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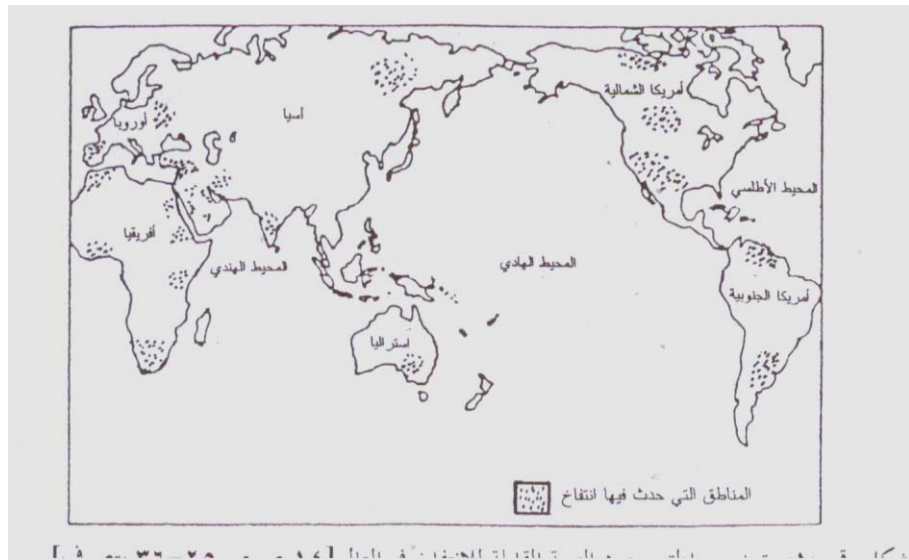
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(colloidal content %)

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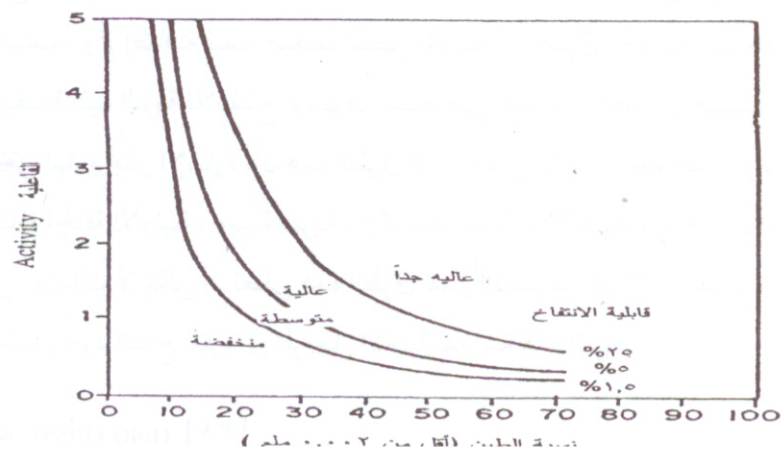
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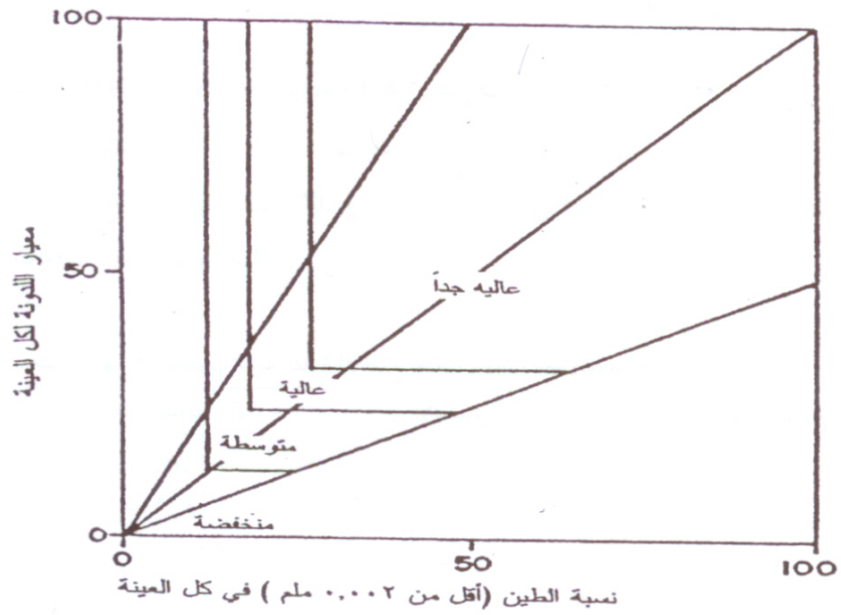
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( ) . [ ] Seed , Woodward, and Lundgren (1962)



( ) . [ ] Van Der Merwe (1964)

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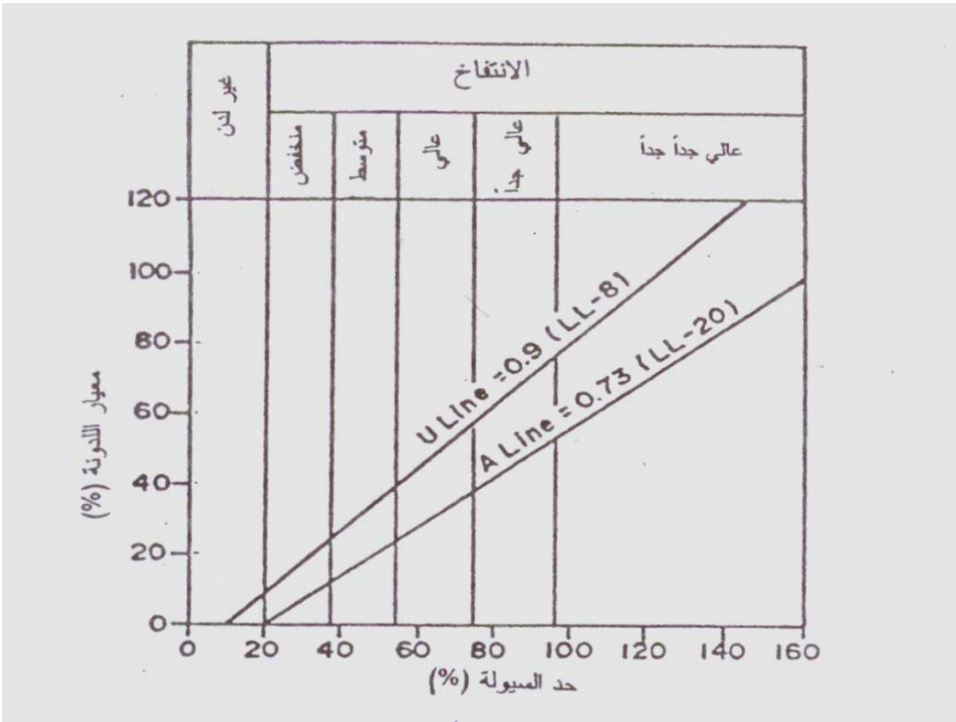
: [ ] Dakshanamanthy and Raman (1973) .  
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: [ ] Snethen (1984) .  
(soil suction)



U.S. Army ( )  
Waterways Experiment Station  
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[ ] Sowers and Sowers (1970)	( )
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Dakshanamanthy and Raman (1973) ( )

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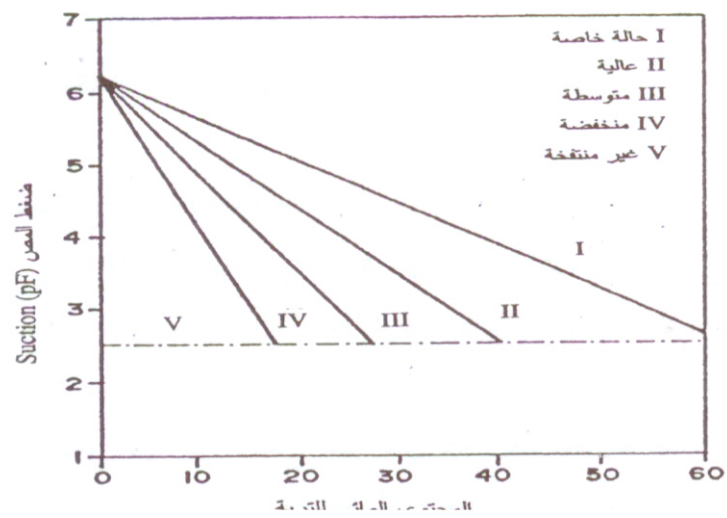
: [ ] Chen (1988) .  
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.(soil suction)

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[ ] McKeen (1992) .( )

Oedometer Test

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### Free Swell Test

7 kPa

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### Constant Volume Swell Test

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### Swell Overburden Test

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### Triaxial Test

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Stress Path Triaxial

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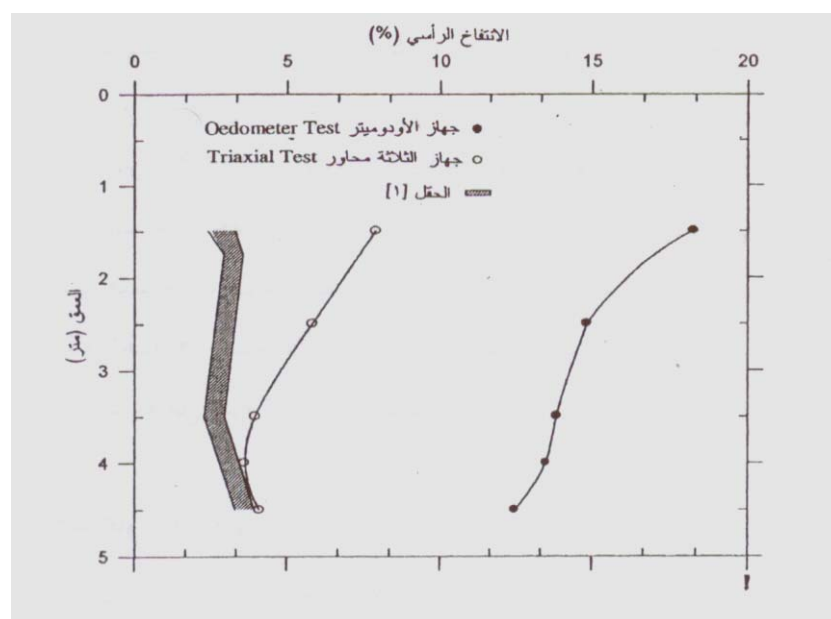
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### Suction Test

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Psychrometer



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claystones shale siltstones







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				LL %	PI	Wn %
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CL	CL	CL-ML	MH	CL	CH	(Unified)
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









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: Wn

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white clay :

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illite kaolinite :

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Green Clay	White Clay	
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,	,	(%)
		% (LL)
		% (PL)
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CH	CH	(Unified)
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-		%
		%
,	,	(G <sub>s</sub> )
CH	CH	(Unified)
,	,	(Activity)

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المسطقة الشرقية		المدنية		شوررة		الجوف		تيماء		تبوك		الغاط		الطريقرة	
القطيف		الهفوف		المنورة											
عالية جداً	عالية جداً	عالية جداً	عالية	متوسطة	متوسطة	متوسطة	عالية جداً	متوسطة	عالية جداً	عالية جداً	عالية جداً	عالية جداً	عالية جداً	عالية جداً	[٢١] Holtz
عالية جداً	عالية جداً	عالية جداً	متوسطة	منخفضة	منخفضة	منخفضة	عالية	منخفضة	عالية	عالية	عالية	عالية	عالية	عالية	Seed, Woodward, [٢٢] and Lundgren
عالية جداً	عالية جداً	عالية جداً	عالية	متوسطة	متوسطة	متوسطة	عالية جداً	متوسطة	عالية جداً	عالية جداً	عالية جداً	عالية جداً	عالية جداً	عالية جداً	[٢٣] Van Der Merwe
عالية جداً	عالية جداً	عالية جداً	متوسطة	متوسطة	متوسطة	متوسطة	عالية	متوسطة	عالية	عالية	عالية	عالية	عالية	عالية	[٢٤] Raman
عالية	عالية	عالية	متوسطة	متوسطة	متوسطة	متوسطة	عالية	منخفضة	عالية	عالية	عالية	عالية	عالية	عالية	[٢٥] Sowers and Sowers
عالية جداً	عالية	عالية*	متوسطة	منخفضة	منخفضة	منخفضة	عالية	منخفضة	عالية	عالية	عالية	عالية	عالية	عالية	Dakshanamany [٢٦] And Raman
عالية	عالية	عالية	متوسطة	منخفضة	منخفضة	منخفضة	متوسطة	منخفضة	متوسطة	متوسطة	متوسطة	عالية	عالية	عالية	[٢٧] Snethen
عالية	عالية	عالية	متوسطة	منخفضة	منخفضة	منخفضة	متوسطة	منخفضة	متوسطة	متوسطة	متوسطة	عالية	عالية	عالية	[٢٨] Chen

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Compaction  
Prewetting

Chemical Stabilization

Piles

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## Characteristics of Expansive Soil in the Kingdom of Saudi Arabia

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**Abstract.** Expansive soils encountered over a large area of the Kingdom of Saudi Arabia. They are found in Al-Ghatt, Tabuk, Tayma, Jouf, Sharorah, Madinah and Eastern regions. Expansive soil is responsible for many damages in buildings and pavements found on it. Also, some heavy damages and losses were reported in some areas of the Kingdom which cost millions of Saudi riyals. Although there has been no precise estimate, annually, in the Kingdom, expansive soils are responsible for millions of riyals worth of damage to man-made structures.

The expansive soil in Saudi Arabia may be classified into three main types: (1) sedimentary rocks include shale, claystones and siltstones which prevail in a strip adjacent to the west boundary of the Arabian Shield in the regions of Al-Ghatt, Tabuk, Tayma, Jouf and Sharorah; (2) clayey soils which are found in small areas scattered in the Arabian Shield such as Medinah region; (3) calcareous clays which are found in Hofuf and Qatif areas in the Eastern region.

This paper presents a brief description of expansive soils and their occurrence around the world, the main factors affecting swell potential. It also presents the main methods for classifying expansive soils, and also the main methods for measuring soil potential in the laboratory. The distribution of expansive soil in Saudi Arabia and the geotechnical properties, mineral composition, as well as the classification of the soil in each region are presented. The paper is concluded by mentioning several techniques of dealing with expansive soils to reduce their effects on buildings.