

Tek Açıklıklı Köprülerde H S Yükleri
İçin Coubon Metoduna Göre Yük

Fahir Atalaya

Yüksek Lisans Tezi

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Yıldız Üniversitesi
Fen Bilimleri Enstitüsü

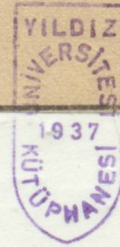
Tek Açıklıklı Köprülerde
HS Yükleri İçin Courbon Metodu
Göre Yük Dağılım Tabloları

(Yüksek Lisans Tezi)
İnş.Müh.M.Fahir ATALAYA

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(yüksek lisans tezi)

İnş. Müh. M.Fahir ATALAYA

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Ö Z E T

Bu çalışmada 4-5-6 ana kirişli, tek açıklıklı köprülerde, kiriş atalet momentlerinin sabit ve kenar kiriş atalet momentlerinin diğerlerine oranının iki katı olması durumlarında kiriş açıklığının $1/8 - 3/8 - 1/4 - 1/2$ noktalarında H-S yüklemeleri yapılarak Courben yöntemi ile kirişlere gelen kuvvetler bulunmuştur. Bu kuvvetlerin tesir çizgileri yardımıyla kirişlere getirilmeleri açıklık ortası momentleri hesaplanmıştır.

Bu konu üzerinde çalışma olanağı sağlayan çalışmalarım sırasında yakın ilgi ve değerli yardımlarını esirgemeyen Sayın Hocam Doç.Naci YÜCEFER'e ve tezin yazımındaki yardımlarından dolayı Arş.Grv. arkadaşım Sevinç DOĞU'ya içten teşekkürlerimi sunarım.

M.Fahir ATALAYA

Yukarıda açıklanan tablolardaki değerler bilgisayar yardımı ile hesaplanmıştır. Fakat kullanılan bilgisayarın kapasitesi yeterli olmadığı için program parça parça çalıştırılmıştır.

S U M M A R Y

Ö Z E T

In this study, in bridges with one span and 4-5-6 main beams; when the beams have constant moment of inertia and Bu çalışmada 4-5-6 ana kirişli, tek açıklıklı köprülerde, kiriş atalet momentlerinin sabit ve kenar kiriş atalet momentlerinin diğerlerine oranının iki katı olması durumlarında kiriş açıklığının $1/8 - 3/8 - 1/4 - 1/2$ noktalarında H-S yüklemeleri yapılarak Courbon yöntemi ile kirişlere gelen kuvvetler bulunmuştur. Bu kuvvetlerin tesir çizgileri yardımıyla kirişlerde meydana getirdikleri açıklık ortası momentleri hesaplanmıştır.

The values were determined for L-span and unit loadings. Değerler L açıklığına bağlı ve birim yüklemeler için elde edilmiştir. Bu değerler 6 tip köprü, 11 eksantriklik ve 5 yükleme pozisyonu için tablo haline getirilmiştir. Herhangi bir noktadaki moment hesaplanmak istenirse ilgili değer bu tablolardan bulunur. Bu değer istenen L açıklığı ve H-S yüklemesinin toplam değeri ile çarpılarak moment elde edilir.

A computer was used to calculate the values on the above mentioned charts. Yukarıda açıklanan tablolardaki değerler bilgisayar yardımı ile hesaplanmıştır. Fakat kullanılan bilgisayarın kapasitesi yeterli olmadığı için program parça parça çalıştırılmıştır.

COURBON METODU

S U M M A R Y

In this study, in bridges with one span and 4-5-6 main beams; when the beams have constant moment of inertia and when the ratio of the moment of inertia of the side beams to the other is double; the H-S loadings are made at the $1/2-3/8-1/4-1/8$ points on the beam span and the forces that act on the beams were calculated by Courbon method. With the help of the influence lines, the mid-span moments that the above forces accomplished on the beams were calculated.

The values were determined for L-span and unit loadings. Those values were shown on a chart for 6 types of bridges, 11 eccentricities and 5 loading positions. If a moment at any point is wanted to be calculated the values can be read on the related chart. When the desired L-span is multiplied by the total load of the H-S loading the moment is obtained.

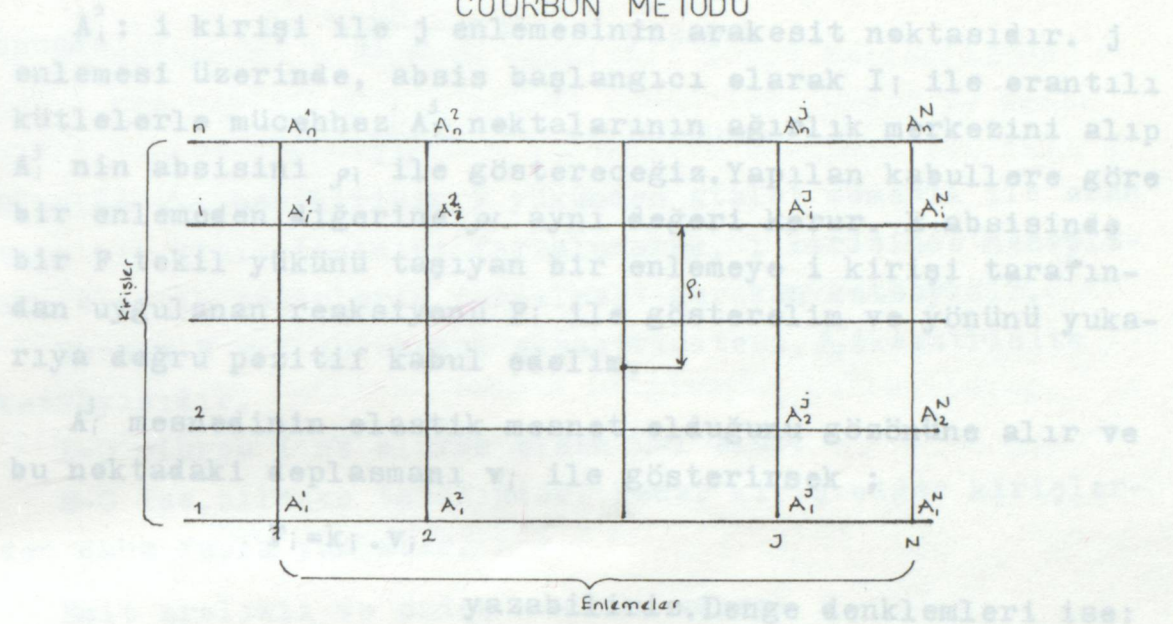
A computer was used to calculate the values on the above mentioned charts. Since the capacity of the computer was insufficient the programme has to be worked out in sections.

Enlemelerin kırışları göre çok rijit olduğu kabul edil-
yer ve kırışların defermasyonu yanında enlemelerin defermu-
masyonu ihmal ediliyor. Yani her enleme $\frac{1}{2}$ olarak elemanlar
mekanikteki katı cisim gibi defermasyon yapmadan yer degis-
tiriyor demektir. Basit mesnetli çok kırışlı bir köprüde, ki-
rişlerin açıklıkları, köprü genişliğinin iki katını aşığı
zaman bu hipotez iyi sonuçlar veriyor.

Yüklerin enlemlere tatbik edilmesini düşünüyüz.

Enlemeler, elastik mesnet üzerine oturan sınırsız rijit
kırışlardır. k_1 ile gösterilen mesnet karakteristik sabit-
leri, kırışların I ; ağırlık momentleri ile orantılıdır.

COURBON METODU



Şekildeki çok kirişli köprüyü göz önüne alıyoruz. Kirişlerin paralel, aynı bağlantıları haiz, orantılı atalet momenti değişimine tabi ve eksenleri kiriş eksenlerine dik enlemelerle birleştirildiklerini kabul ediyoruz. Kirişler üzerinde absis başlangıcı, kirişlere çizilen aynı bir dik doğru üzerindedir. I_i , i kirişine ait, I_k , k kirişine ait atalet momentleri olmak üzere, i ve k ne olursa olsun

$$\frac{I_i}{I_k} = \text{sabit} \quad \text{kabul ediliyor.}$$

Enlemelerin kirişleri göre çok rijit olduğu kabul ediliyor ve kirişlerin deformasyonu yanında enlemelerin deformasyonu ihmal ediliyor. Yani her enleme tüm olarak elementer mekanikteki katı cisim gibi deformasyon yapmadan yer değiştiriyor demektir. Basit mesnetli çok kirişli bir köprüde, kirişlerin açıklıkları, köprü genişliğinin iki katını aştığı zaman bu hipotez iyi sonuçlar veriyor.

Yüklerin enlemelere tatbik edildiğini düşünüyoruz.

Enlemeler, elastik mesnet üzerine oturan sonsuz rijit kirişlerdir. k_i ile gösterilen mesnet karakteristik sabitleri, kirişlerin I_i atalet momentleri ile orantılıdır.

A_i^j : i kirişi ile j enlemesinin arakesit noktasıdır. j enlemesi üzerinde, absis başlangıcı olarak I_i ile orantılı kütlelerle mücehhez A_i^j noktalarının ağırlık merkezini alıp A_i^j nin absisini ρ_i ile göstereceğiz. Yapılan kabullere göre bir enlemeden diğerine ρ_i aynı değeri korur. E absisinde bir F tekil yükünü taşıyan bir enlemeye i kirişi tarafından uygulanan reaksiyonu F_i ile gösterelim ve yönünü yukarıya doğru pozitif kabul edelim.

A_i^j mesnedinin elastik mesnet olduğunu gözönüne alır ve bu noktadaki deplasmanı v_i ile gösterirsek ;

$$F_i = k_i \cdot v_i$$

yazabiliriz. Denge denklemleri ise:

$$\sum F_i = F$$

$$\sum F_i \cdot \rho_i = F \cdot E \quad (E: \text{Yük eksantrikliği})$$

F leri tayin için denge denklemleri yeterli değildir, kirişin sonsuz rijitliği hipotezini de dahil etmek gerekir.

$$v_i = a + b \cdot \rho_i$$

Burada a, b yardımcı bilinmeyen olarak alınan sabitlerdir.

$$F_i = k_i (a + b \cdot \rho_i)$$

$$\sum k_i (a + b \cdot \rho_i) = F$$

$$\sum k_i (a + b \cdot \rho_i) \cdot \rho_i = F \cdot E \quad \text{veya}$$

$$a \sum k_i + b \sum k_i \cdot \rho_i = F$$

$$a \sum k_i \cdot \rho_i + b \sum k_i \cdot \rho_i^2 = F \cdot E$$

Fakat ağırlık merkezi absis başlangıcı olduğundan,

$$\sum k_i \cdot \rho_i = 0 \quad \text{O halde}$$

$$a = \frac{F}{\sum k_i} \quad b = \frac{F \cdot E}{\sum k_i \cdot \rho_i^2}$$

$$\frac{k_i}{\sum k_i} = \frac{I_i}{\sum I_i}$$

$$F_i = F \frac{k_i}{\sum k_i} \left(1 + \frac{\sum k_i}{\sum k_i \cdot \rho_i^2} \rho_i \cdot E \right) = F \frac{I_i}{\sum I_i} \left(1 + \frac{\sum I_i}{\sum I_i \cdot \rho_i^2} \rho_i \cdot E \right)$$

burada $\Delta_i = 1 + \frac{\sum I_i}{\sum I_i \rho_i^2} \rho_i \cdot E$ yazarak

$F_i = F \frac{I_i}{\sum I_i} \Delta_i$ bulunur.

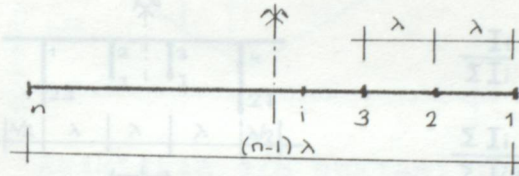
0 halde Δ_i , her kirişin F yükünden atalet momenti ile orantılı bir kısım taşıdığı farz edilerek, i kirişinde hesaplanan elastik tesirlerin çarpılması gereken katsayıdır.

Burada E yük gurubunun eksantrisitesi, Δ_i eksantrisite katsayısıdır.

E=0 olursa i ne olursa olsun $\Delta_i=1$ olur.

E=0 ise, bileşke tarafındaki kenar kiriş diğer kirişlerden daha fazla yük alır.

Eşit aralıklı ve özdeş n kiriş varsa:



$\lambda =$ komşu iki kiriş arası

$$\sum I_i = n \cdot I$$

$$\frac{I_i}{\sum I_i} = \frac{1}{n} \quad \rho_i = \frac{n+1-2i}{2} \cdot \lambda$$

$$\sum I_i \rho_i^2 = I \lambda^2 \left(\frac{n+1-2i}{2} \right) = I \lambda^2 \left[\left(\frac{n+1}{2} \right)^2 n - 2 \frac{n+1}{2} \sum_1^n i + \sum_1^n i^2 \right]$$

$$\sum_1^n i = n \frac{n+1}{2} \quad \sum_1^n i^2 = n \frac{n+1}{2} \cdot \frac{2n+1}{3}$$

$$\sum I_i \rho_i^2 = I \lambda^2 \frac{n(n^2-1)}{12}$$

$$F_i = \frac{F}{n} \left[1 + \frac{12}{\lambda^2 (n^2-1)} \cdot \frac{n+1-2i}{2} \lambda \cdot E \right]$$

$$\Delta_i = 1 + 6 \frac{n+1-2i}{n^2-1} \cdot \frac{E}{\lambda}$$

$$F_i = \frac{F}{n} \left[1 + 6 \frac{n+1-2i}{n^2-1} \cdot \frac{E}{\lambda} \right]$$

Formülde ρ ve E λ 'ya bağlı olduğu için $\frac{\rho_i}{\lambda}$ ifadesinde bölümde bulunan λ ile birbirlerini yok ediyorlar.

Tesir çizgisi ordinatları

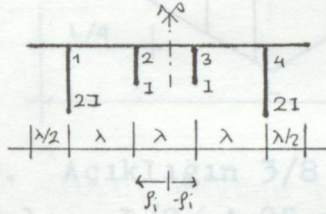
Bu çalışmada 6 tip tek açıklıklı köprü kullanılacak. 4-5-6 ana kirişli, kiriş atalet momentleri sabit ve kenar kiriş atalet momentlerinin içtekilere oranının iki katı olması hali incelenecek.

Kiriş açıklığının $1/2, 3/8, 1/4, 1/8$ noktalarına H-S yüklemesi yapılarak tesir çizgilerinden faydalanılarak açıklık ortası momentleri elde edilecek.

Sonuçların kullanılmasında bilgisayar kullanılacağı için formüllerde bazı düzenlemelere gerek duyuldu.

$$F_i = F \frac{I_i}{\sum I_i} \left(1 + \frac{\sum I_i}{\sum I_i \cdot \rho_i^2} \cdot \rho_i \cdot E \right)$$

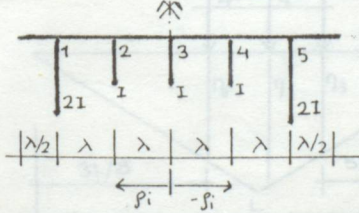
1. 4 ana kirişli



$$\frac{I_1}{\sum I_i} = \frac{I_4}{\sum I_i} = \frac{2}{6}$$

$$\frac{\sum I_i}{\sum I_i \cdot \rho_i^2} = \frac{6}{2(2(1.5 \cdot \lambda)^2 + 1(0.5 \cdot \lambda)^2)} = \frac{6}{8.5 \cdot \lambda^2}$$

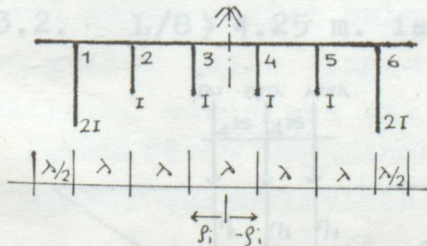
2. 5 ana kirişli



$$\frac{I_1}{\sum I_i} = \frac{I_5}{\sum I_i} = \frac{2}{7}$$

$$\frac{\sum I_i}{\sum I_i \cdot \rho_i^2} = \frac{7}{2(2(2 \cdot \lambda)^2 + 1 \cdot \lambda^2)} = \frac{7}{18 \cdot \lambda^2}$$

3. 6 ana kirişli



$$\frac{I_1}{\sum I_i} = \frac{I_6}{\sum I_i} = \frac{2}{8}$$

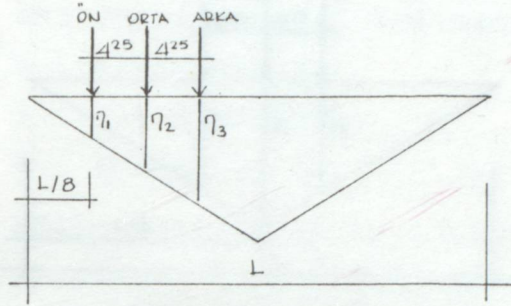
$$\frac{\sum I_i}{\sum I_i \cdot \rho_i^2} = \frac{8}{2(2(2.5 \cdot \lambda)^2 + (1.5 \cdot \lambda)^2 + (0.5 \cdot \lambda)^2)}$$

$$\frac{\sum I_i}{\sum I_i \cdot \rho_i^2} = \frac{4}{15 \cdot \lambda^2}$$

Formülde ρ ve E λ 'ya bağlı olduğu için $\frac{\sum I_i}{\sum I_i \cdot \rho_i^2}$ ifadesinde bölümde bulunan λ^2 ile birbirlerini yok ediyorlar.

Tesir çizgisi ordinatları

1. Açıklığın 1/8 noktası için

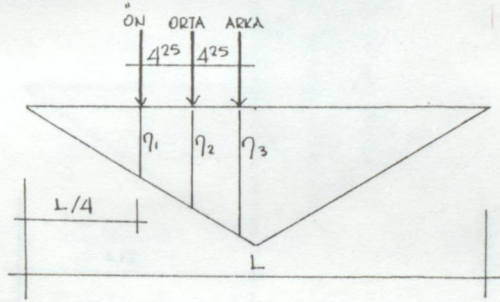


$$\frac{L/2}{L/4} = \frac{L/8}{\eta_1} \quad \eta_1 = L/16$$

$$\frac{L/2}{L/4} = \frac{L/8 + 4.25}{\eta_2} \quad \eta_2 = L/16 + 2.125$$

$$\frac{L/2}{L/4} = \frac{L/8 + 8.50}{\eta_3} \quad \eta_3 = L/16 + 4.25$$

2. Açıklığın 1/4 noktası için



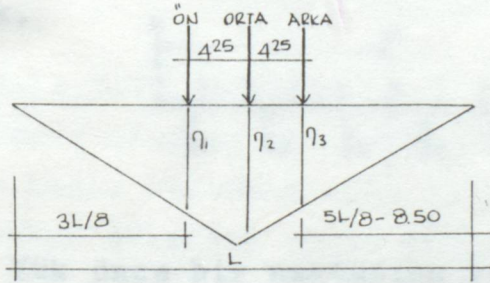
$$\frac{L/2}{L/4} = \frac{L/4}{\eta_1} \quad \eta_1 = L/8$$

$$\frac{L/2}{L/4} = \frac{L/4 + 4.25}{\eta_2} \quad \eta_2 = L/8 + 2.125$$

$$\frac{L/2}{L/4} = \frac{L/4 + 8.50}{\eta_3} \quad \eta_3 = L/8 + 4.25$$

3. Açıklığın 3/8 noktası için

3.1. $L/8 < 4.25$ m. ise

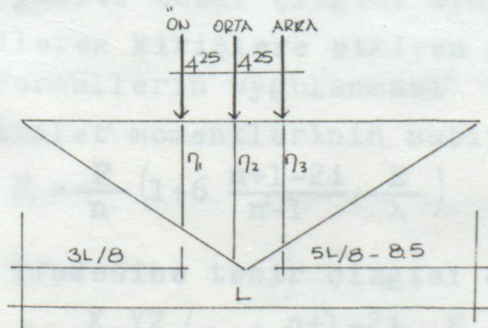


$$\frac{L/2}{L/4} = \frac{3L/8}{\eta_1} \quad \eta_1 = 3L/16$$

$$\frac{L/2}{L/4} = \frac{5L/8 - 4.25}{\eta_2} \quad \eta_2 = 5L/16 - 2.125$$

$$\frac{L/2}{L/4} = \frac{5L/8 - 8.50}{\eta_3} \quad \eta_3 = 5L/16 - 4.25$$

3.2. $L/8 > 4.25$ m. ise

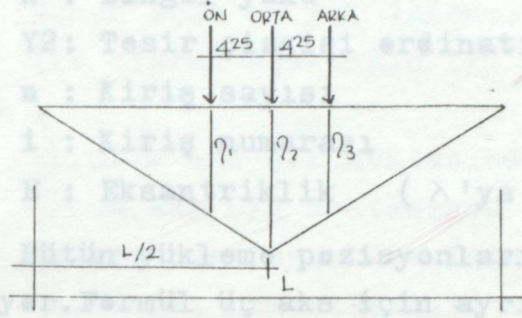


$$\frac{L/2}{L/4} = \frac{3L/8}{\eta_1} \quad \eta_1 = 3L/16$$

$$\frac{L/2}{L/4} = \frac{3L/8 + 4.25}{\eta_2} \quad \eta_2 = 3L/16 + 2.125$$

$$\frac{L/2}{L/4} = \frac{5L/8 - 8.5}{\eta_3} \quad \eta_3 = 5L/16 - 4.25$$

4. Aralığın $L/2$ noktası için
4.1 Orta aks $L/2$ noktasında

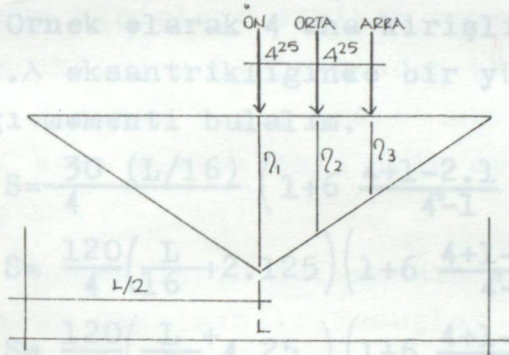


$$\frac{L/2}{L/4} = \frac{L/2 - 4.25}{\eta_1} \quad \eta_1 = L/4 - 2.125$$

$$\frac{L/2}{L/4} = \frac{L/2}{\eta_2} \quad \eta_2 = L/4$$

$$\eta_1 = \eta_3 = L/4 - 2.125$$

4.2 Ön aks $L/2$ noktasında

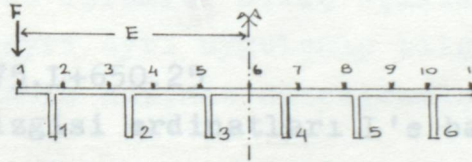


$$\frac{L/2}{L/4} = \frac{L/2 - 4.25}{\eta_2} \quad \eta_2 = L/4 - 2.125$$

$$\frac{L/2}{L/4} = \frac{L/2}{\eta_1} \quad \eta_1 = L/4$$

$$\frac{L/2}{L/4} = \frac{L/2 - 8.50}{\eta_3} \quad \eta_3 = L/4 - 4.25$$

Köprü, boyuna bu 4 noktada, enine ise 10 parçaya bölünerek 11 noktada yüklemeler yapılarak sonuçlar elde edilecek.



Yük önce bir noktaya yüklenecek. Bundan dolayı kirişlere gelen yükler bulunacak. Courbon yöntemine göre bulunan bu yükler tesir çizgisi ordinatları ile çarpılıp süperpoze edilerek kirişlere etkiyen momentler bulunacak.

Formüllerin uygulanması

atalet momentlerinin sabit olması hali :

$$F_i = \frac{F}{n} \left(1 + 6 \frac{n+1-2i}{n^2-1} \cdot \frac{E}{\lambda} \right)$$

İfadesine tesir çizgisi ordinatı çarpan olarak getirildi

$$S = \frac{K \cdot Y_2}{n} \left(1 + 6 \frac{n+1-2i}{n^2-1} \cdot \frac{E}{\lambda} \right)$$

Förmülde:

K : Dingil yükü

Y2: Tesir çizgisi ordinatı

n : Kiriş sayısı

i : Kiriş numarası

E : Eksantriklik (λ 'ya bağlı)

Bütün yükleme pozisyonlarında H15-S12 yükleme kullanılır. Förmül üç aks için ayrı ayrı uygulanıp sonuçlar toplanınca yükleme yapılan noktadaki moment bulunmuş olur.

Örnek olarak 4 ana kirişli açıklığın 1/8 noktasında ve $E=2.\lambda$ eksantrikliğinde bir yüklemenin 1 nolu kirişe uyguladığı momenti bulalım.

$$S = \frac{30 (L/16)}{4} \left(1 + 6 \frac{4+1-2.1}{4^2-1} \frac{2.\lambda}{\lambda} \right) = 1.5937.L$$

$$S = \frac{120}{4} \left(\frac{L}{16} + 2.125 \right) \left(1 + 6 \frac{4+1-2.1}{4^2-1} \frac{2.\lambda}{\lambda} \right) = 6.375.L + 216.75$$

$$S = \frac{120}{4} \left(\frac{L}{16} + 4.25 \right) \left(1 + 6 \frac{4+1-2.1}{4^2-1} \frac{2.\lambda}{\lambda} \right) = 6.375.L + 433.5$$

Bu üç degerin toplamı 1 nolu kirişe uygulanan momenti verir.

$$S = 14.3475.L + 650.25$$

Tesir çizgisi ordinatları L'ye bağlı olduğu için sonuçta L'ye bağlı bulunmuş oldu. Bulunan sonucu H15-S12 nin toplam yüküne bölersek birim yükleme için sonuç bulunmuş olur.

$$S = (14.3475.L + 650.25) / 270 = 0.0531.L + 2.4083$$

Bu degeri istedigimiz H-S yükünün toplamı ile çarparsak H-S yükü için gerekli sonucu elde etmiş oluruz.

Örneğin yükümüz H30-S24 açıklık 20 m. olsun.

$$\text{Moment} = (0.0531 \cdot 20 + 2.4083) \cdot 540 = 1873.962 \text{ kN.m bulunur.}$$

Atalet momentlerinin farklı olması hali:

$$F_i = F \frac{\sum I_i}{\sum I_i} \left(1 + \frac{\sum I_i}{\sum I_i \beta_i^2} \beta_i E \right)$$

bulunduktan sonra yapılan iş-

lemler yukarıdakinin aynısı olacaktır.

Tabloların düzenlenmesi

Bunun için şu yol izlenmiştir.

İlk olarak açıklığın 1/2 noktası gözönüne alındı. Yükleme :

1. Orta aks L/2 noktasında

2. Ön aks L/2 noktasında olması durumları incelendi.

Bu yükleme pozisyonları için:

1. Atalet momentlerinin sabit olması hâli için 4-5-6 ana kirişli tek açıklıklı köprülerin 11 eksantriklik için bütün kirişlere etkiyen momentler, birim yüklemeleri için ve L açıklığına bağlı olarak bulunmuştur.

2. Kenar kiriş atalet momentlerinin diğerlerine oranının iki katı olması hali için de aynı şekilde momentler bulunmuştur.

Momentlerin bulunmasında işlemin başında H15-S12 yüklemesi yapılmıştır. Sonuçlar elde edildikten sonra H15-S12 nin toplam değeri olan 270 kN'a bölünerek momentler birim yüklemeler için bulunmuş oldu.

Bütün bu işlemler kiriş açıklığının 3/8-1/4-1/8 noktaları için ayrı ayrı uygulanıp bilgisayar ile elde edilen sonuçlar tablo halinde düzenlenmiştir.

Programda kullanılan değişkenler

A, B1, B2 kullanılan yük katsayıları. H15-S12 yülemesi kullanıldığından A=30kN. B=120kN. B2=120kN. tanımlandı.

X1, X2, X3, X4, X5, X6 tesir çizgisi ordinatları.

N: Ana kiriş sayısı

I: Kiriş numarası

E: Eksantriklik

$$D2 = \frac{\sum I_i}{\sum I_i \rho_i^2}$$

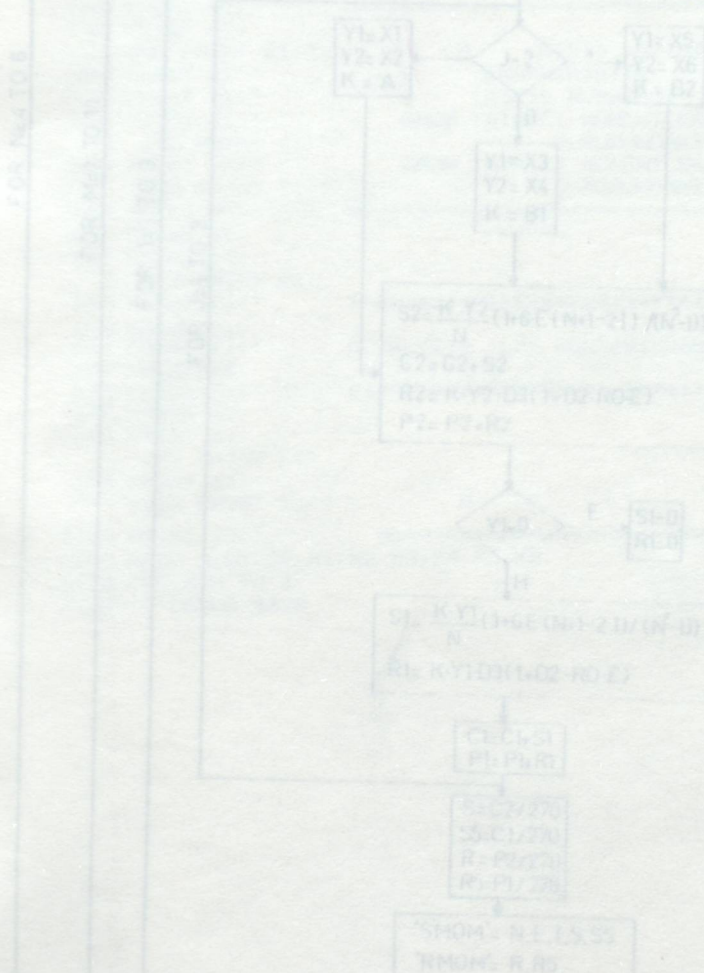
$$D3 = \frac{I_i}{\sum I_i}$$

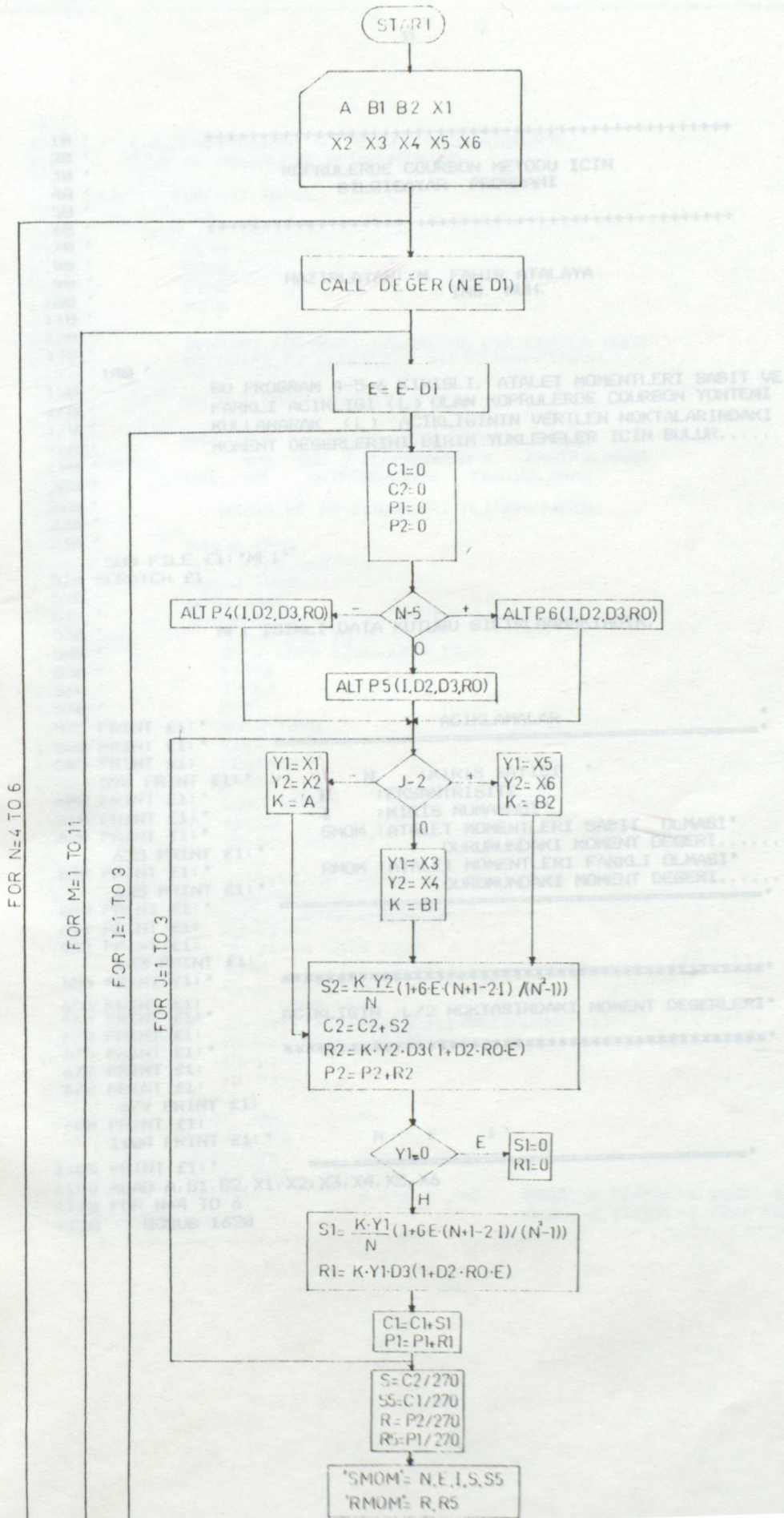
$$\rho = R0$$

Programın çalışma prensibi

Yük katsayıları A, B1, B2 ve tesir çizgisi ordinatları X1, X2, X3, X4, X5, X6 read-data ile okutuluyor. 1. döngüde giriş sayısı seçiliyor. Alt program 1'den seçilen giriş sayısı için eksantrisite değeri çağırılıyor. 2. döngüde bu eksantriklik belirtilen adımda 11'e bölünüyor ve ilk değer alınıyor. 3. döngüde 1 giriş numarası seçiliyor (simetri sözkonusu olduğundan 1, 2, 3 nolu girişler gözönüne alındı.) Giriş sayısına göre 4, 5, 6 alt programlarından D2, D3, R0 değerleri çağırılıyor. 4. döngüde tesir çizgisi ordinatları Y1, Y2'ye yük katsayıları K değişkenlerine atanıyor.

1. adımda E eksantrikliğindeki yükün (dingil yükü) I girişine uyguladığı kuvvet bulunuyor. Bu yük, altındaki tesir çizgisi ile çarpılıyor. Bu işlem üç dingil yükü için yapı- lıp birbiri ile toplanıyor. Bulunan toplam H15-S12 için ol- duğundan 270'e bölünerek birim yük için değer elde ediliyor. Son durumdaki değere L çarpanı getirilerek sonuç L'e bağlı olarak bulunmuş oluyor. (L giriş açıklığı)





```

10 / *****
20 /
30 / KOPRULERDE COURBON METODU ICIN
40 / BILGISAYAR PROGRAMI
50 / *****
60 /
70 /
80 /
90 / HAZIRLAYAN: M. FAHIR ATALAYA
100 / INS. MUH.
110 /
120 /
130 /
140 / BU PROGRAM 4-5-6 KIRISLI, ATALET MOMENTLERI SABIT VE
150 / FARKLI ACIKLIGI (L) OLAN KOPRULERDE COURBON YONTEMI
160 / KULLANARAK (L) ACIKLIGININ VERILEN NOKTALARINDAKI
170 / MOMENT DEGERLERINI BIRIM YUKLEMELER ICIN BULUR.....
180 /
190 /
200 /
210 /
220 /
230 /
500 FILE #1: "MF1"
510 SCRATCH #1
520 /
525 /
530 / MF1 ISIMLI DATA KUTUGU SIFIRLANMAKTADIR.
540 /
550 /
560 /
570 /
575 PRINT #1: " ACIKLAMALAR "
580 PRINT #1: " ===== "
585 PRINT #1:
590 PRINT #1: " N : KIRIS SAYISI "
600 PRINT #1: " E : EKSANTRISITE "
610 PRINT #1: " I : KIRIS NUMARASI "
620 PRINT #1: " SMOM : ATALET MOMENTLERI SABIT OLMASI "
625 PRINT #1: " DURUMUNDAKI MOMENT DEGERI..... "
630 PRINT #1: " RMOM : ATALET MOMENTLERI FARKLI OLMASI "
635 PRINT #1: " DURUMUNDAKI MOMENT DEGERI..... "
640 PRINT #1: " ===== "
641 PRINT #1:
642 PRINT #1:
643 PRINT #1:
650 PRINT #1: " ***** "
655 PRINT #1:
660 PRINT #1: " ACIKLIGIN L/2 NOKTASINDAKI MOMENT DEGERLERI "
670 PRINT #1:
675 PRINT #1: " ***** "
677 PRINT #1:
678 PRINT #1:
679 PRINT #1:
680 PRINT #1:
1104 PRINT #1: " N E I "
1105 PRINT #1: " ===== "
1108 READ A, B1, B2, X1, X2, X3, X4, X5, X6
1110 FOR N=4 TO 6
1120 GOSUB 1620

```

```

1121'
1122' 1 ALTPROGRAMINA N DEGERI GONDERILMEKTE,
1124' E VE D1 DEGERLERI ALINMAKTADIR.
1125'
1130 FOR M=1 TO 11
1140 E=E-D1
1150 FOR I=1 TO 3
1160 C1=0
1170 C2=0
1180 F1=0
1190 F2=0
1191'
1192' SONRAKI FOR-NEXT HALKASINA GIRILMEDEN ONCE
1194' C1,C2,F1,F2 DEGERLERI SIFIRLANMAKTADIR
1196'
1200 ON N-3 GOTO 1210,1230,1250
1201'
1202' N=4 ISE ' ALTPROGRAM-4 CAGIRILARAK
1204' N=5 ISE ALTPROGRAM-5 CAGIRILARAK
1206' N=6 ISE ALTPROGRAM-6 CAGIRILARAK
1207'
1208' D2,D3 VE R0 DEGERLERI ALINMAKTADIR.
1209'
1210 GOSUB 1730
1220 GOTO 1260
1230 GOSUB 1880
1240 GOTO 1260
1250 GOSUB 2060
1260 FOR J=1 TO 3
1270 ON J GOTO 1280,1320,1360
1280 Y1=X1
1290 Y2=X2
1300 K=A
1310 GOTO 1390
1320 Y1=X3
1330 Y2=X4
1340 K=B1
1350 GOTO 1390
1360 Y1=X5
1370 Y2=X6
1380 K=B2
1390 S2=K*Y2/N*(1+6*E*(N+1-2*I))/(N*N-1))
1400 C2=C2+S2
1410 K2=K*Y2*D3*(1+D2*R0*E)
1420 F2=F2+K2
1430 IF Y1<0 GOTO 1470
1440 S1=0
1450 R1=0
1460 GOTO 1490
1470 S1=K*Y1/N*(1+6*E*(N+1-2*I))/(N*N-1))
1480 R1=K*Y1*D3*(1+D2*R0*E)
1490 C1=C1+S1
1500 F1=F1+R1
1510 NEXT J
1520 S=C2/270
1530 S5=C1/270
1540 R=F2/270
1550 R5=F1/270
1560 PRINT #1:USING* -f -f.f -f SMOM=-f.ffff*L+f.ffff*:N,E,I,S,S5
1565 PRINT #1:USING* RMOM=-f.ffff*L+f.ffff*:R,R5

```

```

1567 PRINT #1:
1570 NEXT I
1580 NEXT M
1590 NEXT N
1598 STOP
1599 '
1600 '          ALT PROGRAMLAR
1610 '
1615 '
1616 '
1617 '          ALT PROGRAM 1
1618 '
1620 ON N-3 GOTO 1630,1660,1690
1630 E=2.4
1640 D1=0.4
1650 RETURN
1660 E=3
1670 D1=0.5
1680 RETURN
1690 E=3.6
1700 D1=0.6
1710 RETURN
1715 '
1720 '          ALT PROGRAM 4
1725 '
1730 D2=6/8.5
1740 ON I GOTO 1750,1780,1810
1750 D3=2/6
1760 R0=1.5
1770 RETURN
1780 D3=1/6
1790 R0=0.5
1800 RETURN
1810 D3=1/6
1820 R0=-0.5
1830 RETURN
1870 '
1871 '
1872 '          ALT PROGRAM 5
1875 '
1880 D2=7/18
1890 ON I GOTO 1900,1930,1960
1900 D3=2/7
1910 R0=2
1920 RETURN
1930 D3=1/7
1940 R0=1
1950 RETURN
1960 D3=1/7
1970 R0=0
1980 RETURN
2050 '
2051 '
2052 '          ALT PROGRAM 6
2055 '
2060 D2=4/15
2070 ON I GOTO 2080,2110,2140
2080 D3=0.25
2090 R0=2.5
2100 RETURN

```

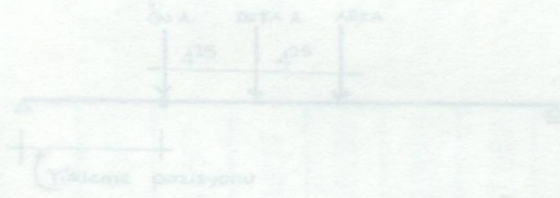
```

2110 D3=0.125
2120 R0=1.5
2130 RETURN
      2140 D3=0.125
2150 R0=0.5
2160 RETURN
3000 DATA 30, 120, 120, 0, 0.0625, 2, 125, 0.0625, 4, 25, 0.0625
9000 END

```

TEK AÇIKLIKLI VE KIRIŞ ATALET MOMENTLERİ SABİT KÖPRÜLER İÇİN YÜK DAĞILIM TABLOLARI

Tabloların kullanımı:



Her tablonun üzerinde şekildeki gibi yükleme pozisyonları gösterilmiştir. İstenilen bir noktadaki moment bulunmak gerektiğinde aşağıdaki örnekte uygulanan yol izlenmelidir.

Sabit atalet momentli 5 ana kirişli bir köprüdün 2 nolu kirişine $R=1.5$ eksantrikliği ile yüklennmiş H30-S24 yükünden dolayı gelen açıklık ortası momentini hesaplayalım. $L=30$ m. ve yük pozisyonu ön aks $L/4$ noktasında olacak şekilde olsun.

İlgili tablodan bulunan değer,

$0.0438 \cdot L + 0.9917$ bunu L açıklığı ve H30-S24 toplam yükü ile çarpacağız.

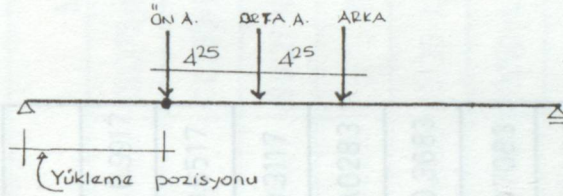
$$\text{Moment} = (0.0438 \cdot 30 + 0.9917) \cdot 340 = 1245.078 \text{ kN.m}$$

bulunmuş olur.

TABLO 1

TEK AÇIKLIKLI VE KİRİŞ ATALET MOMENTLERİ
SABİT KÖPRÜLER İÇİN YÜK DAĞILIM TABLOLARI

Tabloların kullanımı:



Her tablonun üzerinde şekildeki gibi yükleme pozisyonları gösterilmiştir. İstenilen bir noktadaki moment bulunmak gerektiğinde aşağıdaki örnekte uygulanan yol izlenmelidir.

Sabit atalet momentli 5 ana kirişli bir köprünün 2 nolu kirişine $E=1.5$ eksantrikliği ile yüklenmiş H30-S24 yüküne dolyı gelen açıklık ortası momentini hesaplayalım. $L=30$ m. ve yük pozisyonu ön aks $L/4$ noktasında olacak şekilde olsun.

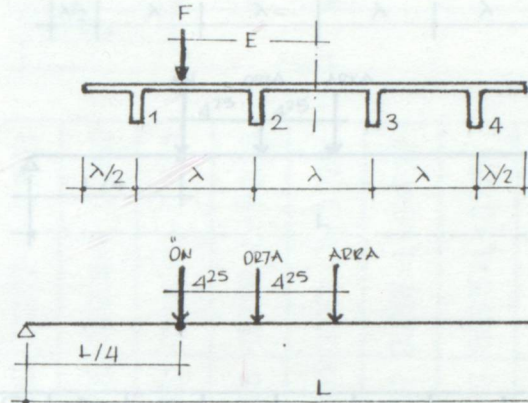
İlgili tablodan bulunan deger,

$0.0438 \cdot L + 0.9917$ bunu L açıklığı ve H30-S24 toplam yükü ile çarpacağız.

$$\text{Moment} = (0.0438 \cdot 30 + 0.9917) \cdot 540 = 1245.078 \text{ kN.m}$$

bulunmuş olur.

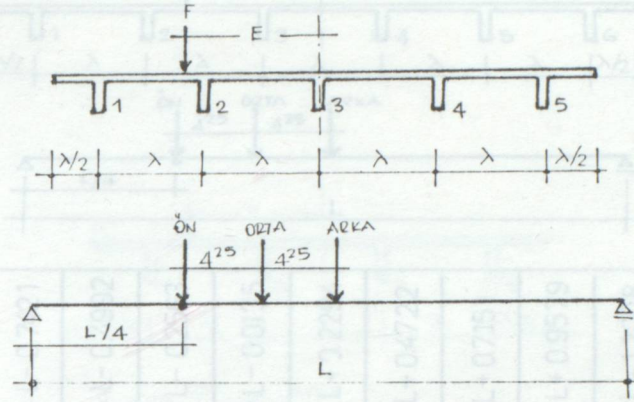
TABLO : 1



E ∅	KİRİS NUMARASI			
	1	2	3	4
2.0	0.1062 × L + 2.4083	0.0562 × L + 1.2750	0.0063 × L + 0.1417	-0.00438 × L + 0.9917
1.6	0.0913 × L + 2.0683	0.0513 × L + 1.1617	0.0113 × L + 0.2550	-0.00288 × L - 0.6517
1.2	0.0762 × L + 1.7283	0.0462 × L + 1.0483	0.0163 × L + 0.3683	-0.0137 × L - 0.3117
0.8	0.0613 × L + 1.3883	0.0412 × L + 0.9350	0.0213 × L + 0.4817	0.0012 × L + 0.0283
0.4	0.0462 × L + 1.0483	0.0362 × L + 0.8217	0.0263 × L + 0.5950	0.0162 × L + 0.3683
0.0	0.0312 × L + 0.7083	0.0312 × L + 0.7083	0.0312 × L + 0.7083	0.0312 × L + 0.7083
-0.4	0.0162 × L + 0.3683	0.0263 × L + 0.5950	0.0363 × L + 0.8217	0.0462 × L + 1.0483
-0.8	0.0012 × L + 0.0283	0.0213 × L + 0.4817	0.0413 × L + 0.9317	0.0613 × L + 1.3883
-1.2	-0.0137 × L - 0.3117	0.0163 × L + 0.3683	0.0462 × L + 1.0483	0.0762 × L + 1.7283
-1.6	-0.0288 × L - 0.6517	0.0112 × L + 0.2550	0.0513 × L + 1.1617	0.0913 × L + 2.0683
-2.0	-0.0438 × L - 0.9917	0.0063 × L + 0.1417	0.0563 × L + 1.2750	0.1062 × L + 2.4083

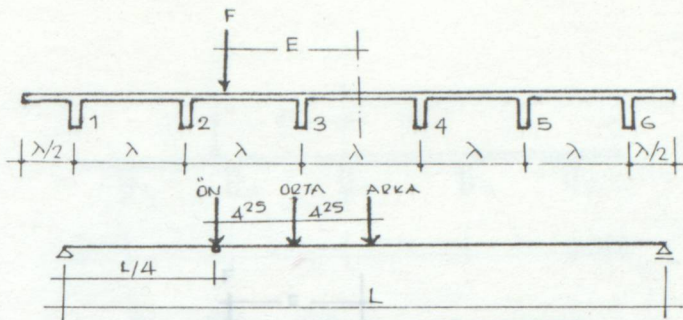
TABLO 3

TABLO 2



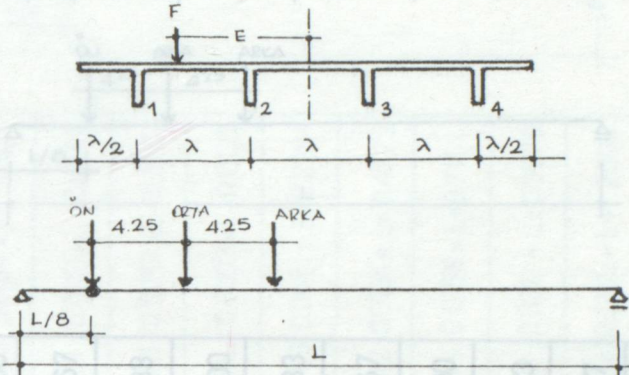
E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.0875 × L + 1.9833	0.0563 × L + 1.2750	0.0250 × L + 0.5667	-0.0063 × L - 0.1417	-0.0375 × L - 0.8500
2.0	0.0750 × L + 1.7000	0.0500 × L + 1.1333	0.0250 × L + 0.5667	0	-0.0250 × L - 0.5667
1.5	0.0625 × L + 1.4167	0.0438 × L + 0.9917	0.0250 × L + 0.5667	0.0063 × L + 0.1417	-0.0125 × L - 0.2833
1.0	0.0500 × L + 1.1333	0.0375 × L + 0.8500	0.0250 × L + 0.5667	0.0125 × L + 0.2833	0
0.5	0.0375 × L + 0.8500	0.0313 × L + 0.7083	0.0250 × L + 0.5667	0.0187 × L + 0.4250	0.0125 × L + 0.2833
0.0	0.0250 × L + 0.5667	0.0250 × L + 0.5667	0.0250 × L + 0.5667	0.0250 × L + 0.5667	0.0250 × L + 0.5667
-0.5	0.0125 × L + 0.2833	0.0187 × L + 0.4250	0.0250 × L + 0.5667	0.0313 × L + 0.7083	0.0375 × L + 0.8500
-1.0	0	0.0125 × L + 0.2833	0.0250 × L + 0.5667	0.0375 × L + 0.8500	0.0500 × L + 1.1333
-1.5	-0.0125 × L - 0.2833	0.0063 × L + 0.1417	0.0250 × L + 0.5667	0.0438 × L + 0.9917	0.0625 × L + 1.4167
-2.0	-0.0250 × L - 0.5667	0	0.0250 × L + 0.5667	0.0500 × L + 1.1333	0.0750 × L + 1.7000
-2.5	-0.0375 × L - 0.8500	-0.0063 × L - 0.1417	0.0250 × L + 0.5667	0.0563 × L + 1.2750	0.0875 × L + 1.9833

TABLO:3



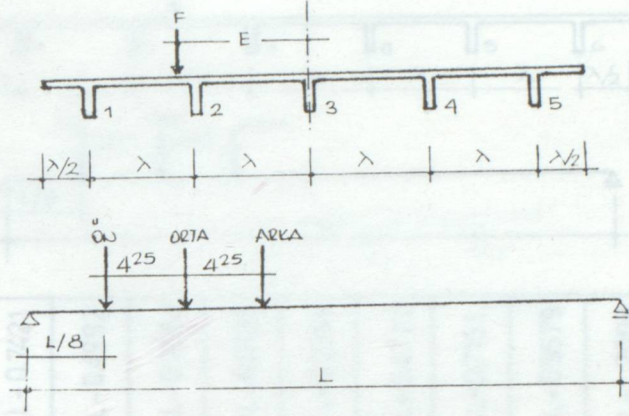
E	KIRIŞ NUMARASI					
	1	2	3	4	5	6
3.0	0.0744 × L + 1.6865	0.0530 × L + 1.2008	0.0315 × L + 0.7151	0.0101 × L + 0.2294	-0.0113 × L - 0.2563	-0.0327 × L - 0.7421
2.4	0.0637 × L + 1.4437	0.0465 × L + 1.0551	0.0264 × L + 0.6665	0.0123 × L + 0.2779	-0.0049 × L - 0.1106	-0.0220 × L - 0.4992
1.8	0.0530 × L + 1.2008	0.0401 × L + 0.9094	0.0273 × L + 0.6179	0.0144 × L + 0.3265	0.0015 × L + 0.0351	-0.0113 × L - 0.2563
1.2	0.0423 × L + 0.9579	0.0337 × L + 0.7637	0.0251 × L + 0.5694	0.0165 × L + 0.3751	0.0080 × L + 0.1808	-0.0006 × L - 0.0135
0.6	0.0315 × L + 0.7151	0.0273 × L + 0.6179	0.0230 × L + 0.5208	0.0187 × L + 0.4237	0.0144 × L + 0.3265	0.0101 × L + 0.2294
0.0	0.0208 × L + 0.4722	0.0208 × L + 0.4722	0.0208 × L + 0.4722	0.0208 × L + 0.4722	0.0208 × L + 0.4722	0.0208 × L + 0.4722
-0.6	0.0101 × L + 0.2294	0.0144 × L + 0.3265	0.0187 × L + 0.4237	0.0230 × L + 0.5208	0.0273 × L + 0.6179	0.0315 × L + 0.7151
-1.2	-0.0006 × L - 0.0135	0.0080 × L + 0.1808	0.0165 × L + 0.3751	0.0251 × L + 0.5694	0.0337 × L + 0.7637	0.0423 × L + 0.9579
-1.8	-0.0113 × L - 0.2563	0.0015 × L + 0.0351	0.0144 × L + 0.3265	0.0273 × L + 0.6179	0.0401 × L + 0.9094	0.0530 × L + 1.2008
-2.4	-0.0220 × L - 0.4992	-0.0049 × L - 0.1106	0.0123 × L + 0.2779	0.0264 × L + 0.6665	0.0465 × L + 1.0551	0.0637 × L + 1.4437
-3.0	-0.0327 × L - 0.7421	-0.0113 × L - 0.2563	0.0101 × L + 0.2294	0.0315 × L + 0.7151	0.0530 × L + 1.2008	0.0744 × L + 1.6865

TABLO 4



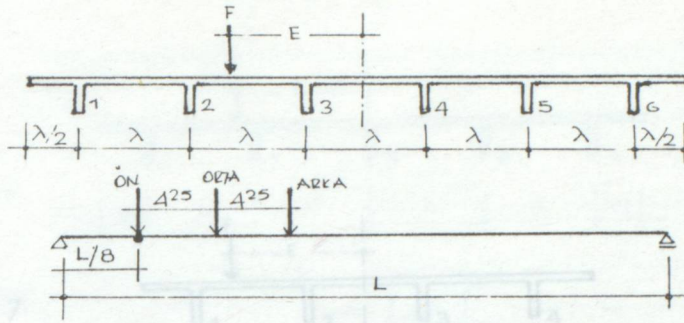
E (λ)	KIRIŞ NUMARASI			
	1	2	3	4
2.0	0.0531 × L + 2.4083	0.0281 × L + 1.2750	0.0031 × L + 0.1417	-0.0219 × L - 0.9917
1.6	0.0456 × L + 2.0683	0.0256 × L + 1.1617	0.0056 × L + 0.2550	-0.0144 × L - 0.6517
1.2	0.0381 × L + 1.7283	0.0231 × L + 1.0483	0.0081 × L + 0.3683	0.0069 × L - 0.3117
0.8	0.0306 × L + 1.3883	0.0206 × L + 0.9350	0.0106 × L + 0.4817	0.0006 × L + 0.0283
0.4	0.0231 × L + 1.0483	0.0181 × L + 0.8217	0.0131 × L + 0.5950	0.0081 × L + 0.3683
±0.0	0.0156 × L + 0.7083	0.0156 × L + 0.7083	0.0156 × L + 0.7083	0.0156 × L + 0.7083
-0.4	0.0081 × L + 0.3683	0.0131 × L + 0.5950	0.0181 × L + 0.8217	0.0231 × L + 1.0483
-0.8	0.0006 × L + 0.0283	0.0106 × L + 0.4817	0.0206 × L + 0.9350	0.0306 × L + 1.3883
-1.2	0.0069 × L - 0.3117	0.0081 × L + 0.3683	0.0231 × L + 1.0483	0.0381 × L + 1.7283
-1.6	-0.0144 × L - 0.6517	0.0056 × L + 0.2550	0.0256 × L + 1.1617	0.0456 × L + 2.0683
-2.0	-0.0219 × L - 0.9917	0.0031 × L + 0.1417	0.0281 × L + 1.2750	0.0531 × L + 2.4083

TABLO 5



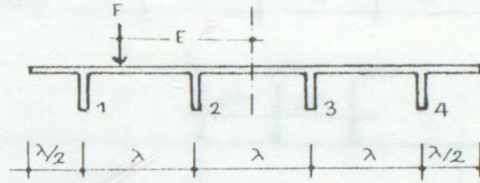
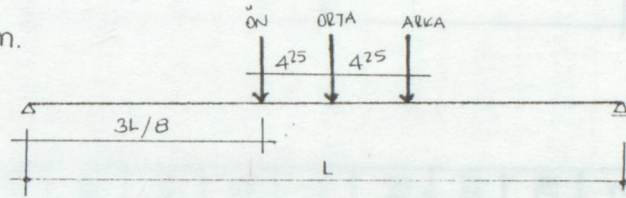
E (λ)	KİRİŞ NUMARASI				
	1	2	3	4	5
2.5	0.0438 × L + 1.9833	0.0281 × L + 1.2750	0.0125 × L + 0.5667	-0.0031 × L + 0.1417	-0.0187 × L - 0.8500
2.0	0.0375 × L + 1.7000	0.0250 × L + 1.1333	0.0125 × L + 0.5667	0.0000 × L + 0.0000	-0.0125 × L - 0.5667
1.5	0.0313 × L + 1.4167	0.0219 × L + 0.9917	0.0125 × L + 0.5667	0.0031 × L + 0.1417	-0.0063 × L - 0.2833
1.0	0.0250 × L + 1.1333	0.0187 × L + 0.8500	0.0125 × L + 0.5667	0.0063 × L + 0.2833	0.0000 × L + 0.0000
0.5	0.0187 × L + 0.8500	0.0156 × L + 0.7083	0.0125 × L + 0.5667	0.0094 × L + 0.4250	0.0063 × L + 0.2833
0.0	0.0125 × L + 0.5667	0.0125 × L + 0.5667	0.0125 × L + 0.5667	0.0125 × L + 0.5667	0.0125 × L + 0.5667
-0.5	0.0063 × L + 0.2833	0.0094 × L + 0.4250	0.0125 × L + 0.5667	0.0156 × L + 0.7083	0.0187 × L + 0.8500
-1.0	0.0000 × L + 0.0000	0.0063 × L + 0.2833	0.0125 × L + 0.5667	0.0187 × L + 0.8500	0.0250 × L + 1.1333
-1.5	-0.0063 × L - 0.2833	0.0031 × L + 0.1417	0.0125 × L + 0.5667	0.0219 × L + 0.9917	0.0313 × L + 1.4167
-2.0	-0.0125 × L - 0.5667	0.0000 × L + 0.0000	0.0125 × L + 0.5667	0.0250 × L + 1.1333	0.0375 × L + 1.7000
-2.5	-0.0187 × L - 0.8500	-0.0031 × L + 0.1417	0.0125 × L + 0.5667	0.0281 × L + 1.2750	0.0438 × L + 1.9833

TABLO 6



E	K İ R İ Ş N U M A R A S I					
	1	2	3	4	5	6
3.0	$0.0372 \times L + 1.6865$	$0.0265 \times L + 1.2008$	$0.0158 \times L + 0.7151$	$0.0051 \times L + 0.2294$	$-0.0057 \times L - 0.2563$	$-0.0164 \times L - 0.7421$
2.4	$0.0318 \times L + 1.4437$	$0.0233 \times L + 1.0551$	$0.0147 \times L + 0.6665$	$0.0061 \times L + 0.2779$	$-0.0024 \times L - 0.1106$	$-0.0110 \times L - 0.4992$
1.8	$0.0265 \times L + 1.2008$	$0.0201 \times L + 0.9094$	$0.0136 \times L + 0.6179$	$0.0072 \times L + 0.3265$	$0.0008 \times L + 0.0351$	$-0.0057 \times L - 0.2563$
1.2	$0.0211 \times L + 0.9579$	$0.0168 \times L + 0.7637$	$0.0126 \times L + 0.5694$	$0.0083 \times L + 0.3751$	$0.0040 \times L + 0.1808$	$-0.0003 \times L - 0.0135$
0.6	$0.0158 \times L + 0.7151$	$0.0136 \times L + 0.6179$	$0.0115 \times L + 0.5208$	$0.0093 \times L + 0.4237$	$0.0072 \times L + 0.3265$	$0.0051 \times L + 0.2294$
0.0	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$
-0.6	$0.0051 \times L + 0.2294$	$0.0072 \times L + 0.3265$	$0.0093 \times L + 0.4237$	$0.0115 \times L + 0.5208$	$0.0136 \times L + 0.6179$	$0.0158 \times L + 0.7151$
-1.2	$-0.0003 \times L - 0.0135$	$0.0040 \times L + 0.1808$	$0.0083 \times L + 0.3751$	$0.0126 \times L + 0.5694$	$0.0168 \times L + 0.7637$	$0.0211 \times L + 0.9579$
-1.8	$-0.0057 \times L - 0.2563$	$0.0008 \times L + 0.0351$	$0.0072 \times L + 0.3265$	$0.0136 \times L + 0.6179$	$0.0201 \times L + 0.9094$	$0.0265 \times L + 1.2008$
-2.4	$-0.0110 \times L - 0.4992$	$-0.0024 \times L - 0.1106$	$0.0061 \times L + 0.2779$	$0.0147 \times L + 0.6665$	$0.0233 \times L + 1.0551$	$0.0318 \times L + 1.4437$
-3.0	$-0.0164 \times L - 0.7421$	$-0.0057 \times L - 0.2563$	$0.0051 \times L + 0.2294$	$0.0158 \times L + 0.7151$	$0.0265 \times L + 1.2008$	$0.0372 \times L + 1.6865$

TABLO 7

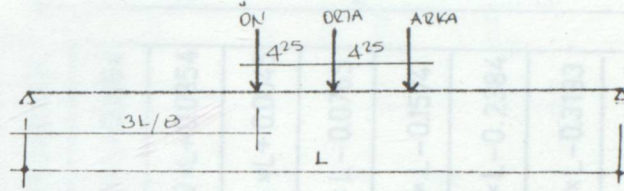

 $L/8 > 4.25 \text{ m.}$


E	KİRİŞ NUMARASI			
	1	2	3	4
2.0	$0.2066 \times L - 0.8028$	$0.1094 \times L - 0.4250$	$0.0122 \times L - 0.0472$	$0.0851 \times L + 0.3306$
1.6	$0.1774 \times L - 0.6894$	$0.0997 \times L - 0.3872$	$0.0219 \times L - 0.0850$	$-0.0559 \times L + 0.2172$
1.2	$0.1483 \times L - 0.5761$	$0.0899 \times L - 0.3494$	$0.0316 \times L - 0.1228$	$-0.0267 \times L + 0.1039$
0.8	$0.1191 \times L - 0.4628$	$0.0802 \times L - 0.3117$	$0.0413 \times L - 0.1606$	$0.0024 \times L - 0.0094$
0.4	$0.0899 \times L - 0.3494$	$0.0705 \times L - 0.2739$	$0.0510 \times L - 0.1983$	$0.0316 \times L - 0.1228$
0.0	$0.0608 \times L - 0.2361$	$0.0608 \times L - 0.2361$	$0.0608 \times L - 0.2361$	$0.0608 \times L - 0.2361$
-0.4	$0.0316 \times L - 0.1228$	$0.0510 \times L - 0.1983$	$0.0705 \times L - 0.2739$	$0.0899 \times L - 0.3494$
-0.8	$0.0024 \times L - 0.0094$	$0.0413 \times L - 0.1606$	$0.0802 \times L - 0.3117$	$0.1191 \times L - 0.4628$
-1.2	$0.0267 \times L + 0.1039$	$0.0316 \times L - 0.1228$	$0.0899 \times L - 0.3494$	$0.1483 \times L - 0.5761$
-1.6	$0.0559 \times L + 0.2172$	$0.0219 \times L - 0.0850$	$0.0997 \times L - 0.3872$	$0.1774 \times L - 0.6894$
-2.0	$0.0851 \times L + 0.3306$	$0.0122 \times L - 0.0472$	$0.1094 \times L - 0.4250$	$0.2066 \times L - 0.8028$

TABLO:8

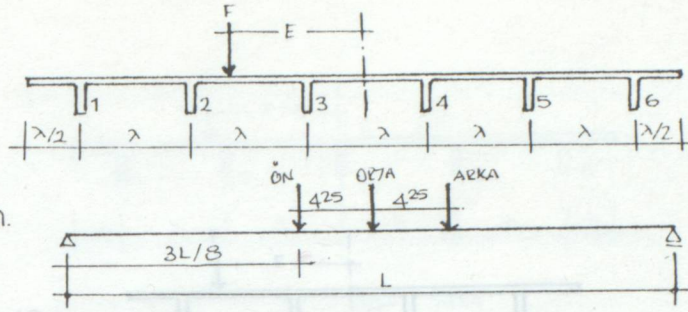


L/8 > 4.25 m.



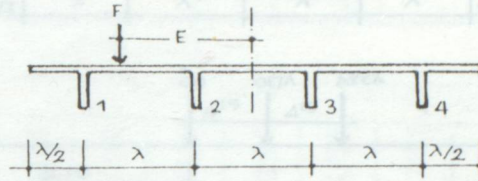
E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.1701 × L - 0.6611	0.1094 × L - 0.4250	0.0486 × L - 0.1889	-0.0122 × L + 0.0472	0.0729 × L + 0.2833
2.0	0.1458 × L - 0.5667	0.0972 × L - 0.3778	0.0486 × L - 0.1889	0.0000 × L - 0.0000	-0.0486 × L + 0.1889
1.5	0.1215 × L - 0.4722	0.0851 × L - 0.3306	0.0486 × L - 0.1889	0.0122 × L - 0.0472	-0.0243 × L + 0.0944
1.0	0.0972 × L - 0.3778	0.0729 × L - 0.2833	0.0486 × L - 0.1889	0.0243 × L - 0.0944	0.0000 × L - 0.0000
0.5	0.0729 × L - 0.2833	0.0608 × L - 0.2361	0.0486 × L - 0.1889	0.0365 × L - 0.1417	0.0243 × L - 0.0944
0.0	0.0486 × L - 0.1889	0.0486 × L - 0.1889	0.0486 × L - 0.1889	0.0486 × L - 0.1889	0.0486 × L - 0.1889
-0.5	0.0243 × L - 0.0944	0.0365 × L - 0.1417	0.0486 × L - 0.1889	0.0608 × L - 0.2361	0.0729 × L - 0.2833
-1.0	0.0000 × L - 0.0000	0.0243 × L - 0.0944	0.0486 × L - 0.1889	0.0729 × L - 0.2833	0.0972 × L - 0.3778
-1.5	-0.0243 × L + 0.0944	0.0122 × L - 0.0472	0.0486 × L - 0.1889	0.0851 × L - 0.3306	0.1215 × L - 0.4722
-2.0	-0.0486 × L + 0.1889	0.0000 × L - 0.0000	0.0486 × L - 0.1889	0.0972 × L - 0.3778	0.1458 × L - 0.5667
-2.5	-0.0729 × L + 0.2833	-0.0122 × L + 0.0472	0.0486 × L - 0.1889	0.1094 × L - 0.4250	0.1701 × L - 0.6611

TABLO: 9

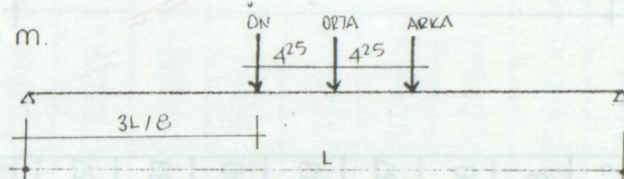
 $L/8 > 4.25 \text{ m.}$ 

E	KIRIŞ NUMARASI					
	1	2	3	4	5	6
3.0	$0.1447 \times L - 0.5622$	$0.1030 \times L - 0.4003$	$0.0613 \times L - 0.2384$	$0.0197 \times L - 0.0708$	$-0.0220 \times L + 0.0854$	$0.0637 \times L + 0.2474$
2.4	$0.1238 \times L - 0.4812$	$0.0905 \times L - 0.2314$	$0.0572 \times L - 0.2222$	$0.0238 \times L - 0.0926$	$-0.0095 \times L + 0.0369$	$-0.0428 \times L + 0.1664$
1.8	$0.1030 \times L - 0.4003$	$0.0780 \times L - 0.3031$	$0.0530 \times L - 0.2060$	$0.0280 \times L - 0.1088$	$-0.0030 \times L - 0.0117$	$-0.0220 \times L + 0.0854$
1.2	$0.0822 \times L - 0.3193$	$0.0655 \times L - 0.2546$	$0.0488 \times L - 0.1898$	$0.0322 \times L - 0.1250$	$0.0155 \times L - 0.0603$	$-0.0012 \times L + 0.0045$
0.6	$0.0613 \times L - 0.2384$	$0.0530 \times L - 0.2060$	$0.0447 \times L - 0.1736$	$0.0363 \times L - 0.1412$	$0.0280 \times L - 0.1088$	$0.0197 \times L - 0.0765$
0.0	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$
-0.6	$0.0197 \times L - 0.0765$	$0.0280 \times L - 0.1088$	$0.0363 \times L - 0.1412$	$0.0447 \times L - 0.1736$	$0.0530 \times L - 0.2060$	$0.0613 \times L - 0.2384$
-1.2	$-0.0012 \times L + 0.0045$	$0.0155 \times L - 0.0603$	$0.0322 \times L - 0.1250$	$0.0488 \times L - 0.1898$	$0.0655 \times L - 0.2546$	$0.0822 \times L - 0.3193$
-1.8	$-0.0220 \times L + 0.0854$	$0.0030 \times L - 0.0117$	$0.0280 \times L - 0.1088$	$0.0530 \times L - 0.2060$	$0.0780 \times L - 0.3031$	$0.1030 \times L - 0.4003$
-2.4	$-0.0428 \times L + 0.1664$	$0.0095 \times L + 0.0369$	$0.0238 \times L - 0.0926$	$0.0572 \times L - 0.2222$	$0.0905 \times L - 0.2314$	$0.1238 \times L - 0.4812$
-3.0	$-0.0637 \times L + 0.2474$	$-0.0220 \times L + 0.0854$	$0.0197 \times L - 0.0708$	$0.0613 \times L - 0.2384$	$0.1030 \times L - 0.4003$	$0.1447 \times L - 0.5622$

TABLO 10



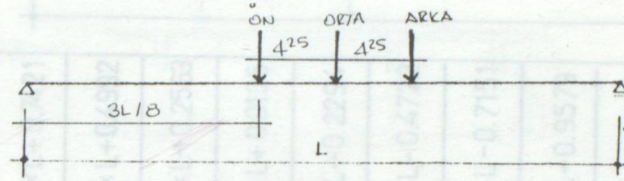
$L/8 < 4.25$ m.



E	KIRIŞ NUMARASI			
	1	2	3	4
2.0	$0.2538 \times L - 2.4083$	$0.1344 \times L - 1.2750$	$0.0149 \times L - 0.1417$	$0.1045 \times L + 0.9917$
1.6	$0.2180 \times L - 2.0683$	$0.1224 \times L - 1.1617$	$0.0269 \times L - 0.2550$	$0.0687 \times L + 0.6517$
1.2	$0.1822 \times L - 1.7283$	$0.1105 \times L - 1.0483$	$0.0388 \times L - 0.3683$	$0.0328 \times L + 0.3117$
0.8	$0.1463 \times L - 1.3883$	$0.0985 \times L - 0.9350$	$0.0508 \times L - 0.4817$	$0.0030 \times L - 0.0283$
0.4	$0.1105 \times L - 1.0483$	$0.0866 \times L - 0.8217$	$0.0627 \times L - 0.5950$	$0.0388 \times L - 0.3683$
0.0	$0.0747 \times L - 0.7083$	$0.0747 \times L - 0.7083$	$0.0747 \times L - 0.7083$	$0.0747 \times L - 0.7083$
-0.4	$0.0388 \times L - 0.3683$	$0.0627 \times L - 0.5950$	$0.0866 \times L - 0.8217$	$0.1105 \times L - 1.0483$
-0.8	$0.0030 \times L - 0.0283$	$0.0508 \times L - 0.4817$	$0.0985 \times L - 0.9350$	$0.1463 \times L - 1.3883$
-1.2	$0.0328 \times L + 0.3117$	$0.0388 \times L - 0.3683$	$0.1105 \times L - 1.0483$	$0.1822 \times L - 1.7283$
-1.6	$0.0687 \times L + 0.6517$	$0.0269 \times L - 0.2550$	$0.1224 \times L - 1.1617$	$0.2180 \times L - 2.0683$
-2.0	$0.1045 \times L + 0.9917$	$0.0149 \times L - 0.1417$	$0.1344 \times L - 1.2750$	$0.2538 \times L - 2.4083$

TABLO : 11

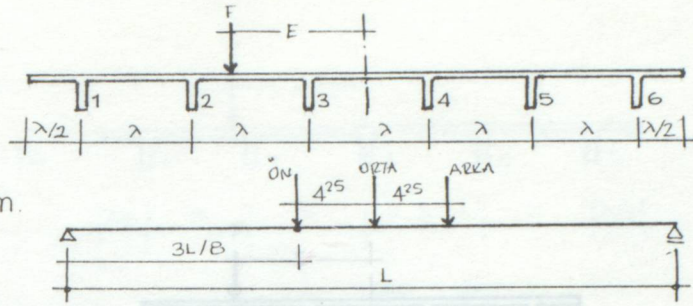
L/8 < 4.25 m.



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.2090 x L - 1.9833	0.1344 x L - 1.2750	0.0597 x L - 0.5667	-0.0149 x L + 0.1417	-0.0896 x L + 0.8500
2.0	0.1792 x L - 1.7000	0.1194 x L - 1.1333	0.0597 x L - 0.5667	0.0000 x L - 0.0000	-0.0597 x L + 0.5667
1.5	0.1493 x L - 1.4167	0.1045 x L - 0.9917	0.0597 x L - 0.5667	0.0149 x L - 0.1417	0.0299 x L + 0.2833
1.0	0.1194 x L - 1.1333	0.0896 x L - 0.8500	0.0597 x L - 0.5667	0.0299 x L - 0.2833	0.0000 x L - 0.0000
0.5	0.0896 x L - 0.8500	0.0747 x L - 0.7083	0.0597 x L - 0.5667	0.0448 x L - 0.4250	0.0299 x L - 0.2833
0.0	0.0597 x L - 0.5667	0.0597 x L - 0.5667	0.0597 x L - 0.5667	0.0597 x L - 0.5667	0.0597 x L - 0.5667
-0.5	0.0299 x L - 0.2833	0.0448 x L - 0.4250	0.0597 x L - 0.5667	0.0747 x L - 0.7083	0.0896 x L - 0.8500
-1.0	0.0000 x L - 0.0000	0.0299 x L - 0.2833	0.0597 x L - 0.5667	0.0896 x L - 0.8500	0.1194 x L - 1.1333
-1.5	0.0299 x L + 0.2833	0.0149 x L - 0.1417	0.0597 x L - 0.5667	0.1045 x L - 0.9917	0.1493 x L - 1.4167
-2.0	-0.0597 x L + 0.5667	0.0000 x L - 0.0000	0.0597 x L - 0.5667	0.1194 x L - 1.1333	0.1792 x L - 1.7000
-2.5	-0.0896 x L + 0.8500	-0.0149 x L + 0.1417	0.0597 x L - 0.5667	0.1344 x L - 1.2750	0.2090 x L - 1.9833

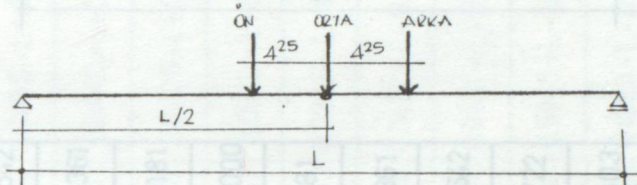
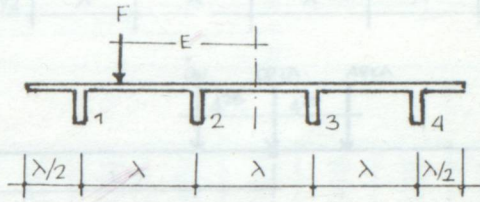
TABLO:12

L/8 < 4.25m.



E	KIRIŞ NUMARASI					
	1	2	3	4	5	6
3.0	0.1777 × L - 1.6865	0.1266 × L - 1.2008	0.0754 × L - 0.7151	0.0242 × L - 0.2294	0.0270 × L + 0.2563	-0.0782 × L + 0.7421
2.4	0.1521 × L - 1.4437	0.1112 × L - 1.0551	0.0702 × L - 0.6665	0.0293 × L - 0.2779	-0.0117 × L + 0.1106	-0.0526 × L + 0.4992
1.8	0.1266 × L - 1.2008	0.0958 × L - 0.9094	0.0651 × L - 0.6179	0.0344 × L - 0.3265	0.0037 × L - 0.0351	-0.0270 × L + 0.2563
1.2	0.1010 × L - 0.9579	0.0805 × L - 0.7637	0.0600 × L - 0.5694	0.0395 × L - 0.3751	0.0191 × L - 0.1808	-0.0014 × L + 0.0135
0.6	0.0754 × L - 0.7151	0.0651 × L - 0.6179	0.0549 × L - 0.5208	0.0446 × L - 0.4237	0.0344 × L - 0.3265	0.0242 × L - 0.2294
0.0	0.0498 × L - 0.4722	0.0498 × L - 0.4722	0.0498 × L - 0.4722	0.0498 × L - 0.4722	0.0498 × L - 0.4722	0.0498 × L - 0.4722
-0.6	0.0242 × L - 0.2294	0.0344 × L - 0.3265	0.0446 × L - 0.4237	0.0549 × L - 0.5208	0.0651 × L - 0.6179	0.0754 × L - 0.7151
-1.2	-0.0014 × L + 0.0135	0.0191 × L - 0.1808	0.0395 × L - 0.3751	0.0600 × L - 0.5694	0.0805 × L - 0.7637	0.1010 × L - 0.9579
-1.8	-0.0270 × L + 0.2563	0.0037 × L - 0.0351	0.0344 × L - 0.3265	0.0651 × L - 0.6179	0.0958 × L - 0.9094	0.1266 × L - 1.2008
-2.4	-0.0526 × L + 0.4992	-0.0117 × L + 0.1106	0.0293 × L - 0.2779	0.0702 × L - 0.6665	0.1112 × L - 1.0551	0.1521 × L - 1.4437
-3.0	-0.0782 × L + 0.7421	-0.0270 × L + 0.2563	0.0242 × L - 0.2294	0.0754 × L - 0.7151	0.1266 × L - 1.2008	0.1777 × L - 1.6865

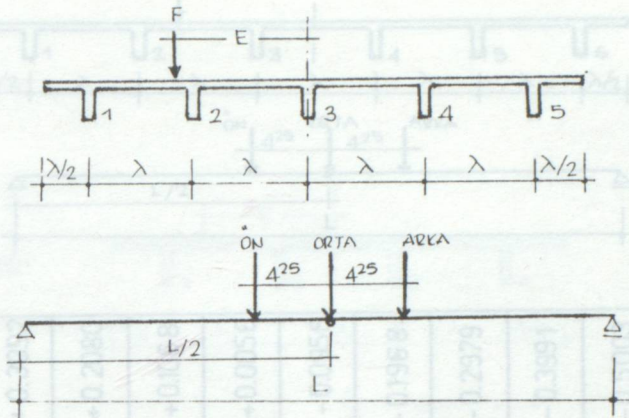
TABLO : 13



E	KİRİŞ NUMARASI			
	1	2	3	4
2.0	0.2125xL - 1.0035	0.1125xL - 0.5312	0.0125xL - 0.0590	-0.0875xL + 0.4132
1.6	0.1825xL - 0.8618	0.1025xL - 0.4840	0.0225xL - 0.1063	-0.0575xL + 0.2715
1.2	0.1525xL - 0.7201	0.0925xL - 0.4368	0.0325xL - 0.1535	-0.0275xL + 0.1299
0.8	0.1225xL - 0.5785	0.0825xL - 0.3896	0.0425xL - 0.2007	0.0025xL - 0.0118
0.4	0.0925xL - 0.4368	0.0725xL - 0.3424	0.0525xL - 0.2479	0.0325xL - 0.1535
0.0	0.0625xL - 0.2951	0.0625xL - 0.2951	0.0625xL - 0.2951	0.0625xL - 0.2951
-0.4	0.0325xL - 0.1535	0.0525xL - 0.2479	0.0725xL - 0.3424	0.0925xL - 0.4368
-0.8	0.0025xL - 0.0118	0.0425xL - 0.2007	0.0825xL - 0.3896	0.1225xL - 0.5785
-1.2	-0.0275xL + 0.1299	0.0325xL - 0.1535	0.0925xL - 0.4368	0.1525xL - 0.7201
-1.6	-0.0575xL + 0.2715	0.0225xL - 0.1062	0.1025xL - 0.4840	0.1825xL - 0.8618
-2.0	-0.0875xL + 0.4132	0.0125xL - 0.0590	0.1125xL - 0.5313	0.2125xL - 1.0035

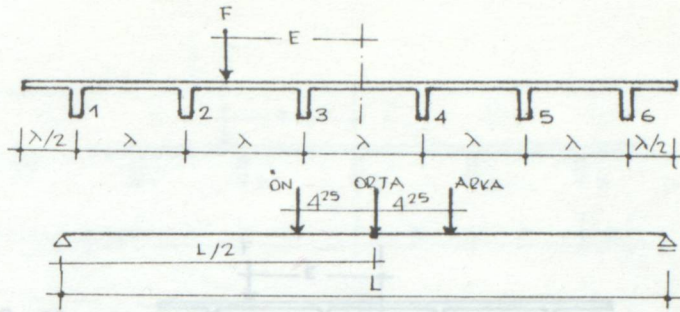
TABLO 15

TABLO 14



E	KİRİŞ NUMARASI				
	1	2	3	4	5
2.5	0.1750 × L - 0.8264	0.1125 × L - 0.5313	0.0500 × L - 0.2361	-0.0125 × L + 0.0590	-0.0750 × L + 0.3542
2.0	0.1500 × L - 0.7083	0.1000 × L - 0.4722	0.0500 × L - 0.2361	0.0000 × L - 0.0000	-0.0500 × L + 0.2361
1.5	0.1250 × L - 0.5903	0.0875 × L - 0.4132	0.0500 × L - 0.2361	0.0125 × L - 0.0590	-0.0250 × L + 0.1181
1.0	0.1000 × L - 0.4722	0.0750 × L - 0.3542	0.0500 × L - 0.2361	0.0250 × L - 0.1181	0.0000 × L - 0.0000
0.5	0.0750 × L - 0.3542	0.0625 × L - 0.2951	0.0500 × L - 0.2361	0.0375 × L - 0.1771	0.0250 × L - 0.1181
0.0	0.0500 × L - 0.2361	0.0500 × L - 0.2361	0.0500 × L - 0.2361	0.0500 × L - 0.2361	0.0500 × L - 0.2361
-0.5	0.0250 × L - 0.1181	0.0375 × L - 0.1771	0.0500 × L - 0.2361	0.0625 × L - 0.2951	0.0750 × L - 0.3542
-1.0	0.0000 × L - 0.0000	0.0250 × L - 0.1181	0.0500 × L - 0.2361	0.0750 × L - 0.3542	0.1000 × L - 0.4722
-1.5	0.0250 × L + 0.1181	0.0125 × L - 0.0590	0.0500 × L - 0.2361	0.0875 × L - 0.4132	0.1250 × L - 0.5903
-2.0	0.0500 × L + 0.2361	0.0000 × L - 0.0000	0.0500 × L - 0.2361	0.1000 × L - 0.4722	0.1500 × L - 0.7083
-2.5	-0.0750 × L + 0.3542	-0.0125 × L + 0.0590	0.0500 × L - 0.2361	0.1125 × L - 0.5313	0.1750 × L - 0.8264

TABLO: 15

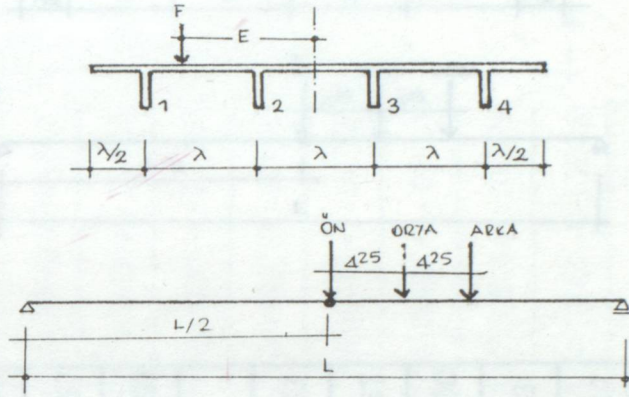


TABLO 16

E	KİRİŞ NUMARASI					
	1	2	3	4	5	6
3.0	0.1488 * L - 0.7027	0.1060 * L - 0.5003	0.0631 * L - 0.2979	0.0202 * L - 0.0956	-0.0226 * L + 0.1068	-0.0655 * L + 0.3092
2.4	0.1274 * L - 0.6015	0.0931 * L - 0.4396	0.0588 * L - 0.2777	0.0245 * L - 0.1158	-0.0098 * L + 0.0461	-0.0440 * L + 0.2080
1.8	0.1060 * L - 0.5003	0.0802 * L - 0.3789	0.0545 * L - 0.2575	0.0288 * L - 0.1360	0.0031 * L - 0.0146	-0.02226 * L + 0.1068
1.2	0.0845 * L - 0.3991	0.0674 * L - 0.3182	0.0502 * L - 0.2372	0.0331 * L - 0.1563	0.0160 * L - 0.0753	-0.0012 * L + 0.0056
0.6	0.0631 * L - 0.2979	0.0545 * L - 0.2575	0.0460 * L - 0.2170	0.0374 * L - 0.1765	0.0288 * L - 0.1360	0.0202 * L - 0.0956
0.0	0.0417 * L - 0.1968	0.0417 * L - 0.1968	0.0417 * L - 0.1968	0.0417 * L - 0.1968	0.0417 * L - 0.1968	0.0417 * L - 0.1968
-0.6	0.0202 * L - 0.0956	0.0288 * L - 0.1360	0.0374 * L - 0.1765	0.0460 * L - 0.2170	0.0545 * L - 0.2575	0.0631 * L - 0.2979
-1.2	-0.0012 * L + 0.0056	0.0160 * L - 0.0753	0.0331 * L - 0.1563	0.0502 * L - 0.2372	0.0674 * L - 0.3182	0.0845 * L - 0.3991
-1.8	-0.02226 * L + 0.1068	0.0031 * L - 0.0146	0.0288 * L - 0.1360	0.0545 * L - 0.2575	0.0802 * L - 0.3789	0.1060 * L - 0.5003
-2.4	-0.0440 * L + 0.2080	-0.0098 * L + 0.0461	0.0245 * L - 0.1158	0.0588 * L - 0.2777	0.0931 * L - 0.4396	0.1274 * L - 0.6013
-3.0	-0.0655 * L + 0.3092	-0.02226 * L + 0.1068	0.0202 * L - 0.0956	0.0631 * L - 0.2979	0.1060 * L - 0.5003	0.1488 * L - 0.7027

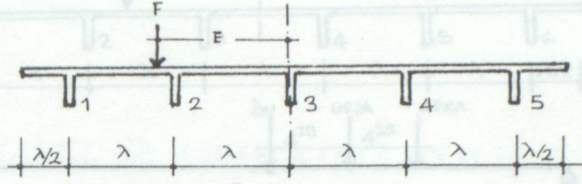
TABLO 17

TABLO 16

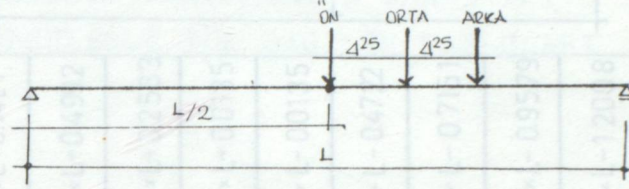


E	KIRIŞ NUMARASI			
	1	2	3	4
2.0	0.2125 * L - 2.4083	0.1125 * L - 1.2750	0.0125 * L - 0.1417	-0.0875 * L + 0.9917
1.6	0.1825 * L - 2.0683	0.1025 * L - 1.1617	0.0225 * L - 0.2550	-0.0575 * L + 0.6517
1.2	0.1525 * L - 1.7283	0.0925 * L - 1.0483	0.0325 * L - 0.3683	-0.0275 * L + 0.3117
0.8	0.1225 * L - 1.3883	0.0825 * L - 0.9350	0.0425 * L - 0.4817	0.0025 * L - 0.0283
0.4	0.0925 * L - 1.0483	0.0725 * L - 0.8217	0.0525 * L - 0.5950	0.0325 * L - 0.3683
0.0	0.0625 * L - 0.7083	0.0625 * L - 0.7083	0.0625 * L - 0.7083	0.0625 * L - 0.7083
-0.4	0.0325 * L - 0.3683	0.0525 * L - 0.5950	0.0725 * L - 0.8217	0.0925 * L - 1.0483
-0.8	0.0025 * L - 0.0283	0.0425 * L - 0.4817	0.0825 * L - 0.9350	0.1225 * L - 1.3883
-1.2	-0.0275 * L + 0.3117	0.0325 * L - 0.3683	0.0925 * L - 1.0483	0.1525 * L - 1.7283
-1.6	-0.0575 * L + 0.6517	0.0225 * L - 0.2550	0.1025 * L - 1.1617	0.1825 * L - 2.0683
-2.0	-0.0875 * L + 0.9917	0.0125 * L - 0.1417	0.1125 * L - 1.2750	0.2125 * L - 2.4083

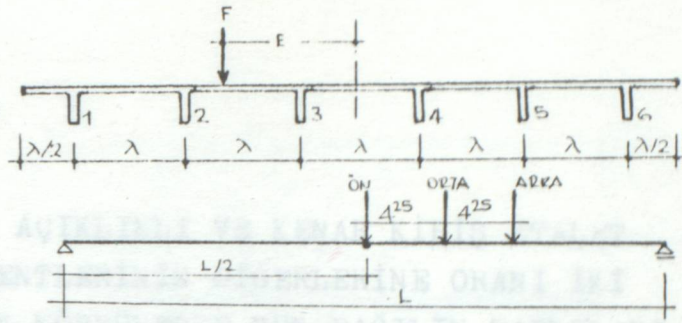
TABLO : 17



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.1750 × L - 1.9833	0.1125 × L - 1.2750	0.0500 × L - 0.5667	-0.0125 × L + 0.1417	-0.0750 × L + 0.8500
2.0	0.1500 × L - 1.7000	0.1000 × L - 1.1333	0.0500 × L - 0.5667	0	-0.0500 × L + 0.5667
1.5	0.1250 × L - 1.4167	0.0875 × L - 0.9917	0.0500 × L - 0.5667	0.0125 × L - 0.1417	-0.0250 × L + 0.2833
1.0	0.1000 × L - 1.1333	0.0750 × L - 0.8500	0.0500 × L - 0.5667	0.0250 × L - 0.2833	0
0.5	0.0750 × L - 0.8500	0.0625 × L - 0.7083	0.0500 × L - 0.5667	0.0375 × L - 0.4250	0.0250 × L - 0.2833
0.0	0.0500 × L - 0.5667	0.0500 × L - 0.5667	0.0500 × L - 0.5667	0.0500 × L - 0.5667	0.0500 × L - 0.5667
-0.5	0.0250 × L - 0.2833	0.0375 × L - 0.4250	0.0500 × L - 0.5667	0.0625 × L - 0.7083	0.0750 × L - 0.8500
-1.0	0	0.0250 × L - 0.2833	0.0500 × L - 0.5667	0.0750 × L - 0.8500	0.1000 × L - 1.1333
-1.5	-0.0250 × L + 0.2833	0.0125 × L - 0.1417	0.0500 × L - 0.5667	0.0875 × L - 0.9917	0.1250 × L - 1.4167
-2.0	-0.0500 × L + 0.5667	0	0.0500 × L - 0.5667	0.1000 × L - 1.1333	0.1500 × L - 1.7000
-2.5	-0.0750 × L + 0.8500	-0.0125 × L + 0.1417	0.0500 × L - 0.5667	0.1125 × L - 1.2750	0.1750 × L - 1.9833

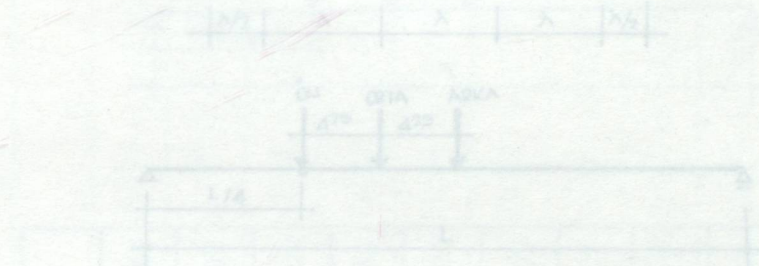


TABLO:18



E	KIRIŞ NUMARASI					
	1	2	3	4	5	6
-3.0	0.1488 * L - 1.6865	0.1060 * L - 1.2008	0.0631 * L - 0.7151	0.0202 * L - 0.2294	-0.0226 * L + 0.2563	-0.0655 * L + 0.7421
-2.4	0.1274 * L - 1.4437	0.0931 * L - 1.0551	0.0588 * L - 0.6665	0.0245 * L - 0.2779	-0.0098 * L + 0.1106	-0.0440 * L + 0.4992
-1.8	0.1060 * L - 1.2008	0.0802 * L - 0.9094	0.0545 * L - 0.6179	0.0288 * L - 0.3265	0.0031 * L - 0.0351	-0.0226 * L + 0.2563
-1.2	0.0845 * L - 0.9579	0.0674 * L - 0.7637	0.0502 * L - 0.5694	0.0331 * L - 0.3751	0.0160 * L - 0.1808	-0.0012 * L + 0.0135
-0.6	0.0601 * L - 0.7151	0.0545 * L - 0.6179	0.0460 * L - 0.5208	0.0374 * L - 0.4237	0.0288 * L - 0.3265	0.0202 * L - 0.0135
0.0	0.0417 * L - 0.4722	0.0417 * L - 0.4722	0.0417 * L - 0.4722	0.0417 * L - 0.4722	0.0417 * L - 0.4722	0.0417 * L - 0.4722
0.6	0.0202 * L - 0.2294	0.0288 * L - 0.3265	0.0374 * L - 0.4237	0.0460 * L - 0.5208	0.0545 * L - 0.6179	0.0601 * L - 0.7151
1.2	-0.0012 * L + 0.0135	0.0160 * L - 0.1808	0.0331 * L - 0.3751	0.0502 * L - 0.5694	0.0674 * L - 0.7637	0.0845 * L - 0.9579
1.8	-0.0226 * L + 0.2563	0.0031 * L - 0.0351	0.0288 * L - 0.3265	0.0545 * L - 0.6179	0.0802 * L - 0.9094	0.1060 * L - 1.2008
2.4	-0.0440 * L + 0.4992	-0.0098 * L + 0.1106	0.0245 * L - 0.2779	0.0588 * L - 0.6665	0.0931 * L - 1.0551	0.1274 * L - 1.4437
3.0	-0.0655 * L + 0.7421	-0.0226 * L + 0.2563	0.0202 * L - 0.2294	0.0631 * L - 0.7151	0.1060 * L - 1.2008	0.1488 * L - 1.6865

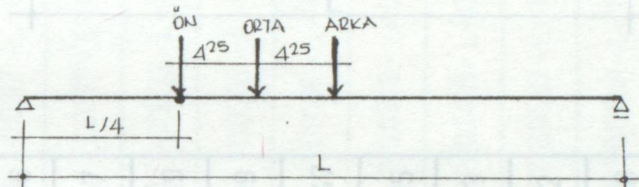
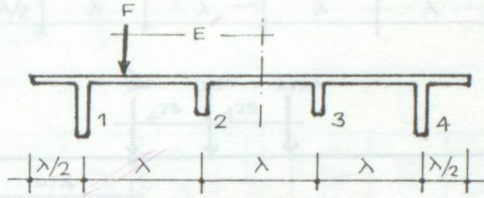
TEK AÇIKLIKLI VE KENAR KİRİŞ ATALET
MOMENTLERİNİN DİĞERLERİNE ORANI İKİ
OLAN KÖPRÜLERDE YÜK DAĞILIM TABLOLARI



E iX	KİRİŞ NUMARASI			
	1	2	3	4
26	0.1299x-2.8444	0.0355x+0.8056	0.0061x-0.1389	0.0466xL-10556
16	0.1123xL-25444	0.0326xL+0.7389	0.0091xL-0.2056	0.0209xL-06556
12	0.0946xL-21444	0.0297xL+0.6722	0.0126xL+0.2772	0.0013xL-0.2556
08	0.0770xL-17444	0.0267xL+0.6057	0.0150xL+0.3389	0.0084xL-0.1444
04	0.0593xL-13444	0.0238xL+0.5399	0.0179xL+0.4056	0.0240xL-05444
00	0.0417xL-09444	0.0208xL+0.4722	0.0208xL+0.4772	0.0417xL+09444
-04	0.0240xL-05444	0.0179xL+0.4056	0.0238xL+0.5399	0.0593xL+13444
-08	0.0084xL-01444	0.0150xL+0.3389	0.0267xL+0.6056	0.0770xL+17444
-12	-0.0113xL-0.2556	0.0126xL+0.2772	0.0297xL+0.6722	0.0946xL+21444
-16	-0.0269xL-0.6556	0.0091xL+0.2056	0.0326xL+0.7389	0.1123xL+25444
-20	-0.0466xL-1.0556	0.0061xL+0.1389	0.0355xL+0.8056	0.1299xL+29444

TABLO : 20

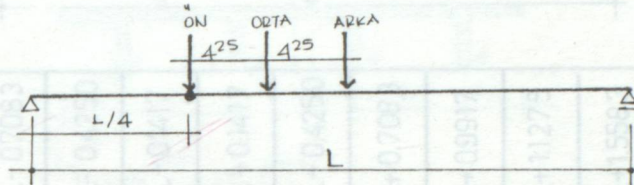
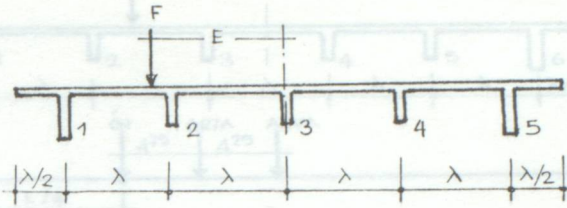
TABLO : 19



E (λ)	KİRİŞ NUMARASI			
	1	2	3	4
2.0	$0.1299 \times L + 2.9444$	$0.0355 \times L + 0.8056$	$0.0061 \times L + 0.1389$	$-0.0466 \times L - 1.0556$
1.6	$0.1123 \times L + 2.5444$	$0.0326 \times L + 0.7389$	$0.0091 \times L + 0.2056$	$-0.0289 \times L - 0.6556$
1.2	$0.0946 \times L + 2.1444$	$0.0297 \times L + 0.6722$	$0.0120 \times L + 0.2722$	$-0.0113 \times L - 0.2556$
0.8	$0.0770 \times L + 1.7444$	$0.0267 \times L + 0.6057$	$0.0150 \times L + 0.3389$	$0.0064 \times L + 0.1444$
0.4	$0.0593 \times L + 1.3444$	$0.0238 \times L + 0.5389$	$0.0179 \times L + 0.4056$	$0.0240 \times L + 0.5444$
0.0	$0.0417 \times L + 0.9444$	$0.0208 \times L + 0.4722$	$0.0208 \times L + 0.4722$	$0.0417 \times L + 0.9444$
-0.4	$0.0240 \times L + 0.5444$	$0.0179 \times L + 0.4056$	$0.0238 \times L + 0.5389$	$0.0593 \times L + 1.3444$
-0.8	$0.0064 \times L + 0.1444$	$0.0150 \times L + 0.3389$	$0.0267 \times L + 0.6056$	$0.0770 \times L + 1.7444$
-1.2	$-0.0113 \times L - 0.2556$	$0.0120 \times L + 0.2722$	$0.0297 \times L + 0.6722$	$0.0946 \times L + 2.1444$
-1.6	$-0.0289 \times L - 0.6556$	$0.0091 \times L + 0.2056$	$0.0326 \times L + 0.7389$	$0.1123 \times L + 2.5444$
-2.0	$-0.0466 \times L - 1.0556$	$0.0061 \times L + 0.1389$	$0.0355 \times L + 0.8056$	$0.1299 \times L + 2.9444$

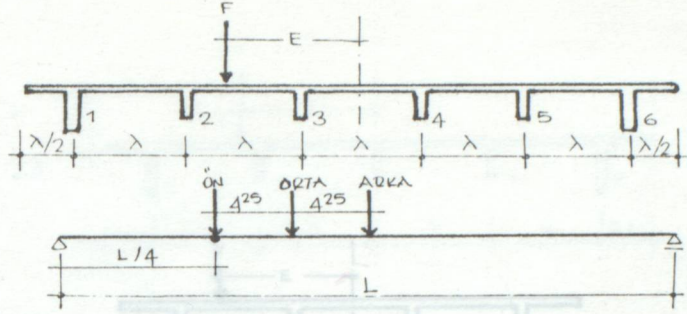
TABLO 21

TABLO : 20



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	$0.1052 \times L + 2.3836$	$0.0352 \times L + 0.7983$	$0.0179 \times L + 0.4048$	$0.0005 \times L + 0.0112$	$-0.0337 \times L - 0.7646$
2.0	$0.0913 \times L + 2.0688$	$0.0317 \times L + 0.7196$	$0.0179 \times L + 0.4048$	$0.0040 \times L + 0.0899$	$-0.0198 \times L - 0.4497$
1.5	$0.0774 \times L + 1.7540$	$0.0283 \times L + 0.6409$	$0.0179 \times L + 0.4048$	$0.0074 \times L + 0.1687$	$-0.0060 \times L - 0.1349$
1.0	$0.0635 \times L + 1.4392$	$0.0248 \times L + 0.5622$	$0.0179 \times L + 0.4048$	$0.0109 \times L + 0.2474$	$0.0079 \times L + 0.1799$
0.5	$0.0496 \times L + 1.1243$	$0.0213 \times L + 0.4835$	$0.0179 \times L + 0.4048$	$0.0144 \times L + 0.3261$	$0.0218 \times L + 0.4947$
0.0	$0.0357 \times L + 0.8095$	$0.0179 \times L + 0.4048$	$0.0179 \times L + 0.4048$	$0.0179 \times L + 0.4048$	$0.0357 \times L + 0.8095$
-0.5	$0.0218 \times L + 0.4947$	$0.0144 \times L + 0.3261$	$0.0179 \times L + 0.4048$	$0.0213 \times L + 0.4835$	$0.0496 \times L + 1.1243$
-1.0	$0.0079 \times L + 0.1799$	$0.0109 \times L + 0.2474$	$0.0179 \times L + 0.4048$	$0.0248 \times L + 0.5622$	$0.0635 \times L + 1.4392$
-1.5	$-0.0060 \times L - 0.1349$	$0.0074 \times L + 0.1687$	$0.0179 \times L + 0.4048$	$0.0283 \times L + 0.6409$	$0.0774 \times L + 1.7540$
-2.0	$-0.0198 \times L - 0.4497$	$0.0040 \times L + 0.0899$	$0.0179 \times L + 0.4048$	$0.0317 \times L + 0.7196$	$0.0913 \times L + 2.0688$
-2.5	$-0.0337 \times L - 0.7646$	$0.0005 \times L + 0.0112$	$0.0179 \times L + 0.4048$	$0.0352 \times L + 0.7983$	$0.1052 \times L + 2.3836$

TABLO: 21

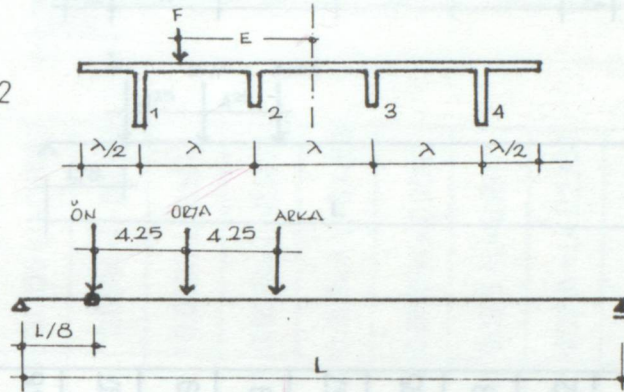


TABLO 22

E	KİRİŞ NUMARASI					
	1	2	3	4	5	6
3.0	$0.0938 \times L + 2.1250$	$0.0344 \times L + 0.7792$	$0.0219 \times L + 0.4958$	$0.0094 \times L + 0.2125$	$-0.0031 \times L - 0.0708$	$-0.0312 \times L - 0.7083$
2.4	$0.0813 \times L + 1.8417$	$0.0306 \times L + 0.6942$	$0.0206 \times L + 0.4675$	$0.0106 \times L + 0.2400$	$0.0006 \times L + 0.0142$	$-0.0187 \times L - 0.4250$
1.8	$0.0688 \times L + 1.5583$	$0.0269 \times L + 0.6092$	$0.0194 \times L + 0.4392$	$0.0119 \times L + 0.2692$	$0.0044 \times L + 0.0992$	$-0.0062 \times L - 0.1417$
1.2	$0.0563 \times L + 1.1275$	$0.0231 \times L + 0.5242$	$0.0181 \times L + 0.4108$	$0.0131 \times L + 0.2975$	$0.0081 \times L + 0.1842$	$0.0063 \times L + 0.1417$
0.6	$0.0438 \times L + 0.9917$	$0.0194 \times L + 0.4392$	$0.0169 \times L + 0.3825$	$0.0144 \times L + 0.3258$	$0.0119 \times L + 0.2692$	$0.0188 \times L + 0.4250$
0.0	$0.0313 \times L + 0.7083$	$0.0156 \times L + 0.3542$	$0.0150 \times L + 0.3542$	$0.0156 \times L + 0.3542$	$0.0156 \times L + 0.3542$	$0.0313 \times L + 0.7083$
-0.6	$0.0188 \times L + 0.4250$	$0.0119 \times L + 0.2692$	$0.0144 \times L + 0.3258$	$0.0169 \times L + 0.3825$	$0.0194 \times L + 0.4392$	$0.0438 \times L + 0.9917$
-1.2	$0.0063 \times L + 0.1417$	$0.0081 \times L + 0.1842$	$0.0131 \times L + 0.2975$	$0.0181 \times L + 0.4108$	$0.0231 \times L + 0.4252$	$0.0563 \times L + 1.1275$
-1.8	$-0.0062 \times L - 0.1417$	$0.0044 \times L + 0.0992$	$0.0119 \times L + 0.2692$	$0.0194 \times L + 0.4392$	$0.0269 \times L + 0.6092$	$0.0688 \times L + 1.5583$
-2.4	$-0.0187 \times L - 0.4250$	$0.0006 \times L + 0.0142$	$0.0106 \times L + 0.2400$	$0.0206 \times L + 0.4675$	$0.0306 \times L + 0.6942$	$0.0813 \times L + 1.8417$
-3.0	$-0.0312 \times L - 0.7083$	$-0.0031 \times L - 0.0708$	$0.0094 \times L + 0.2125$	$0.0219 \times L + 0.4958$	$0.0344 \times L + 0.7792$	$0.0938 \times L + 2.1250$

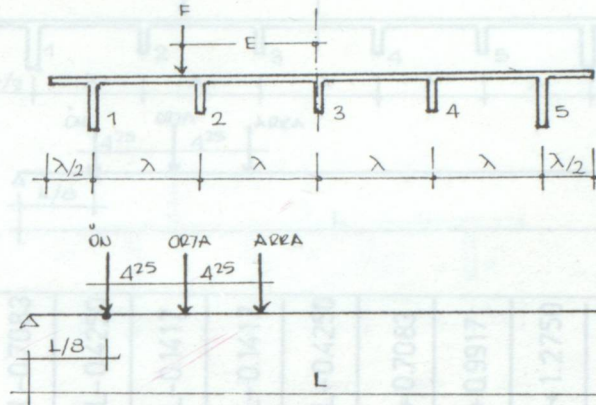
TABLO 23

TABLO 22



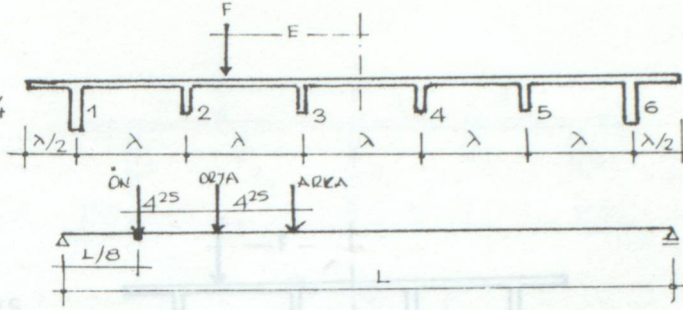
E (λ)	KIRIŞ NUMARASI			
	1	2	3	4
2.0	$0.0650 \times L + 2.9444$	$0.0178 \times L + 0.8056$	$0.0031 \times L + 0.1389$	$-0.0233 \times L - 1.0556$
1.6	$0.0561 \times L + 2.5444$	$0.0163 \times L + 0.7389$	$0.0045 \times L + 0.2056$	$-0.0145 \times L - 0.6556$
1.2	$0.0473 \times L + 2.1444$	$0.0148 \times L + 0.6722$	$0.0060 \times L + 0.2722$	$-0.0056 \times L - 0.2556$
0.8	$0.0385 \times L + 1.7444$	$0.0134 \times L + 0.6056$	$0.0075 \times L + 0.3389$	$0.0032 \times L + 0.1444$
0.4	$0.0297 \times L + 1.3444$	$0.0119 \times L + 0.5389$	$0.0089 \times L + 0.4056$	$0.0120 \times L + 0.5444$
±0.0	$0.0208 \times L + 0.9444$	$0.0104 \times L + 0.4722$	$0.0104 \times L + 0.4722$	$0.0208 \times L - 0.9444$
-0.4	$0.0120 \times L + 0.5444$	$0.0089 \times L + 0.4056$	$0.0119 \times L + 0.5389$	$0.0297 \times L + 1.3444$
-0.8	$0.0032 \times L + 0.1444$	$0.0075 \times L + 0.3389$	$0.0134 \times L + 0.6056$	$0.0385 \times L + 1.7444$
-1.2	$-0.0056 \times L - 0.2556$	$0.0060 \times L + 0.2722$	$0.0148 \times L + 0.6722$	$0.0473 \times L + 2.1444$
-1.6	$-0.0145 \times L - 0.6556$	$0.0045 \times L + 0.2056$	$0.0163 \times L + 0.7389$	$0.0561 \times L + 2.5444$
-2.0	$-0.0233 \times L - 1.0556$	$0.0031 \times L + 0.1389$	$0.0178 \times L + 0.8056$	$0.0650 \times L + 2.9444$

TABLO 23



E (x)	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	$0.0526 \times L + 2.3836$	$0.0176 \times L + 0.7983$	$0.0089 \times L + 0.4048$	$-0.0002 \times L + 0.0112$	$0.0169 \times L - 0.7646$
2.0	$0.0456 \times L + 2.0688$	$0.0159 \times L + 0.7196$	$0.0089 \times L + 0.4048$	$0.0020 \times L + 0.0899$	$0.0099 \times L - 0.4497$
1.5	$0.0387 \times L + 1.7540$	$0.0141 \times L + 0.6409$	$0.0089 \times L + 0.4048$	$0.0037 \times L + 0.1687$	$0.0030 \times L - 0.1349$
1.0	$0.0317 \times L + 1.4392$	$0.0124 \times L + 0.5622$	$0.0089 \times L + 0.4048$	$0.0055 \times L + 0.2474$	$0.0040 \times L + 0.1799$
0.5	$0.0248 \times L + 1.1243$	$0.0107 \times L + 0.4835$	$0.0089 \times L + 0.4048$	$0.0072 \times L + 0.3261$	$0.0109 \times L + 0.4947$
0.0	$0.0179 \times L + 0.8095$	$0.0089 \times L + 0.4048$	$0.0089 \times L + 0.4048$	$0.0089 \times L + 0.4048$	$0.0179 \times L + 0.8095$
-0.5	$0.0109 \times L + 0.4947$	$0.0072 \times L + 0.3261$	$0.0089 \times L + 0.4048$	$0.0107 \times L + 0.4835$	$0.0248 \times L + 1.1243$
-1.0	$0.0040 \times L + 0.1799$	$0.0055 \times L + 0.2474$	$0.0089 \times L + 0.4048$	$0.0124 \times L + 0.5622$	$0.0317 \times L + 1.4392$
-1.5	$0.0030 \times L - 0.1349$	$0.0037 \times L + 0.1687$	$0.0089 \times L + 0.4048$	$0.0141 \times L + 0.6409$	$0.0387 \times L + 1.7540$
-2.0	$0.0099 \times L - 0.4497$	$0.0020 \times L + 0.0899$	$0.0089 \times L + 0.4048$	$0.0159 \times L + 0.7196$	$0.0456 \times L + 2.0688$
-2.5	$-0.0169 \times L - 0.7646$	$0.0002 \times L + 0.0112$	$0.0089 \times L + 0.4048$	$0.0176 \times L + 0.7983$	$0.0526 \times L + 2.3836$

TABLO: 24



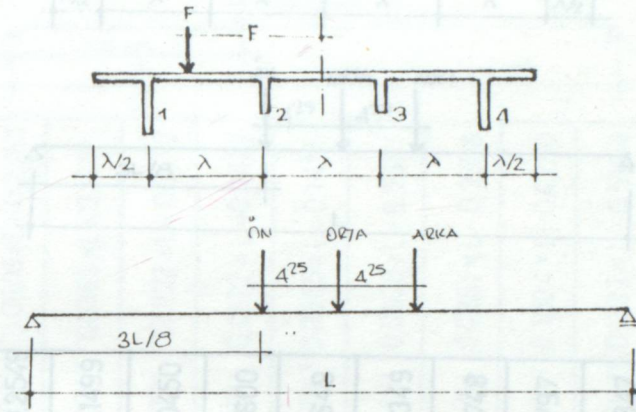
TABLO: 25

E	KIRIŞ NÜMARAŞI					
	1	2	3	4	5	6
3.0	$0.0469 \times L + 2.1250$	$0.0172 \times L + 0.7792$	$0.0109 \times L + 0.4958$	$0.0047 \times L + 0.2125$	$-0.0016 \times L - 0.0708$	$-0.0156 \times L - 0.7083$
2.4	$0.0406 \times L + 1.8417$	$0.0153 \times L + 0.6942$	$0.0103 \times L + 0.4675$	$0.0053 \times L + 0.2408$	$0.0003 \times L + 0.0142$	$-0.0094 \times L - 0.4250$
1.8	$0.0344 \times L + 1.5583$	$0.0134 \times L + 0.6092$	$0.0097 \times L + 0.4392$	$0.0059 \times L + 0.2692$	$0.0022 \times L + 0.0992$	$-0.0031 \times L - 0.1417$
1.2	$0.0281 \times L + 1.2750$	$0.0116 \times L + 0.5242$	$0.0091 \times L + 0.4108$	$0.0066 \times L + 0.2975$	$0.0041 \times L + 0.1842$	$0.0031 \times L + 0.1417$
0.6	$0.0219 \times L + 0.9917$	$0.0097 \times L + 0.4392$	$0.0084 \times L + 0.3825$	$0.0072 \times L + 0.3258$	$0.0059 \times L + 0.2692$	$0.0094 \times L + 0.4250$
0.0	$0.0156 \times L + 0.7083$	$0.0078 \times L + 0.3542$	$0.0078 \times L + 0.3542$	$0.0078 \times L + 0.3542$	$0.0078 \times L + 0.3542$	$0.0156 \times L + 0.7083$
-0.6	$0.0094 \times L + 0.4250$	$0.0059 \times L + 0.2692$	$0.0072 \times L + 0.3258$	$0.0084 \times L + 0.3825$	$0.0097 \times L + 0.4392$	$0.0219 \times L + 0.9917$
-1.2	$0.0031 \times L + 0.1417$	$0.0041 \times L + 0.1842$	$0.0066 \times L + 0.2975$	$0.0091 \times L + 0.4108$	$0.0116 \times L + 0.5242$	$0.0281 \times L + 1.2750$
-1.8	$-0.0031 \times L - 0.1417$	$0.0022 \times L + 0.0992$	$0.0059 \times L + 0.2692$	$0.0097 \times L + 0.4392$	$0.0134 \times L + 0.6092$	$0.0344 \times L + 1.5583$
-2.4	$-0.0094 \times L - 0.4250$	$0.0003 \times L + 0.0142$	$0.0053 \times L + 0.2408$	$0.0103 \times L + 0.4675$	$0.0153 \times L + 0.6942$	$0.0406 \times L + 1.8417$
-3.0	$-0.0156 \times L - 0.7083$	$-0.0016 \times L - 0.0708$	$0.0047 \times L + 0.2125$	$0.0109 \times L + 0.4958$	$0.0172 \times L + 0.7792$	$0.0469 \times L + 2.1250$

TABLO 20

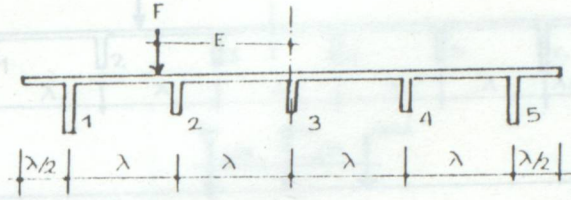
TABLO 25

$L/8 > 4.25 \text{ m.}$

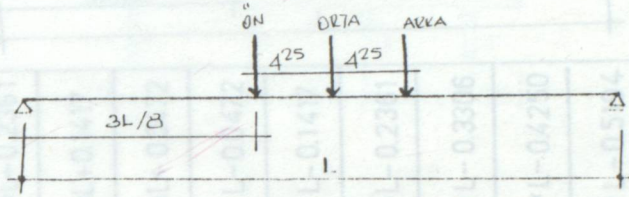


E	KİRİŞ NUMARASI			
	1	2	3	4
2.0	$0.2526 \times L - 0.9815$	$0.0691 \times L - 0.2685$	$0.0119 \times L - 0.0463$	$-0.0906 \times L + 0.3519$
1.6	$0.2183 \times L - 0.8481$	$0.0634 \times L - 0.2463$	$0.0176 \times L - 0.0685$	$-0.0562 \times L + 0.2185$
1.2	$0.1840 \times L - 0.7148$	$0.0577 \times L - 0.2241$	$0.0234 \times L - 0.0907$	$-0.0219 \times L + 0.0852$
0.8	$0.1496 \times L - 0.5815$	$0.0519 \times L - 0.2019$	$0.0291 \times L - 0.1130$	$0.0124 \times L - 0.0481$
0.4	$0.1153 \times L - 0.4481$	$0.0462 \times L - 0.1796$	$0.0348 \times L - 0.1352$	$0.0467 \times L - 0.1815$
0.0	$0.0810 \times L - 0.3148$	$0.0405 \times L - 0.1574$	$0.0405 \times L - 0.1574$	$0.0810 \times L - 0.3148$
-0.4	$0.0467 \times L - 0.1815$	$0.0348 \times L - 0.1352$	$0.0462 \times L - 0.1796$	$0.1153 \times L - 0.4481$
-0.8	$0.0124 \times L - 0.0481$	$0.0291 \times L - 0.1130$	$0.0519 \times L - 0.2019$	$0.1496 \times L - 0.5815$
-1.2	$-0.0219 \times L + 0.0852$	$0.0234 \times L - 0.0907$	$0.0577 \times L - 0.2241$	$0.1840 \times L - 0.7148$
-1.6	$-0.0562 \times L + 0.2185$	$0.0176 \times L - 0.0685$	$0.0634 \times L - 0.2463$	$0.2183 \times L - 0.8481$
-2.0	$-0.0906 \times L + 0.3519$	$0.0119 \times L - 0.0463$	$0.0691 \times L - 0.2685$	$0.2526 \times L - 0.9815$

TABLO : 26



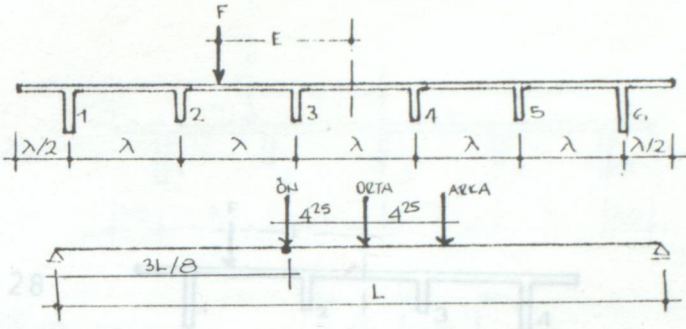
L/8 > 4.25 m.



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.2045 × L - 0.7945	0.0685 × L - 0.2661	0.0347 × L - 0.1349	0.0010 × L - 0.0037	-0.0656 × L + 0.2549
2.0	0.1775 × L - 0.6896	0.0617 × L - 0.2399	0.0347 × L - 0.1349	0.0077 × L - 0.0300	-0.0386 × L + 0.1499
1.5	0.1505 × L - 0.5847	0.0550 × L - 0.2136	0.0347 × L - 0.1349	0.0145 × L - 0.0562	-0.0116 × L + 0.0450
1.0	0.1235 × L - 0.4797	0.0482 × L - 0.1874	0.0347 × L - 0.1349	0.0212 × L - 0.0825	0.0154 × L - 0.0600
0.5	0.0965 × L - 0.3748	0.0415 × L - 0.1612	0.0347 × L - 0.1349	0.0280 × L - 0.1087	0.0424 × L - 0.1649
0.0	0.0347 × L - 0.1349	0.0347 × L - 0.1349	0.0347 × L - 0.1349	0.0347 × L - 0.1349	0.0347 × L - 0.1349
-0.5	0.0424 × L - 0.1649	0.0280 × L - 0.1087	0.0347 × L - 0.1349	0.0415 × L - 0.1612	0.0965 × L - 0.3748
-1.0	0.0154 × L - 0.0600	0.0212 × L - 0.0825	0.0347 × L - 0.1349	0.0482 × L - 0.1874	0.1235 × L - 0.4797
-1.5	-0.0116 × L + 0.0450	0.0145 × L - 0.0562	0.0347 × L - 0.1349	0.0550 × L - 0.2136	0.1505 × L - 0.5847
-2.0	-0.0386 × L + 0.1499	0.0077 × L - 0.0300	0.0347 × L - 0.1349	0.0617 × L - 0.2399	0.1775 × L - 0.6896
-2.5	-0.0656 × L + 0.2549	0.0010 × L - 0.0037	0.0347 × L - 0.1349	0.0685 × L - 0.2661	0.2045 × L - 0.7945

TABLO 27

$L/8 > 4.25m.$



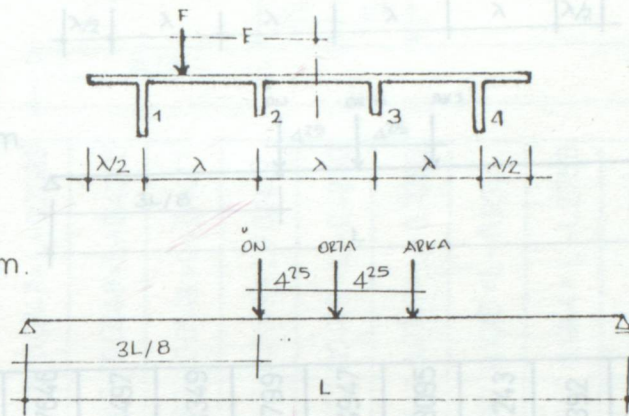
E	KIRIŞ NUMARASI					
	1	2	3	4	5	6
3.0	$0.1823 \times L - 0.7083$	$0.0668 \times L - 0.2597$	$0.0425 \times L - 0.1653$	$0.0182 \times L - 0.0708$	$-0.0061 \times L + 0.0236$	$-0.0608 \times L + 0.2361$
2.4	$0.1580 \times L - 0.6139$	$0.0595 \times L - 0.2314$	$0.0401 \times L - 0.1558$	$0.0207 \times L - 0.0803$	$0.0012 \times L - 0.0047$	$-0.0365 \times L + 0.1417$
1.8	$0.1337 \times L - 0.5194$	$0.0523 \times L - 0.2031$	$0.0377 \times L - 0.1464$	$0.0231 \times L - 0.0897$	$0.0085 \times L - 0.0331$	$-0.0122 \times L + 0.0472$
1.2	$0.1094 \times L - 0.4250$	$0.0450 \times L - 0.1747$	$0.0352 \times L - 0.1369$	$0.0255 \times L - 0.0992$	$0.0158 \times L - 0.0614$	$0.0122 \times L - 0.0472$
0.6	$0.0851 \times L - 0.3306$	$0.0377 \times L - 0.1464$	$0.0328 \times L - 0.1275$	$0.0280 \times L - 0.1086$	$0.0231 \times L - 0.0897$	$0.0365 \times L - 0.1417$
0.0	$0.0608 \times L - 0.2361$	$0.0304 \times L - 0.1181$	$0.0304 \times L - 0.1181$	$0.0304 \times L - 0.1181$	$0.0304 \times L - 0.1181$	$0.0608 \times L - 0.2361$
-0.6	$0.0365 \times L - 0.1417$	$0.0231 \times L - 0.0897$	$0.0280 \times L - 0.1086$	$0.0328 \times L - 0.1275$	$0.0377 \times L - 0.1464$	$0.0851 \times L - 0.3306$
-1.2	$0.0122 \times L - 0.0472$	$0.0158 \times L - 0.0614$	$0.0255 \times L - 0.0992$	$0.0352 \times L - 0.1369$	$0.0450 \times L - 0.1747$	$0.1094 \times L - 0.4250$
-1.8	$-0.0122 \times L + 0.0472$	$0.0085 \times L - 0.0331$	$0.0231 \times L - 0.0897$	$0.0377 \times L - 0.1464$	$0.0523 \times L - 0.2031$	$0.1337 \times L - 0.5194$
-2.4	$-0.0365 \times L + 0.1417$	$0.0012 \times L - 0.0047$	$0.0207 \times L - 0.0803$	$0.0401 \times L - 0.1558$	$0.0595 \times L - 0.2314$	$0.1580 \times L - 0.6139$
-3.0	$-0.0608 \times L + 0.2361$	$0.0061 \times L - 0.0236$	$0.0182 \times L - 0.0708$	$0.0425 \times L - 0.1653$	$0.0668 \times L - 0.2597$	$0.1823 \times L - 0.7083$

TABLO 29

TABLO 28

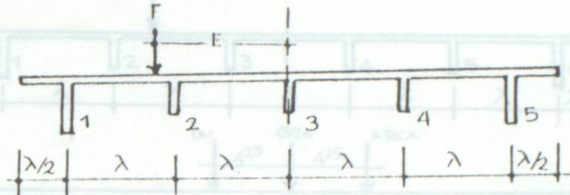
$L/8 < 4.25 \text{ m}$

$L/8 < 4.25 \text{ m}$

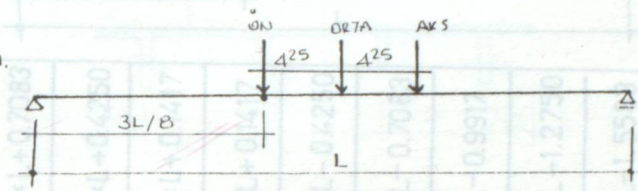


E	KIRIŞ NUMARASI			
	1	2	3	4
2.0	$0.3103 \times L - 2.9444$	$0.0849 \times L - 0.8056$	$0.0146 \times L - 0.1389$	$-0.1112 \times L + 1.0556$
1.6	$0.2682 \times L - 2.5444$	$0.0779 \times L - 0.7389$	$0.0217 \times L - 0.2056$	$-0.0691 \times L + 0.6556$
1.2	$0.2260 \times L - 2.1444$	$0.0708 \times L - 0.6722$	$0.0287 \times L - 0.2722$	$-0.0269 \times L + 0.2556$
0.8	$0.1839 \times L - 1.7444$	$0.0638 \times L - 0.6056$	$0.0357 \times L - 0.3389$	$0.0152 \times L - 0.1444$
0.4	$0.1417 \times L - 1.3444$	$0.0568 \times L - 0.5389$	$0.0427 \times L - 0.4056$	$0.0574 \times L - 0.5444$
0.0	$0.0995 \times L - 0.9444$	$0.0498 \times L - 0.4722$	$0.0498 \times L - 0.4722$	$0.0995 \times L - 0.9444$
-0.4	$0.0574 \times L - 0.5444$	$0.0427 \times L - 0.4056$	$0.0568 \times L - 0.5389$	$0.1417 \times L - 1.3444$
-0.8	$0.0152 \times L - 0.1444$	$0.0357 \times L - 0.3389$	$0.0638 \times L - 0.6056$	$0.1839 \times L - 1.7444$
-1.2	$-0.0269 \times L + 0.2556$	$0.0287 \times L - 0.2722$	$0.0708 \times L - 0.6722$	$0.2260 \times L - 2.1444$
-1.6	$-0.0691 \times L + 0.6556$	$0.0217 \times L - 0.2056$	$0.0779 \times L - 0.7389$	$0.2682 \times L - 2.5444$
-2.0	$-0.1112 \times L + 1.0556$	$0.0146 \times L - 0.1389$	$0.0849 \times L - 0.8056$	$0.3103 \times L - 2.9444$

TABLO: 30
TABLO: 29
L/8 < 4.25 m



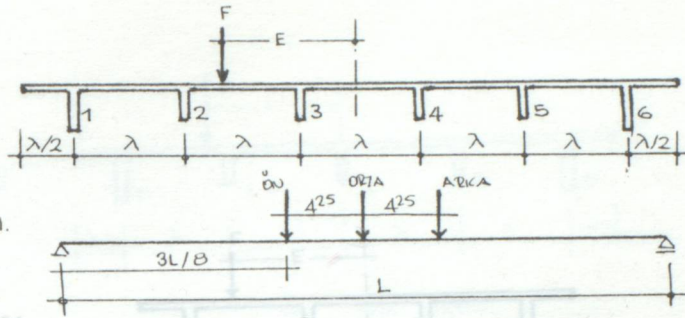
L/8 < 4.25 m.



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	0.2512 × L - 2.3836	0.0841 × L - 0.7983	0.0427 × L - 0.4048	0.0012 × L - 0.0112	-0.0806 × L + 0.7646
2.0	0.2180 × L - 2.0688	0.0758 × L - 0.7196	0.0427 × L - 0.4048	0.0095 × L - 0.0899	-0.0474 × L + 0.4497
1.5	0.1849 × L - 1.7540	0.0675 × L - 0.6409	0.0427 × L - 0.4048	0.0178 × L - 0.1687	-0.0142 × L + 0.1349
1.0	0.1517 × L - 1.4392	0.0592 × L - 0.5622	0.0427 × L - 0.4048	0.0261 × L - 0.2474	0.0190 × L - 0.1799
0.5	0.1185 × L - 1.1243	0.0510 × L - 0.4835	0.0427 × L - 0.4048	0.0344 × L - 0.3261	0.0521 × L - 0.4947
0.0	0.0853 × L - 0.8095	0.0427 × L - 0.4048	0.0427 × L - 0.4048	0.0427 × L - 0.4048	0.0853 × L - 0.8095
-0.5	0.0521 × L - 0.4947	0.0344 × L - 0.3261	0.0427 × L - 0.4048	0.0510 × L - 0.4835	0.1185 × L - 1.1243
-1.0	0.0190 × L - 0.1799	0.0261 × L - 0.2474	0.0427 × L - 0.4048	0.0592 × L - 0.5622	0.1517 × L - 1.4392
-1.5	0.0142 × L + 0.1349	0.0178 × L - 0.1687	0.0427 × L - 0.4048	0.0675 × L - 0.6409	0.1849 × L - 1.7540
-2.0	-0.0474 × L + 0.4497	0.0095 × L - 0.0899	0.0427 × L - 0.4048	0.0758 × L - 0.7196	0.2180 × L - 2.0688
-2.5	-0.0806 × L + 0.7646	0.0012 × L - 0.0112	0.0427 × L - 0.4048	0.0841 × L - 0.7983	0.2512 × L - 2.3836

TABLO: 30

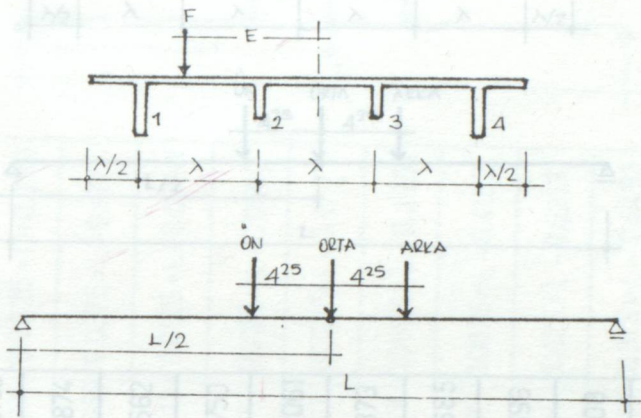
L/8 < 4.25 m.



E	KİRİŞ NUMARASI					
	1	2	3	4	5	6
3.0	$0.2240 \times L - 2.1250$	$0.0821 \times L - 0.7792$	$0.0523 \times L - 0.4958$	$0.0224 \times L - 0.2125$	$-0.0075 \times L + 0.0708$	$-0.0747 \times L + 0.7083$
2.4	$0.1941 \times L - 1.8417$	$0.0732 \times L - 0.6942$	$0.0493 \times L - 0.4675$	$0.0254 \times L - 0.2408$	$0.0015 \times L - 0.0142$	$-0.0448 \times L + 0.4250$
1.8	$0.1642 \times L - 1.5583$	$0.0642 \times L - 0.6092$	$0.0463 \times L - 0.4392$	$0.0284 \times L - 0.2692$	$0.0105 \times L - 0.0992$	$-0.0149 \times L + 0.1417$
1.2	$0.1344 \times L - 1.2750$	$0.0552 \times L - 0.5242$	$0.0433 \times L - 0.4108$	$0.0314 \times L - 0.2975$	$0.0194 \times L - 0.1842$	$0.0149 \times L + 0.1417$
0.6	$0.1045 \times L - 0.9917$	$0.0463 \times L - 0.4392$	$0.0403 \times L - 0.3825$	$0.0343 \times L - 0.3258$	$0.0284 \times L - 0.2692$	$0.0448 \times L - 0.4250$
0.0	$0.0747 \times L - 0.7083$	$0.0373 \times L - 0.3542$	$0.0373 \times L - 0.3542$	$0.0373 \times L - 0.3542$	$0.0373 \times L - 0.3542$	$0.0747 \times L - 0.7083$
-0.6	$0.0448 \times L - 0.4250$	$0.0284 \times L - 0.2692$	$0.0343 \times L - 0.3258$	$0.0403 \times L - 0.3825$	$0.0463 \times L - 0.4392$	$0.1045 \times L - 0.9917$
-1.2	$0.0149 \times L - 0.1417$	$0.0194 \times L - 0.1842$	$0.0314 \times L - 0.2975$	$0.0433 \times L - 0.4108$	$0.0552 \times L - 0.5242$	$0.1344 \times L - 1.2750$
-1.8	$-0.0149 \times L + 0.1417$	$0.0105 \times L - 0.0992$	$0.0284 \times L - 0.2692$	$0.0463 \times L - 0.4392$	$0.0642 \times L - 0.6092$	$0.1642 \times L - 1.5583$
-2.4	$-0.0448 \times L + 0.4250$	$0.0015 \times L - 0.0142$	$0.0254 \times L - 0.2408$	$0.0493 \times L - 0.4675$	$0.0732 \times L - 0.6942$	$0.1941 \times L - 1.8417$
-3.0	$-0.0747 \times L + 0.7083$	$-0.0075 \times L + 0.0708$	$0.0224 \times L - 0.2125$	$0.0523 \times L - 0.4958$	$0.0821 \times L - 0.7792$	$0.2240 \times L - 2.1250$

TABLO 32

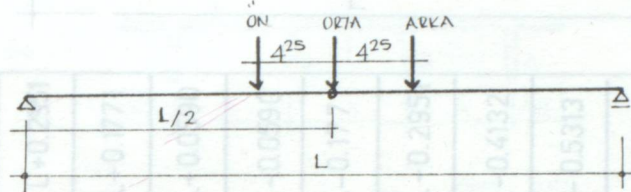
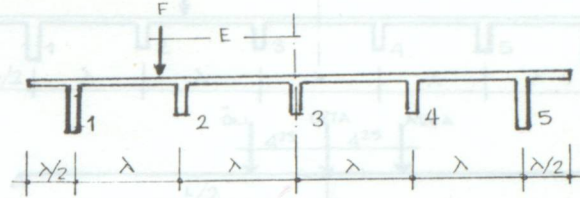
TABLO 31



E	KIRIŞ NUMARASI			
	1	2	3	4
2.0	0.2598 * L - 1.2269	0.0711 * L - 0.3356	0.0123 * L - 0.0579	-0.0931 * L + 0.4398
1.6	0.2245 * L - 1.0602	0.0652 * L - 0.3079	0.0181 * L - 0.0856	-0.0578 * L + 0.2731
1.2	0.1892 * L - 0.8935	0.0593 * L - 0.2801	0.0240 * L - 0.1134	-0.0225 * L + 0.1065
0.8	0.1539 * L - 0.7269	0.0534 * L - 0.2523	0.0299 * L - 0.1412	0.0127 * L - 0.0602
0.4	0.1186 * L - 0.5602	0.0475 * L - 0.2245	0.0358 * L - 0.1690	0.0480 * L - 0.2269
0.0	0.0833 * L - 0.3935	0.0417 * L - 0.1968	0.0417 * L - 0.1968	0.0833 * L - 0.3935
-0.4	0.0480 * L - 0.2269	0.0358 * L - 0.1690	0.0475 * L - 0.2245	0.1186 * L - 0.5602
-0.8	0.0127 * L - 0.0602	0.0299 * L - 0.1412	0.0534 * L - 0.2523	0.1539 * L - 0.7269
-1.2	-0.0225 * L + 0.1065	0.0240 * L - 0.1134	0.0593 * L - 0.2801	0.1892 * L - 0.8935
-1.6	-0.0578 * L + 0.2731	0.0181 * L - 0.0856	0.0652 * L - 0.3079	0.2245 * L - 1.0602
-2.0	-0.0931 * L + 0.4398	0.0123 * L - 0.0579	0.0711 * L - 0.3356	0.2598 * L - 1.2269

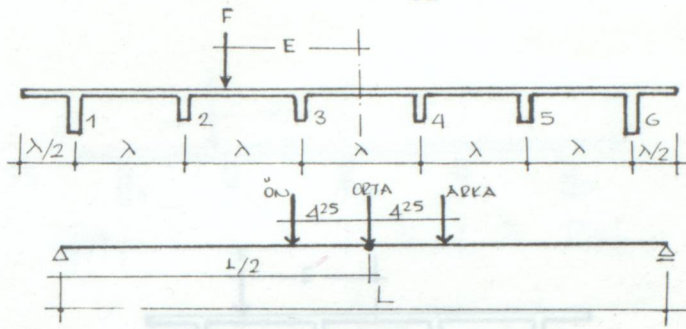
TABLO 33

TABLO : 32



E	KIRIŞ NUMARASI				
	1	2	3	4	5
2.5	$0.2103 \times L - 0.9932$	$0.0704 \times L - 0.3326$	$0.0357 \times L - 0.1687$	$0.0010 \times L - 0.0047$	$-0.0675 \times L + 0.3186$
2.0	$0.1825 \times L - 0.8620$	$0.0635 \times L - 0.2998$	$0.0357 \times L - 0.1687$	$0.0079 \times L - 0.0375$	$-0.0397 \times L + 0.1874$
1.5	$0.1548 \times L - 0.7308$	$0.0565 \times L - 0.2670$	$0.0357 \times L - 0.1687$	$0.0149 \times L - 0.0703$	$-0.0119 \times L + 0.0562$
1.0	$0.1270 \times L - 0.5996$	$0.0496 \times L - 0.2342$	$0.0357 \times L - 0.1687$	$0.0218 \times L - 0.1031$	$0.0159 \times L - 0.0750$
0.5	$0.0992 \times L - 0.4685$	$0.0427 \times L - 0.2014$	$0.0357 \times L - 0.1687$	$0.0288 \times L - 0.1359$	$0.0437 \times L - 0.2061$
0.0	$0.0714 \times L - 0.3373$	$0.0357 \times L - 0.1687$	$0.0357 \times L - 0.1687$	$0.0357 \times L - 0.1687$	$0.0714 \times L - 0.3373$
-0.5	$0.0437 \times L - 0.2061$	$0.0288 \times L - 0.1359$	$0.0357 \times L - 0.1687$	$0.0427 \times L - 0.2014$	$0.0992 \times L - 0.4685$
-1.0	$0.0159 \times L - 0.0750$	$0.0218 \times L - 0.1031$	$0.0357 \times L - 0.1687$	$0.0496 \times L - 0.2342$	$0.1270 \times L - 0.5996$
-1.5	$-0.0119 \times L + 0.0562$	$0.0149 \times L - 0.0703$	$0.0357 \times L - 0.1687$	$0.0565 \times L - 0.2670$	$0.1548 \times L - 0.7308$
-2.0	$-0.0397 \times L + 0.1874$	$0.0079 \times L - 0.0375$	$0.0357 \times L - 0.1687$	$0.0635 \times L - 0.2998$	$0.1825 \times L - 0.8620$
-2.5	$-0.0675 \times L + 0.3186$	$0.0010 \times L - 0.0047$	$0.0357 \times L - 0.1687$	$0.0704 \times L - 0.3326$	$0.2103 \times L - 0.9932$

TABLO:33



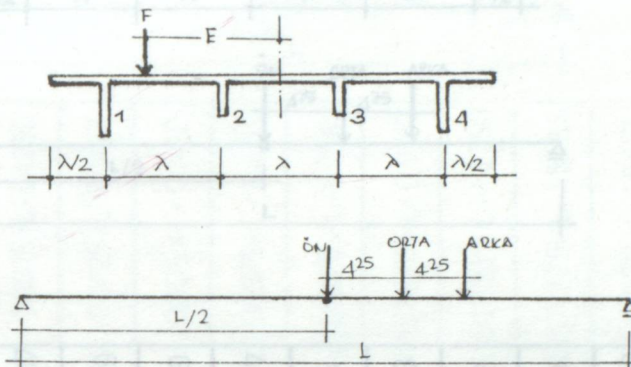
TABLO 34

E	KRIS NUMERASI					
	1	2	3	4	5	6
3.0	0.1875 * L - 0.8854	0.0687 * L - 0.3247	0.0438 * L - 0.2066	0.0188 * L - 0.0885	-0.0062 * L + 0.0295	-0.0625 * L + 0.2951
2.4	0.1625 * L - 0.7674	0.0613 * L - 0.2892	0.0413 * L - 0.1948	0.0213 * L - 0.1003	0.0013 * L - 0.0059	-0.0375 * L + 0.1771
1.8	0.1375 * L - 0.6493	0.0538 * L - 0.2538	0.0388 * L - 0.1830	0.0238 * L - 0.1122	0.0088 * L - 0.0413	-0.0125 * L + 0.0590
1.2	0.1125 * L - 0.5313	0.0463 * L - 0.2184	0.0363 * L - 0.1712	0.0263 * L - 0.1240	0.0163 * L - 0.0767	0.0125 * L - 0.0590
0.6	0.0875 * L - 0.4132	0.0388 * L - 0.1830	0.0388 * L - 0.1594	0.0288 * L - 0.1358	0.0238 * L - 0.1122	0.0375 * L - 0.1771
0.0	0.0625 * L - 0.2951	0.0313 * L - 0.1476	0.0313 * L - 0.1476	0.0313 * L - 0.1476	0.0313 * L - 0.1476	0.0625 * L - 0.2951
-0.6	0.0375 * L - 0.1771	0.0238 * L - 0.1122	0.0288 * L - 0.1358	0.0388 * L - 0.1594	0.0388 * L - 0.1830	0.0875 * L - 0.4132
-1.2	0.0125 * L - 0.0590	0.0163 * L - 0.0767	0.0263 * L - 0.1240	0.0363 * L - 0.1712	0.0463 * L - 0.2184	0.1125 * L - 0.5313
-1.8	-0.0125 * L + 0.0590	0.0088 * L - 0.0413	0.0238 * L - 0.1122	0.0388 * L - 0.1830	0.0538 * L - 0.2538	0.1375 * L - 0.6493
-2.4	-0.0375 * L + 0.1771	0.0013 * L + 0.0059	0.0213 * L - 0.1003	0.0413 * L - 0.1948	0.0613 * L - 0.2892	0.1625 * L - 0.7674
-3.0	-0.0625 * L + 0.2951	-0.0062 * L + 0.0295	0.0188 * L - 0.0885	0.0438 * L - 0.2066	0.0687 * L - 0.3247	0.1875 * L - 0.8854

TABLO 35



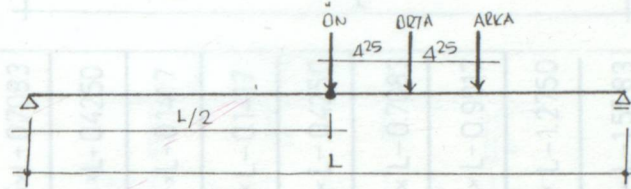
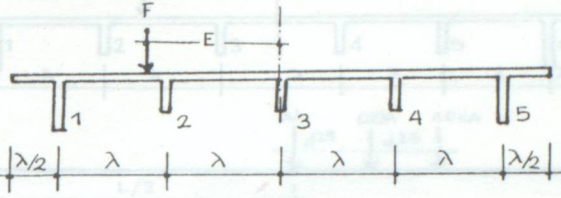
TABLO 34



E	KIRIŞ NUMARASI			
	1	2	3	4
2.0	0.2598 × L - 2.9444	0.0711 × L - 0.8056	0.0123 × L - 0.1389	-0.0931 × L + 1.0556
1.6	0.2245 × L - 2.5444	0.0652 × L - 0.7389	0.0181 × L - 0.2056	-0.0578 × L + 0.6556
1.2	0.1892 × L - 2.1444	0.0593 × L - 0.6722	0.0240 × L - 0.2722	-0.0225 × L + 0.2556
0.8	0.1539 × L - 1.7444	0.0534 × L - 0.6056	0.0299 × L - 0.3389	0.0127 × L - 0.1444
0.4	0.1186 × L - 1.3444	0.0475 × L - 0.5389	0.0358 × L - 0.4056	0.0480 × L - 0.5444
0.0	0.0833 × L - 0.9444	0.0417 × L - 0.4722	0.0417 × L - 0.4722	0.0833 × L - 0.9444
-0.4	0.0480 × L - 0.5444	0.0358 × L - 0.4056	0.0475 × L - 0.5389	0.1186 × L - 1.3444
-0.8	0.0127 × L - 0.1444	0.0299 × L - 0.3389	0.0534 × L - 0.6056	0.1539 × L - 1.7444
-1.2	-0.0225 × L + 0.2556	0.0240 × L - 0.2722	0.0593 × L - 0.6722	0.1892 × L - 2.1444
-1.6	-0.0578 × L + 0.6556	0.0181 × L - 0.2056	0.0652 × L - 0.7389	0.2245 × L - 2.5444
-2.0	-0.0931 × L + 1.0556	0.0123 × L - 0.1389	0.0711 × L - 0.8056	0.2598 × L - 2.9444

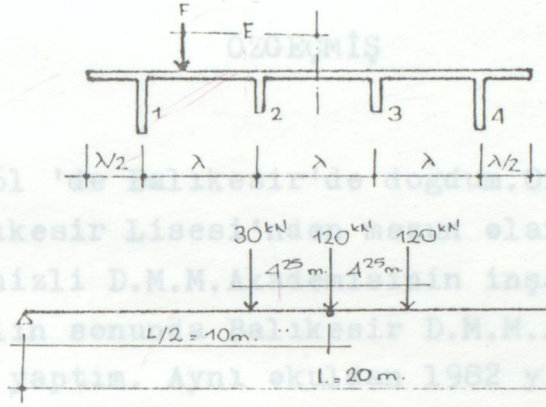
TABLO

TABLO : 35



E	KIRIŞ NUMARASI RASI				
	1	2	3	4	5
2.5	$0.2103 \times L - 2.3836$	$0.0704 \times L - 0.7983$	$0.0357 \times L - 0.4048$	$0.0010 \times L - 0.0112$	$-0.00675 \times L + 0.7646$
2.0	$0.1825 \times L - 2.0688$	$0.0635 \times L - 0.7196$	$0.0357 \times L - 0.4048$	$0.0079 \times L - 0.0899$	$-0.0397 \times L + 0.4497$
1.5	$0.1548 \times L - 1.7540$	$0.0565 \times L - 0.6409$	$0.0357 \times L - 0.4048$	$0.0149 \times L - 0.1687$	$-0.0119 \times L + 0.1349$
1.0	$0.1270 \times L - 1.4392$	$0.0496 \times L - 0.5622$	$0.0357 \times L - 0.4048$	$0.0218 \times L - 0.2474$	$0.0159 \times L - 0.1799$
0.5	$0.0992 \times L - 1.1243$	$0.0427 \times L - 0.4835$	$0.0357 \times L - 0.4048$	$0.0288 \times L - 0.3261$	$0.0437 \times L - 0.4947$
0.0	$0.0714 \times L - 0.8095$	$0.0357 \times L - 0.4048$	$0.0357 \times L - 0.4048$	$0.0357 \times L - 0.4048$	$0.0714 \times L - 0.8095$
-0.5	$0.0437 \times L - 0.4947$	$0.0288 \times L - 0.3261$	$0.0357 \times L - 0.4048$	$0.0427 \times L - 0.4835$	$0.0992 \times L - 1.1243$
-1.0	$0.0159 \times L - 0.1799$	$0.0218 \times L - 0.2474$	$0.0357 \times L - 0.4048$	$0.0496 \times L - 0.5622$	$0.1270 \times L - 1.4392$
-1.5	$-0.0119 \times L + 0.1349$	$0.0149 \times L - 0.1687$	$0.0357 \times L - 0.4048$	$0.0565 \times L - 0.6409$	$0.1548 \times L - 1.7540$
-2.0	$-0.0397 \times L + 0.4497$	$0.0079 \times L - 0.0899$	$0.0357 \times L - 0.4048$	$0.0635 \times L - 0.7196$	$0.1825 \times L - 2.0688$
-2.5	$-0.0675 \times L + 0.7646$	$0.0010 \times L - 0.0112$	$0.0357 \times L - 0.4048$	$0.0704 \times L - 0.7983$	$0.2103 \times L - 2.3836$

ÖRNEK: AÇIKLIK $L=20m$, YÜKLEME H15-S12



YÜKLEME POZİSYONU: ORTA AKS $L/2$ NOKTASINDA

(Bütün tablolarda momentler açıklık ortası içindir.)

(Birimler $kN \cdot m$)

E (λ)	KİRİŞ NUMARASI			
	1	2	3	4
2.0	1071.69	293.199	50.5513	-384.191
1.6	926.103	268.934	74.8162	-238.603
1.2	780.515	244.669	99.0809	-93.0147
0.8	634.926	220.404	123.346	52.5735
0.4	489.338	196.14	147.61	198.62
0.0	343.75	171.875	171.875	343.75
-0.4	198.62	147.61	196.14	489.338
-0.8	52.5735	123.346	220.404	634.926
-1.2	-93.0147	99.0809	244.669	780.515
-1.6	-238.603	74.8162	268.934	926.103
-2.0	-384.191	50.5513	293.199	1071.69

ÖZGEÇMİŞ

18.01.1961 'de Balıkesir'de doğdum.Orta öğrenimimi 1978'de Balıkesir Lisesi'nden mezun olarak tamamladım. Aynı yıl Denizli D.M.M.Akademisinin inşaat bölümüne girdim.1.yılın sonunda Balıkesir D.M.M.Akademisine yatay geçiş yaptım. Aynı okuldan 1982 yılının yaz döneminde mezun oldum. Nisan 1983'te Uludağ Üniversitesi Balıkesir Mühendislik Fakültesi İnşaat Bölümüne araştırma görevlisi olarak girdim.Halen aynı okulda aynı görevde çalışmaktayım.

M.Fahir ATALAYA

