Deponi İnşaatı Tekniği

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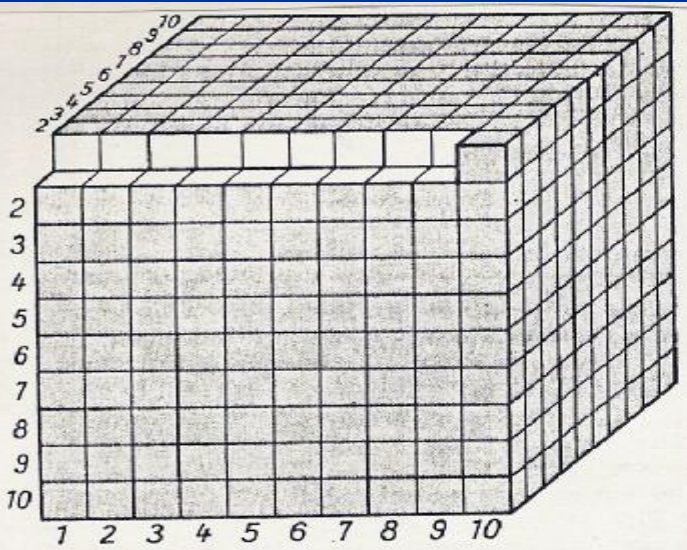
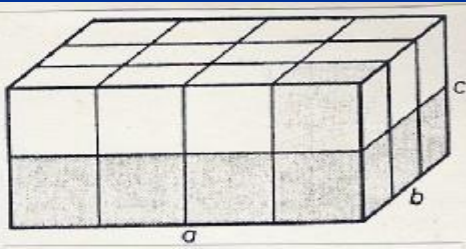
Deponi Hacmini Hesaplamada Kullanılacak Geometrik Şekillerden Bazıları

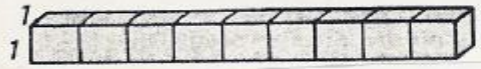
- Küre
- Kesik küre
- Piramid
- Kesik piramid
- Küp
- Koni
- Kesik koni





Prizmanın Hacmi

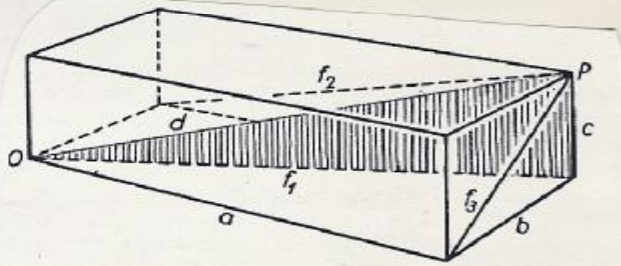
Aş ağıda sıralanan formüller, uzunluğu birim kübün kenar uzunluğunun"e" tam katı olmayan kenar veya kenarlar için de geçerlidir. z. B. $a = \frac{p_1 e}{q_1}$, $b = \frac{p_2 e}{q_2}$, $c = \frac{p_3 e}{q_3}$,



Desimetrekübün Hacmi

Kübün Hacmi: $V = a^3$

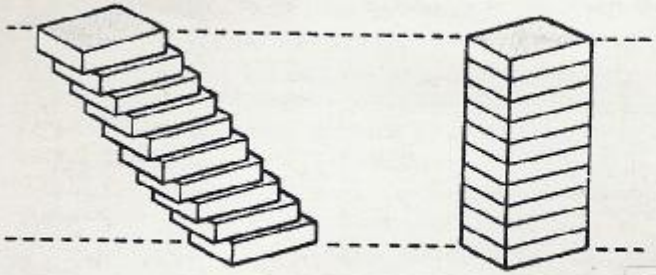
Prizmanın Hacmi: $V = a\,b\,c$



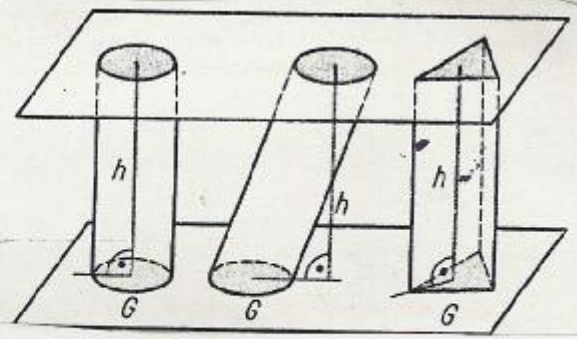
$f_1 = \sqrt{a^2 + b^2}$, $f_2 = \sqrt{a^2 + c^2}$, $f_3 = \sqrt{b^2 + c^2}$.

Prizmanın Cisim Köşegeninin Uzunluğu

$$d = \sqrt{f_1^2 + c^2} = \sqrt{f_2^2 + b^2} = \sqrt{f_3^2 + a^2} = \sqrt{a^2 + b^2 + c^2}.$$



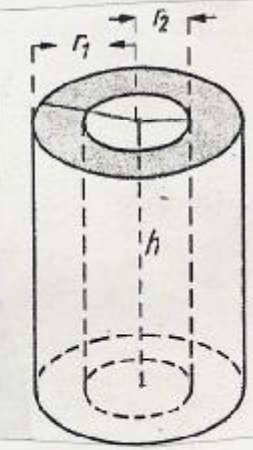
Kavaliyer prensibinincanlandırılması



Kavaliyer prensibine göre hacim hesabı

Prizma veya silindirin hacmi	$V = G \cdot h$
Dairesel silindirin hacmi	$V = \pi r^2 h = \frac{\pi}{4} d^2 h$

İçi boş silindirin sathı	$O = 2\pi (r_1 + r_2)(r_1 - r_2 + h)$
İçi boş silindirin hacmi	$= G \cdot h = \pi (r_1 + r_2)(r_1 - r_2) \cdot h$



İçi boş silindir

$H = h + h'$, $S = s + s'$. Işın Kuralına göre $: r_2 = (s + s') : s'$ veya $(r_1 - r_2) : r_1 = s : S$,

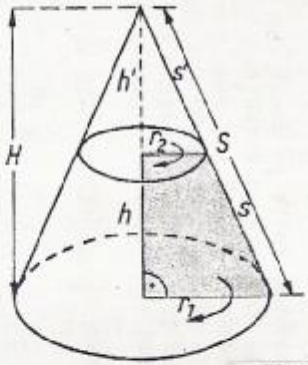
d. h. $S = \frac{s \cdot r_1}{r_1 - r_2}$ gene $' : s = r_2 : (r_1 - r_2)$ oder $s' = \frac{s r_2}{r_1 - r_2}$. Kesik koninin üst yüzeyi için

$$O = \pi r_1^2 + \pi r_2^2 + \pi (r_1 + r_2) s.$$

Dik kesik koninin Yanal Alanı	$M = \pi s (r_1 + r_2)$
v e Yüzey Alanı	$O = \pi [(r_1^2 + r_2^2) + s (r_1 + r_2)] = \frac{\pi}{4} [d_1^2 + d_2^2 + 2 s (d_1 + d_2)]$

$$V = \frac{1}{3} [G_1 (h + h') - G_2 h'].$$

$$h' : (h + h') = \sqrt{G_2} : \sqrt{G_1}.$$



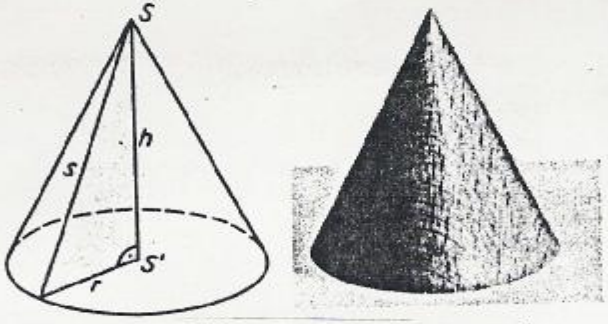
Kesik Koni

$$h' = \frac{h \sqrt{G_2}}{\sqrt{G_1} - \sqrt{G_2}} \text{ ve } (h + h') = \frac{h \sqrt{G_1}}{\sqrt{G_1} - \sqrt{G_2}}.$$

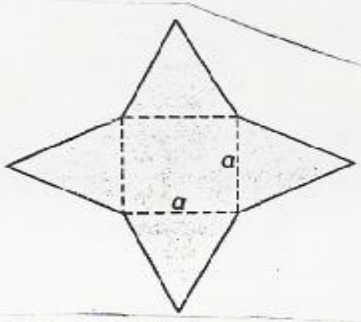
$$V = \frac{h}{3} \cdot \frac{G_1 \sqrt{G_1} - G_2 \sqrt{G_2}}{\sqrt{G_1} - \sqrt{G_2}} = \frac{h}{3} \cdot \frac{G_1^2 - G_2 \sqrt{G_1 G_2} + G_1 \sqrt{G_1 G_2} - G_2^2}{G_1 - G_2} = \frac{h}{3} (G_1 + \sqrt{G_1 G_2} + G_2).$$

$G_1 = \pi r_1^2$ ve $G_2 = \pi r_2^2$.

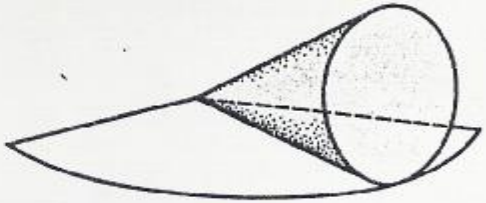
	Hacim	Yaklaşık Formülü
Kesik pramit	$V = \frac{h}{3} (G_1 + \sqrt{G_1 G_2} + G_2)$	$V \approx \frac{G_1 + G_2}{2} \cdot h$
Kesik koni	$V = \frac{\pi h}{3} (r_1^2 + r_1 r_2 + r_2^2)$	$V \approx \frac{\pi h}{2} (r_1^2 + r_2^2)$ oder $V \approx \frac{\pi h}{4} (r_1 + r_2)^2$



Düzgün Koni



Kare pramit açılımı



Dairesel koninin yanal yüzey açılımı

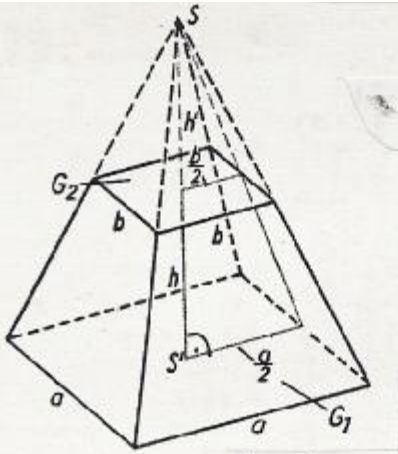
$$M : \pi \varrho^2 = b : 2\pi\varrho,\ M = \frac{b\varrho^2}{2\varrho} = \frac{2\pi r s}{2} = \pi r s.$$

$$s = \sqrt{r^2 + h^2}.$$

Yan yüz hesabı	$M = \pi r s$

$O = G + M.$ $\quad G = \frac{a^2}{4}\sqrt{3}$ $\quad M = 3G$ $\quad O = 4G = 4 \cdot \frac{a^2}{4}\sqrt{3} = a^2\sqrt{3}.$

Kesik Pramit	$O = G_1 + G_2 + M$



Kesik Pramit

H: Yükseklik

O: Üst Yüzey

M: Yanal alan

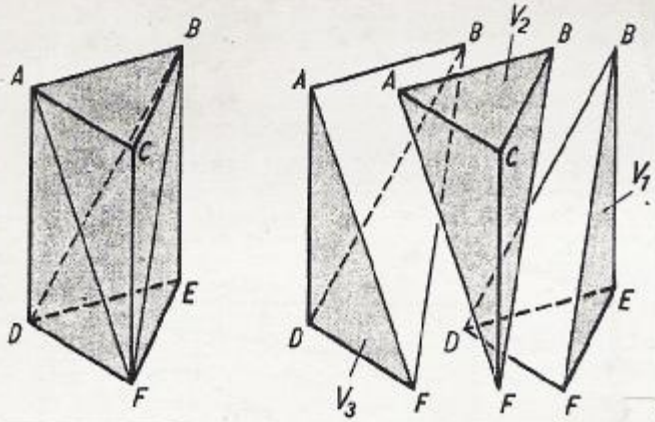
$$\eta = \sqrt{h^2 + \frac{1}{4}(a-b)^2},$$

$$= a^2 + b^2 + 2\,\eta\,(a+b).$$

$$O = a^2 + b^2 + 4 \cdot \frac{a+b}{2}\,\eta$$

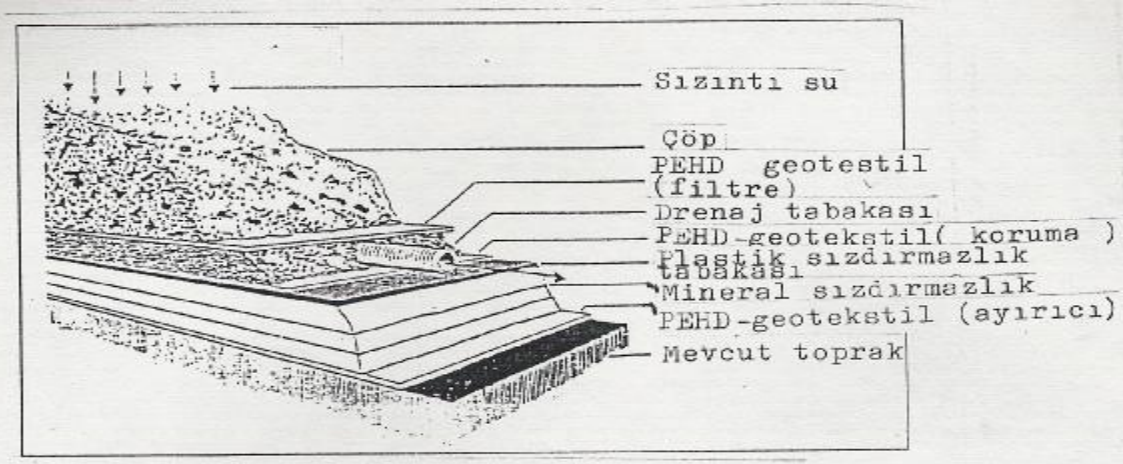
$$V = \frac{1}{3} G \cdot h.$$

Pramitin Hacmi	$V = \frac{1}{3} G \cdot h$

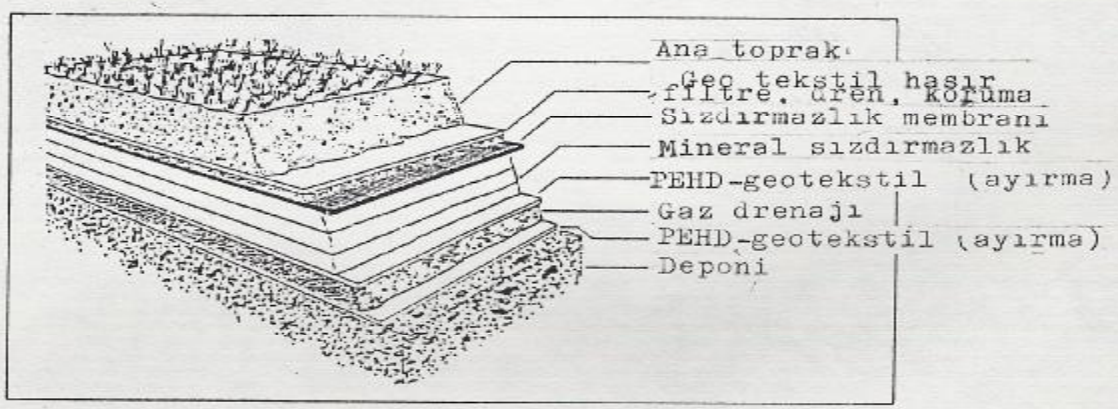


3 Kenarlı Prizmanın 3Kenarlı 3 Pramite Ayrılması

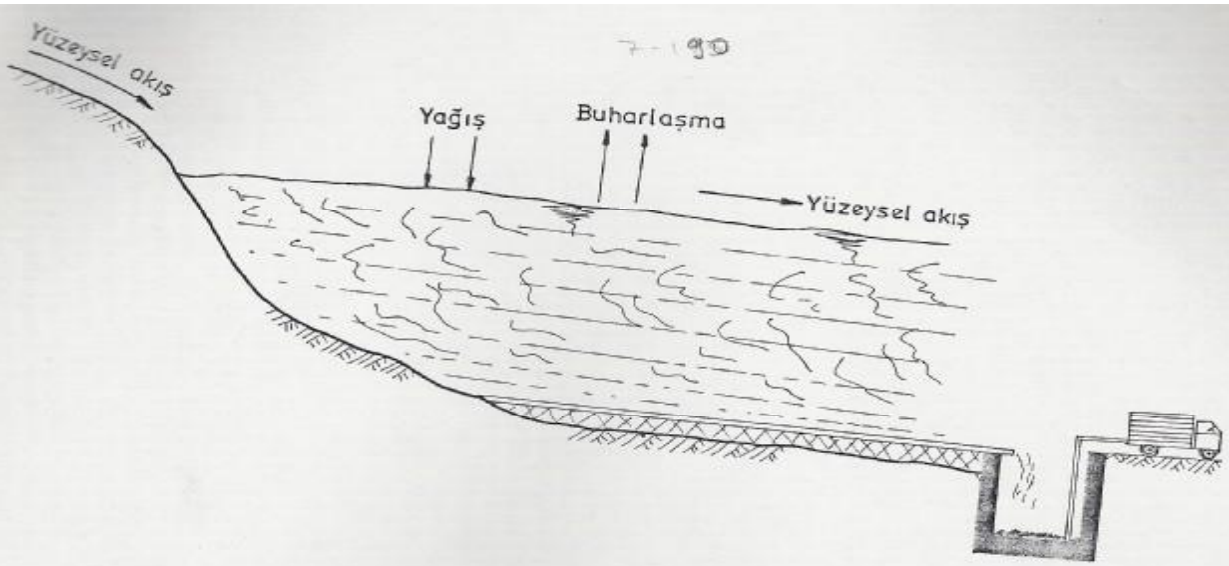
Prizmaların Hacmi	$V = \frac{1}{3}\pi r^2 h = \frac{1}{12}\pi d^2 h$

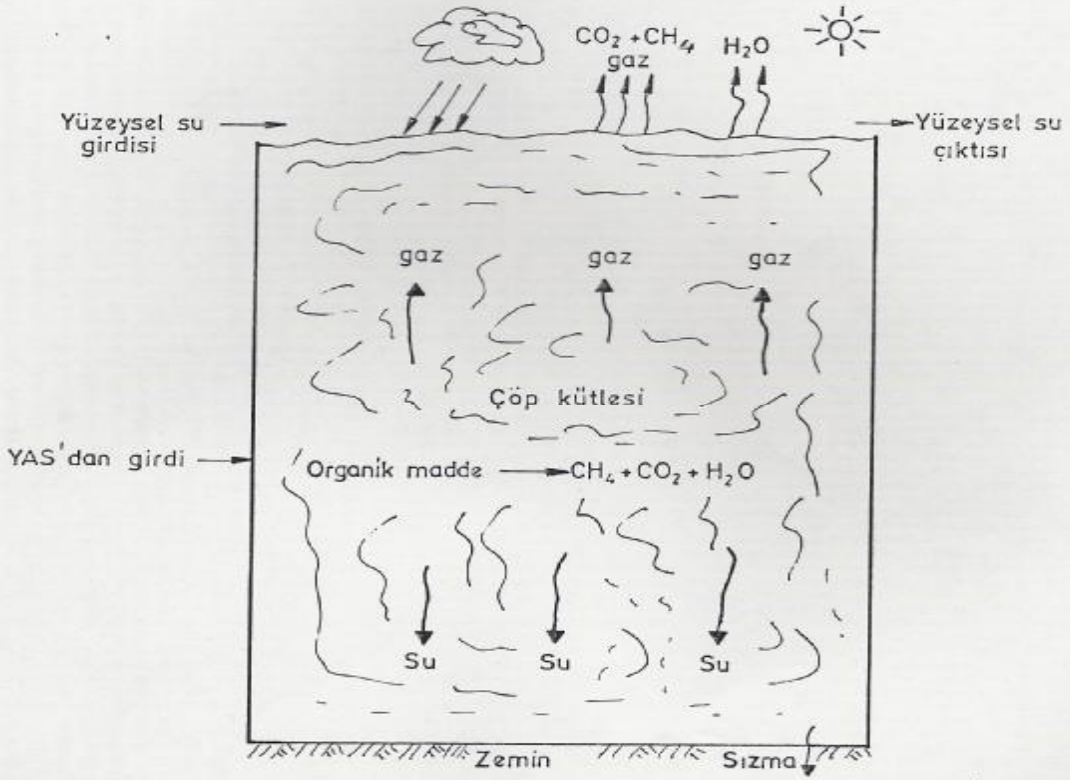


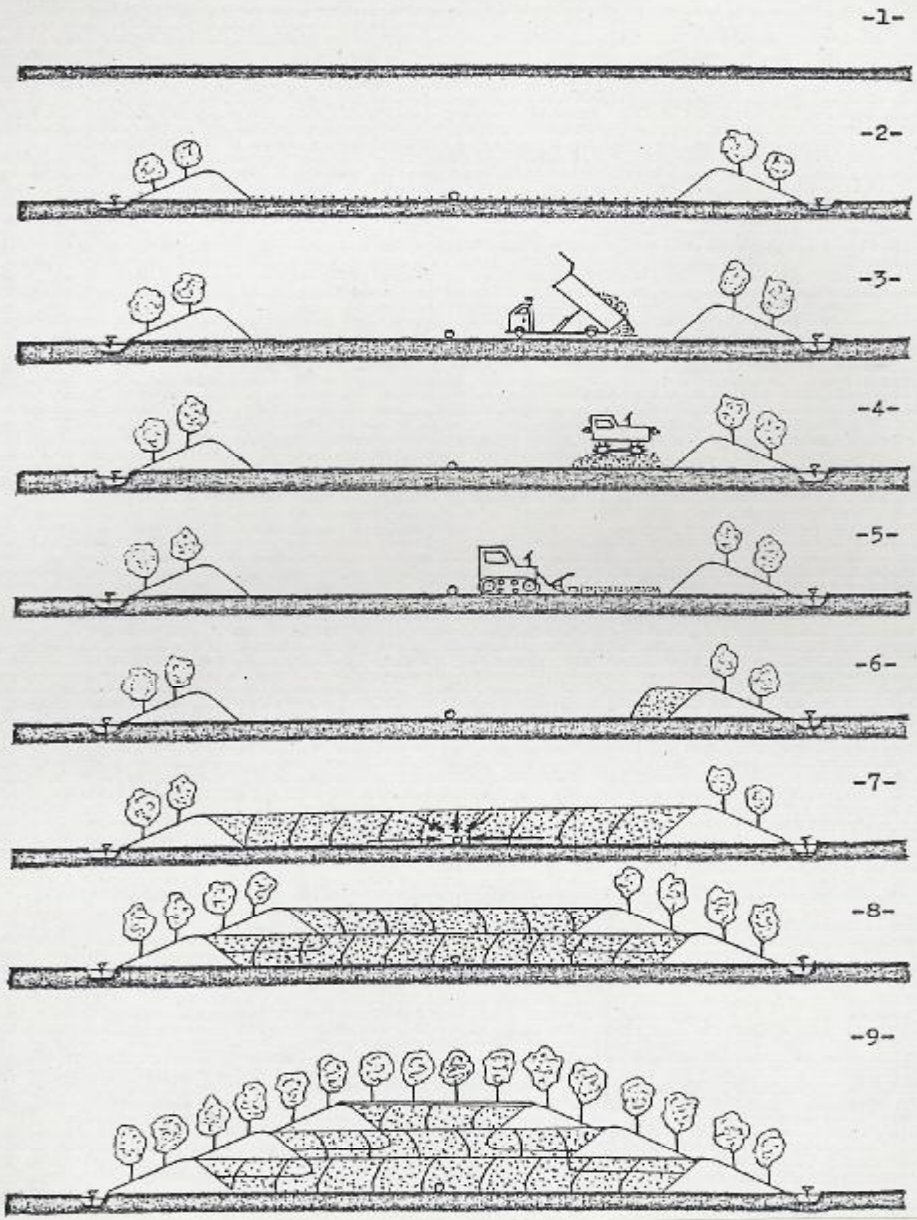
Şekil : Zemin sızdırmazlık sistemleri



Şekil : Deponilerin örtülmesi ve sızdırmazlık tabakası


Yüzeysel akış
Yağış
Buharlaşma
Yüzeysel akış


$CO_2 + CH_4$ gaz
H_2O
Yüzeysel su girdisi
Yüzeysel su çıktısı
gaz
gaz
gaz
Çöp kütlesi
YAS'dan girdi
Organik madde → $CH_4 + CO_2 + H_2O$
Su
Su
Su
Zemin
Sızma



Şekil : Düz arazilerde uygulanan baraj tipi çöp depolama yerlerinin inşaat aşamaları

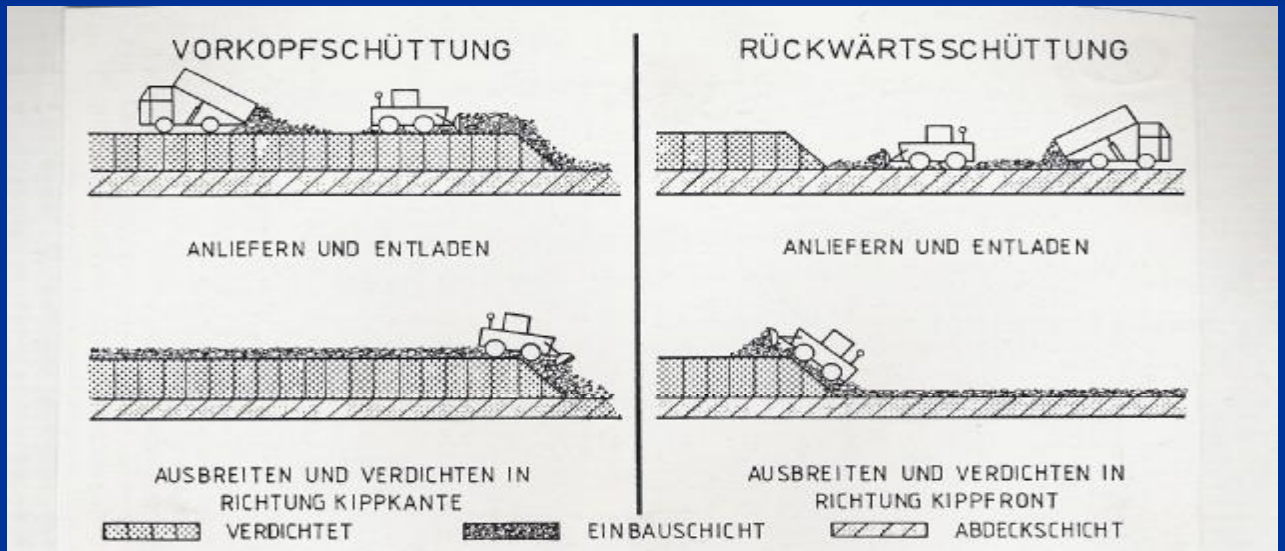
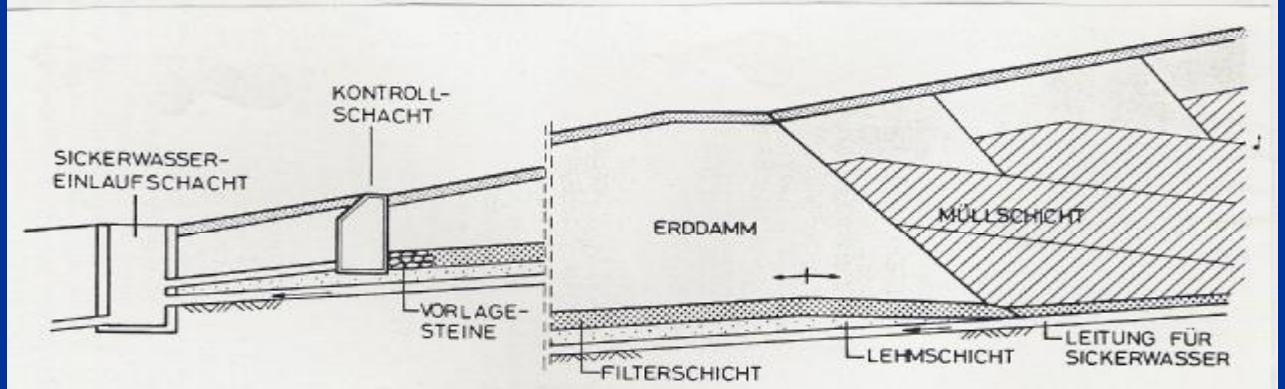
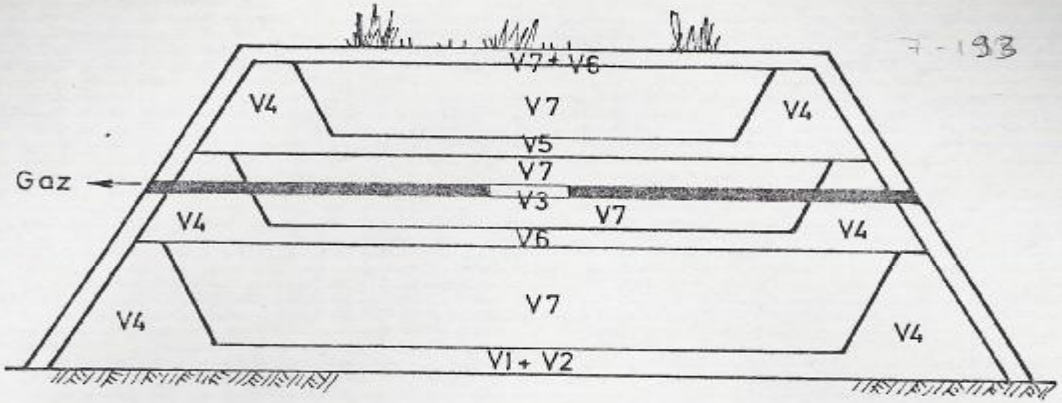


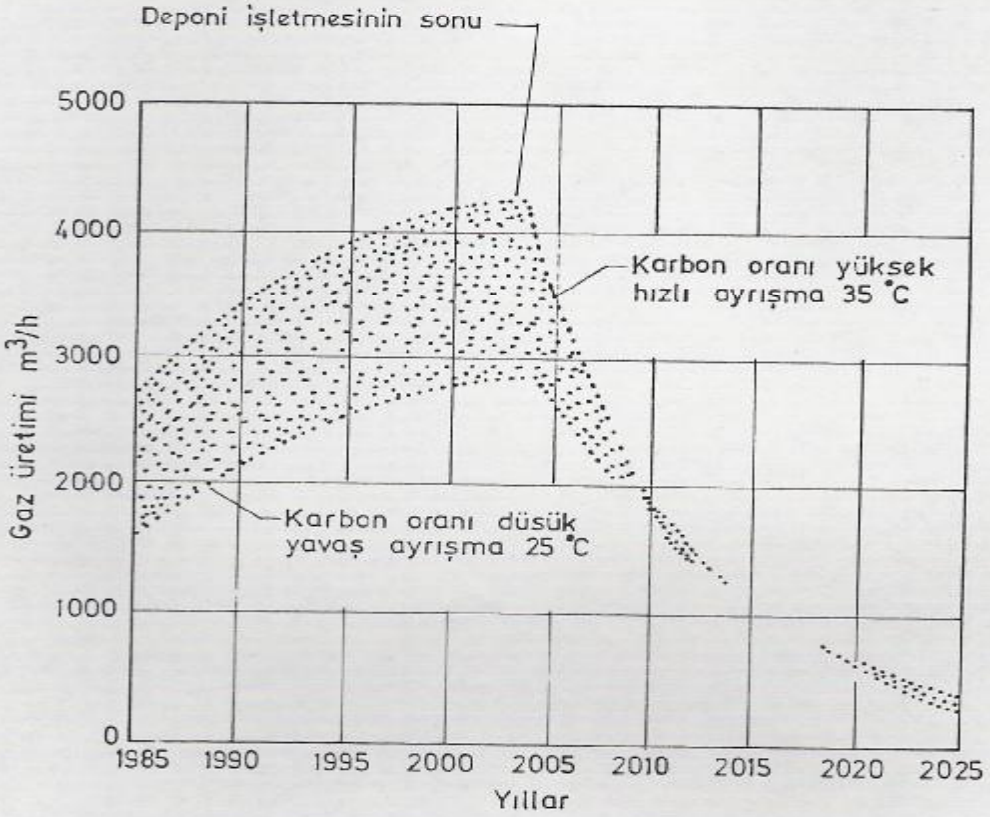
Abb. 4.36 Methoden der Deponieschüttung



AUSBILDUNG DES DAMMFUSSES UND DER DEPONIEABDECKUNG

Abb. 4.37 Dammfuß und Deponieabdeckung
(Quelle: Müllhandbuch Kz 4525)


V7 + V6
V4
V7
V4
V5
V7
Gaz
V3
V7
V4
V4
V6
V7
V4
V4
V1 + V2


Deponi işletmesinin sonu
5000
4000
3000
2000
1000
0
Gaz üretimi m³/h
Karbon oranı yüksek
hızlı ayrışma 35 °C
Karbon oranı düsük
yavaş ayrışma 25 °C
1985
1990
1995
2000
2005
2010
2015
2020
2025
Yıllar

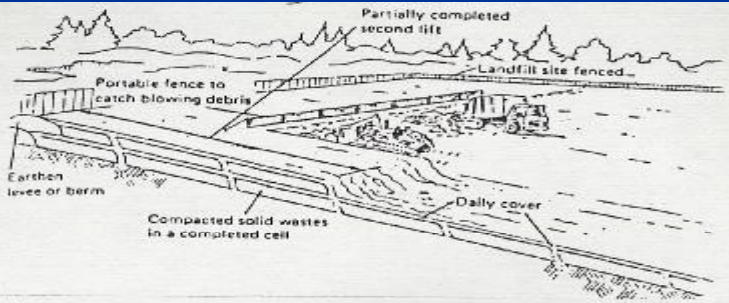


Fig. 5.2. Area method of operation for a sanitary landfill

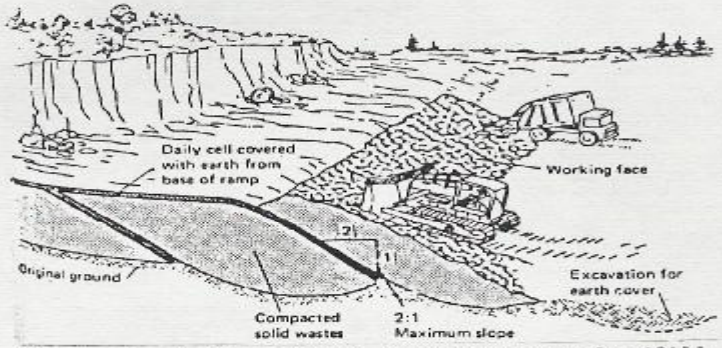


Fig. 5.3. Ramp method of operation for a sanitary landfill

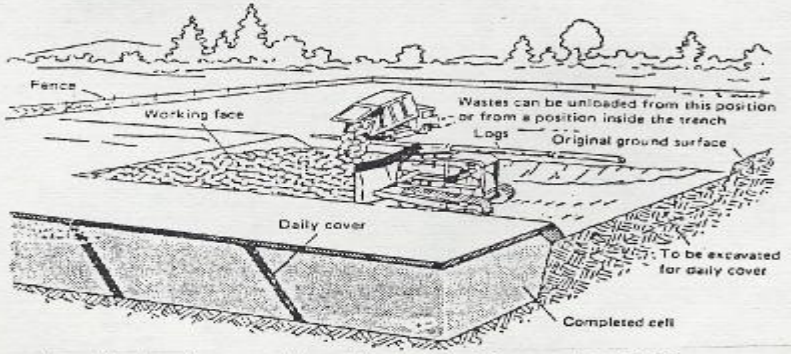
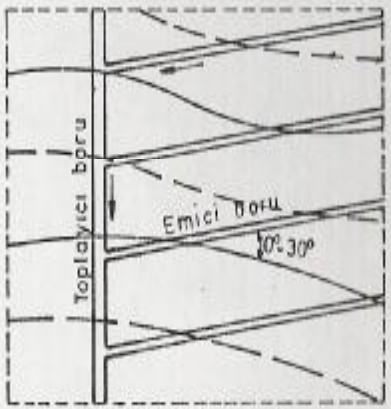
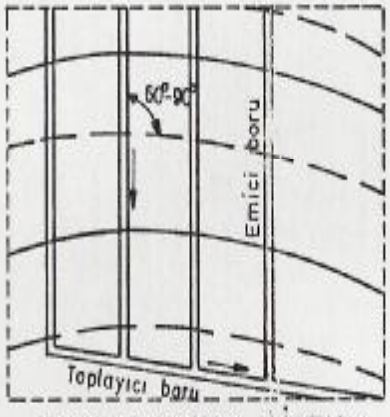


Fig. 5.4. Trench method of operation for a sanitary landfill

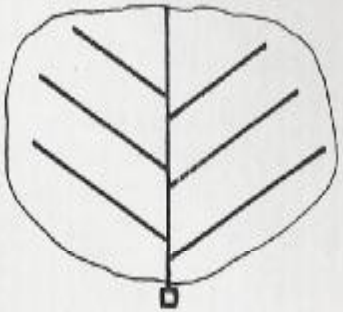


ÇAPRAZ SİSTEM

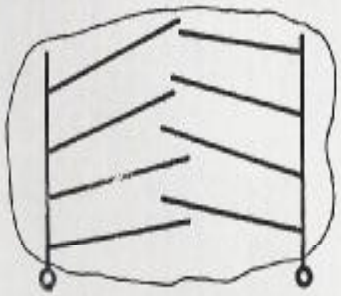
BALIK SIRTI SİSTEM



BOYLAMASINA SİSTEM

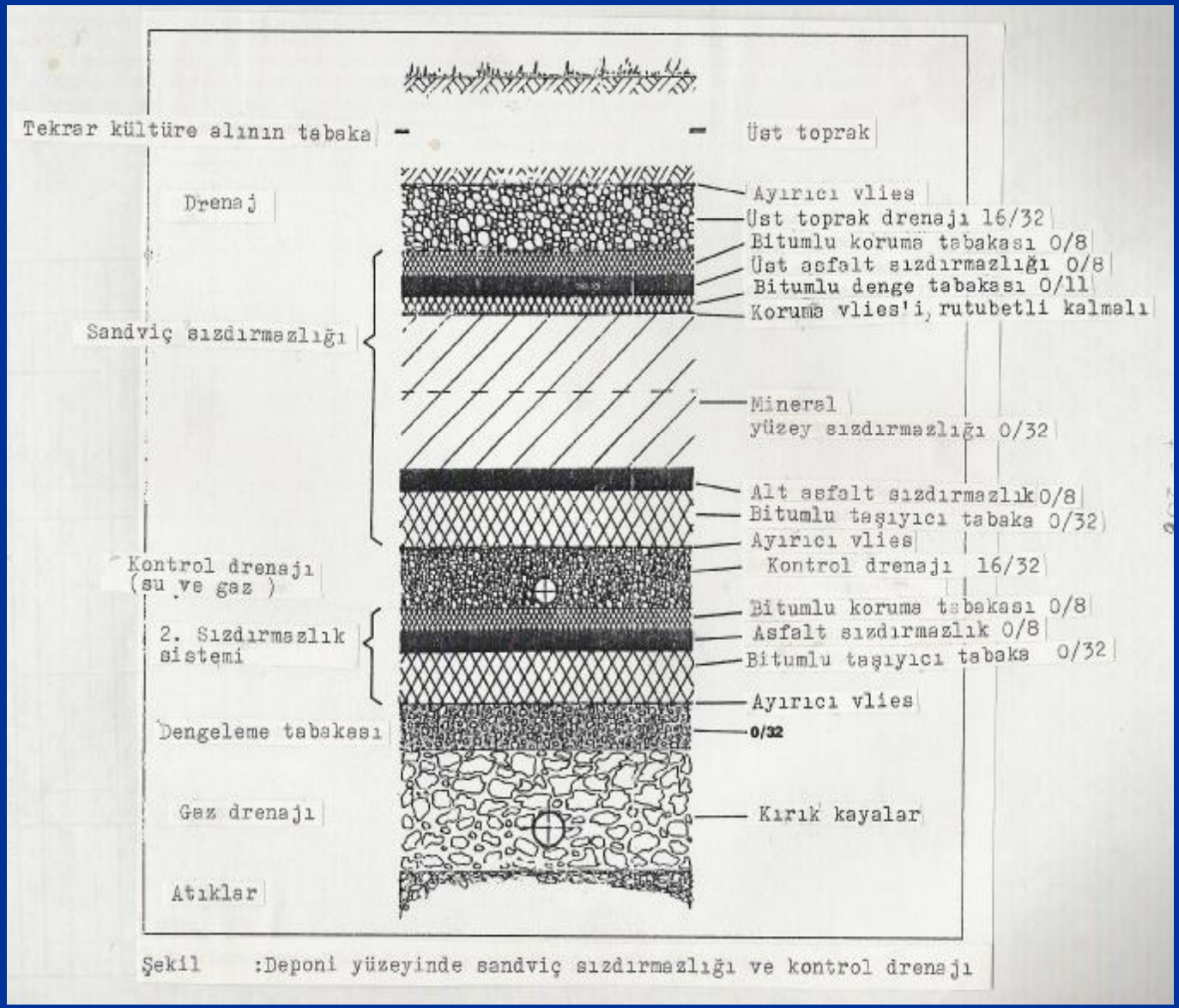


DAL SİSTEM



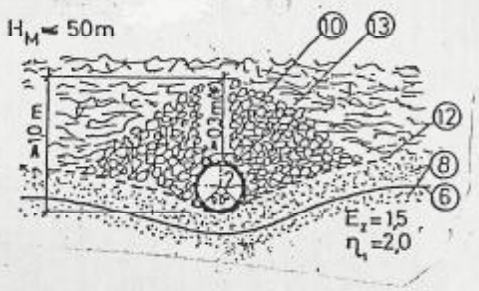
TARAK SİSTEM

YELPAZE SİSTEM
(YILDIZ)

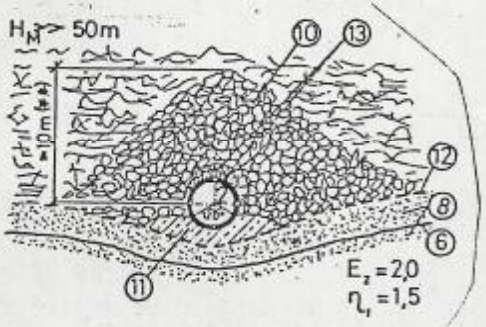


Şekil :Deponi yüzeyinde sandviç sızdırmazlığı ve kontrol drenajı

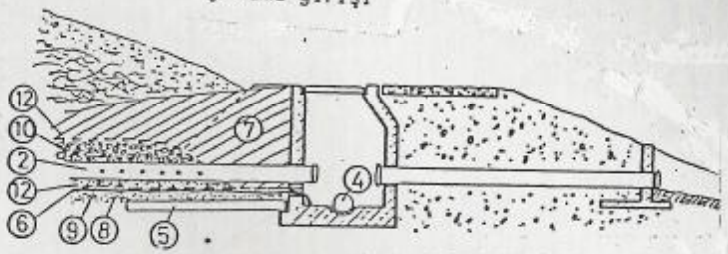
Normal deponi



Büyük deponi



yıkama girişi



(*) $\geq$ 0,3 m (Deponi talimatnamesine göre)
$\geq$ 1,0 m (Önerilen)
(*) $\geq$ 1,5 m (Önerilen)

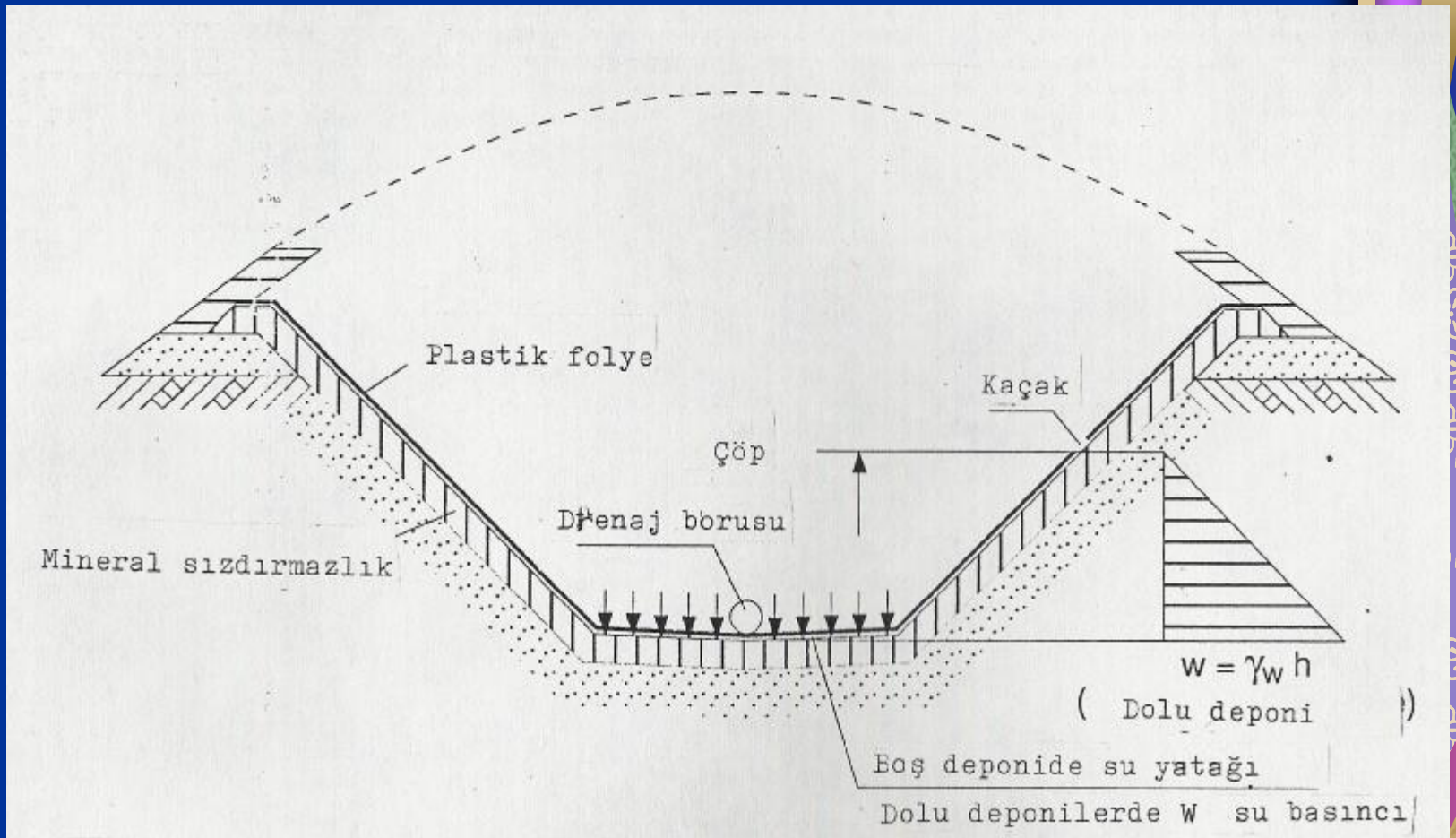
$H_{çöp}$ = 30 m de boyutlandırmada önemli olan.

$E_z \cdot P_s = \eta_i \cdot P_E = \eta_i \cdot \rho_{çöp} \cdot g \cdot D_{boru} \cdot H_{çöp}$

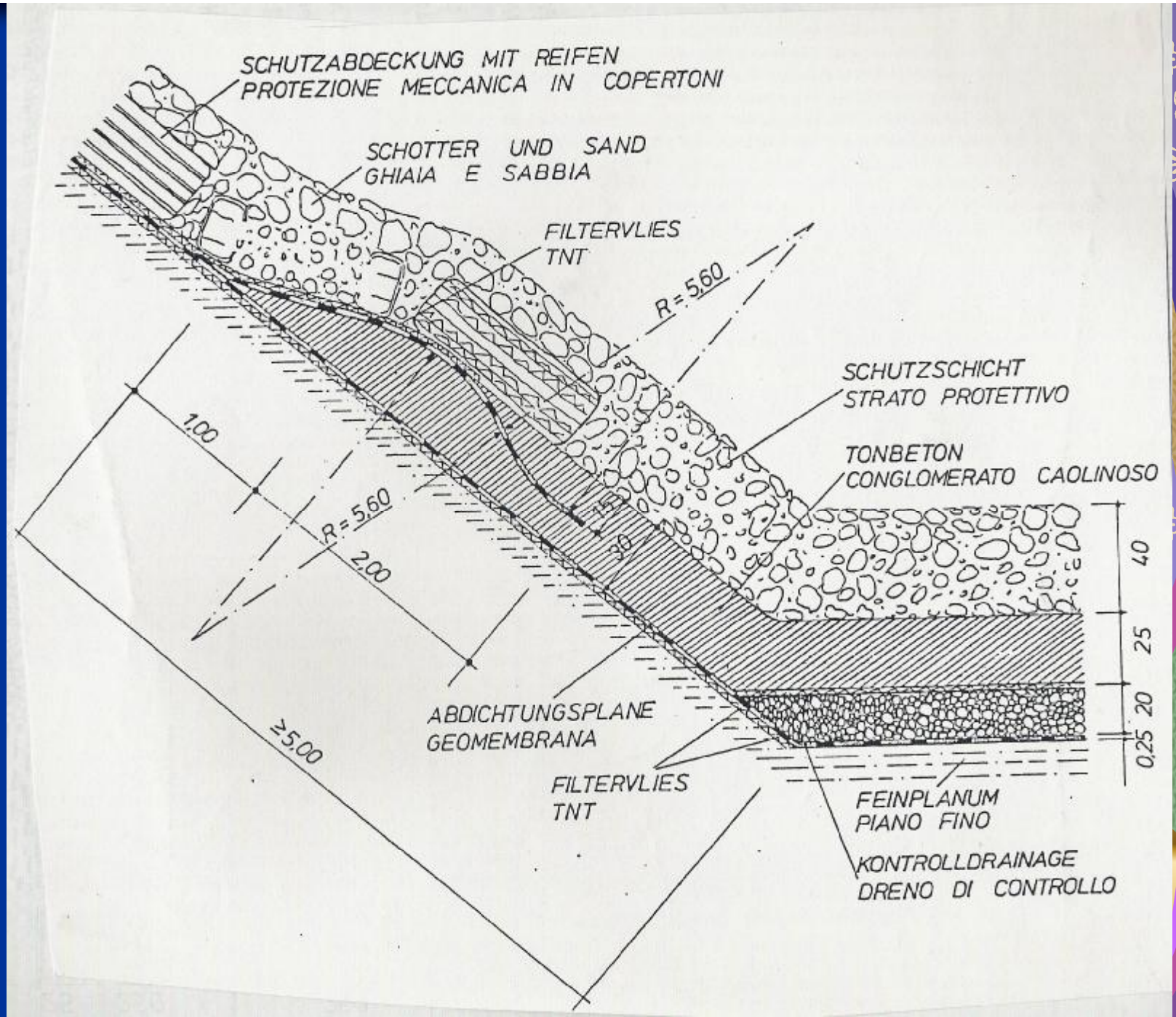
P_s = Kırılma drenci (ton/m)
E_z = biçim katsayısı (elastisite sabiti)
P_E = Statik yük (ton/m)

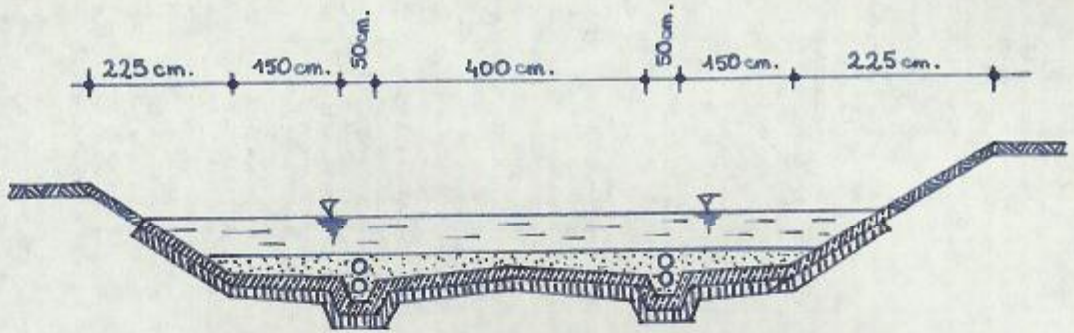
1. Ölçüm savağı
2. Drenaj borusu, anma çapı NW 250
3. Drenaj borusu, anma çapı NW 50
4. Arıtma tesisine akış
5. Geçiş yapısı (Palplanj)
6. Sızdırmazlık folyesi
7. Kil veya Bentonit-Kum Karışımı
8. Kum
9. Çakıl
10. İri Çakıl
11. Gro beton
12. Vlies
13. Kokus cevizi hasırı

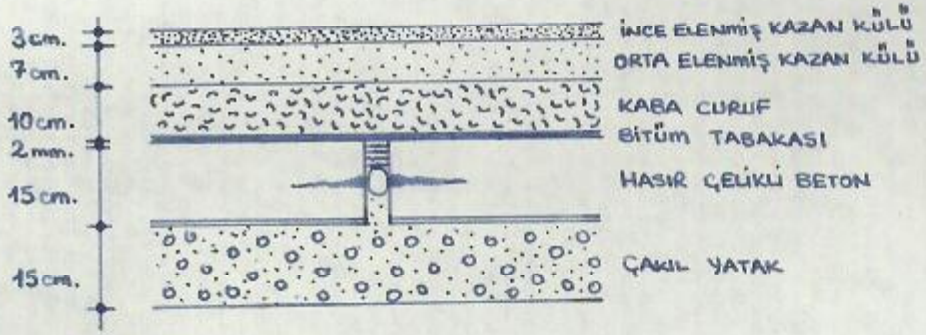
Şekil Yüksekliği 50 m'ye kadar ve fazla olan deponilerde enkesitler, drenaj yıkama yapısı



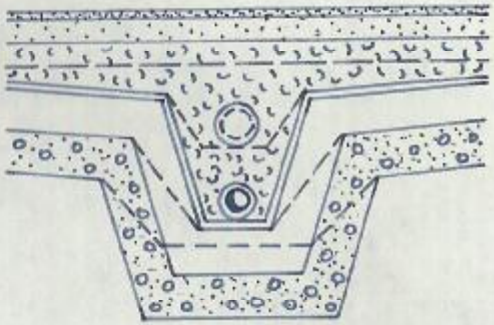
Şekil : Kombinasyon sızdırmazlığı - mineral sızdırmaz tabaka üzerine gelen plastik folyenin sızdırmasının etkileri


SCHUTZABDECKUNG MIT REIFEN
PROTEZIONE MECCANICA IN COPERTONI
SCHOTTER UND SAND
GHIAIA E SABBIA
FILTERVLIES
TNT
R = 5,60
SCHUTZSCHICHT
STRATO PROTETTIVO
TONBETON
CONGLOMERATO CAOLINOSO
1,00
R = 5,60
2,00
1,5
3,0
40
25
20
0,25
≥5,00
ABDICHTUNGSPLANE
GEOMEMBRANA
FILTERVLIES
TNT
FEINPLANUM
PIANO FINO
KONTROLLDRAINAGE
DRENO DI CONTROLLO



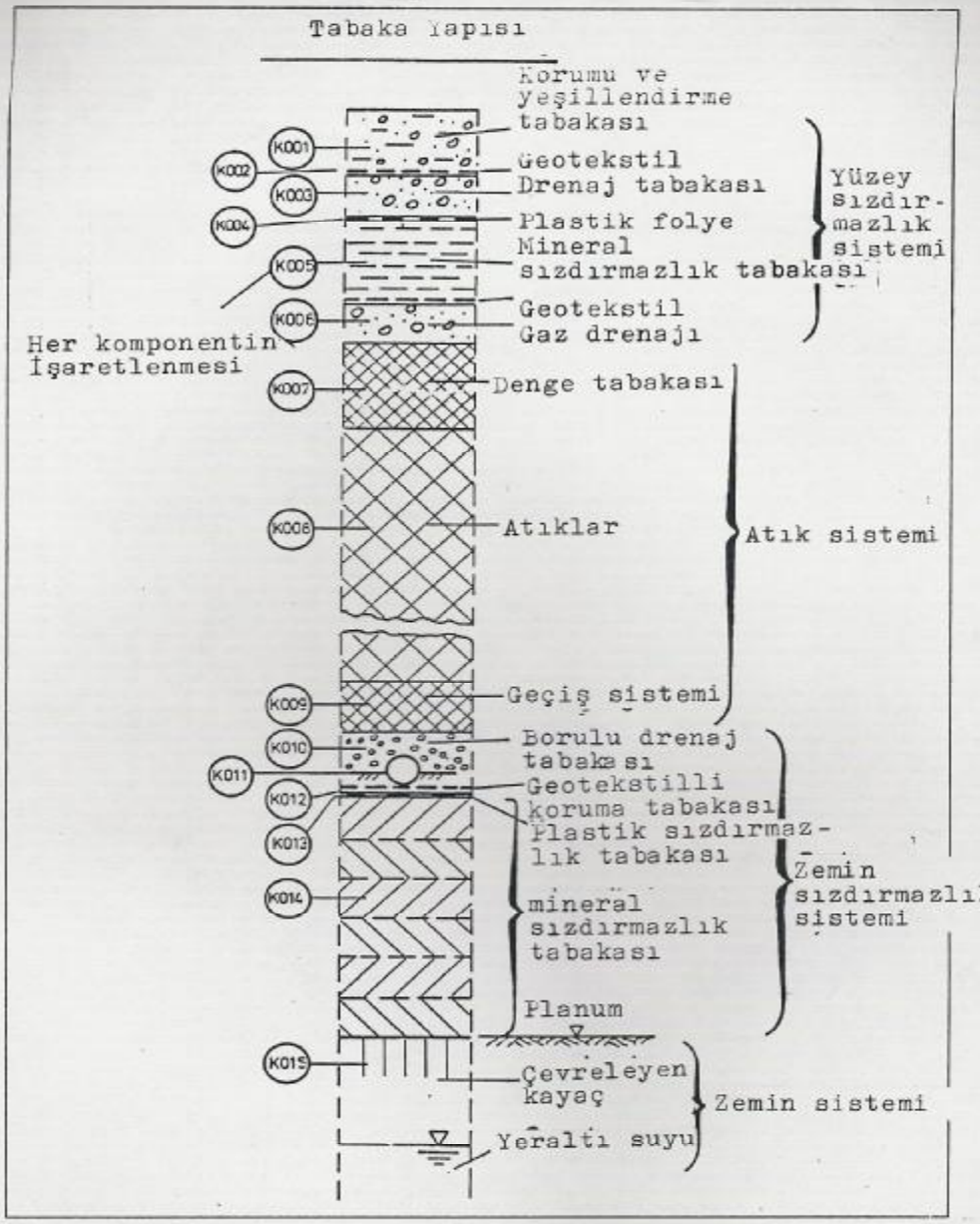


TABAN İNŞAATI

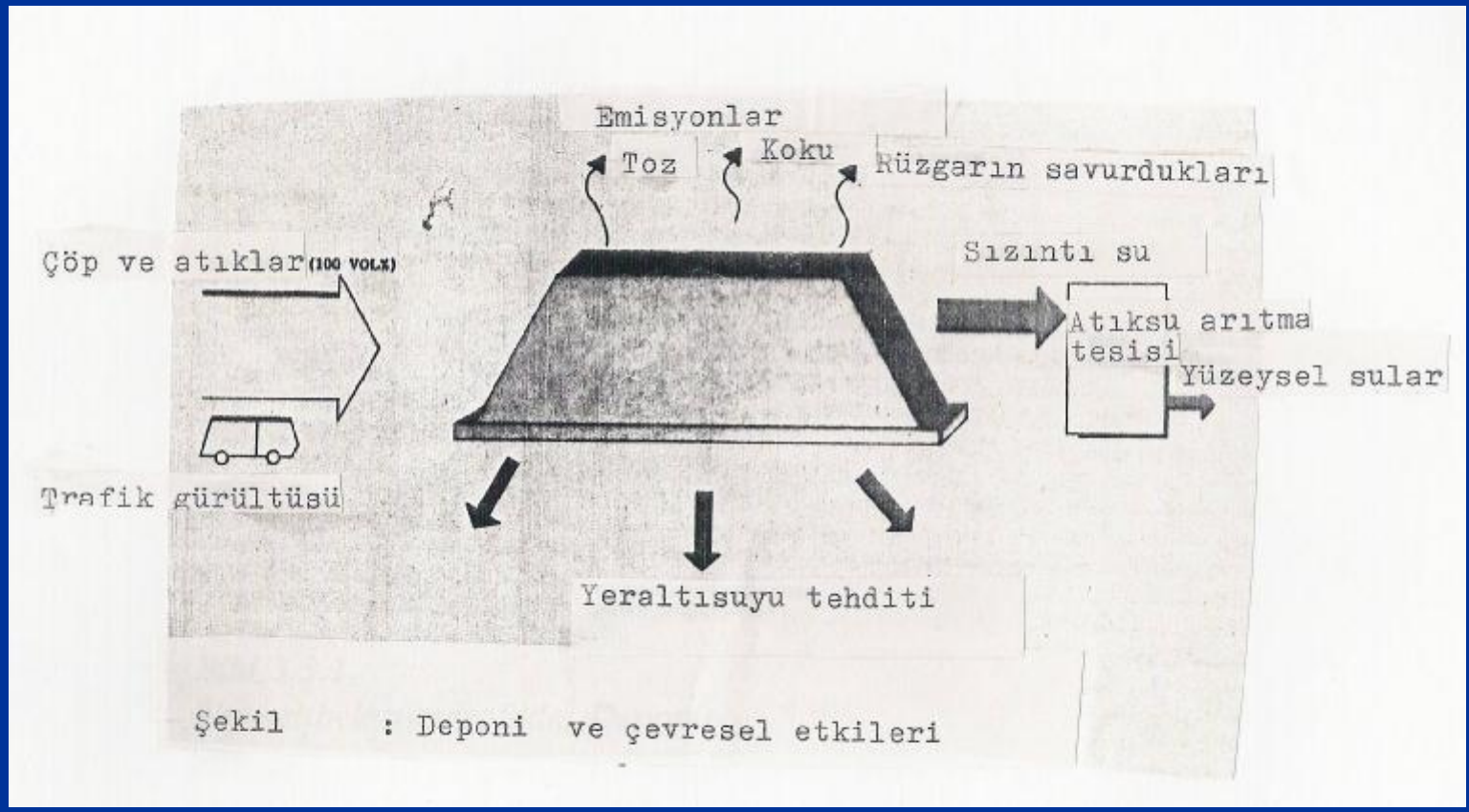


DRENAJ İNŞAATI

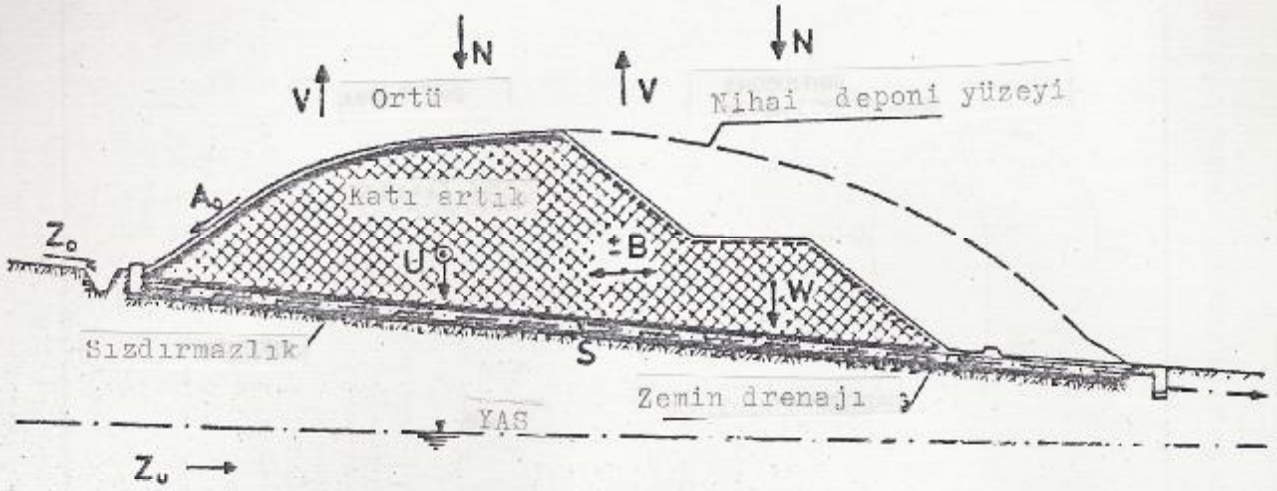
SU KORUMA BÖLGELERİNDE ÇAMUR KURUTMA YATAKLARININ TEŞKİLİ



Şekil : Deponi komponentleri (zemin sistemi, zemin sızdırmazlık sistemi , atık sistemi , örtü tabakası sızdırmazlık sistemi)



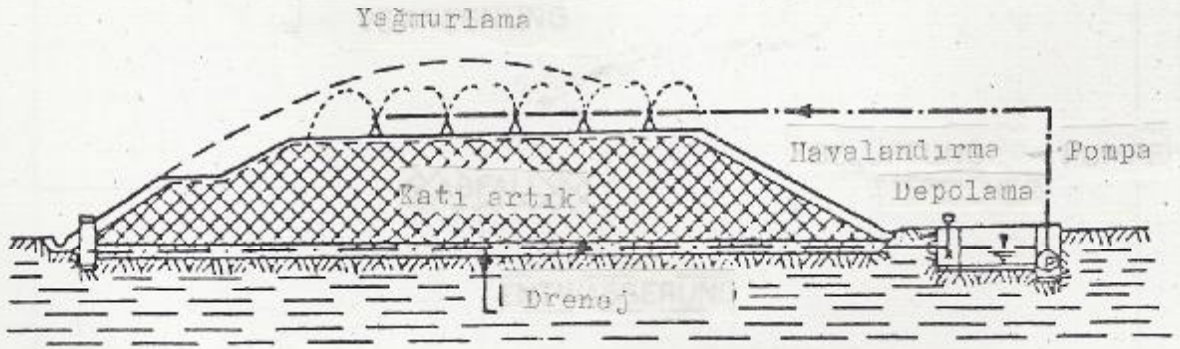
Şekil : Deponi ve çevresel etkileri



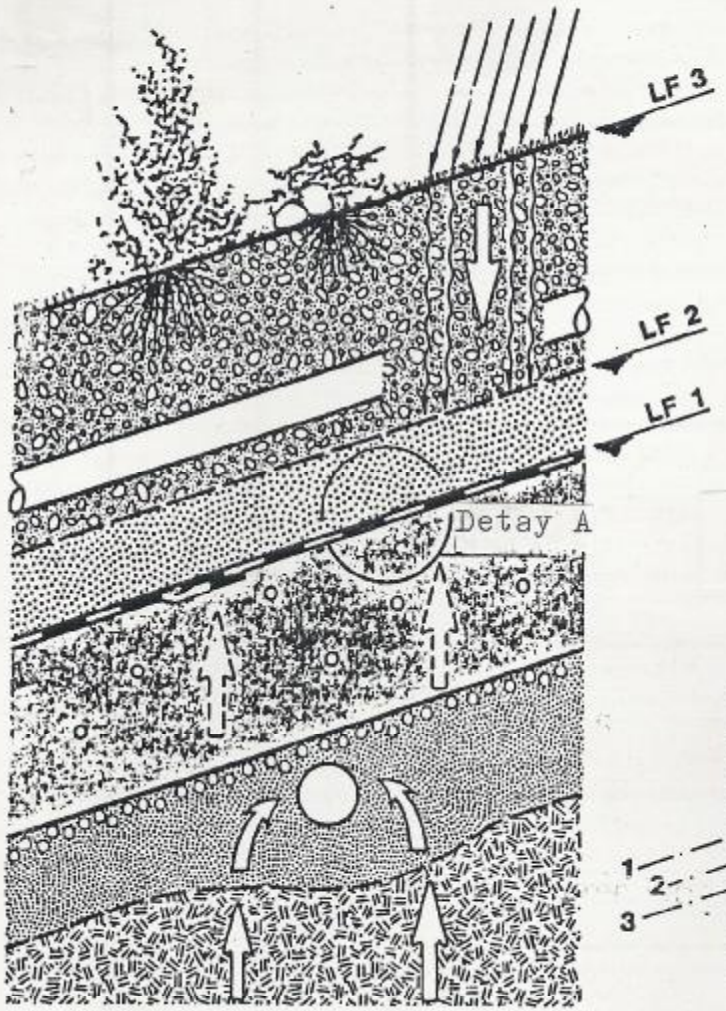
$$S = N - A_o - V \pm B + W + U$$

S = Sızıntı su
N = Yağış
A_o = Yüzeysel akış
V = Buharlaşma
B = Depolanan
W = Yaş getirilen çöpün fazla suyu
U = YAS[illegible] ğmada oluşan su

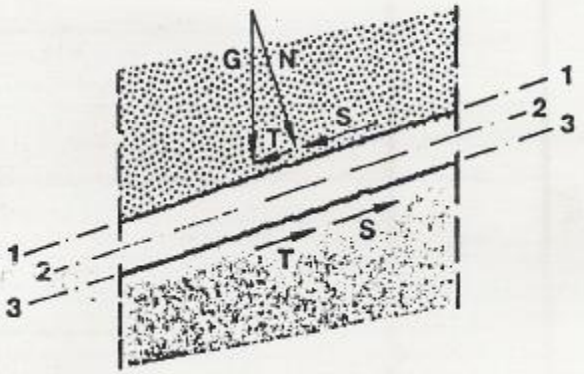
Şekil : Deponi su bilançosu



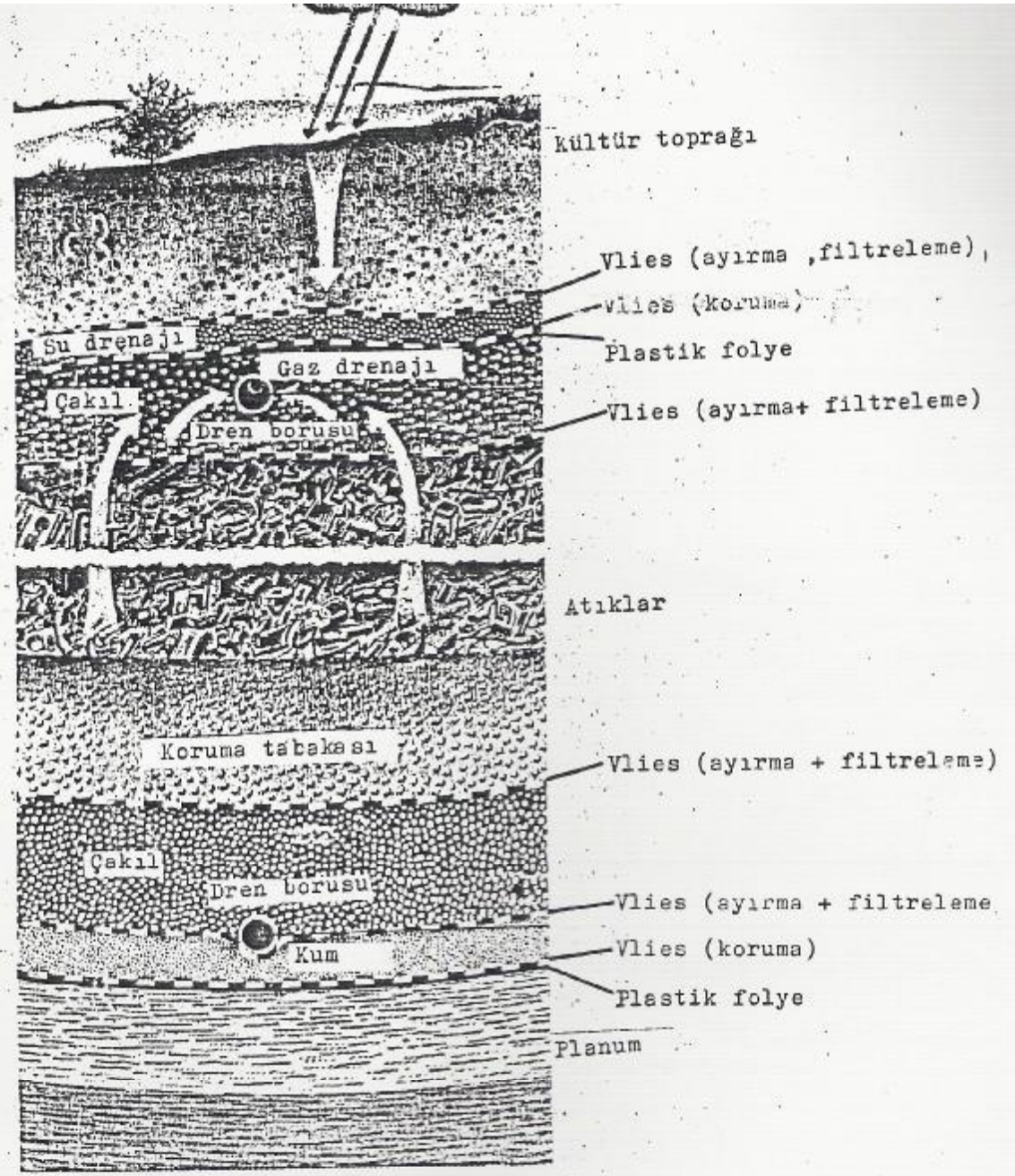
Şekil : Deponi sızıntı su yağmurlaması



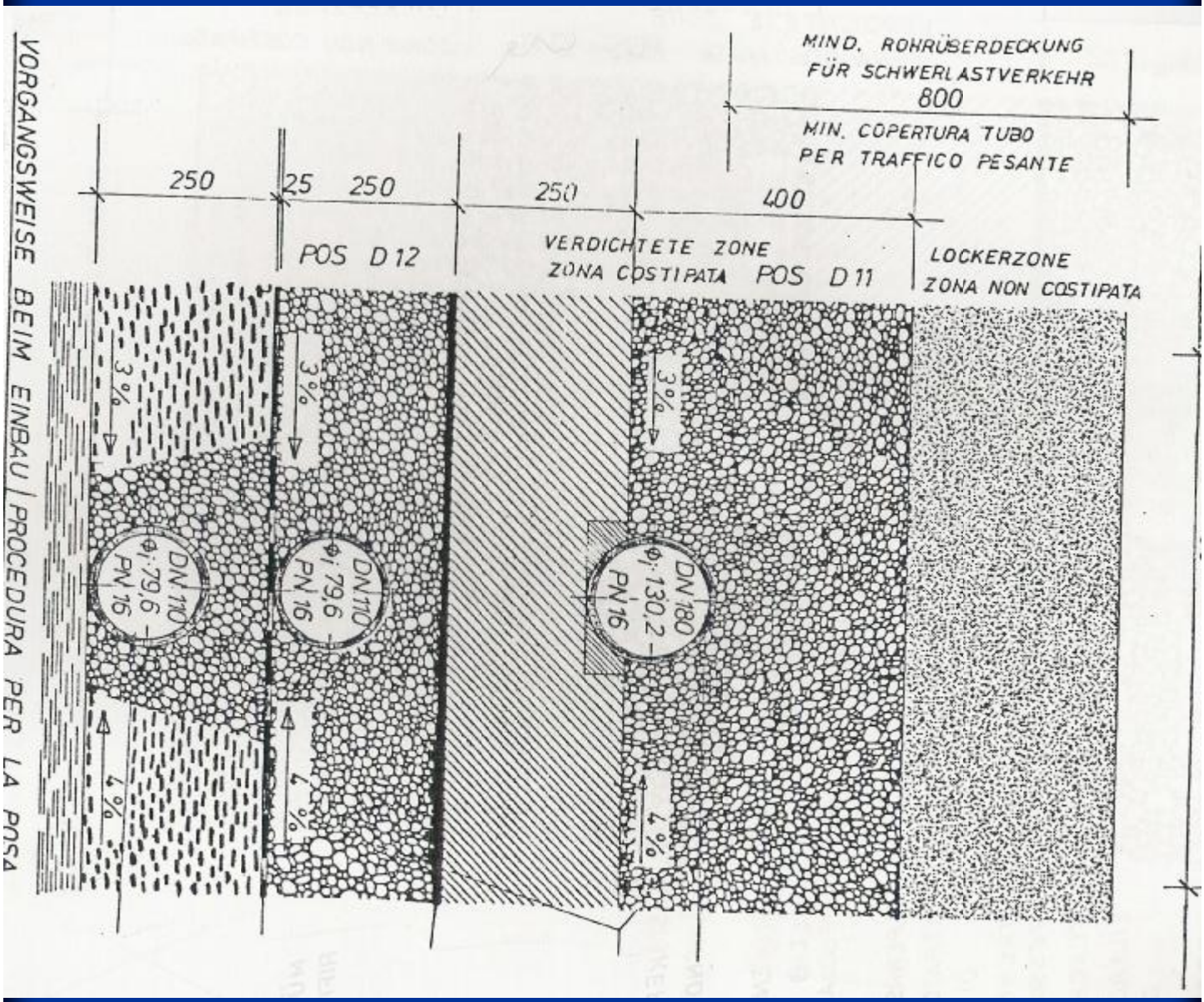
Detay A

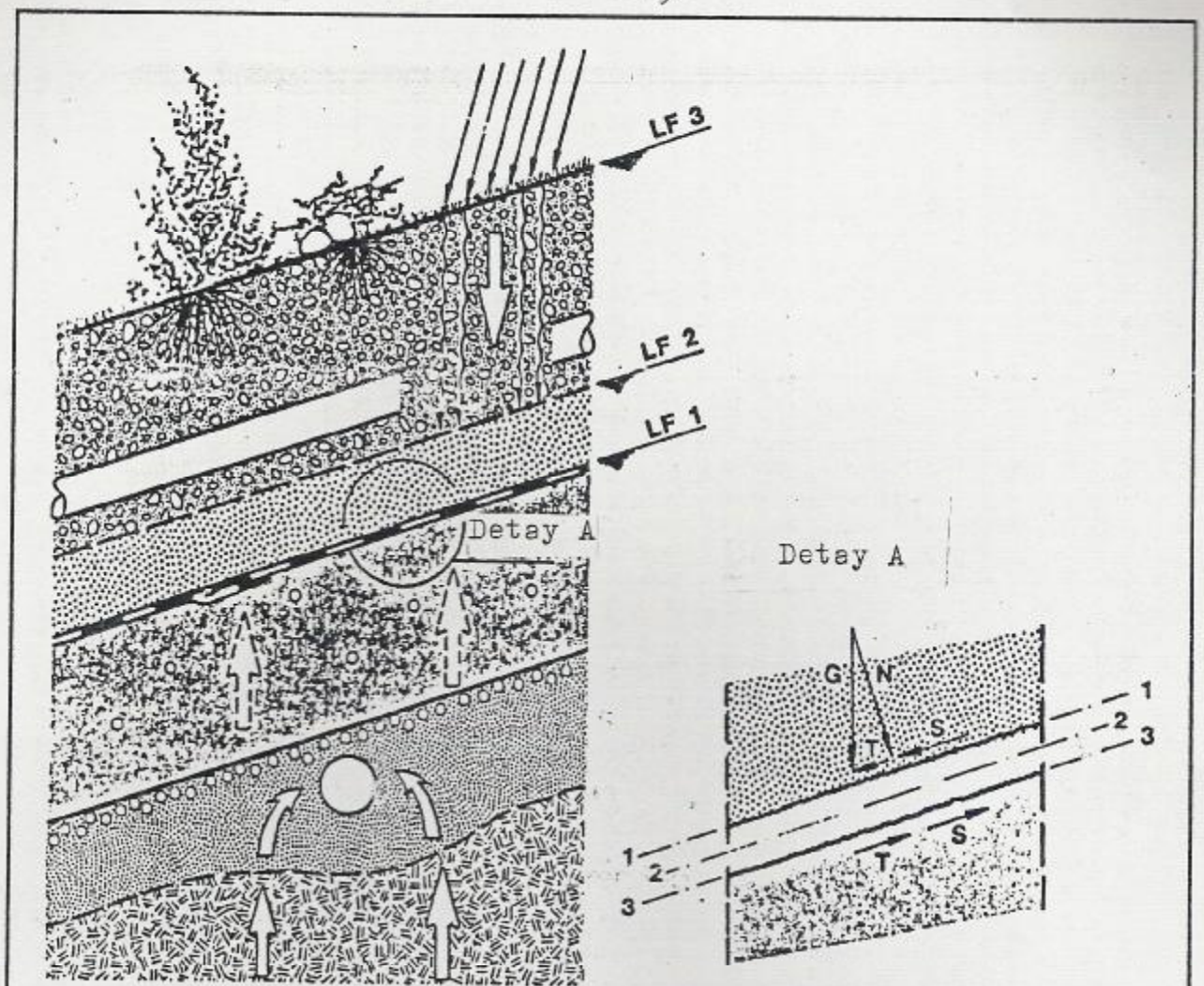


Şekil :Kombinasyon sızdırmazlığı ile deponinin örtülmesi

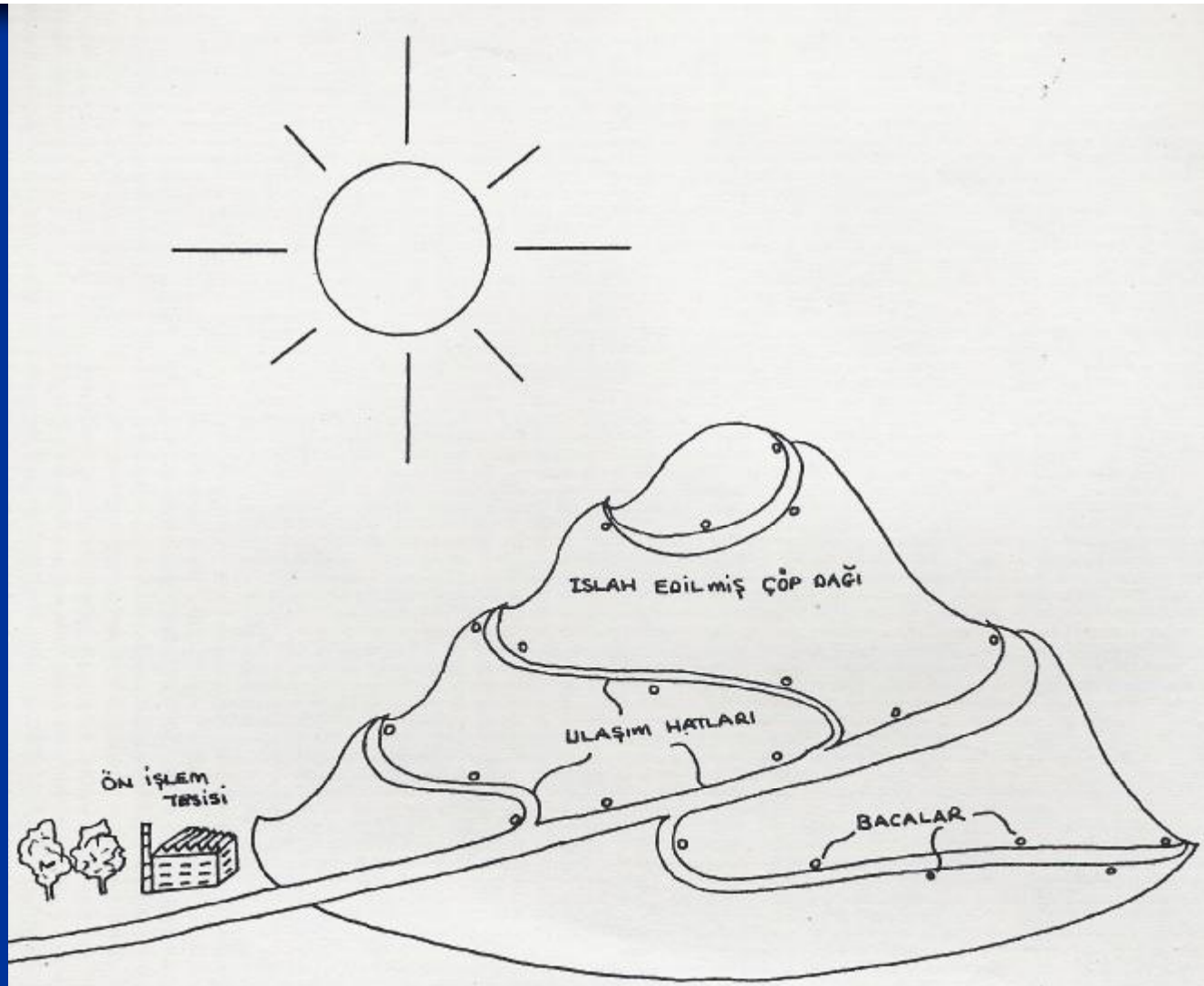


Şekil : Geotekstillerin sızdırmazlık tabakalarında kullanım yerleri ve işlevleri

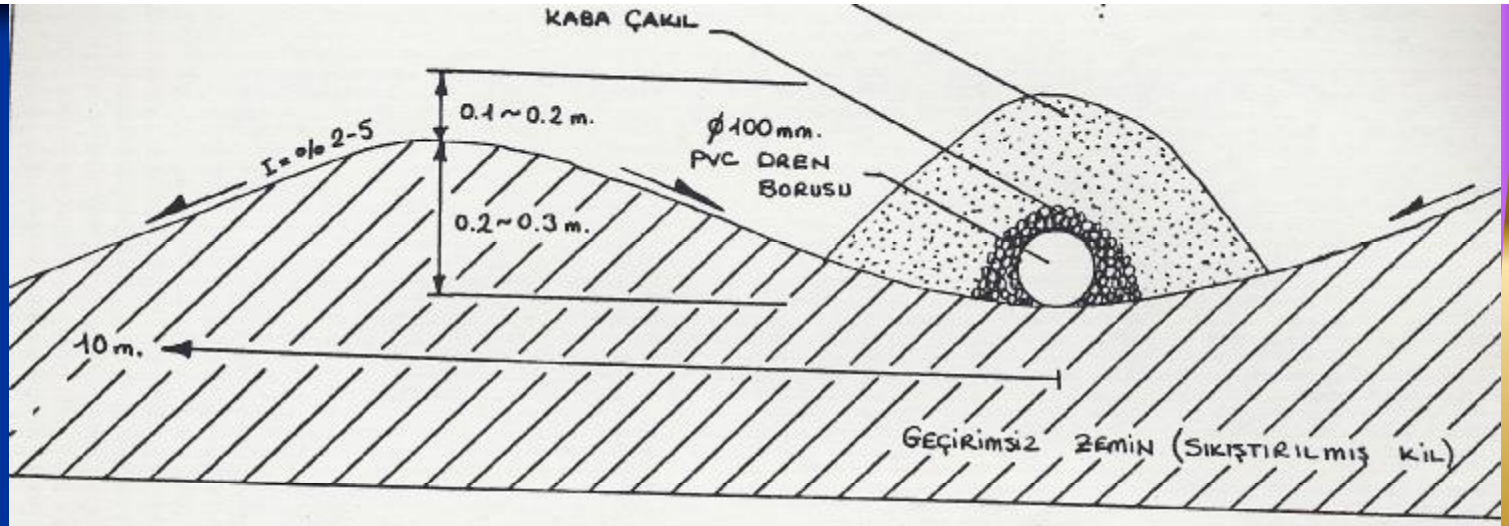

VORGANGSWEISE BEIM EINBAU / PROCEDURA PER LA POSA
MIND. ROHRÜBERDECKUNG
FÜR SCHWERLASTVERKEHR
800
MIN. COPERTURA TUBO
PER TRAFFICO PESANTE
250
25
250
250
400
POS D 12
VERDICHTETE ZONE
ZONA COSTIPATA
POS D 11
LOCKERZONE
ZONA NON COSTIPATA
3%
3%
3%
4%
4%
4%
DN 110
Φi 79,6
PN 16
DN 110
Φi 79,6
PN 16
DN 180
Φi 130,2
PN 16



Şekil :Kombinasyon sızdırmazlığı ile deponinin örtülmesi



ŞEKİL: TOPOĞRAFİK YAPIYA UYDURULMUŞ VE PİKNİK YERİ HALİNE GETİRİLMESİ PLANLANAN BİR DEPONİNİN PEYZAJ ÇALIŞMASINA HAZIRLANMIŞ HALİ.



ŞEKİL: Düz Bir Arazide Dren Borularının İnşa Tekniği;