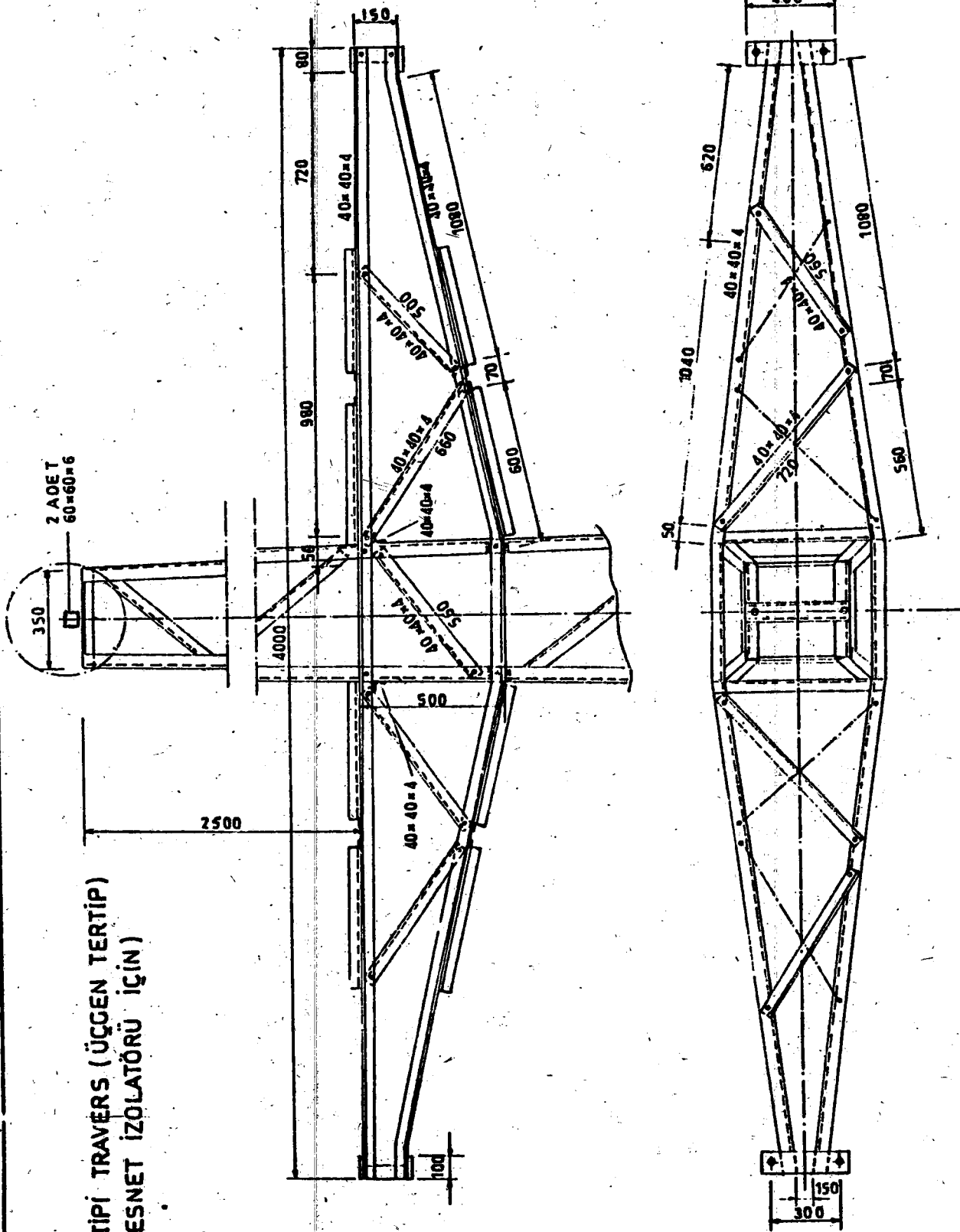


D - D KESİTİ

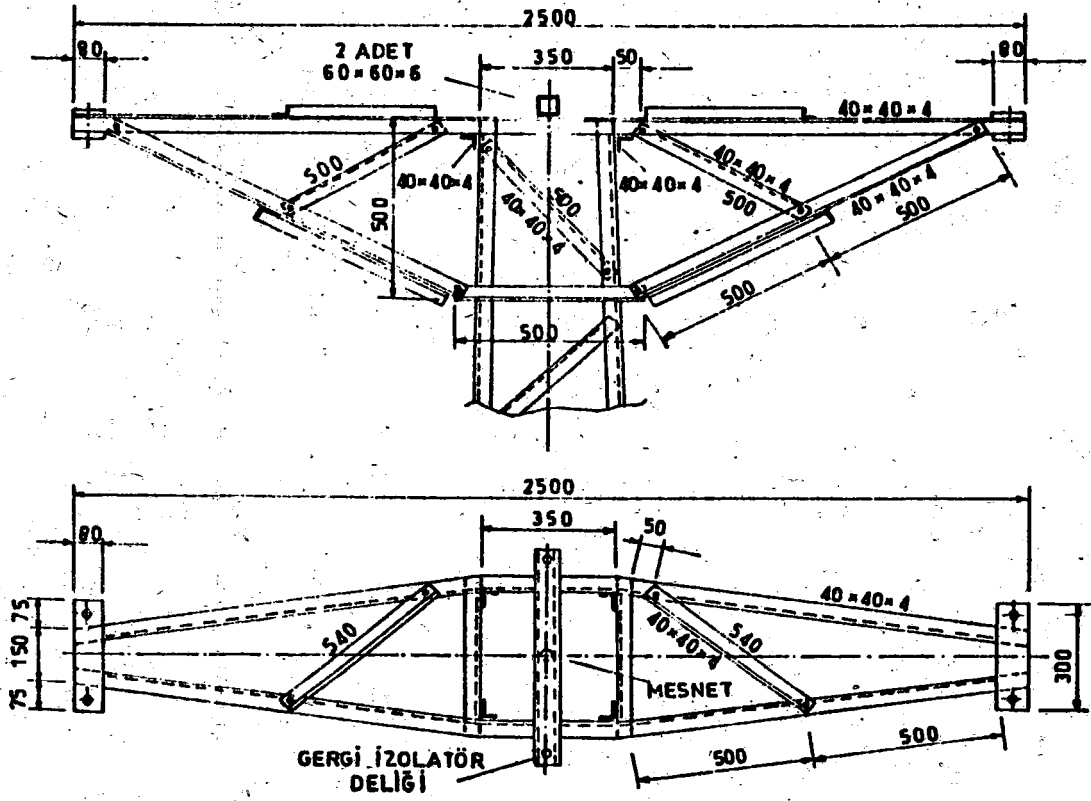


A - TAFSİLATI
ÖLÇEK: 1/10

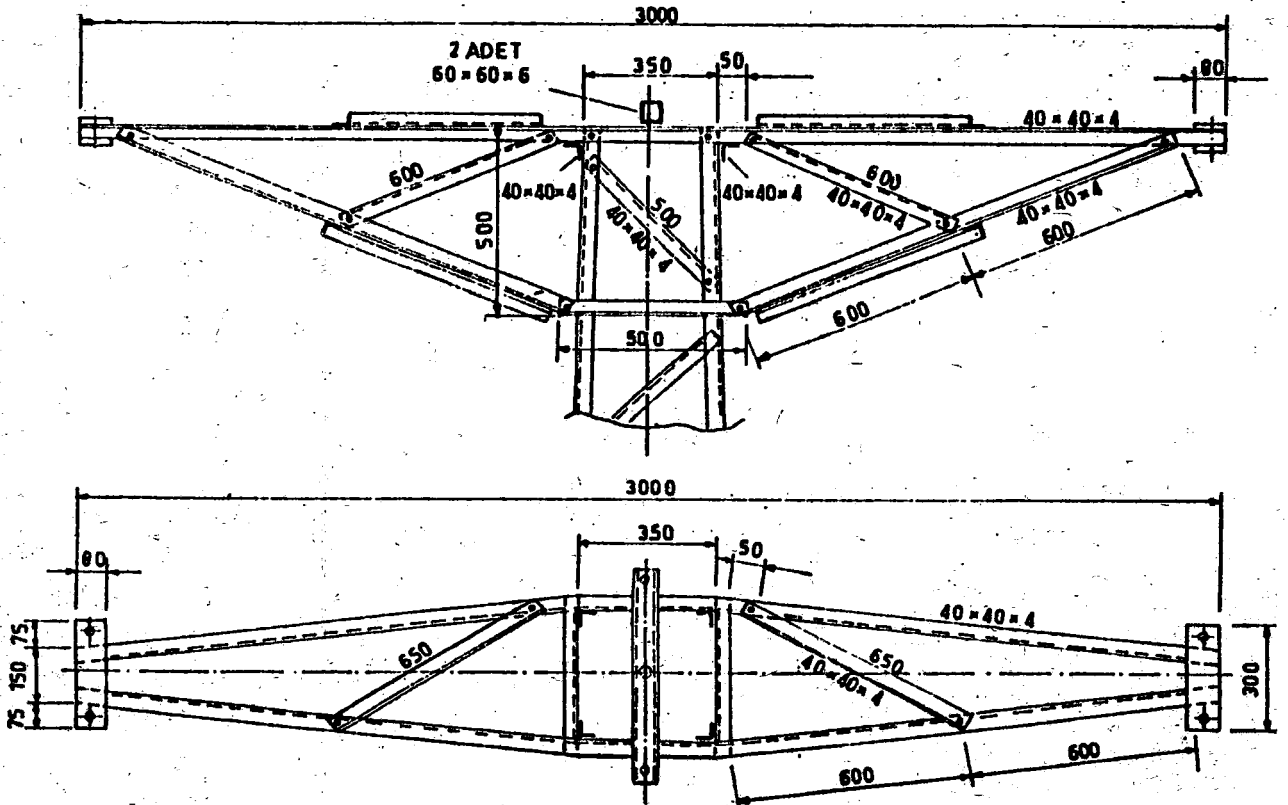
DU - 400 TİPİ TRAVERS (ÜÇGEN TERTİP)
(MESNET İZOLATÖRÜ İÇİN)

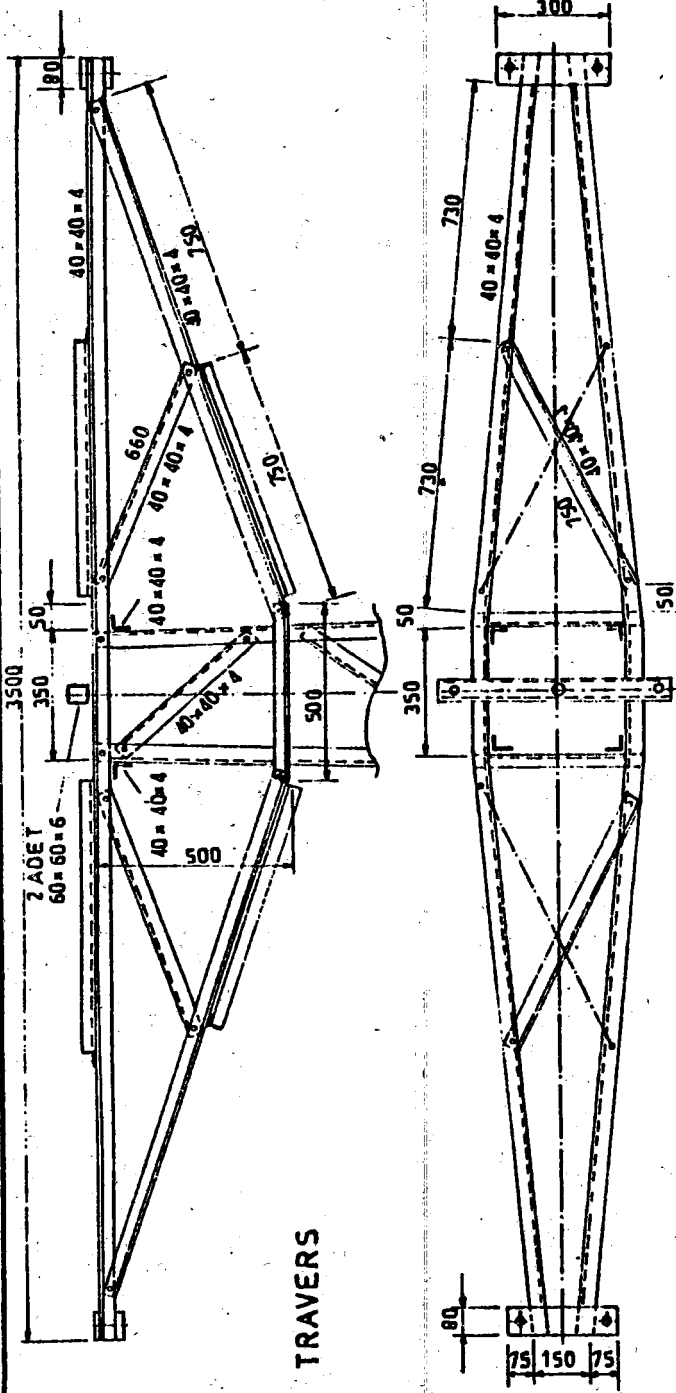


D_250 TİPİ TRAVERS (GERGİ İZOLATÖR İÇİN)

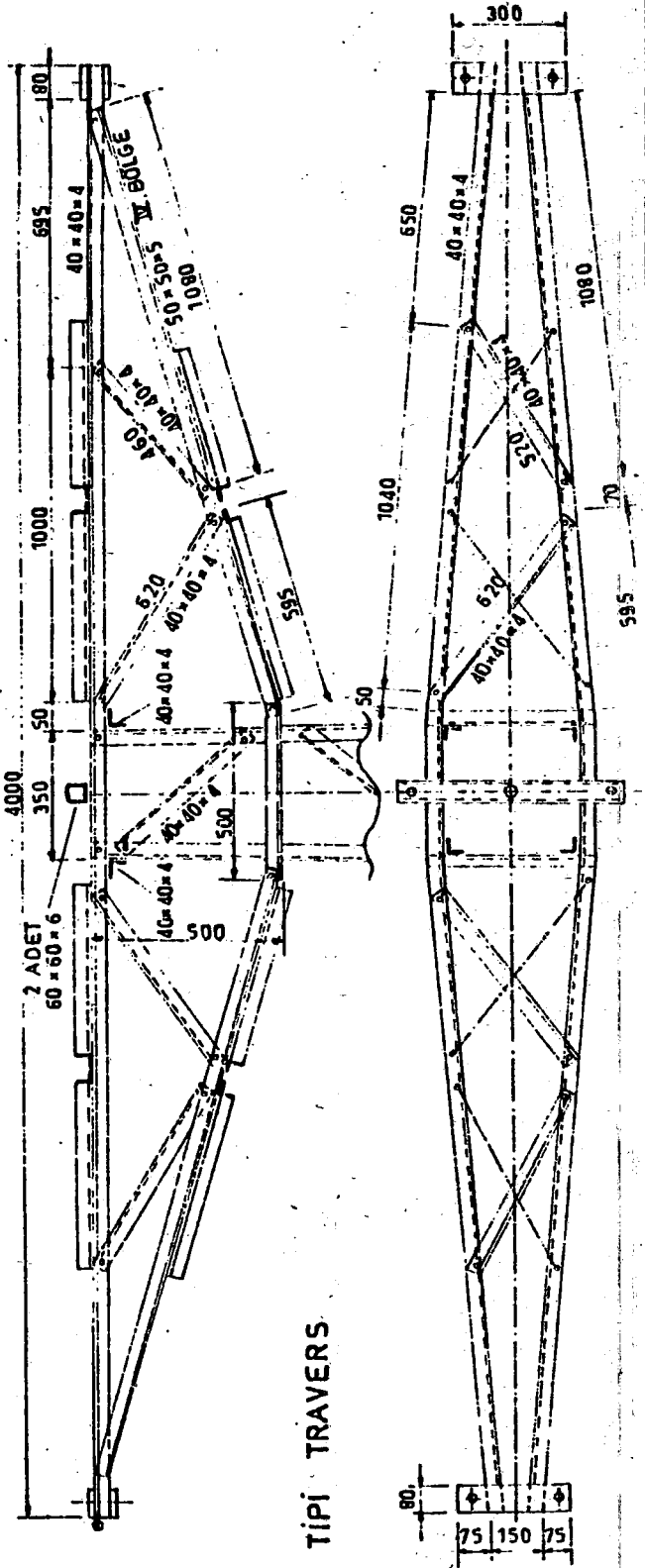


D_300 TİPİ TRAVERS (GERGİ İZOLATÖR İÇİN)

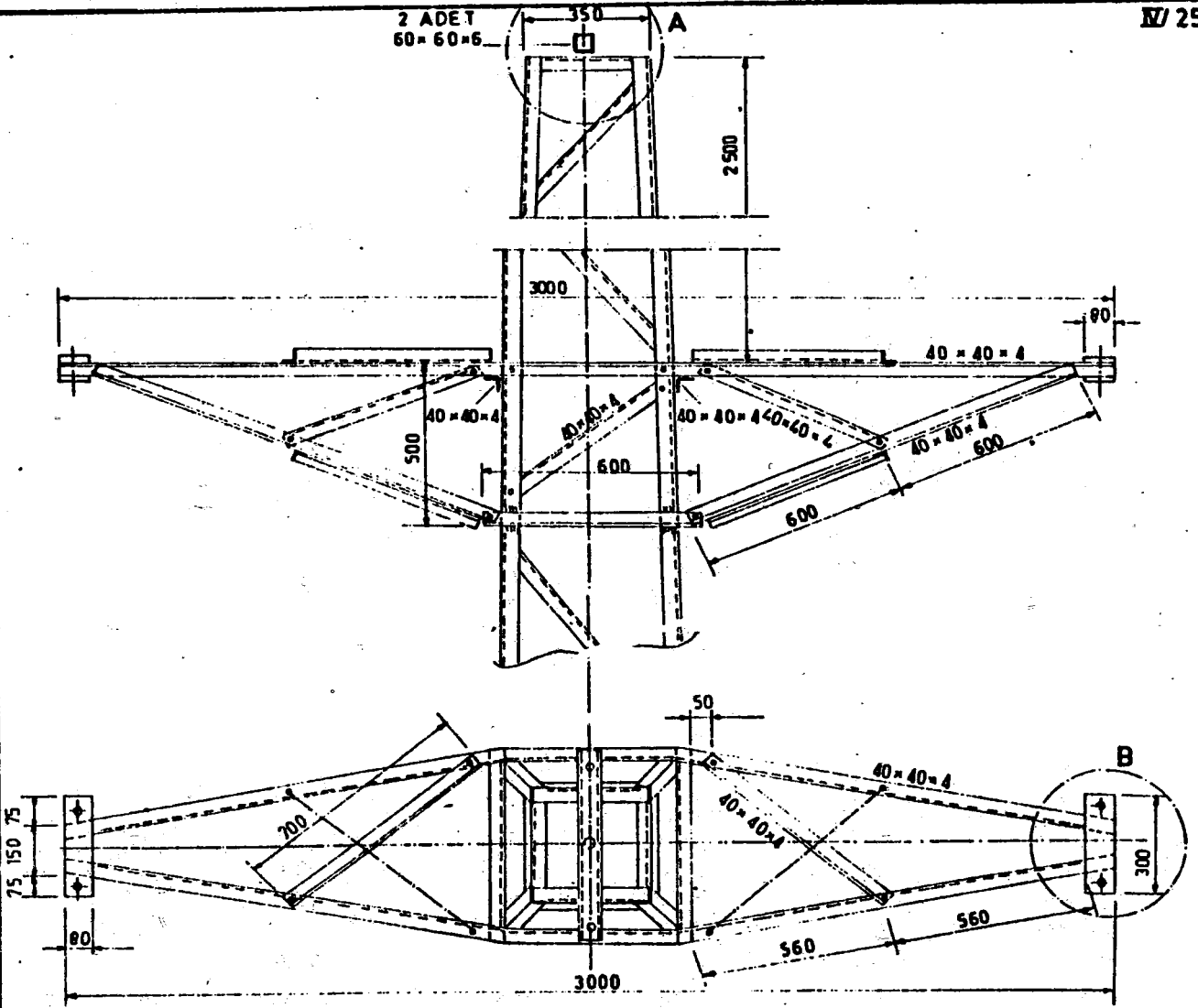




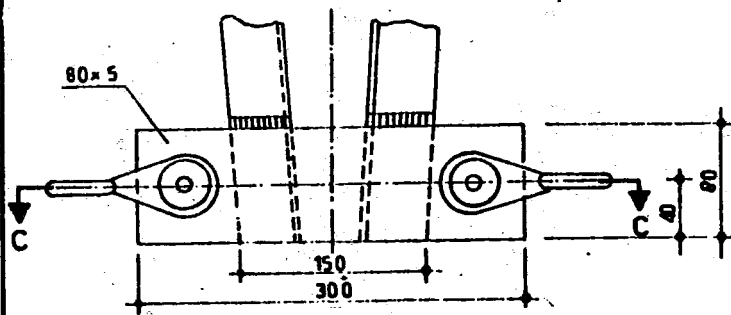
D-350 TIPI TRAVERS



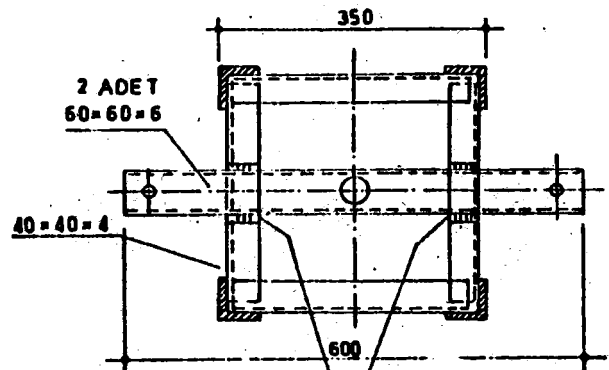
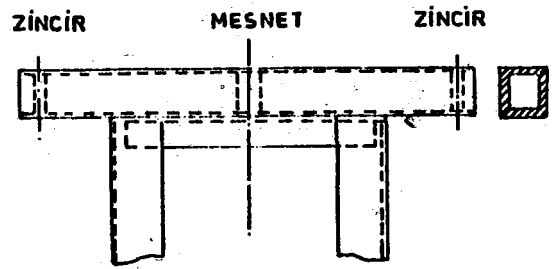
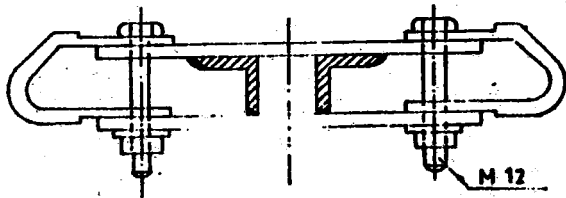
D-400 TIPI TRAVERS



DÜ - 300 TİPİ TRAVERS (ÜÇGEN TERTİP)
(GERGİ İZOLATÖR İÇİN)



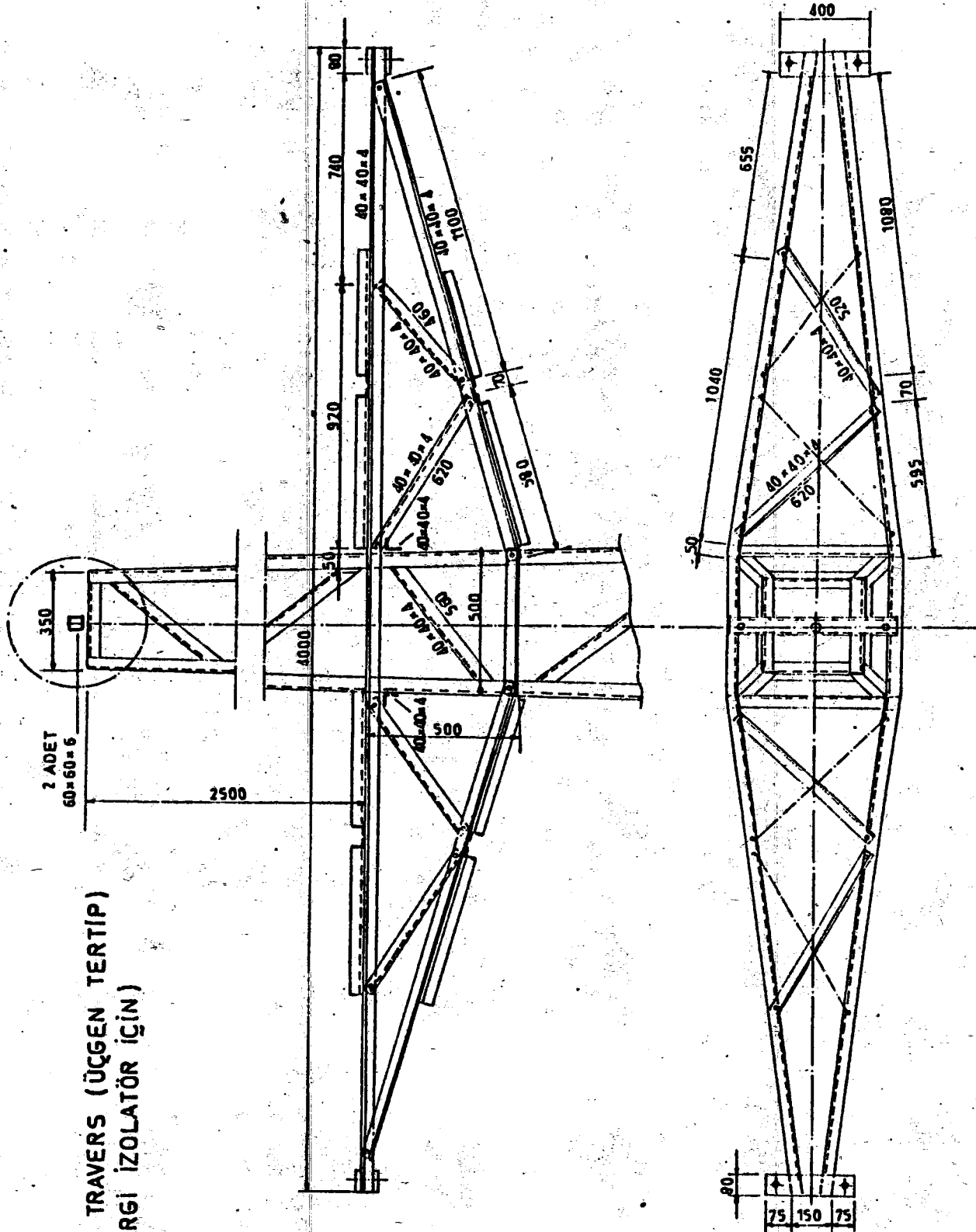
C-C KESİTİ



NOT : B TAFSİLATINDAKİ GERGİ TAKIMINI
A TAFSİLATINDAKİ GERGİ TAKIMININ
AYNI OLDUĞUNDA AYRICA ÇİZİLMEMİŞTİR.

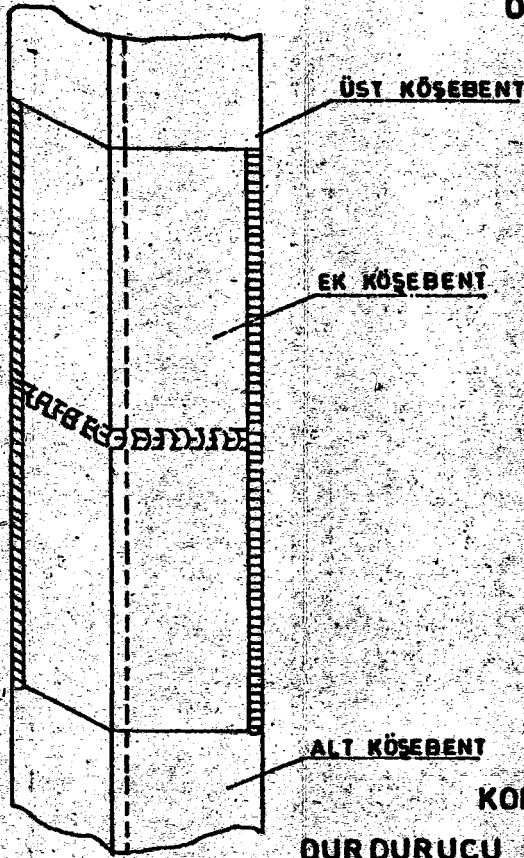
BU İRTİBATLAR M 12 LİK
CIVATA İLEDE YAPILABİLİR.

DÜ-400 TİPİ TRAVERS (ÜÇGEN TERTİP)
(GERGİ İZOLATOR İÇİN)



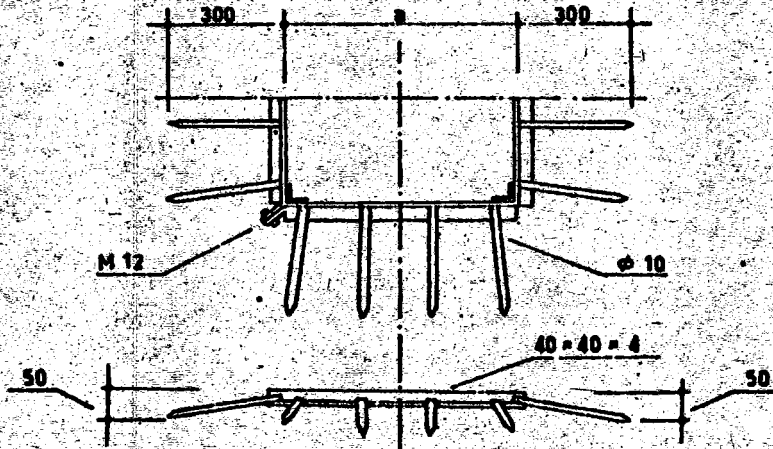
ÖLÇEK : 1/20

DİREKLERİN KAYNAKLA İRTİBAT DETAYI ÖLÇEK: 1/25

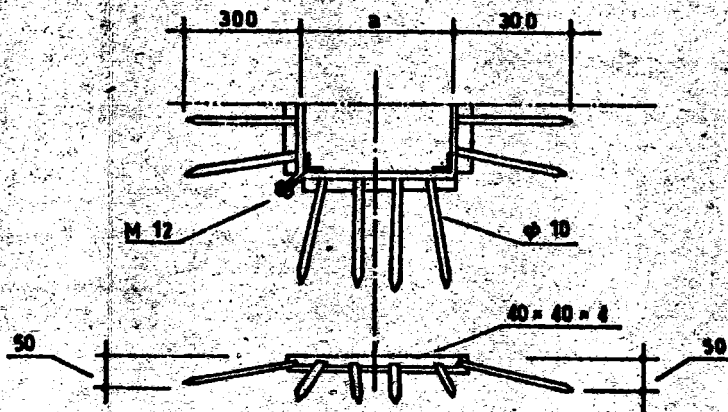


ÜST KÖŞEBENT (mm)	ALT KÖŞEBENT (mm)	EK KÖŞEBENT (mm)	L (mm)	KAYNAK KALINLIĞI (mm)
50 x 50 x 5	50 x 50 x 5	50 x 50 x 5	200	3
50 x 50 x 5	60 x 60 x 6	50 x 50 x 5	250	3
60 x 60 x 6	60 x 60 x 6	60 x 60 x 6	250	4

KORKULUK DETAYI DURDURUCU VE NİHAyet DİREKLER İÇİN



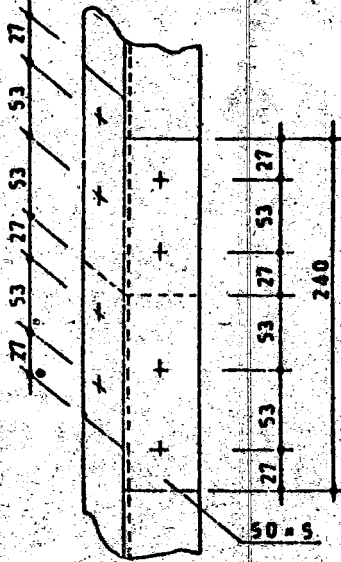
TAŞIYICI DİREKLER İÇİN



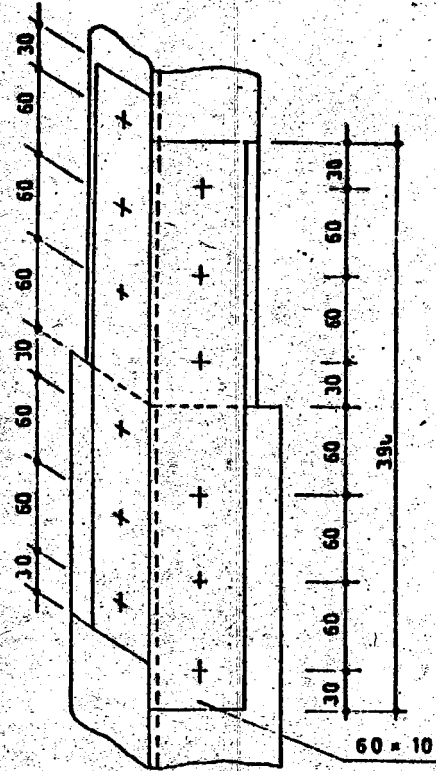
NOT: KORKULUKLAR VERDEN 5.5 m. MESAFEDEN MONTE EDİLECEĞİNE GÖRE (a) MESAFESİ ALINACAKTIR.

ÖLÇEK: 1/25

DİKMELERİN İRTİBATI (CİVATALI)

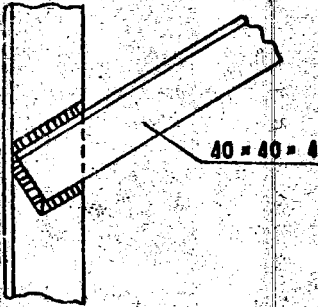


8-M12 VE 8-M14
İÇİN EK YERİ



6-M16 İÇİN
EK YERİ

BİR ÇAPRAZIN BİR DİKMEYE İRTİBATI



KAYNAK KALINLIĞI : 3 mm.

KAYNAK BOYU

1- TAŞIYICILARDA : 80 mm.

2- DÜRDÜRÜCULARDA : 100 mm

3- NİHAyetLERDE : 100 mm

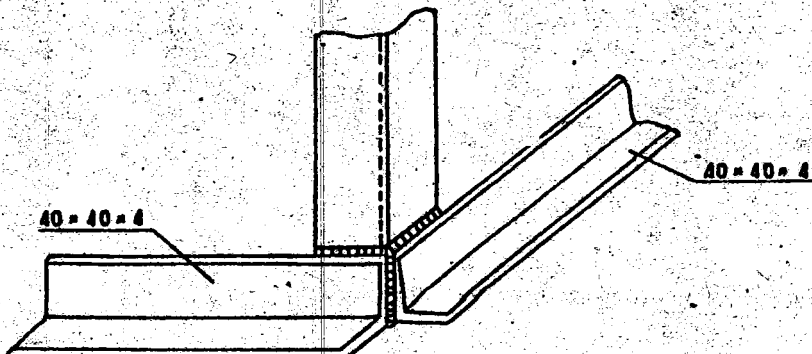
4- ZAVİLERDE : 100 mm.

NOT: EK YERİNE GELEN ÇAPRAZLAR

DİKME İRTİBAT CİVATALARINDAN

BİR TANESİYLE İRTİBATLANACAKTIR.

TABAN KÖŞEBENTİ İRTİBATI



KAYNAK KALINLIĞI 3 mm.

KAYNAK BOYU ŞEKİLDE

GÖSTERİLDİĞİ UZUNLUKTA

OLACAKTIR.

IV. BÖLGE DİREK AĞIRLIK ANALİZLERİ

IV/29

	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 50 × 50 × 5	3.77	40	151	48	181	56	211	64	241	72	272	72	272
50 × 50 × 7	6.56											8	53
65 × 65 × 7	6.83												
70 × 70 × 7	7.38												
ÇAPRAZLAR 40 × 40 × 4	2.42	37	90	44	107	56	136	66	160	76	184	85	206
40 × 40 × 5	2.97												
50 × 50 × 5	3.77												
KORKULUK 40 × 40 × 4 φ 10	2.42	1.1	3	1.2	3	1.30	3	1.4	4	1.5	4	1.6	4
	0.617	4.8	3		3		3		3		3		3
EK 50 × 50 × 5	3.77	0.8	3	0.8	3	1.6	6	1.6	6	1.6	6	2.6	10
60 × 60 × 6	5.42												
60 × 6	2.84												
70 × 8	4.42												
80 × 8	5.05												
80 × 10	6.32												
TOPLAM		250		297		359		414		469		548	
KAYNAK - % 3		8		9		11		12		14		16	
GENEL TOPLAM		258		306		370		426		473		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 50 × 50 × 5	3.77	40	151	48	181	56	211	64	181	48	181	48	181
60 × 60 × 6	5.42							16	87	24	130	32	174
65 × 65 × 7	6.83												
70 × 70 × 7	7.38												
ÇAPRAZLAR 40 × 40 × 4	2.42	45	109	58	141	74	179	85	206	101	245	113	274
40 × 40 × 4	2.97												
50 × 50 × 5	3.77												
KORKULUK 40 × 40 × 4 φ 10	2.42	2.1	5	2.4	6	2.8	7	3.2	8	3.5	9	3.8	9
	0.617	4.3	3		3		3		3		3		3
EK 50 × 50 × 5	3.77	0.8	3	0.8	3	1.6	6	1.6	6	1.6	6	1.6	6
60 × 60 × 6	5.12											0.8	4
60 × 6	2.84												
70 × 8	4.42												
80 × 8	5.05												
80 × 10	6.32												
TOPLAM		271		334		406		491		574		651	
KAYNAK - % 3		8		10		12		15		17		20	
GENEL TOPLAM		278		344		418		506		591		671	

	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.
DİKMELER 50×50×5	3.77	40	151	48	181	56	211	48	181	48	181	48	181
60×60×6	5.42							16	81	24	130	32	174
65×65×7	6.83												
70×70×7	7.38												
ÇAPRAZLAR 40×40×4	2.42	50	121	67	162	86	208	102	247	120	291	140	339
40×40×5	2.97												
50×50×5	3.77												
KORKULUK 40×40×4 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 50×50×5	3.77	0.8	3	0.8	3	1.6	6	1.6	6	1.6	6	1.6	6
60×60×6												0.8	4
60×6	2.84												
70×8	4.42												
80×8	5.05												
80×10	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	

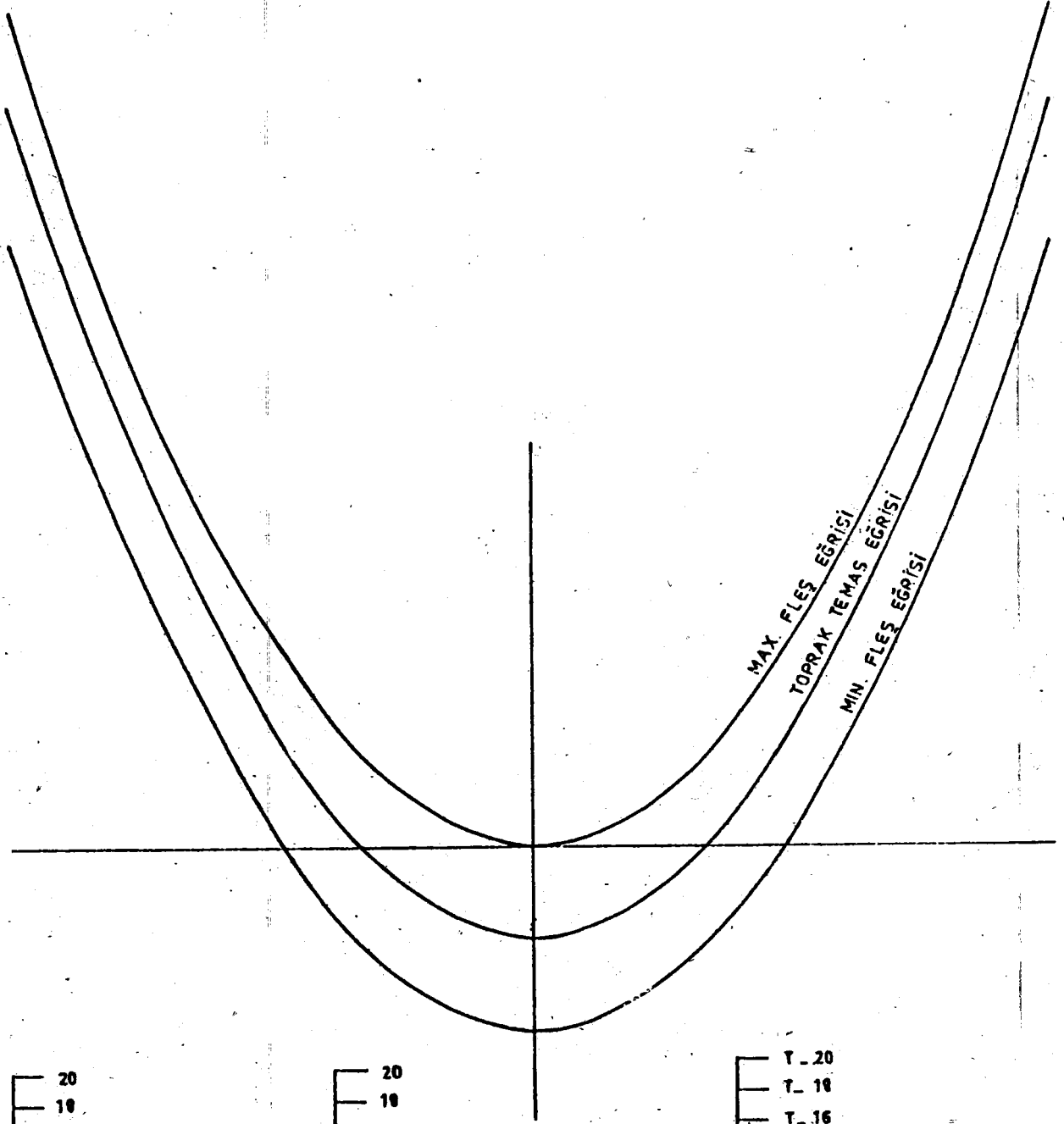
	kg/m	Z _ 10		Z _ 12		Z _ 14		Z _ 16		Z _ 18		Z _ 20	
		m.	kg.	m.	kg.	m.	kg.	m.	kg.	m.	kg.	m.	kg.
DİKMELER 50×50×5	3.77	24	91	24	91	24	91	24	91	24	91	24	91
60×60×6	5.42	16	87	24	130	32	173	40	217	48	260	56	304
65×65×7	6.83												
70×70×7	7.38												
ÇAPRAZLAR 40×40×4	2.42	57	138	72	173	88	213	105	254	130	315	150	363
40×40×4	2.97												
50×50×5	3.77												
KORKULUK 40×40×4 φ 10	2.42	2.5	6	3	8	3.5	9	4	10	4.4	11	5	12
	0.617	4.8	3		3		3		3		3		3
EK 50×50×5	3.77	0.8	3	0.8	3	1.6	6	0.8	3	0.8	3	0.8	3
60×60×6	5.42							0.8	5	0.8	5	6	9
60×6	2.84												
70×8	4.42												
80×8	5.05												
80×10	6.32												
TOPLAM		328		408		495		583		688		785	
KAYNAK - % 3		10		12		15		18		21		24	
GENEL TOPLAM		338		420		510		601		709		809	

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
40×40×4	2.48	14	34	17	41	21	51	26	63	15	36	18	44
50×50×5	3.77												
60×60×6	5.42	0.4	2		2		2	5	2		5		5
LAMA 80×10	6.32	0.6	4		4		4		4		10		10
LAMA 50×5	1.96	0.48	1		1		1		1		1		1
TOPLAM			41		48		53		70		52		60
CIVATA 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_ 450		D_ 400	
		ME. İZOLAT.		ME. İZOLAT.		GER. İZOLAT.		GER. İZOLAT.		GER. İZOLAT.		GER. İZOLAT.	
		m.	kg.	m.	kg.	m.	kg.	m.	kg.	m.	kg.	m.	kg.
40×40×4	2.42	20	49	26	63		36		40		49		63
50×50×5	3.77												
60×60×6	5.42		5		5		5		5		5		5
LAMA 80×10	5.32		10		10		8		8		8		8
LAMA 50×5	1.96	0.6	1		1								
TOPLAM			65		78		49		57		62		76
CIVATA KAYNAK %3 ~			2		2		2		2		2		3
GENEL TOPLAM			67		80		51		59		64		79

IV. BÖLGE — 3xSWALLOW (AWG-3)
 $\sigma = 11 \text{ kg/mm}^2$



20
18
16
14
12
10

--- 0 (ÜÇGEN TERTİP)
 0 (DÜZ TERTİP)
 D-N-Z
 GERİ İZOLATÖRLÜ

20
18
16
14
12
10

--- 0 (ÜÇGEN TERTİP)
 0 (DÜZ TERTİP)
 D-N-Z
 MESNET İZOLATÖRLÜ

T-20
T-18
T-16
T-14
T-12
T-10

--- 0 (ÜÇGEN TERTİP)
 0 (DÜZ TERTİP) TAŞIVICI

ÖLÇEK: 1/400 — 1/2000