



İBE — 115 : 1976  
İLLER BANKASI  
TİP PROJELERİ

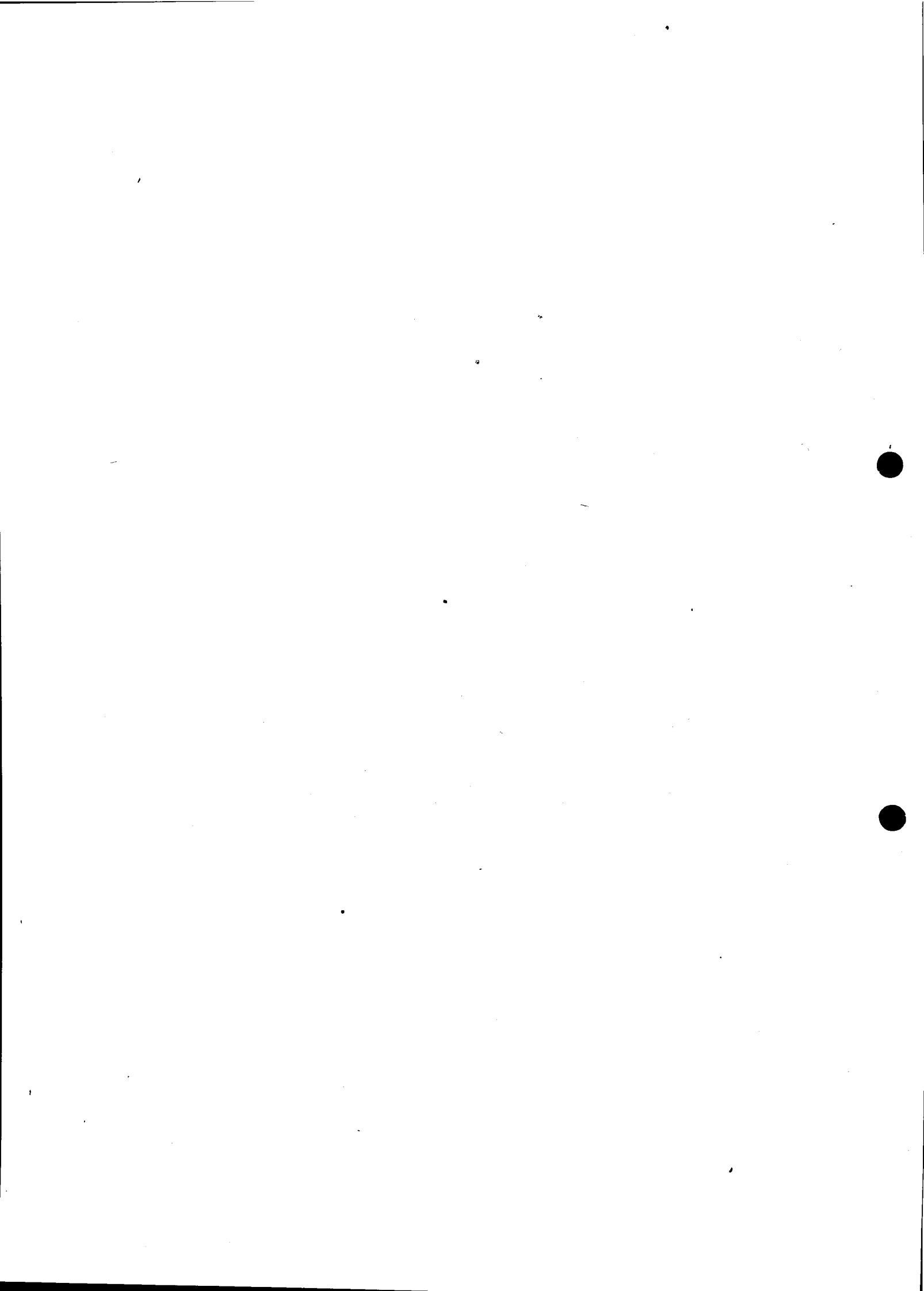
# KULE ÇIKIŞLI 4 HÜCRELİ 6,3-15 KV. TRANSFORMATÖR BİNASI

(BANKA İÇİN BASTIRILMIŞTIR.)

## İ Ç İ N D E K İ L E R

## PLÂN NO:

MONTAJ PLÂNI .....	1/39
MİMARİ PROJESİ .....	1/40
BETONARME RESİMLERİ .....	1/41
BETONARME HESAPLARI .....	1/42
KAPI VS. DETAY PLÂNLARI .....	1/60

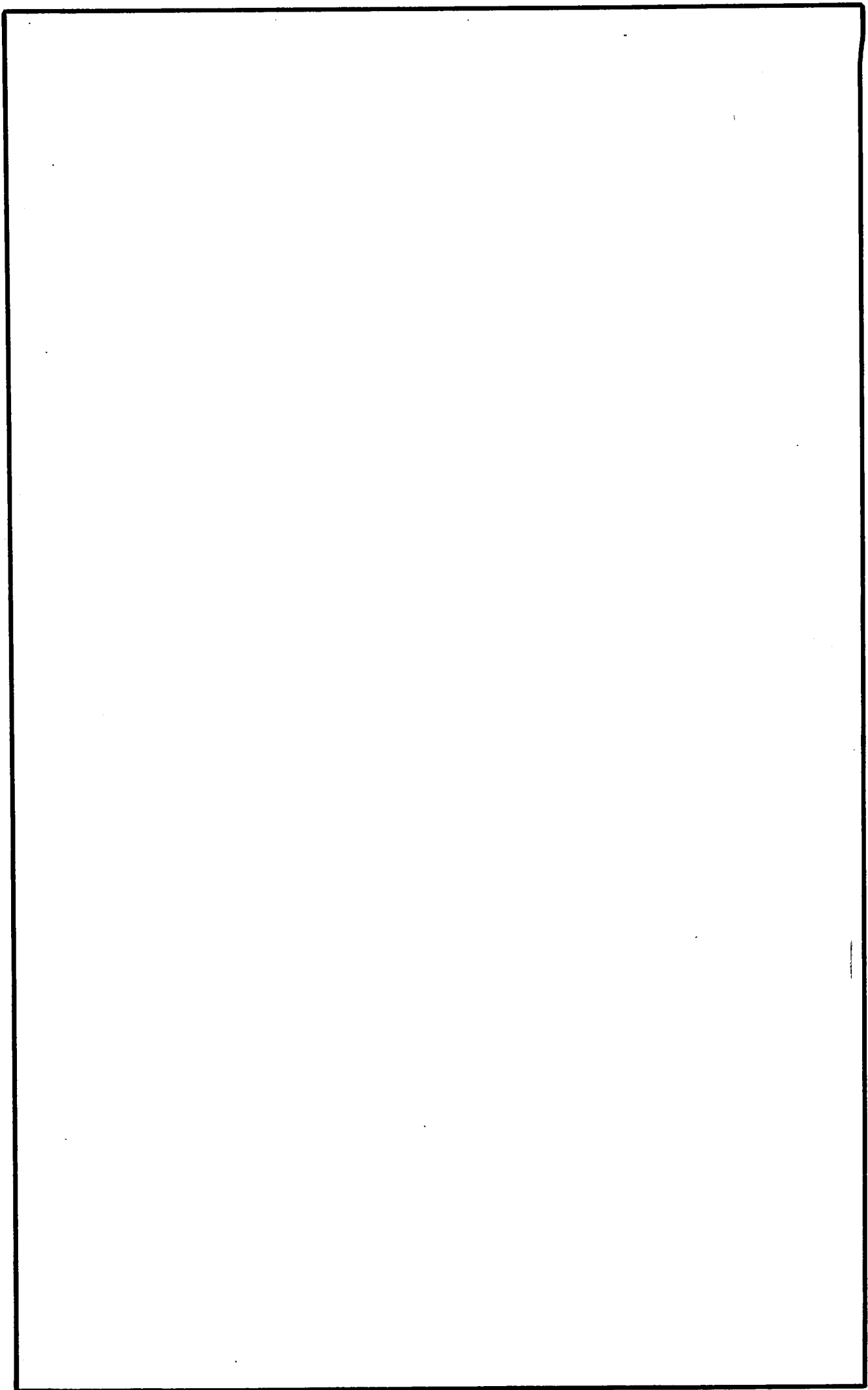


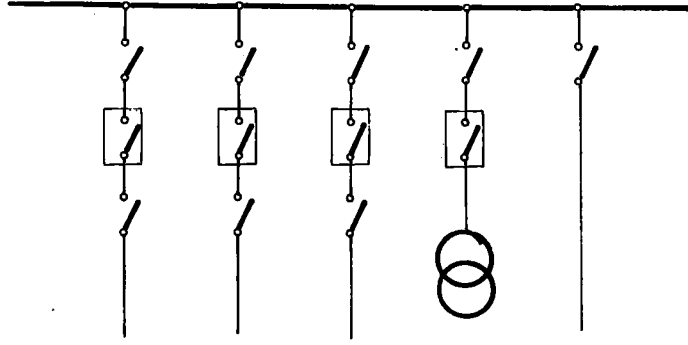
İLLER BANKASI

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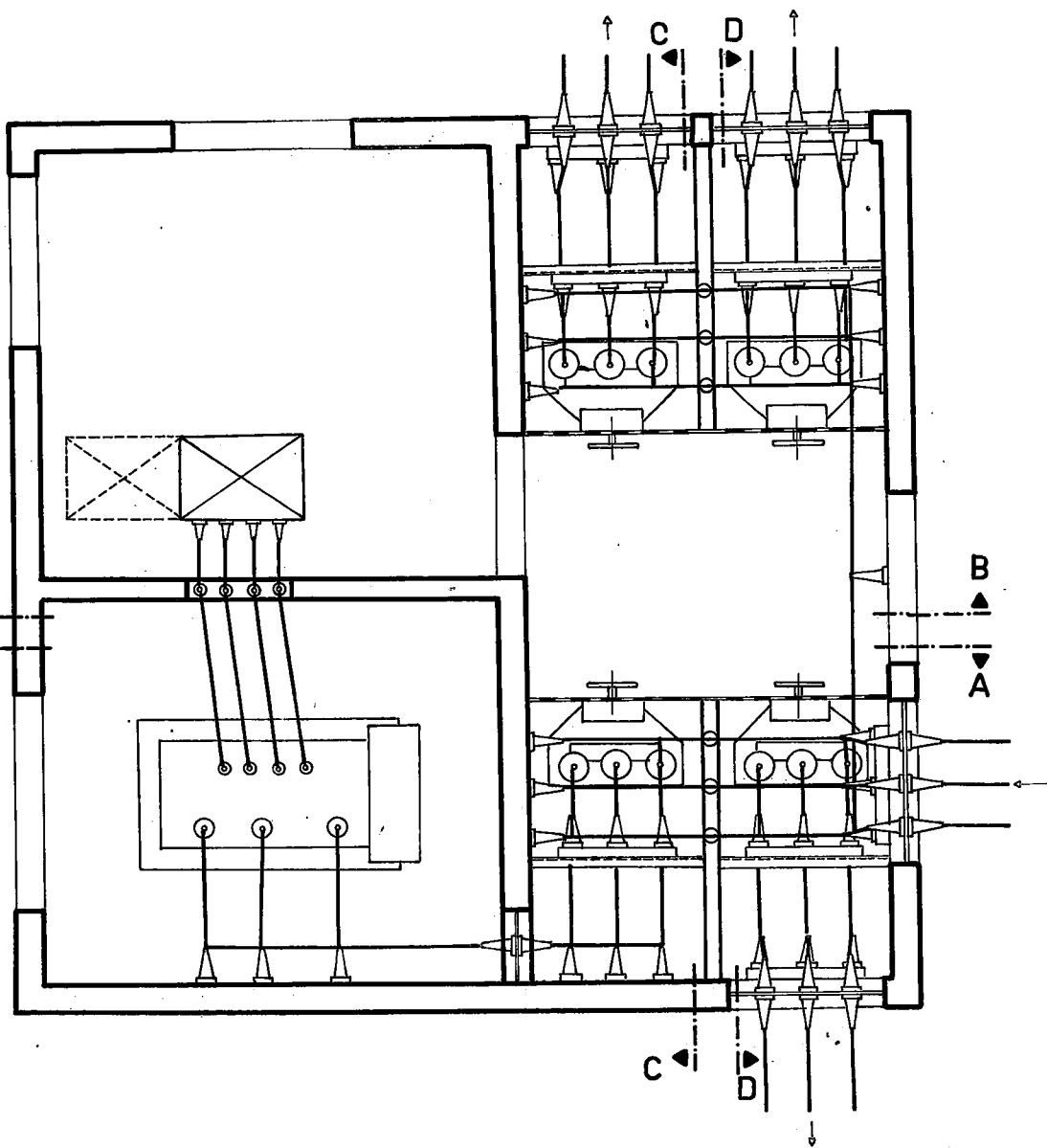
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DEĞİŞİKLİK			TARİH	İMZA
a)				
b)				
6.3 -15 kV 4 HÜCRELİ KULE ÇIKIŞLI TİP TRANSFORMATÖR BİNASI MONTAJ PLÂNI			ÖLÇEK :	
			NO.LU PLÂN İPTAL EDİLDİ	
			NO.LU PLÂN İPTAL EDİLDİ	
			PLÂN NO 115 - 1/39	
PROJİYİ YAPANIN, DİPL. NO, ÜNVANI, ADI, SOYADI	İMZA	İMZA TARİHİ		ARŞİV KAYIT NO
Yük. MÜH HÜSEYİN BODUR OPA NO : 343				
ÇİZEN : SAVAŞ BAYIR.				

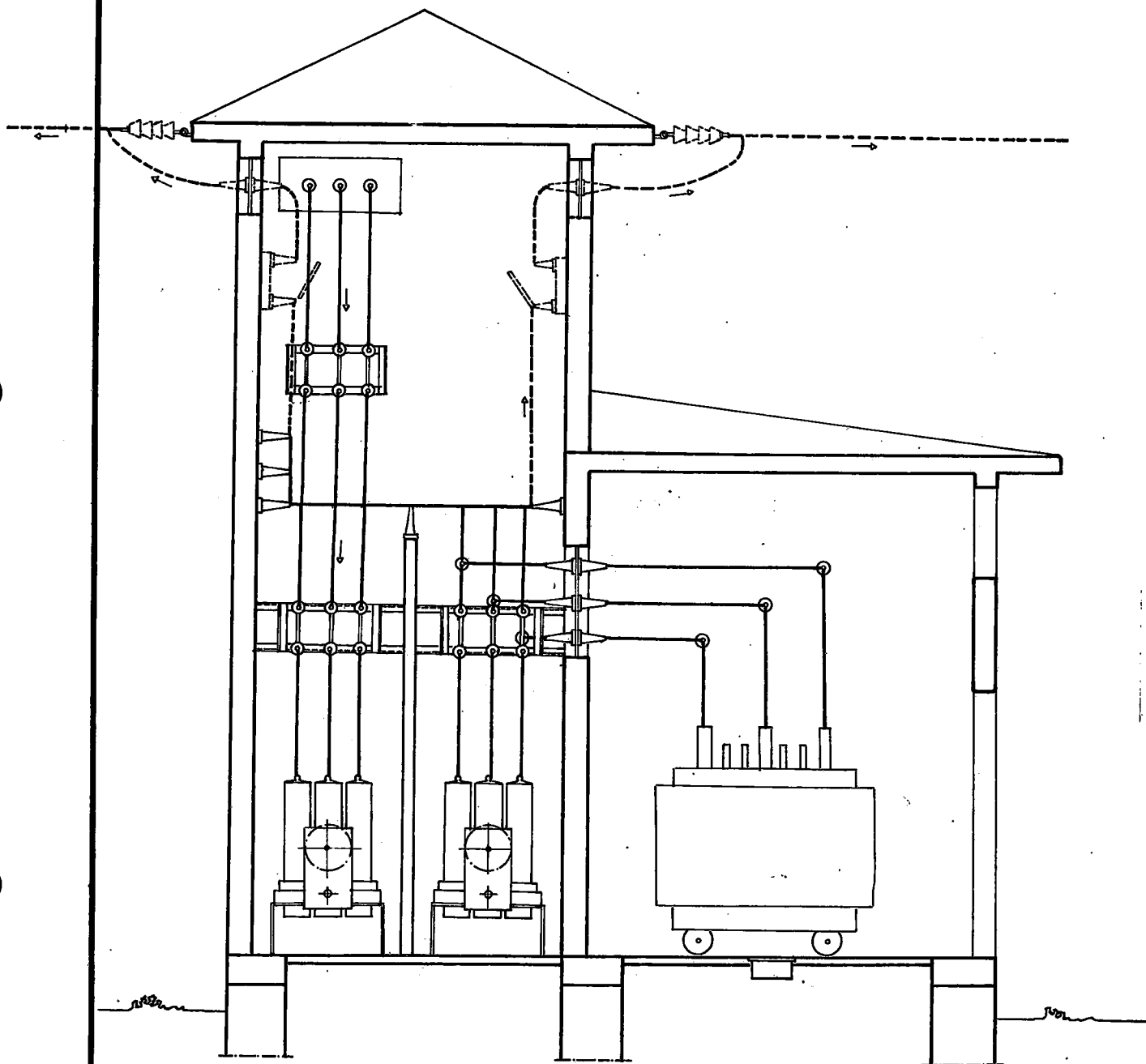




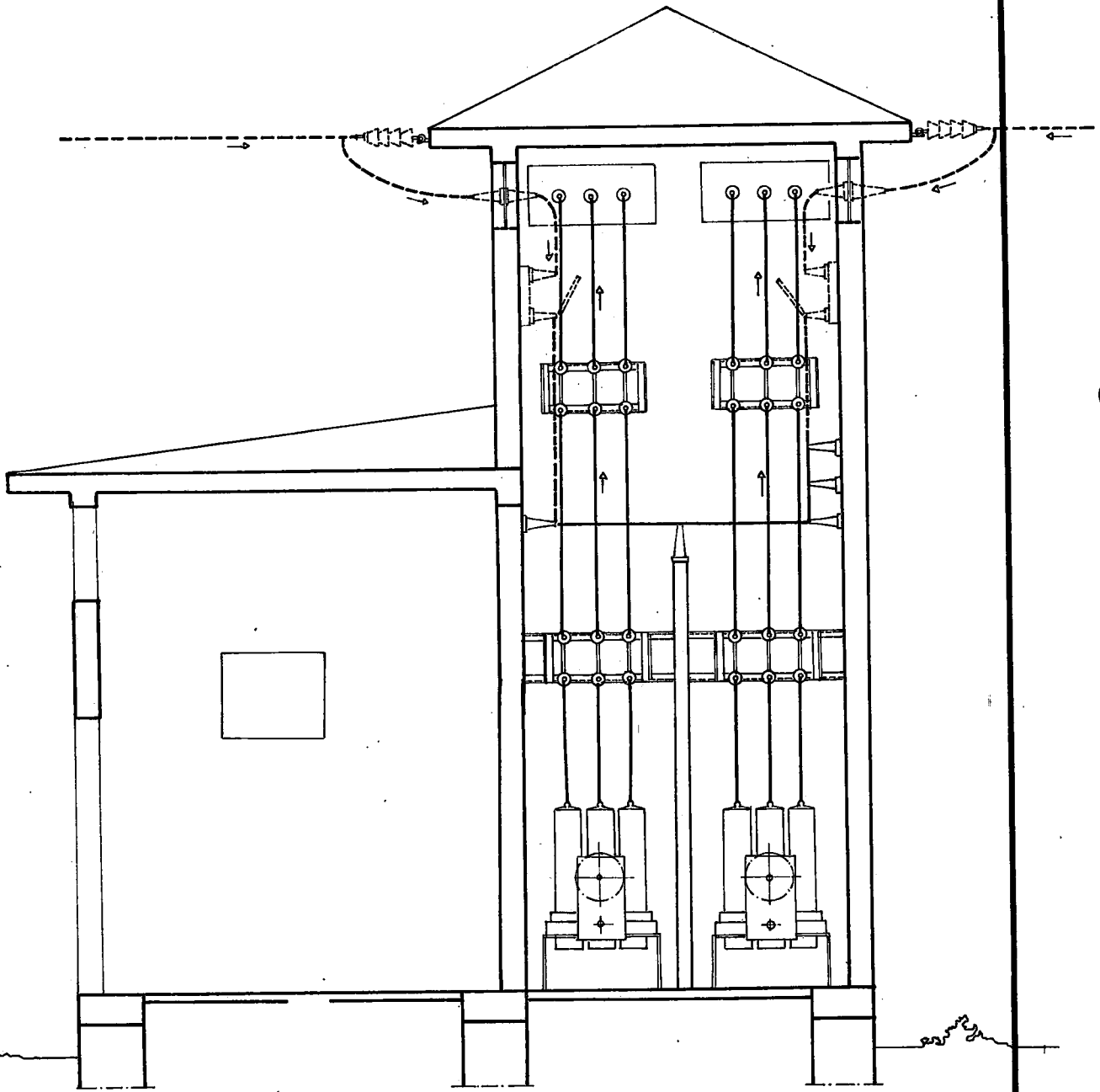
ŞALT ŞEMASI



PLÂN

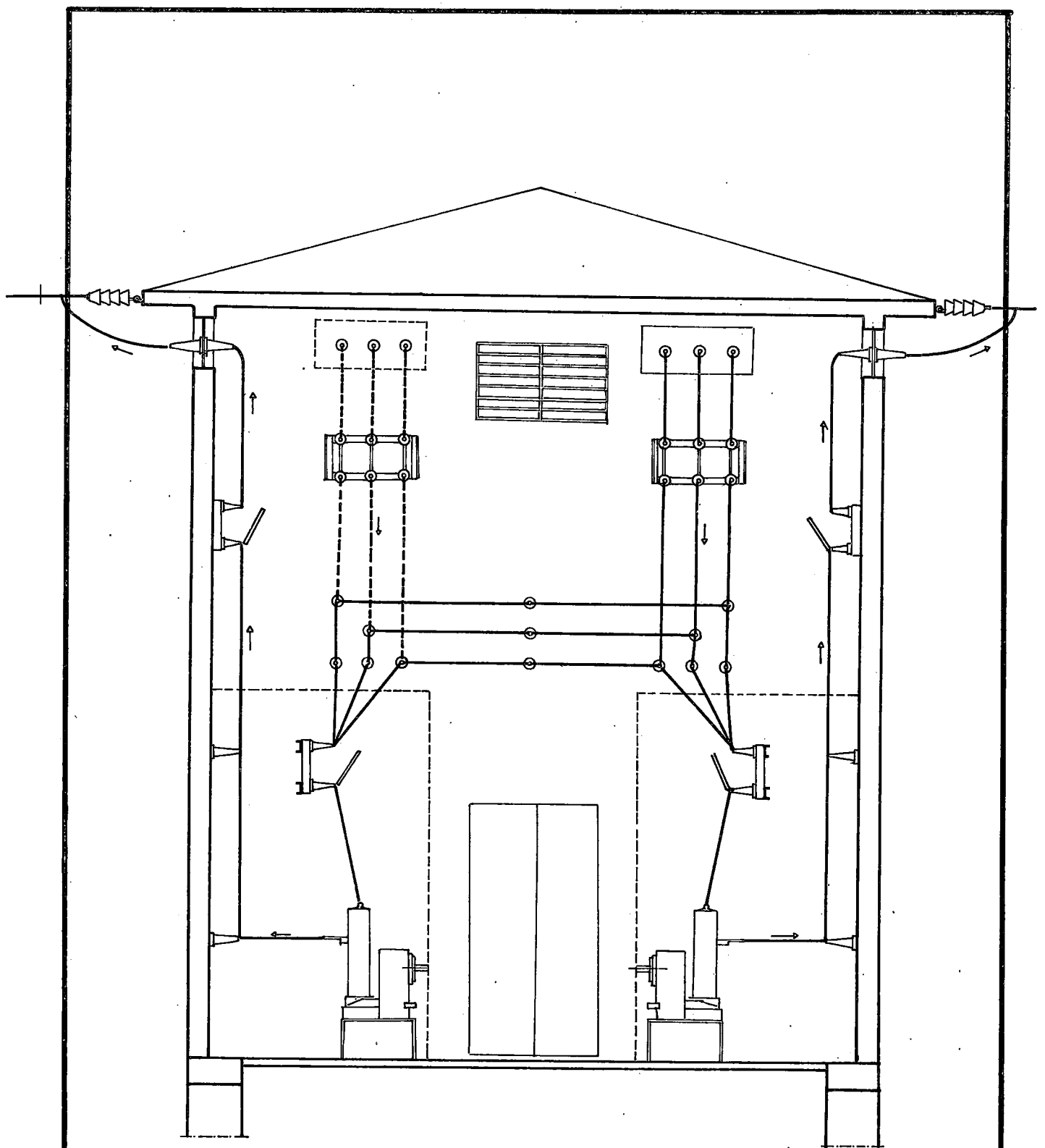


A-A KESİTİ

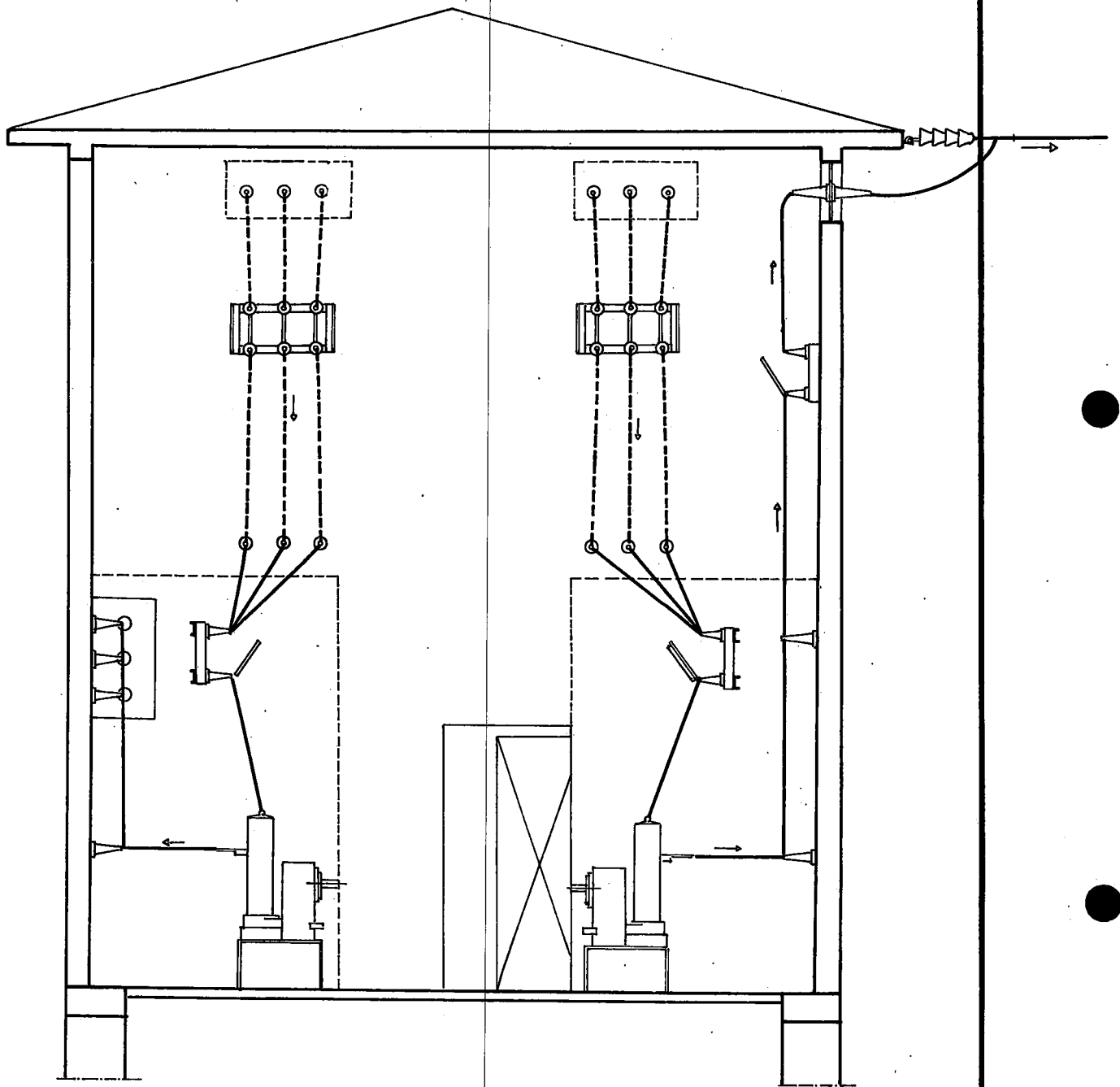


B-B KESİTİ





C - C KESİTİ



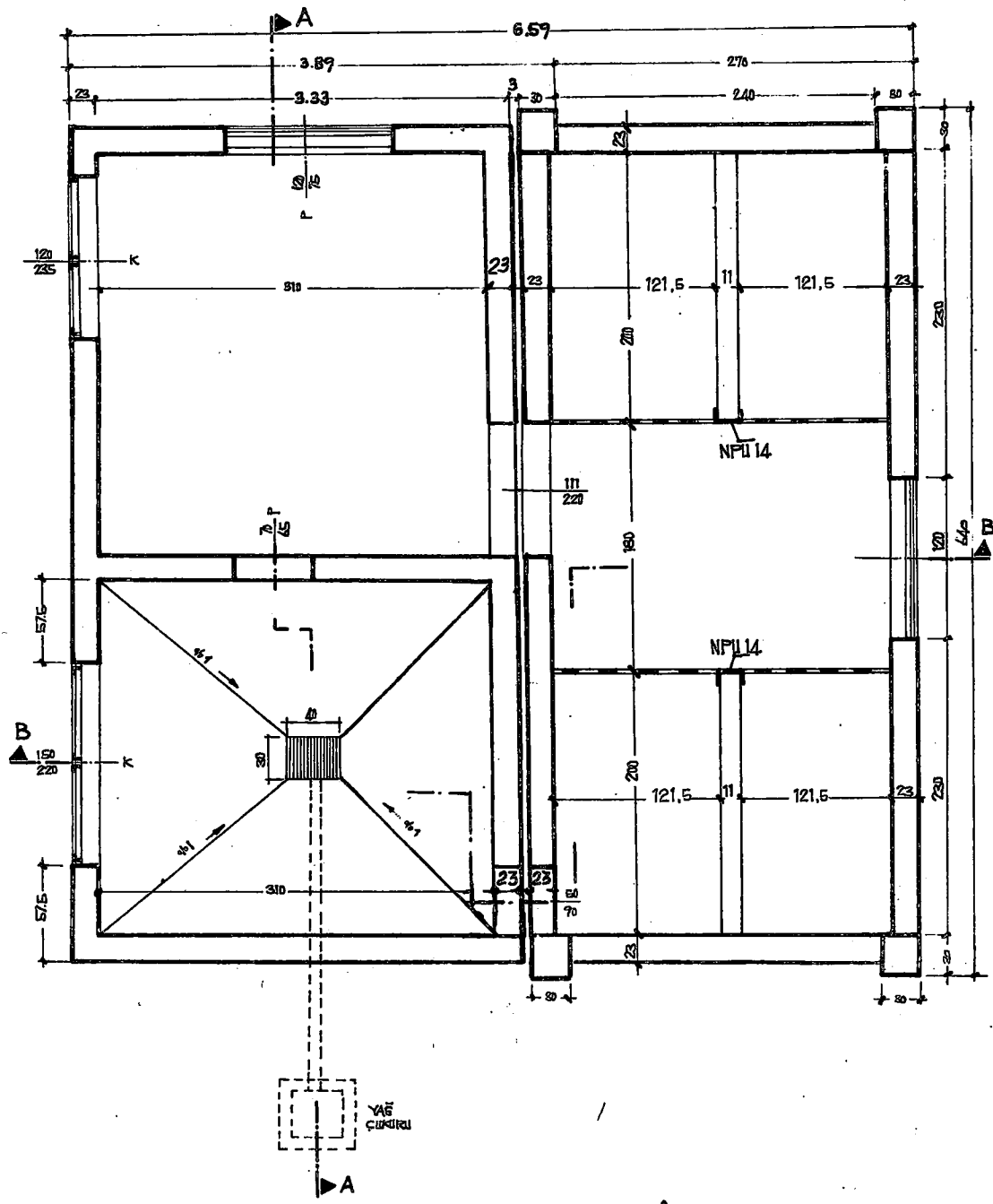
D - D KESİTİ

## İLLER BANKASI

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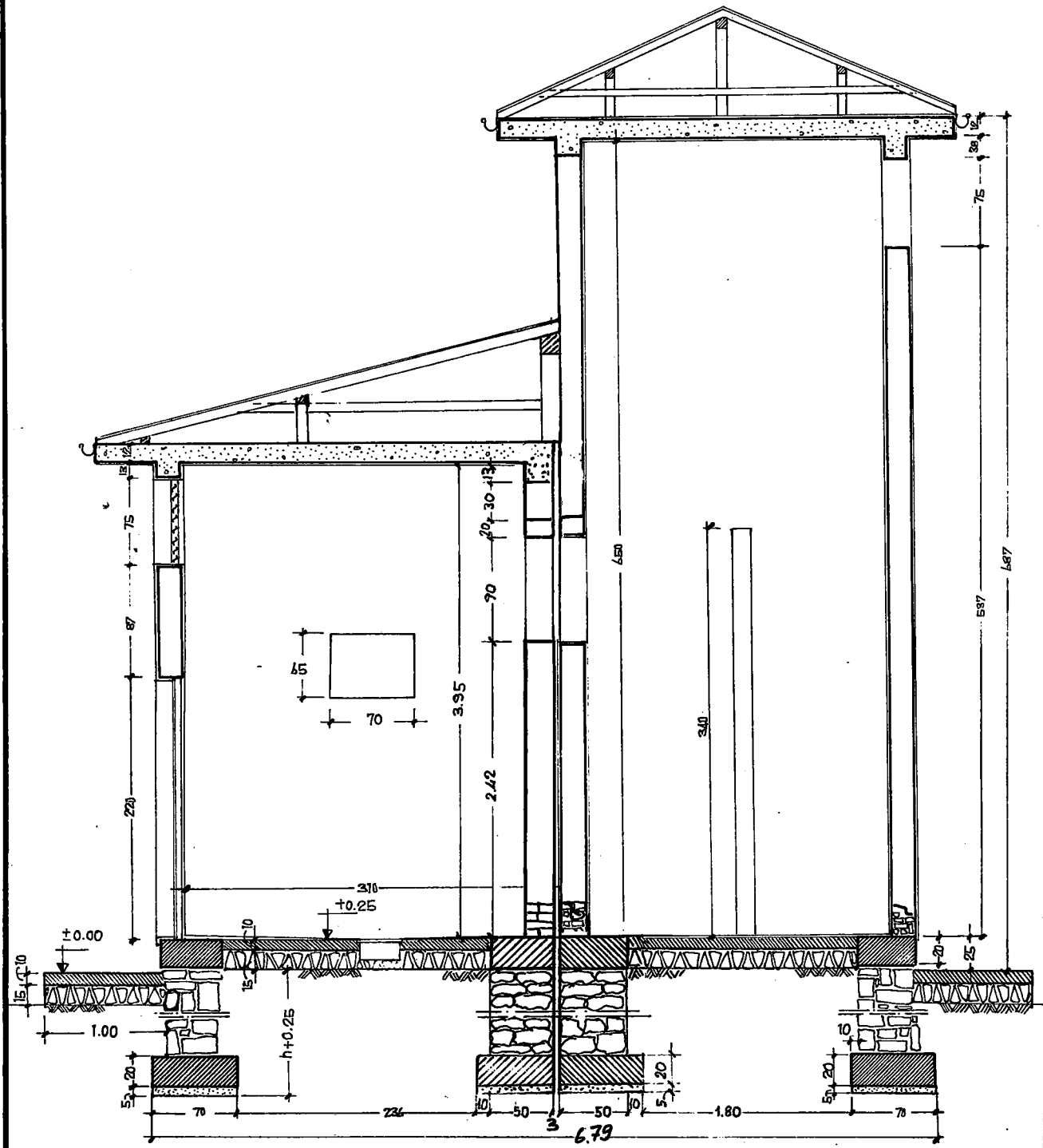
DEĞİŞİKLİK			TARİH	İMZA
a)			16.7.1975	
b)				
<p style="text-align: center;"><b>6,3-15kV KULE ÇIKIŞLI 4 HÜCRELİ TİP TRANSFORMATÖR BİNASI MİMARİ PROJESİ</b></p>			ÖLÇEK : 1/50	
			NO. LU PLÂN İPTÂL EDİLDİ	
			NO. LU PLÂN İPTÂL EDİLDİ	
Projeyi Yapanın Dip. No. Unvanı Adı Soyadı	İMZA	İMZA TARİHİ	<p style="text-align: center;"><b>İLLER BANKASI ENERJİ DAİRESİ REİSLİĞİ</b></p>	PLÂN NO. : <b>15- 1/40</b>
<p style="text-align: center;">YÜK.İNŞ. MÜH. ÇETİN PEKİNER ODA NO:8730 DİPL.NO:7493 TEL: 17 4701</p>				ARŞİV KAYIT NO. :
ÇİZEN :				

0.50m.2

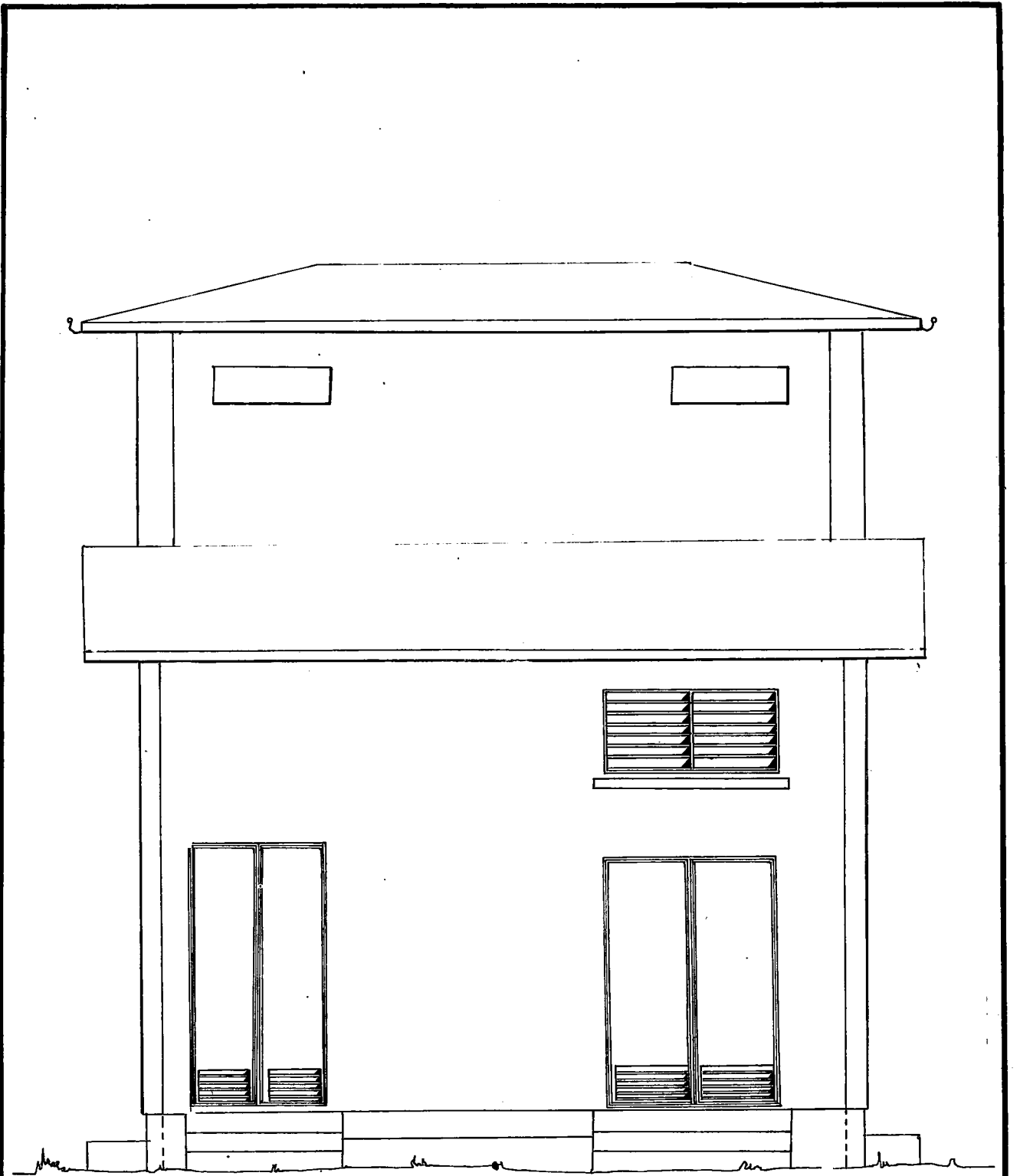


PLÂN

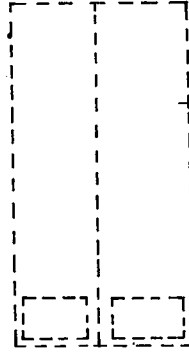
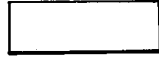
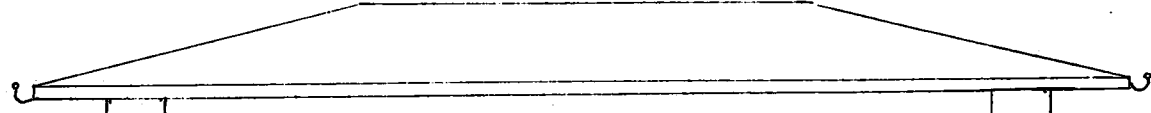




B-B KESİTİ



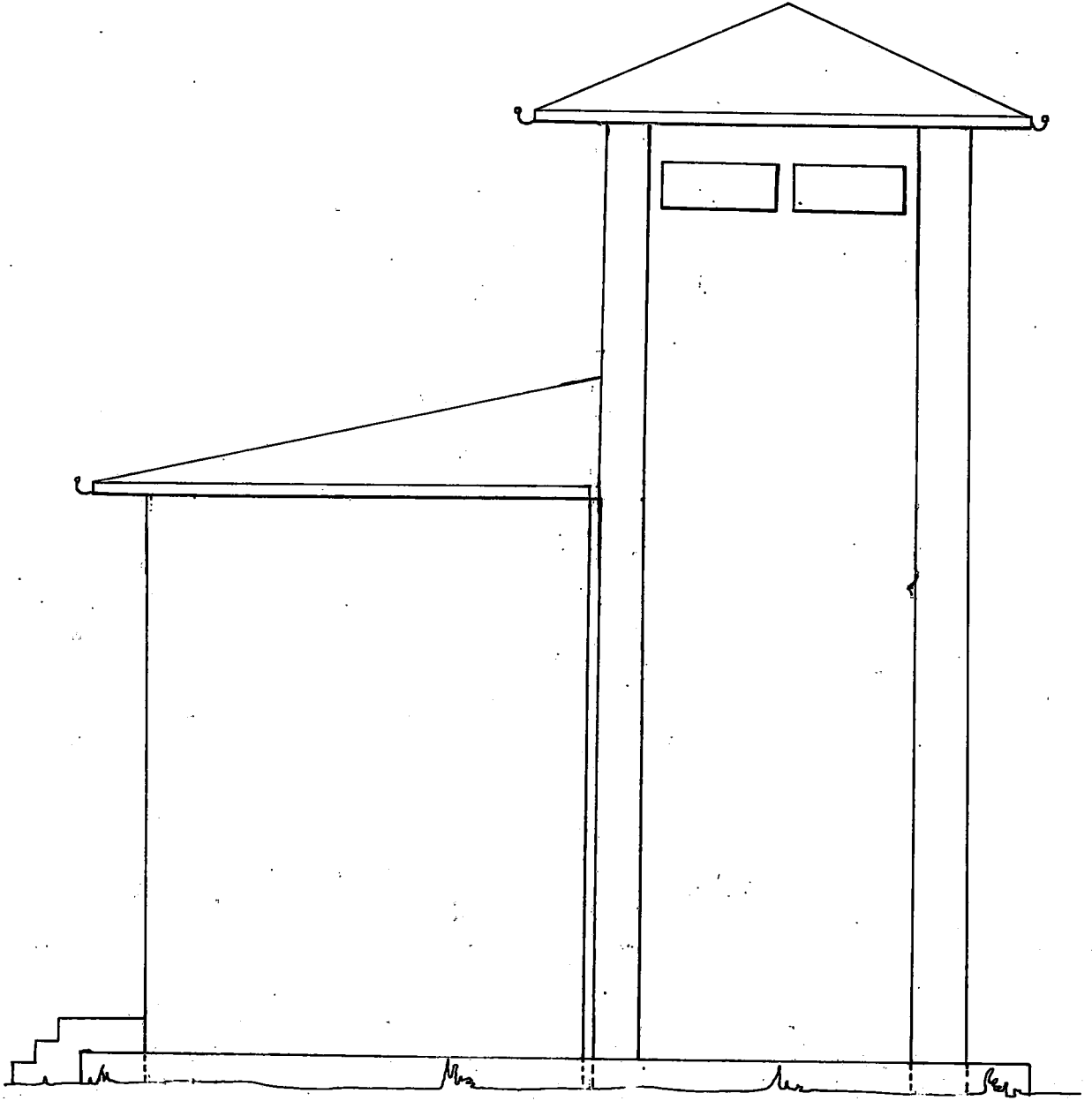
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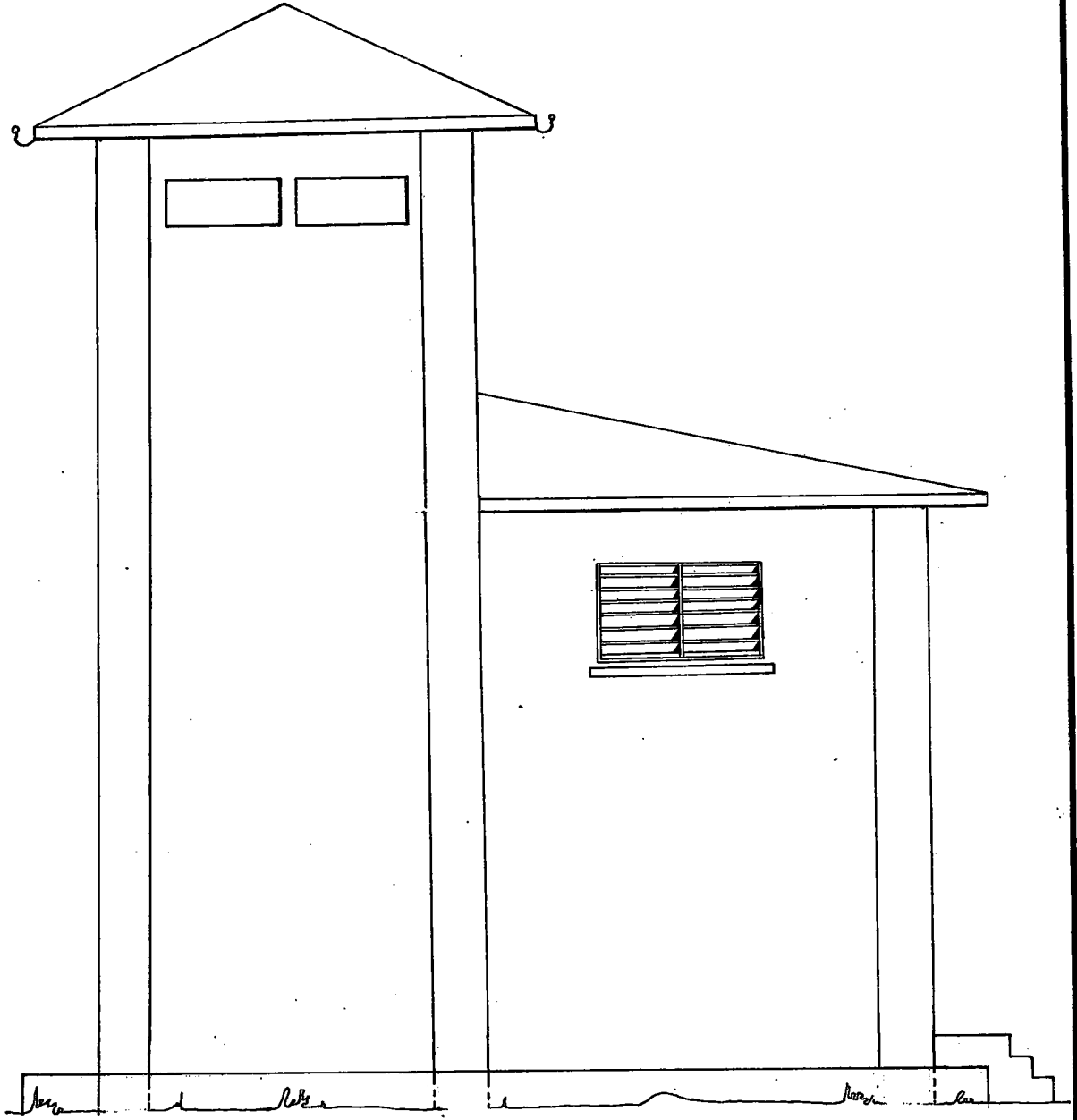
AYRICA İSTENİDİĞİ  
YAKIRDE KAPI

ARKA GÖRÜNÜŞ





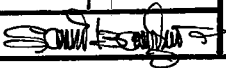
SAĞ YAN ÇEPHE

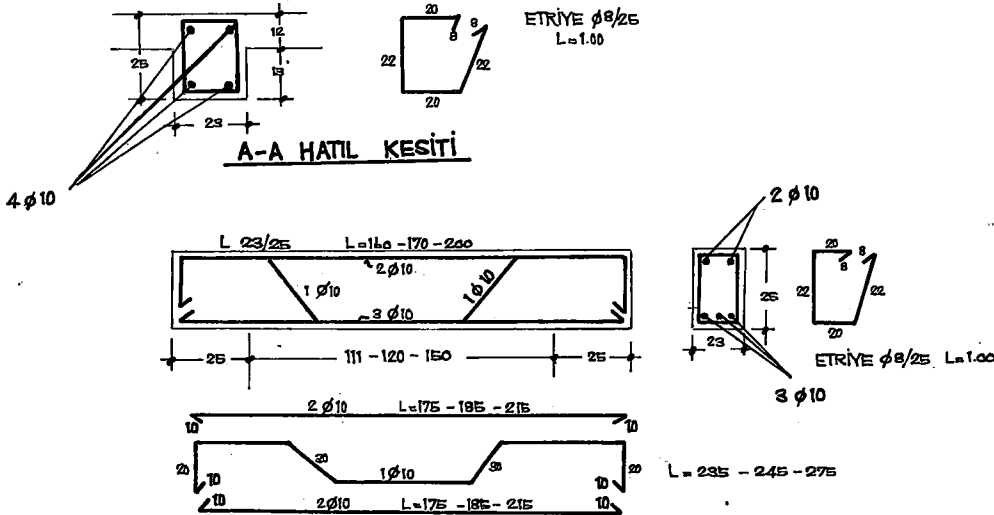
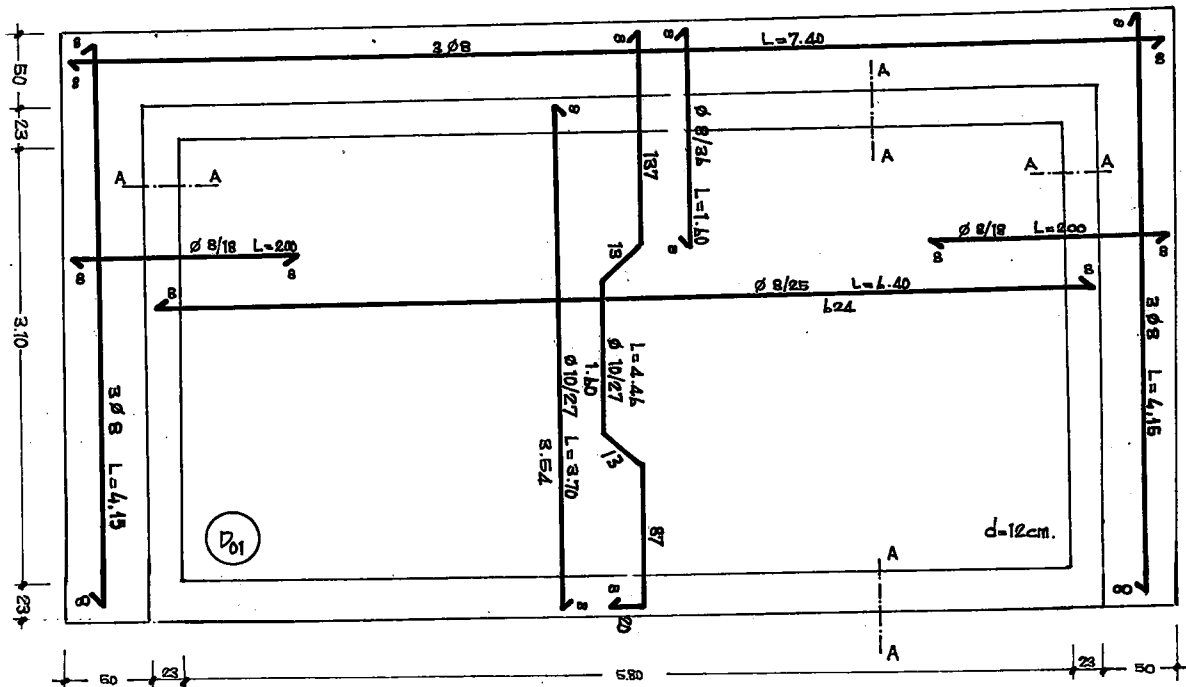


SOL YAN ÇEPHE

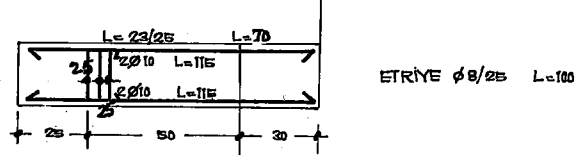
İLLER BANKASI

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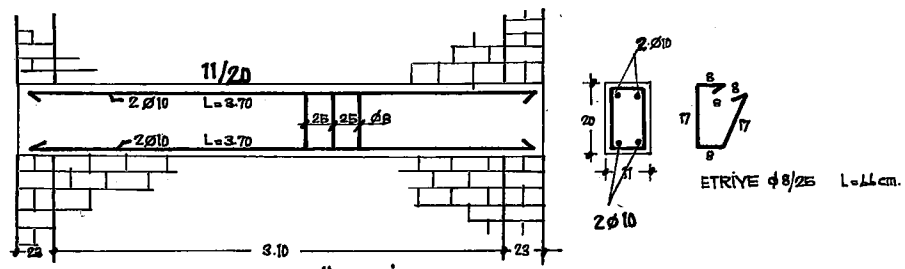
DEĞİŞİKLİK			TARİH	İMZA
a)			16.7.975	
b)				
6.3-15 kv. 4 HÜCRELİ KULE ÇIKIŞLI TİP TRANSFORMATÖR BİNASI BETONARME RESİMLERİ			ÖLÇEK 1/50	
			NO.LU PLÂN İPTAL EDİLDİ	
			NO.LU PLÂN İPTAL EDİLDİ	
PROJİYİ YAPANIN, DİP. NO, ÜNVANI, ADI, SOYADI	İMZA	İMZA TARİHİ	İLLEER BANKASI	PLÂN NO 115 1 / 41
Yük. İnş. Müh. ŞETİN PEKİNER. DPA NO: 8730 - DİP. NO: 4753 TELEFON: 174701			ENERJİ DAİRESİ REİSLİĞİ	ARŞİV KAYIT NO
ÇİZEN: SAVAS BAYIR. 				



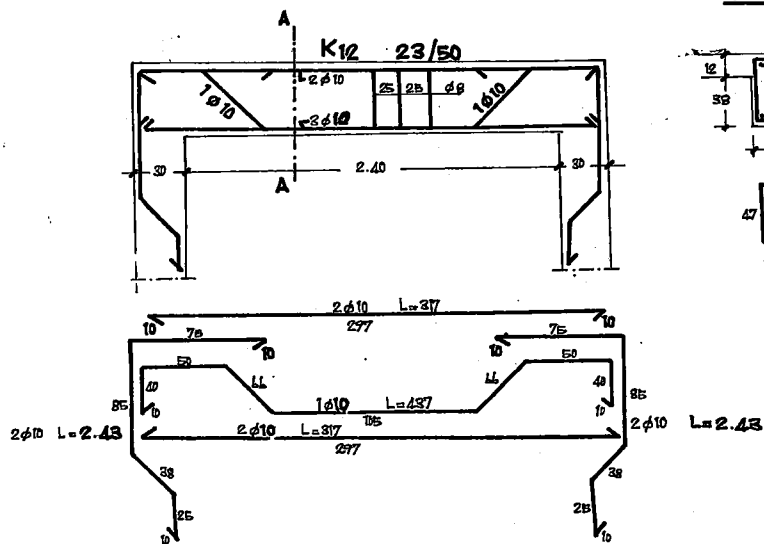
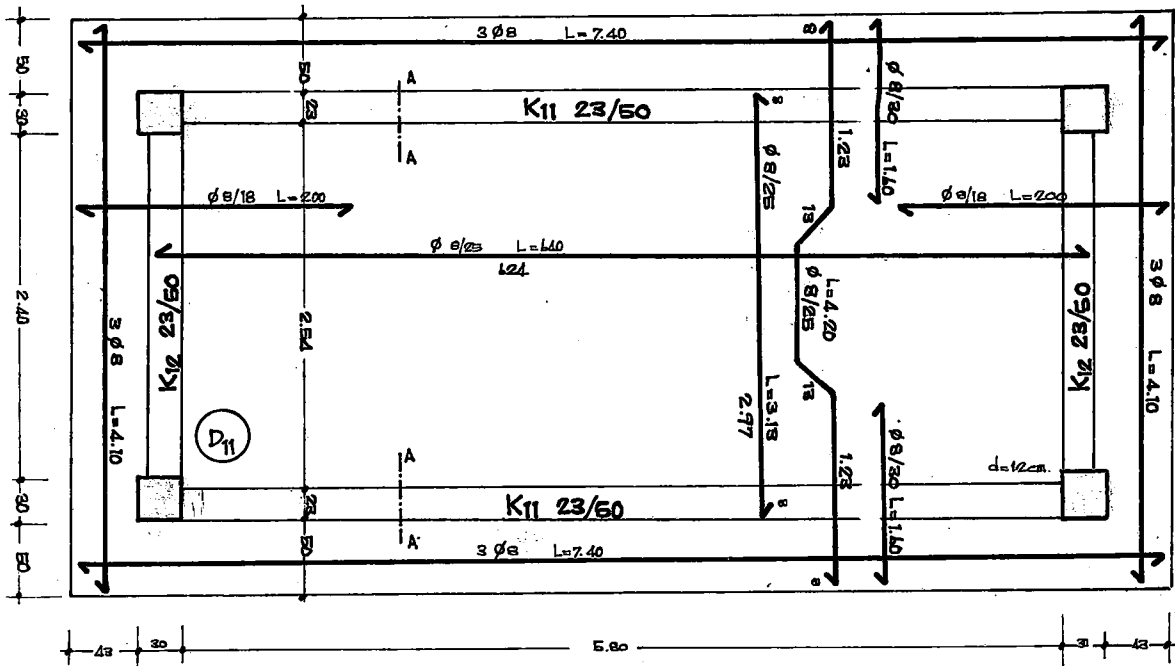
**111/220 - 120/235 - 150/220 KAPI LENTOLARI**



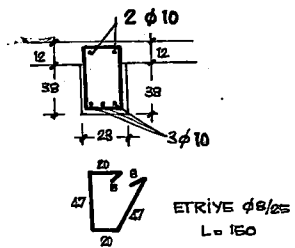
**50/90 PENCERE LENTOLARI**



**TRAFO ARA BÖLMESİ**  
**YARIM TUĞLA DUVAR ARA HATILI**

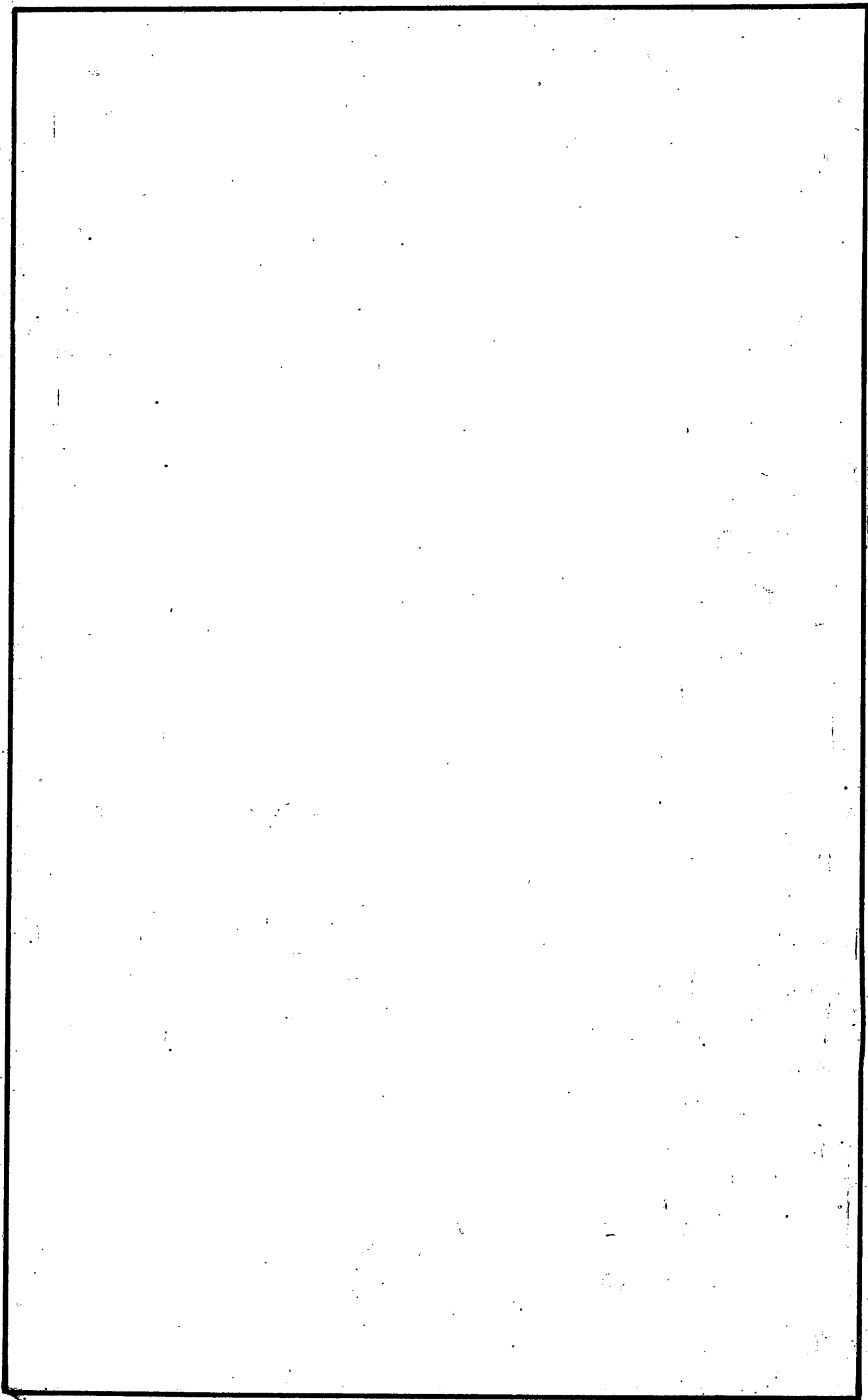


**A-A KESİTİ**



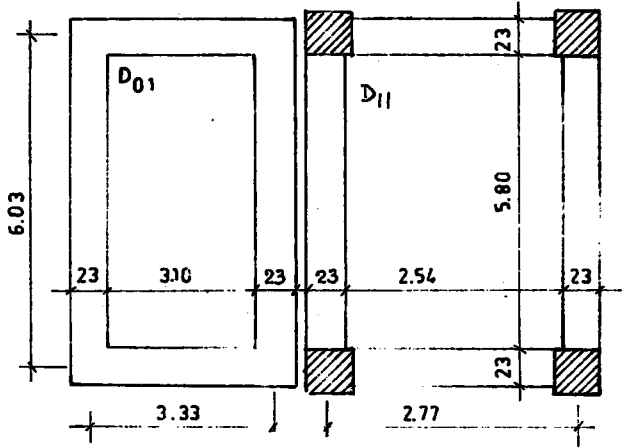








**15 KV\_4 HÜCRELİ ÇIKIŞLAR KULELİ  
TRANSFORMATÖR BİNASI BETONARME HESAPLARI**



MALZEME St I B 160

YÜK : DÖŞEME ZATI =  $0.12 \times 2.4 = 0.288 \text{ t/m}^2$ SIVA =  $0.057 \text{ t/m}^2$ CATI =  $0.100 \text{ t/m}^2$ KAR. =  $0.075 \text{ t/m}^2$  $p = q = 0.520 \text{ t/m}^2$ 

D<sub>01</sub> DÖŞEMESİ      $\epsilon = \frac{6.03}{3.33} = 1.81$  TEK DOĞRULTU

$$M = \frac{0.520 \times 3.33^2}{8} = 0.72 \text{ tm.} \quad h = 10 \text{ cm.} \quad G_b = 4\theta \text{ Kg/cm}^2 \quad f_e = 5.80 \text{ cm}^2$$

DONATI  $\phi 10/13^5$  (1 düz 1 plye)DİĞER DOĞRULTU TEVZİ  $\phi 8/25$ 

D<sub>11</sub> DÖŞEMESİ

$$\epsilon = \frac{6.03}{2.77} = 2.18$$

h = 10 cm.      $G_b = 38 \text{ Kg/m}^2$ 

TEK DOĞRULTU:      $M = \frac{0.520 \times 2.77^2}{8} = 0.50 \text{ tm.}$

f<sub>e</sub> = 3.95 cm donatı  $\phi 8/12^5$ DİĞER DOĞRULTU TEVZİ :  $\phi 8/25$ 

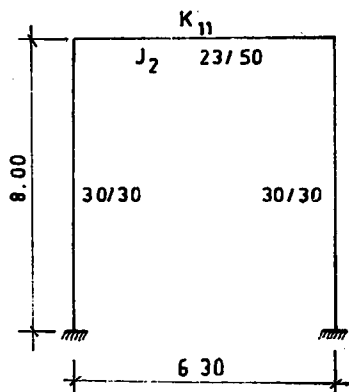
SACAĞ TAHKİKİ

$$M = \frac{0.52 \times 0.62^2}{2} = 0.10 \text{ tm.}$$

min. DONATI  $\phi 8/18$ 

ÇERÇEVE HESABI :

SİSTEM HER İKİ İSTİKAMETTE ÇERÇEVE OLARAK HESAPLANACAK.

KİRİŞ ATALET MOMENTİ  $b = 2.25 d + b_1 = 2.25 \times 12 + 23 = 50 \text{ cm.}$ 

$$\frac{b_o}{b} = \frac{23}{50} = 0.46$$

$$\frac{d}{d_o} = \frac{12}{50} = 0.42$$

M = 18.7

$$J = \frac{50 \times 50^3}{1.87} = 33.42 \text{ dm}^4$$

$$J_1 = \frac{3.0^4}{12} = 6.75 \text{ dm}^4$$

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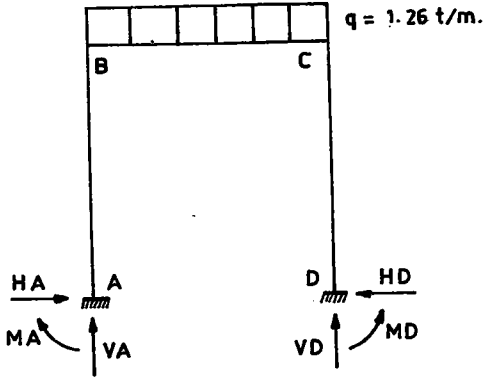
1/42

$$K = \frac{J_2}{J_1} \cdot \frac{h}{l} = \frac{33.42}{6.75} \cdot \frac{8.00}{6.03} = 6.6$$

$$N_1 = 6.6 + 2.0 = 8.6$$

$$N_2 = 6 \times 6.6 + 1 = 40.6$$

### ZATİ YÜK:



$$\text{YÜK: Döşemeden} = 0.50 \times 0.520 \times 2.77 = 0.720 \text{ t/m.}$$

$$\text{Saçaktan} = 0.50 \times 0.520 = 0.260 \text{ t/m.}$$

$$\text{Kiriş zati} = \frac{0.23 \times 0.50 \times 2.4}{1.26} = 0.280 \text{ t/m.}$$

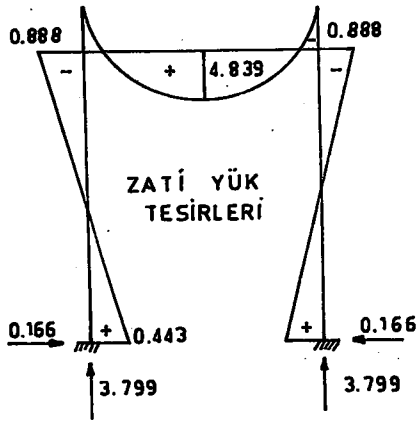
$$MA = MD = \frac{1.26 \times 6.03^2}{12 \times 8.6} = 0.443 \text{ tm.}$$

$$MB = MC = \frac{1.26 \times 6.03^2}{6 \times 8.6} = 0.888 \text{ tm.}$$

$$M_{\max} = M = \frac{1.26 \times 6.03^2}{8} - 0.888 = 4.837$$

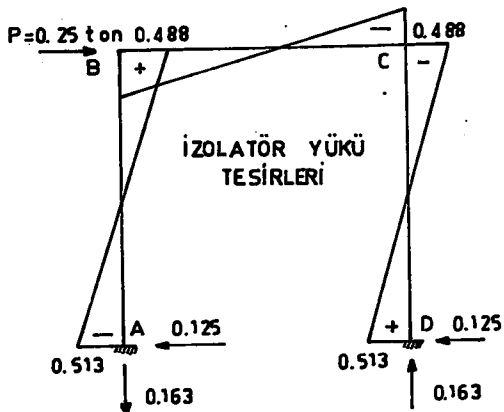
$$VA = VD = \frac{1.26 \times 6.03}{2} = 3.799 \text{ tm.}$$

$$HA = HD = \frac{3 \times 0.443}{8.00} = 0.166 \text{ tm.}$$



### İZOLATÖR YÜKÜ:

$$P = 2.50 \text{ ton.}$$



$$\begin{aligned} MA &= + \frac{0.25 \times 8.00}{2} \cdot \frac{1+3 \times 6.6}{40.6} = -0.513 \\ MD &= + \frac{0.25 \times 8.00}{2} \cdot \frac{1+3 \times 6.6}{40.6} = +0.513 \end{aligned}$$

$$\begin{aligned} MB &= + \frac{0.25 \times 8.00}{2} \cdot \frac{3 \times 6.6}{40.6} = +0.488 \\ MC &= - \frac{0.25 \times 8.00}{2} \cdot \frac{3 \times 6.6}{40.6} = -0.488 \end{aligned}$$

$$VA = VD = \frac{2 \times 0.488}{6.03} = 0.163$$

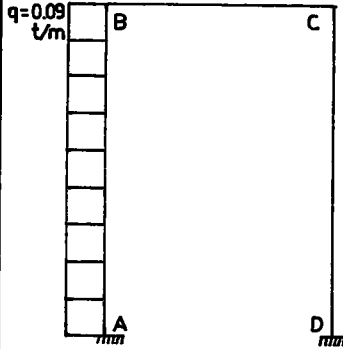
$$HA = HD = \frac{0.250}{2} = 0.125$$

**TAM RÜZGÂR :**

RÜZGÂR YÜKÜ :

$$W = 1.2 \times 50 = 60 \text{ Kg/m}^2$$

$$q = 60 \times \frac{3.00}{2} = 90 \text{ Kg/m.}$$



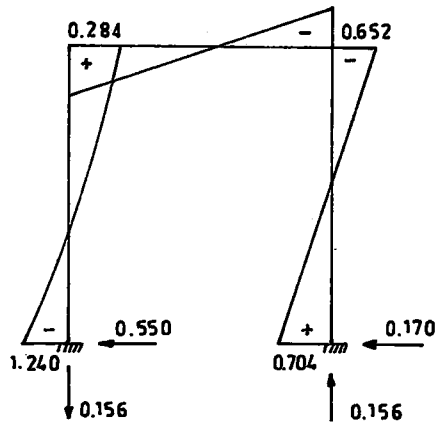
$$\begin{matrix} MA \\ MD \end{matrix} = \frac{0.09 \times 8.0^{-2}}{4} \left( -\frac{3+6.6}{6 \times 8.6} + \frac{1+4 \times 6.6}{40.6} \right) = \begin{matrix} -1.240 \\ 0.704 \end{matrix}$$

$$\begin{matrix} MB \\ MC \end{matrix} = \frac{0.09 \times 8.0}{4} \left( -\frac{6.6}{6 \times 8.6} \pm \frac{2 \times 6.6}{40.6} \right) = \begin{matrix} +0.284 \text{ tm.} \\ -0.652 \text{ tm.} \end{matrix}$$

$$VA = VD = \frac{0.09 \times 6.6 \times 8.0^{-2}}{6.03 \times 40.6} = 0.156 \text{ ton.}$$

$$HD = \frac{(0.09 \times 8.00)(3+2 \times 6.6)}{8 \times 8.6} = 0.170 \text{ ton.}$$

$$HA = -(0.09 \times 8.00 - 0.170) = -0.550 \text{ ton.}$$

**ÇERÇEVE KİRİŞİ HESABI:**

$$\frac{G_b}{G_e} = \frac{50}{1400}$$

$$M_{\max} = 483.9 \text{ tcm.}$$

$$j = \frac{d}{h} = \frac{12}{47} = 0.26$$

$$i_3 = 0.797 \quad i_6 = 137$$

$$b = \frac{137 \times 483.9}{47^{-2}} = 30 \text{ cm.} \quad \left\langle \quad b_{\max} = 4.5 \times 12 + 23 = 77 \text{ cm.} \right.$$

$$f_e = \frac{0.797 \times 483.9}{47} = 8.2 \text{ cm}^2$$

DONATI ÜSTTE 2  $\phi$  10ALTTA 4  $\phi$  16 (2 PLİYE)**MESNET TAHKİKİ:**

$$X_{\max} = -88.8 - 48.8 - 65.2 = -202.8 \text{ tcm.}$$

$$K_2 = 47 \sqrt{\frac{23}{202.8}} = 15.83 \rightarrow G_b = 34 \text{ Kg/cm}^2$$

$$K_3 = 0.784$$

$$f_e = \frac{0.784 \times 202.8}{47} = 3.38 \text{ cm}^2$$

DONATI MEVCUT 2  $\phi$  10 + 2  $\phi$  16 (560 cm<sup>2</sup>)

KAFİ İLÂVE İSTEMEZ.

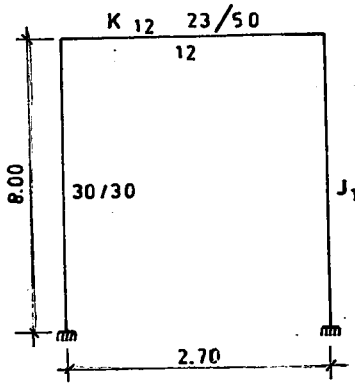
KAYMA TAHKİKİ:

Q = 4.118 ton

Z = 0.911 \* 47 = 43 cm.

$$\tau_o = \frac{4.118}{23 \times 48} = 4.16 \text{ Kg/cm}^2 < \tau_o \text{ em} = 6 \text{ Kg/cm}^2$$

Etr.  $\phi$  8/25



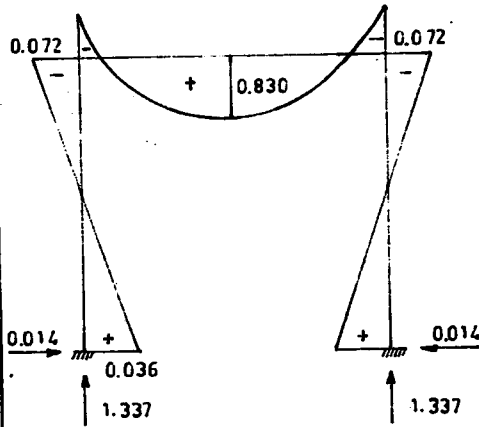
b = 50 cm.  $J_2 = \frac{5 \times 5^3}{18.7} = 33.42 \text{ dm}^4$   $J_1 = \frac{3^4}{12} = 6.75 \text{ dm}^4$

$$K = \frac{33.42}{6.75} \cdot \frac{8.00}{2.70} = 14.7$$

$$N_1 = 14.7 + 2.0 = 16.7$$

$$N_2 = 6 \times 14.7 + 1.0 = 87.2$$

ZATI YÜK:



YÜK : DÖŞEMEDEN = 0.315 + 0.520 = 2.77 = 0.45

SAÇAK = 0.50 \* 0.52 = 0.26

KİRİŞ ZATI = 0.23 \* 0.52 \* 2.4 = 0.28

= 0.99 t/m.

$$MA = MB = \frac{0.99 \times 2.7^2}{12 \times 16.7} = 0.036 \text{ tm.}$$

$$MB = MC = -\frac{0.99 \times 2.7^2}{6 \times 16.7} = 0.072 \text{ tm.}$$

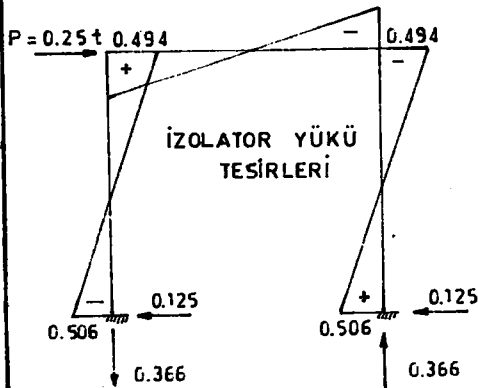
$$\text{Max } M = \frac{0.99 \times 2.7^2}{8} - 0.072 = 0.830 \text{ tm.}$$

$$VA = VD = \frac{0.99 \times 2.7^2}{2} = 1.337 \text{ tm.}$$

$$HA = HD = \frac{3 \times 0.036}{8.00} = 0.014 \text{ ton}$$

İZOLATÖR YÜKÜ:

P = 0.250 ton.



$$\begin{matrix} MA \\ MD \end{matrix} \left\{ \begin{matrix} + \\ - \end{matrix} \right. \frac{0.25 \times 8.00}{2} \cdot \frac{1 + 3 \times 14.7}{89.2} = \begin{matrix} -0.506 \\ +0.506 \end{matrix}$$

$$\begin{matrix} MB \\ MC \end{matrix} \left\{ \begin{matrix} + \\ - \end{matrix} \right. \frac{0.25 \times 8.00}{2} \cdot \frac{3 \times 14.7}{89.2} = \begin{matrix} +0.494 \\ -0.494 \end{matrix}$$

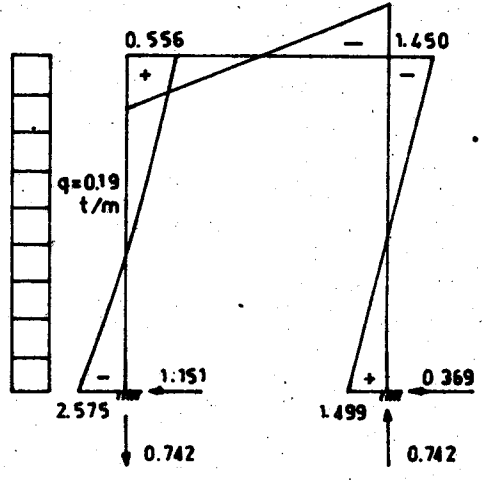
$$VA = -VD = \frac{2 \times 0.474}{2.70} = 0.366$$

$$HA = HD = \frac{0.250}{2} = 0.125$$

**TAM RÜZGÂR:**

$W = 1.2 \times 50 = 60 \text{ Kg/m.}^2$

$q = 60 \times \frac{6.26}{2} = 190 \text{ Kg/m.}$



$$\begin{matrix} MA \\ MD \end{matrix} \left\{ \frac{0.19 \times 8.0^2}{4} \left( \frac{3+14.7}{6 \times 16.7} + \frac{1+4 \times 14.7}{89.2} \right) \right. = \begin{matrix} -2.575 \\ +1.499 \end{matrix}$$

$$\begin{matrix} MB \\ MC \end{matrix} \left\{ \frac{0.19 \times 8.0^2}{4} \left( \frac{14.7}{6 \times 16.7} + \frac{2 \times 14.7}{89.2} \right) \right. = \begin{matrix} +0.556 \\ -1.450 \end{matrix}$$

$VA = -VD = \frac{0.19 \times 14.7 \times 8.0^2}{2.7 \times 89.2} = 0.742$

$HD = \frac{0.19 \times 8.0 \{3+2 \times 14.7\}}{8 \times 16.7} = 0.369$

$HA = - (0.19 \times 8.0 - 0.369) = 1.151$

**K<sub>12</sub> KİRİŞ DONATI HESABI : 23/50**

$M_{max} = 83 \text{ tm}$

$f_e = \frac{0.797 \times 83}{47} = 1.41 \text{ cm.}^2$

DONATI ÜSTTE 2  $\phi$  10

ALTTA 3  $\phi$  10 (1 plye); (2.36 cm<sup>2</sup>)

**C MESNET TAHKİKİ : X max = -7.2 - 49.4 - 145 = - 201.6 tm.**

$K_2 = 47 \sqrt{\frac{23}{201.6}} = 15.9 \rightarrow GB = 32 \quad K_3 = 0.781$

$f_e = \frac{0.781 \times 201.6}{47} = 3.35 \text{ cm.}^2$

MES NET 2  $\phi$  10 + 1  $\phi$  10 = 2.36

İLÂVE 2  $\phi$  10 ..... + = 1.57  
3.93 cm<sup>2</sup>

**B MESNET TAHKİKİ : X = 55.6 + 49.4 - 1.2 = 97.8**

$f_e = \frac{0.781 \times 97.8}{47} = 1.36 \text{ cm.}^2$

MES NET 3  $\phi$  10 ..... = 2.36

İLÂVE 2  $\phi$  10 ..... + = 1.57  
3.93 cm<sup>2</sup>

**KOLON HESABI :**

$N \text{ ZATİ} = 3.799 + 1.337 = 5.136 \text{ ton.}$

$M_x \text{ ZATİ} = 0.443 \text{ tm} \quad M_y = 0.036$

$N \text{ İZOLATÖR} = 0.136 + 0.366 = 0.529 \text{ ton.}$

$M_x \text{ İZOL.} = 0.513 \text{ tm.} \quad M_y = 0.506$

$N \text{ RÜZGÂR} = 0.742 = 0.742 \text{ ton.}$

$M_x \text{ RÜZG.} = \text{---} \quad M_y = 1.499$

$KOLON \text{ ZATİ } (0.30^2 \times 8.00) 2.4 = 1.728 \text{ ton.}$   
 $N = 8.135 \text{ ton.}$

$M_x \text{ Max} = 0.956 \quad M_y = 2.041$

$$G_o = \frac{8.135}{30 \times 30} = 9.04 \text{ Kg/cm}^2$$

$$\gamma = \frac{0.956}{8.135 \times 0.30} + \frac{2.041}{8.135 \times 0.30} = 1.23 \rightarrow \mu = \mu_o = 0.04$$

$$F_e = F_e = 0.004 \times 30 \times 30 = 3.6 \text{ cm.}^2 \rightarrow F_e + F_e = 2 \times 3.6 = 7.20 \text{ cm.}^2$$

DONATI 4  $\phi 16$  ( 8.04 cm<sup>2</sup> )  
ERT.  $\phi 8 / 20$

### FLANBAT TAHKIKI :

$$\rho = \frac{800}{30} = 27 \rightarrow W = 1.48$$

$$P_{cm} = \frac{(K_b \cdot F_b + G_s \cdot F_e)}{3W}$$

$$K_b = 144$$

$$F_e = 30 \times 30 = 900 \text{ cm.}^2$$

$$G_s = 2400$$

$$F_e = 8.04 \text{ cm.}^2$$

$$P_{em} = \frac{144 \times 900 + 2400 \times 8.04}{3 \times 1.48} = 33.535 \text{ ton} < N = 8.135 \text{ ton.}$$

### TEMEL HESABI :

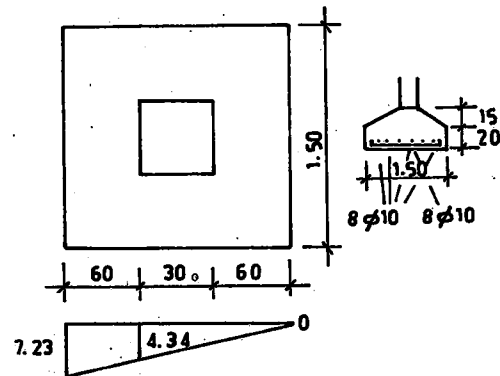
$$N = 11.53 \text{ ton} \quad M = 2.964 \text{ tm.}$$

$$G_{zem} = 15 \text{ t/m}^2$$

$$e = \frac{M}{N} = \frac{2.04}{8.135} = 0.25 \text{ cm.}$$

$$G_3 = \frac{8.135}{1.50 \times 1.50} \left( 1 + \frac{6 \times 0.25}{1.50} \right) = \begin{cases} 7.23 \\ 0.00 \end{cases}$$

$$G_3 = (15 - 2) \cdot 1.00 = 13 \text{ t/m}^2 > 7.23 \text{ t/m}^2$$



$$M = \frac{1}{2} \cdot 4.34 \times 0.60 \times \frac{0.60}{3} + \frac{1}{2} \times 7.23 \times 0.60 \times \frac{2}{3} \times 0.60 = 1.13 \text{ tm.}$$

$$K_2 = 25 \sqrt{\frac{150}{113}} = 28.8$$

$$G_b = 17$$

$$K_3 = 0.753$$

$$f_e = \frac{0.753 \times 113}{25} = 3.40 \text{ cm}^2$$

DONATI 8  $\phi 10$

HERİKİ İSTİKAMETTE

ENERJİ VE TABİİ KAYNAKLAR  
BAKANLIĞI.

İLLER BANKASI ENERJİ DAİRESİ REİSLİĞİ

İLLER BANKASI  
BÖLGE MÜDÜRLÜĞÜ

YÜKLENİCİ

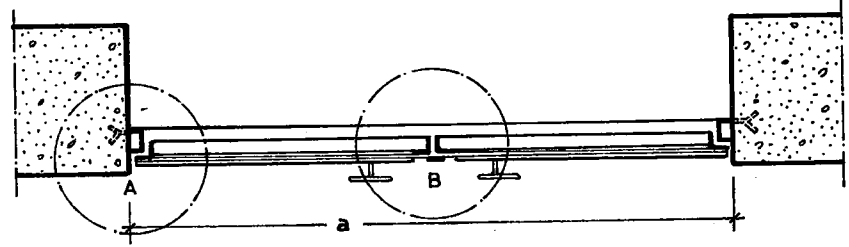
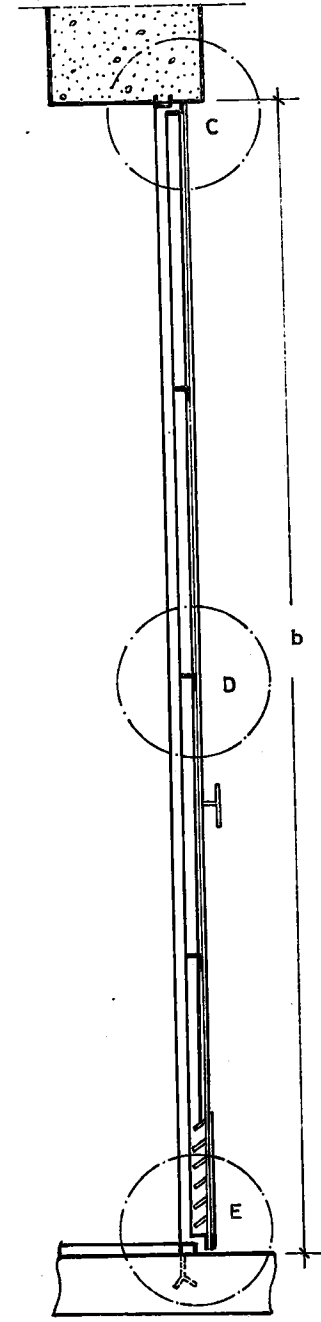
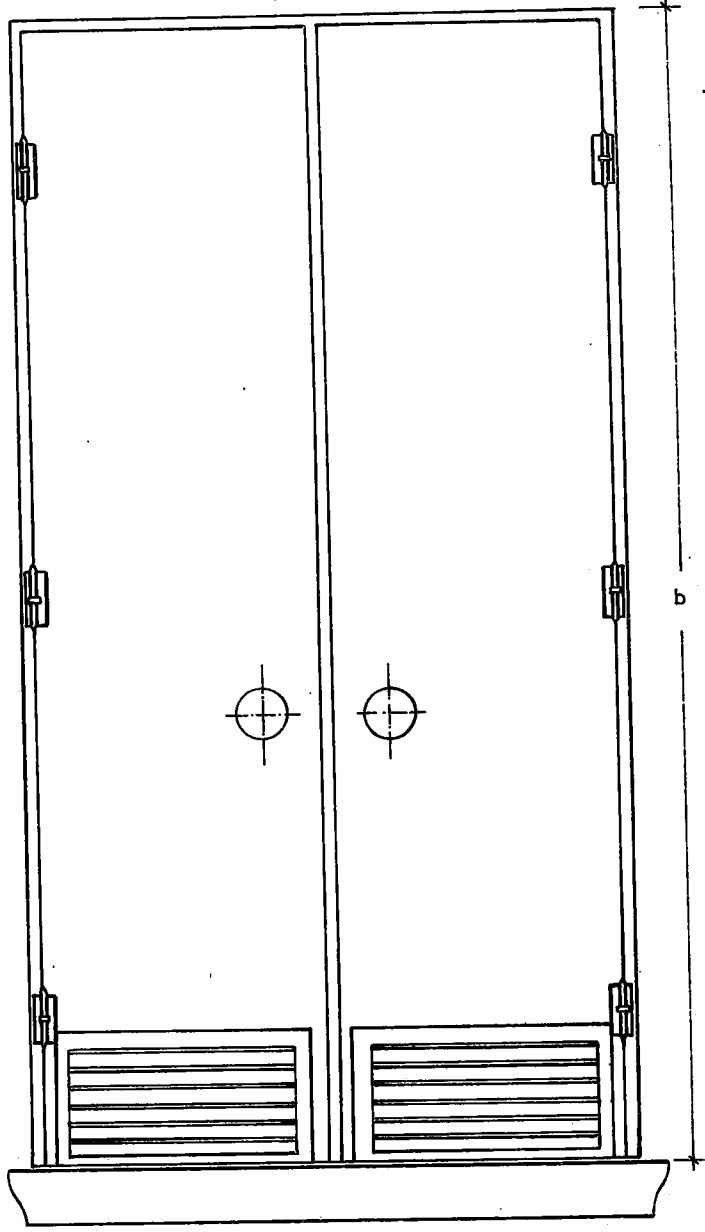
73

58

DEĞİŞİKLİK

DEĞİŞİKLİK SEBEBİ					
DEĞİŞİKLİĞE AİT PROJİYİ YAPANIN	ADI VE SOYADI	ÜNVANI	ODA NO.	TARİH	İMZA
				//	
TRAFO BİNALARI KAPI, PENCERE PANCUR, KABLO KANALI, TEL KAFES KAPI V.S DETAY PLÂNLARI					ÖLÇEK:
					NOLU PLÂN İPTÂL EDİLDİ
PROJİYİ YAPAN					NOLU PLÂN İPTÂL EDİLDİ
					İMZA
YÜK.MÜH. HÜSEYİN BODUR ODA NO: 343		8_10_1973	ARŞİV KAYIT NO:		
ÇİZEN: İLKNUR ŞENİZ					

0.50 m.<sup>2</sup>

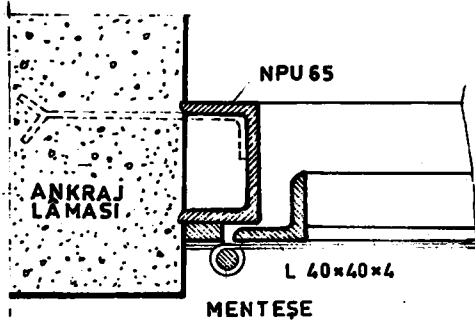


- ŞEBEKE TRAF0 MERKEZLERİNDE VE TRAF0 KAPISINDA
- ŞEBEKE TRAFOLARINDA VE GİRİŞ KAPISINDA
- TEVZİ MERKEZLERİNDE VE GİRİŞ KAPISINDA

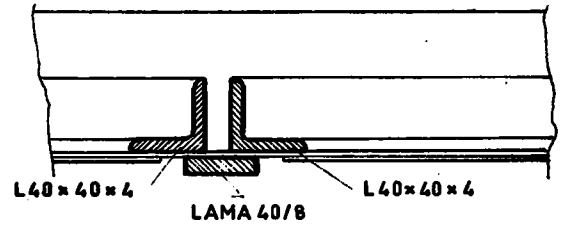
( a ) cm.	( b ) cm
.....	.....
.....	.....
.....	.....

TRAF0 KAPI PLÂNI  
ÖLÇEK:1/15

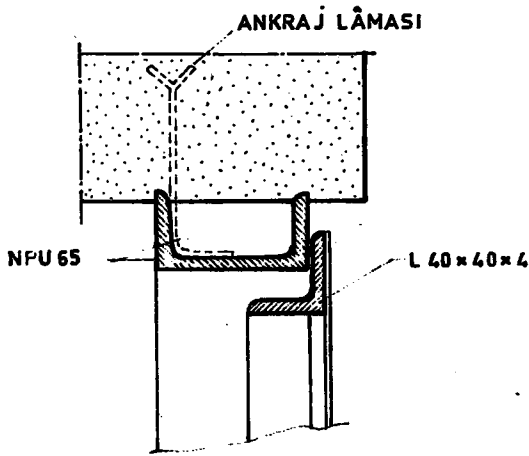




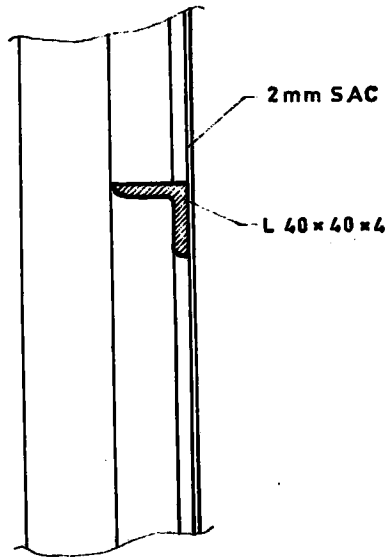
A DETAYI ÖLÇEK: 1/4



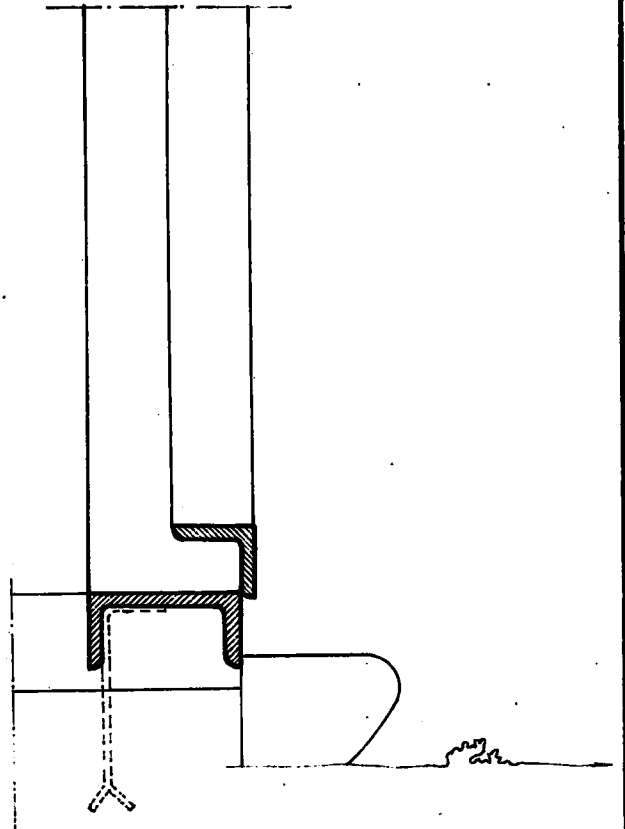
B DETAYI ÖLÇEK: 1/4



C DETAYI ÖLÇEK: 1/4

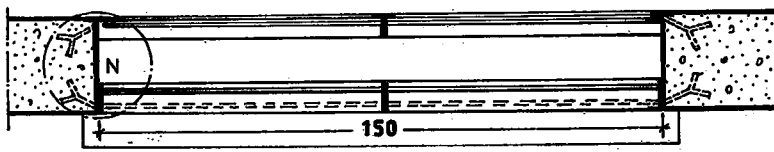
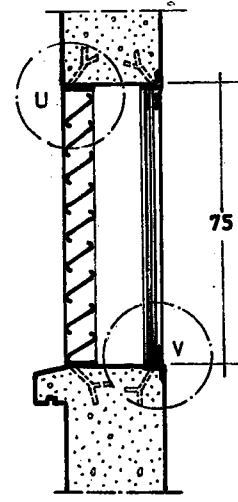
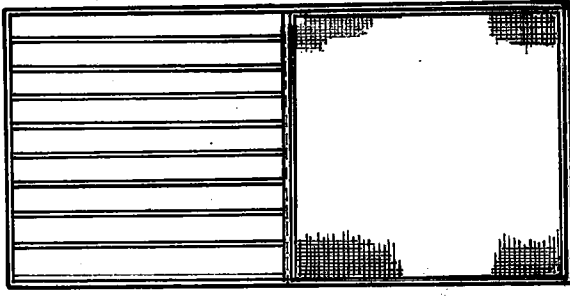


D DETAYI ÖLÇEK: 1/4



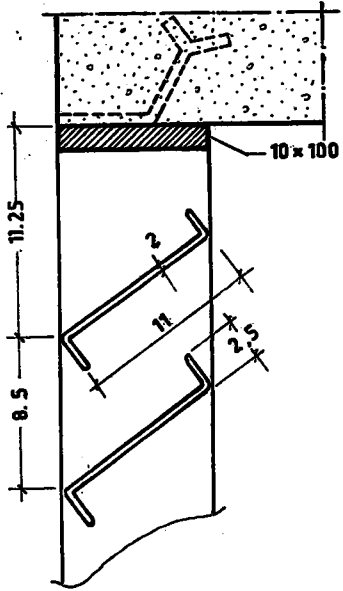
E DETAYI ÖLÇEK: 1/4

TRAFÖ KAPI DETAYLARI

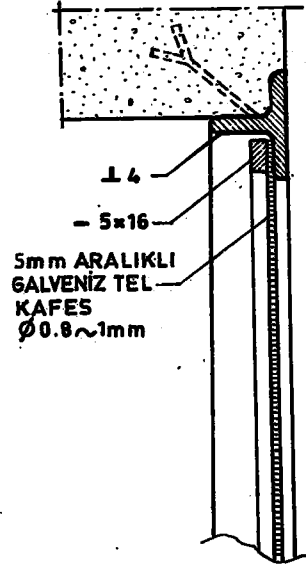


150 x 75 TRAFÖ PENCERE TİPİ ÖLÇEK: 1/20

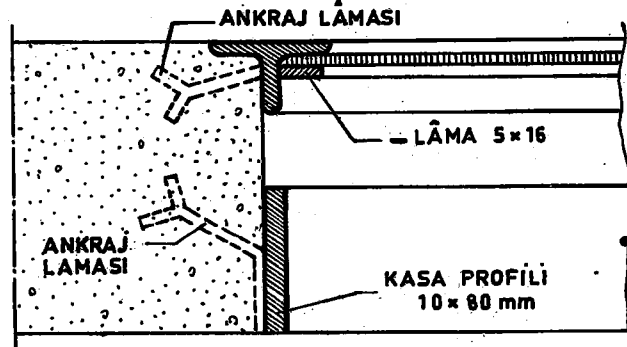
U DETAYI ÖLÇEK: 1/4



V DETAYI ÖLÇEK: 1/4

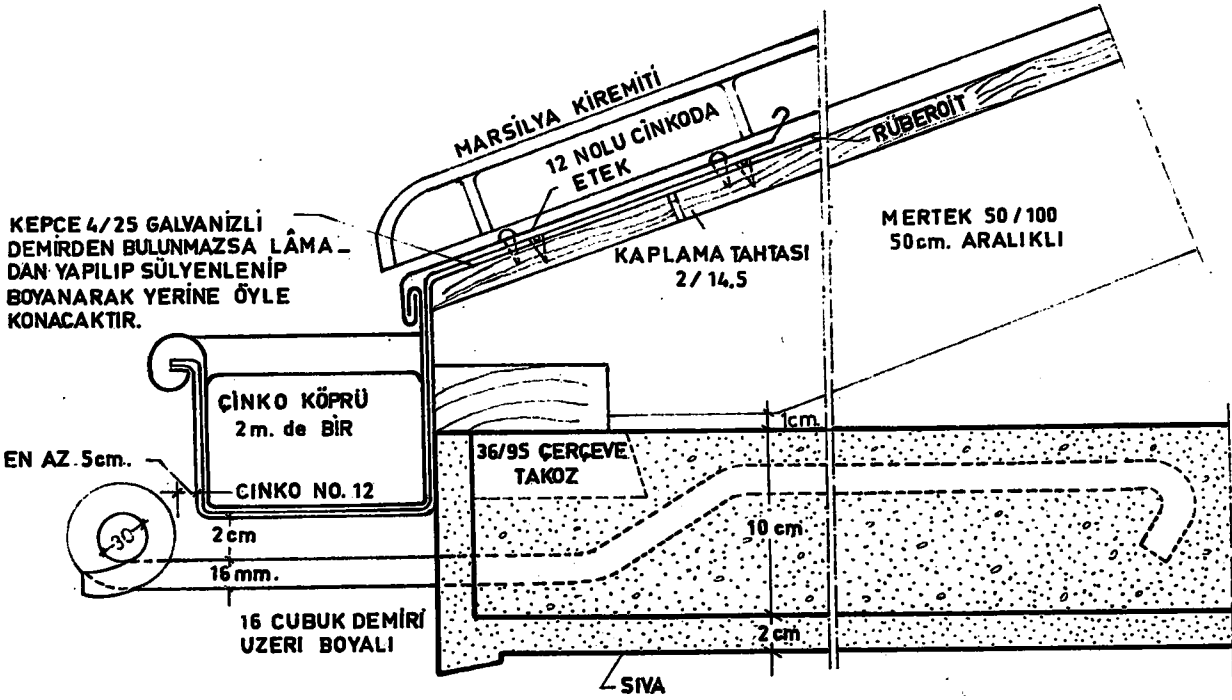


N DETAYI ÖLÇEK: 1/4

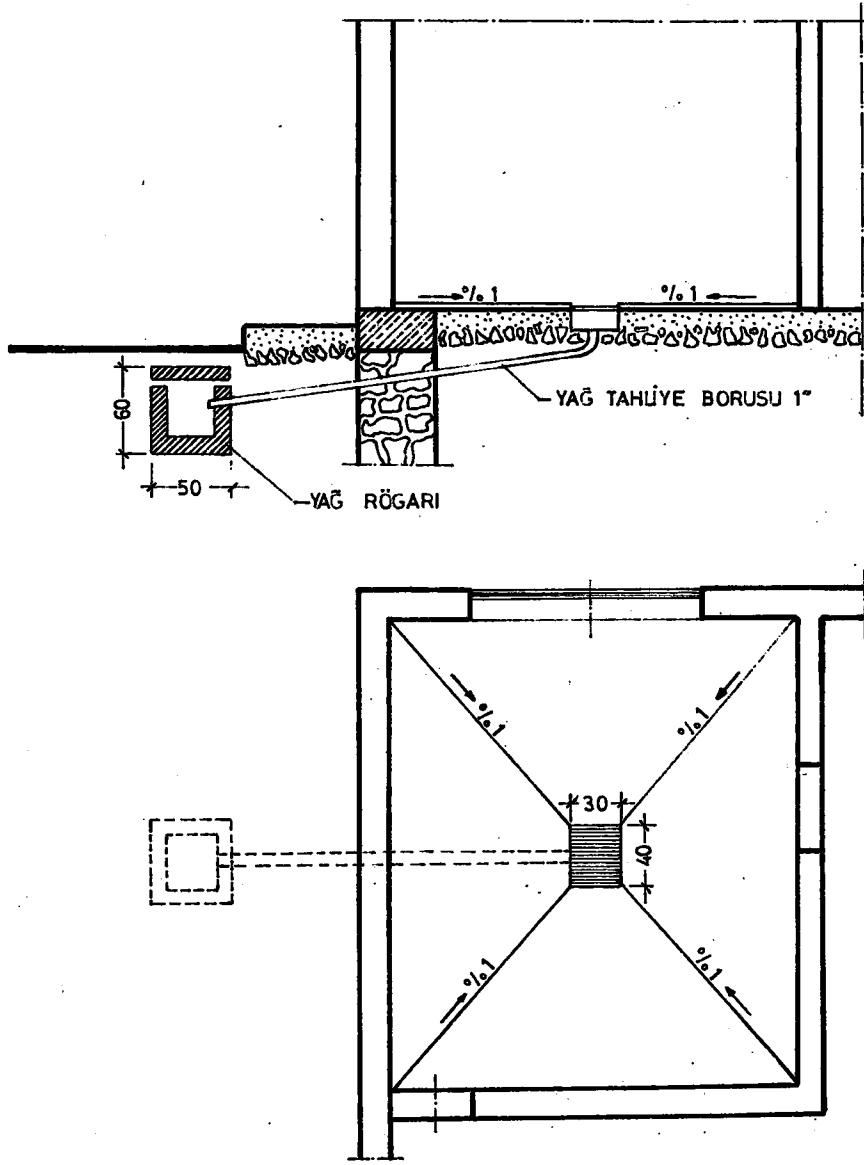


TRAFÖ PANCUR PLÂNI VE DETAYLARI

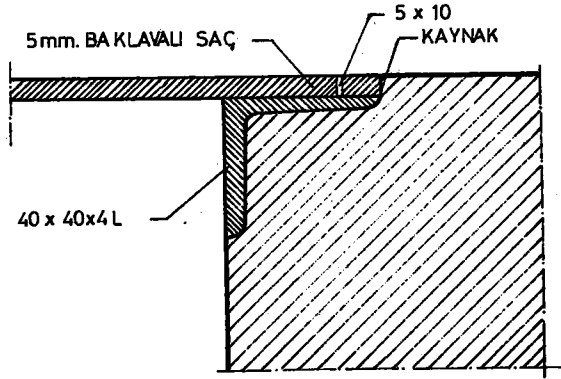
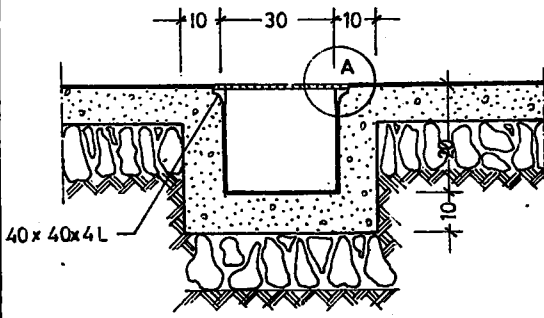




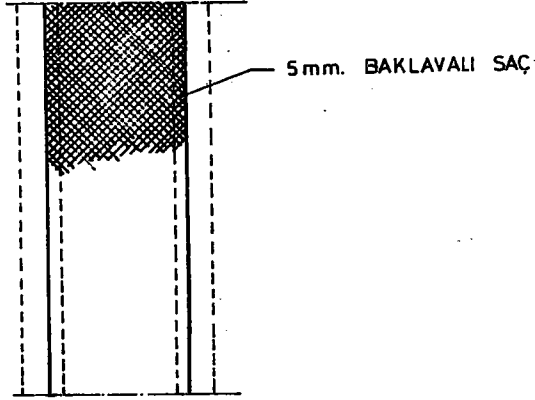
ÇATI DETAYI  
ÖLÇEK: 1/4



TRAFÖ YAG ÇUKURU DETAYI  
ÖLÇEK: 1/50

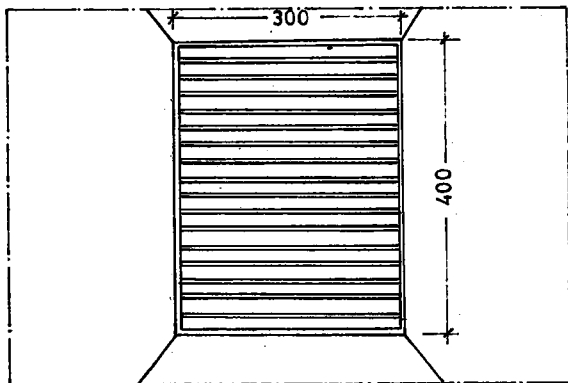
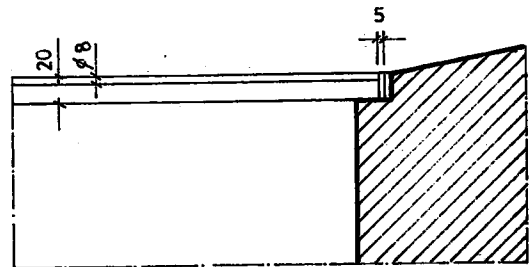
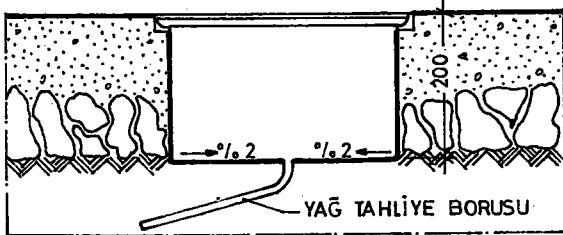


A DETAYI ÖLÇEK: 1/2,5

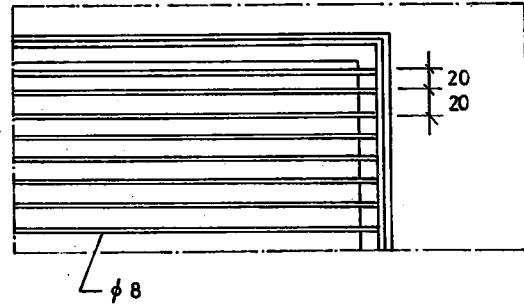


KABLO KANALI DETAYI

KABLO KANALI DETAYI



YAĞ ÇUKURU DETAYI ÖLÇEK: 1/10



IZGARA DETAYI ÖLÇEK: 1/5

YAĞ ÇUKURU DETAYI