

العنوان:	تحسين خواص الأسفلت بإضافة مادة البوليمر
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الناشر:	جامعة الزعيم الأزهري
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رابط:	<a href="http://search.mandumah.com/Record/709574">http://search.mandumah.com/Record/709574</a>

## تحسين خواص الإسفلت - بإضافة مادة البولييمر

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EVA

SBS

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\* معتمد محلية بحري .  
\*\* قسم الهندسة المدنية - كلية الهندسة - جامعة الزعيم الازهرى .

SBS	EVA	-1
Penetration	Index	

.K. Viscosity	Softening Point
EVA	
%5	%(7-5)

-2

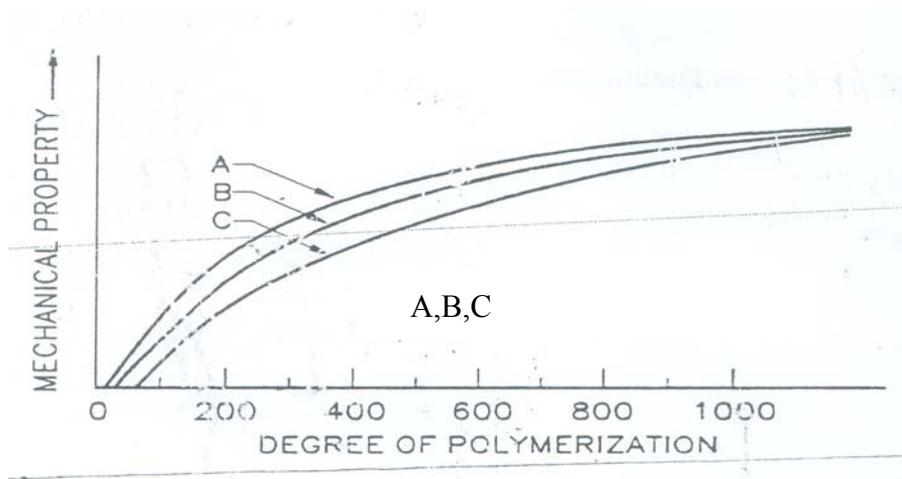
-1

)):

((



.  
 :  
 ...  
 .[5][4]  
 [3][2][1]  
 : [4]  
 .1  
 .2  
 .3  
 .4  
 .  
 .  
 .[9]  
 : (1)



: (1)

.A,B,C

: [7][5][3]

\*

\*

Thermosets

. Plastomer

Elastomers

Ring

Linear ( )

: [10][9][7]



<b>Increase flexibility</b>		<b>.1</b>
<b>Reduce Thermal cracking</b>		<b>.2</b>
<b>Improve surface Texture</b>		<b>.3</b>
<b>Reduce noise</b>		<b>.4</b>
<b>Provide improved fatigue</b>		<b>.5</b>
<b>Reduce Rutting &amp; pavelling</b>	)	<b>.6</b>
<b>Increase chipretention</b>		<b>.7</b>
<b>Reduce Deformation pavement</b>		<b>.8</b>
<b>Reduce cracks</b>		<b>.9</b>
<b>Increase abrasion resistance</b>		<b>.10</b>
<b>Reduce life cycle cost of the</b>		<b>.11</b>
<b>Replace Asphalt cement as an</b>		<b>.12</b>
<b>Improve resistant to oxidation</b>		<b>.13</b>
<b>Stiffness to reduce thickness</b>		<b>.14</b>

%7

[ 2 ]

3-4

: [8][3][2][1]

Stability

Viscosity

Stiffness modulus

Flow

)

(

[ 3 ][ 2 ]

: [3][2][1]

.1

(stiffness modulus)

.2

6

2.5

.

.3

volatile compounds

..

%98

%65

- Rheometer

-

sliding

.

platevisconat

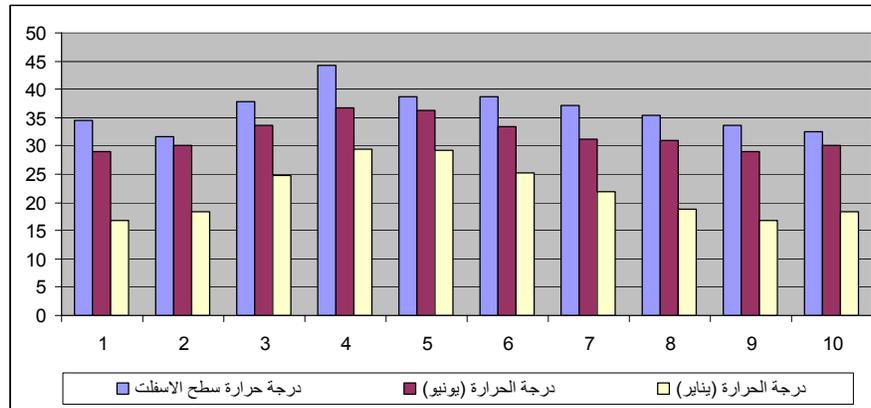
. ( ) ( )



: (1)

: (

		( )	( )	( )
1	4	34.5	29	16.8
2	7	31.6	30	18.3
3	10	37.9	33.7	24.8
4	13	44.3	36.7	29.5
5	15	38.7	36.2	29.2
6	18	38.7	33.5	25.2
7	21	37.1	31.2	21.8
8	0	35.5	31.0	18.7
9	3	33.6	29	16.8
10	6	32.6	30	18.3



: (2)

(

( 24 ) (2)

( )

%33.4 %51.3

%17 %16 ( )

Styrene Butadiene ) SBS

(Ethylene Vinyl Acetate) EVA

(Styrene

.(4)

**-4**

\_\_\_\_\_:

-3

-2

-1

-4

: **1-4**

: **1-1-4**

3 2 1

( )

..

: 2-1-4

:

SBS

EVA

: 2-4

: 1-2-4

70/60

: 2-2-4

EVA

(PLASTOMER)

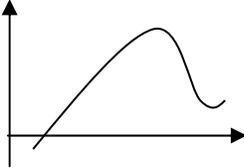
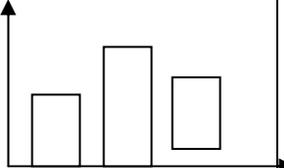
SBS

.(ELASTOMER)

:[11][10][9] EVA

SBS

1-2-2-4

EVA	SBS		
		<b>Elongation</b>	<b>1</b>
<b>Low flexibility</b> 1000Psi<	<b>High flexibility 1000 Psi</b> >	<b>Strain, Stress</b>	<b>2</b>
<b>Linear / branched</b> /	<b>Cross- linked</b>		<b>3</b>
<b>170 - 160</b>	<b>4      190-200</b>		<b>4</b>
<b>EVA Ethylene Vinyl Acetate</b> <b>PP Polypropylene</b> <b>PS Polypropylene</b> <b>LOPE , EE2</b>	<b>SBS/ Styrene Butadiene</b> <b>Styrene</b> <b>SBR/ Styrene</b> <b>Rrubber</b> <b>SBS/ tyrene Butadiene</b>		<b>5</b>

:

3-4

:

<b>Penetration Test AASHTO .T49</b>		<b>.1</b>
<b>Specific Gravity Test .AASHTO T84</b>		<b>.2</b>
<b>Softening Point Test .AASHTO T53</b>	( )	<b>.3</b>
<b>Saybolt Viscosity .AASHTO T72</b>		<b>.4</b>

. ( Conc. Asphalt Mix.)

:

4-4

:

EVA	% 7	% 3	.1
SBS	% 7	% 2.5	.2
		% 2.5	-*
		[3]	

170/160

EVA

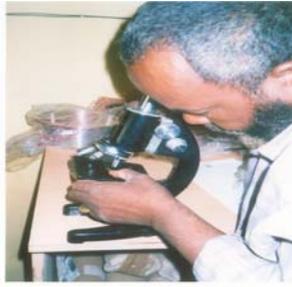
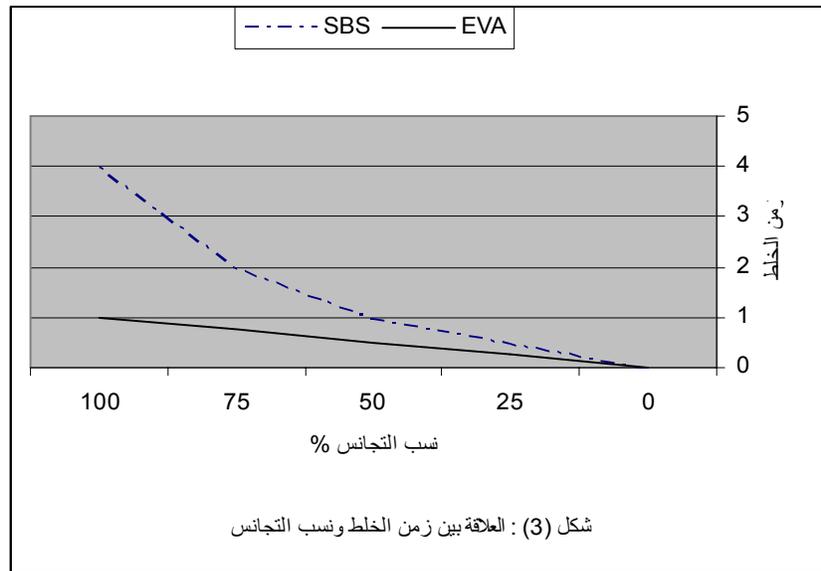
200/190

4

SBS

(2) (1)

( )



EVA



(3)

SBS

: [8][6]

-5.4

:

.1

. ( 1.5-1 )  
1.5-1 ) 25

.2

.3

.(

.4

. 5 100  
(5 -3)

:

. (A) .1  
. (B) 25 .2  
.3  
. 30 .4  
. (C) .5  
25 .6  
. 30 .7  
. (D)  
 $(C - A)/(B - A)(D - C) =$

	:	.1
30		.2
		.3
	30	.4
240		.5
		.6
(1±) 4		.7
	15	.8
		.9
	:	.1
60	20	.2
	135	.3

.4

30

.5

70/60

( )

(2)

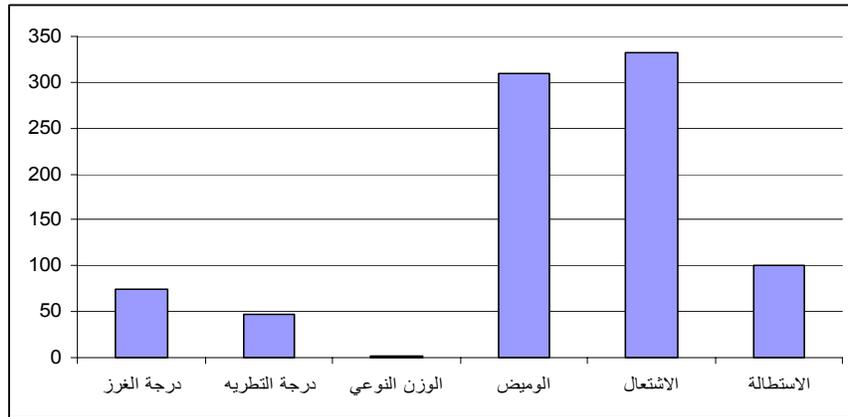
:

**-6.4**

70/60

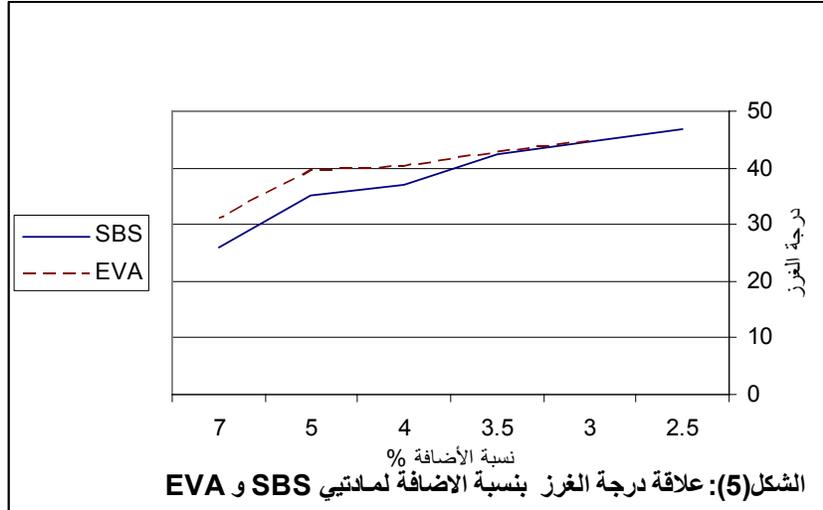
:(2)

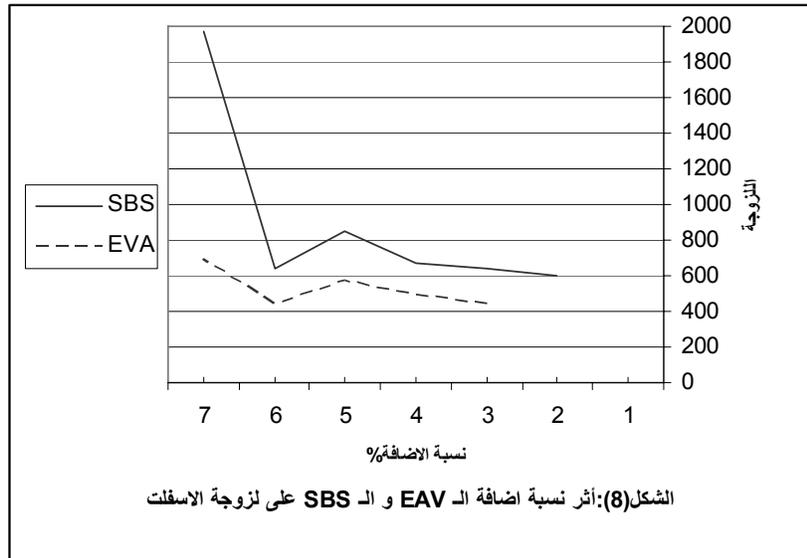
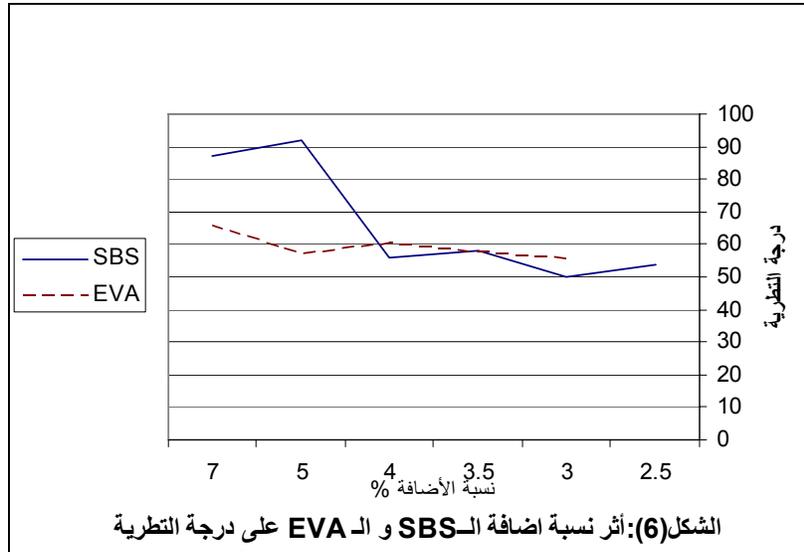
		-							
<b>C135</b>									
307.8	102	C332	C310	1.03	47C	74.4	C 170	70/60	



70/60

:(4)





: -5

(EVA,SBS)

)

SBS

. (

EVA (%7 %5 %4 %3.5 %2.5) 70/60  
 (%7 %5 %4 %3)

(5) -1

(SBS,EVA)

70/60

(2)

EVA

31.39 %3 44.9

%7

74.4

25.8

SBS

.%7

(2) (6) -2

47C SBS

66C %7 87C

. %7 EVA

SBS EVA (7) -3

[3]

			(8)	-4
696.9	SBS	%7	1973	
			. EVA	%7
			:	<u>-6</u>

EVA      SBS

:

%(7-5)		EVA	SBS	-
--------	--	-----	-----	---

% 57.9	SBS	% 65.3
--------	-----	--------

EVA  
Stability

Penetration

Index

, Softening point

, SBS

Bleeding

SBS

-

EVA

Workability Index

Optimum Bitumen Content

-

EVA

SBS

-

: -7

-

-

-

-

( 24 )

-

SBS

EVA

%5 %(7-5)

- [1] : ,
- 2002 -
- [2] : ,
- 2002 -
- [3] : ,
- , ( )
- 2002 -
- [4] : ,
- 2000 -
- [5] :
- 2001 - ,
- High way Engineering (1) ::
- . 1984
- [7] :
- 2003 ( )
- [8] :
- ( )
- . 1999

[9] Altered Ruin , the elements of science and Engineering , second Edition university of Waterloo 1998

[10] Kiparis EVA sideo , Polymenzation : Reactor Modeling : A Review of Recent Developments and Future Directions – Research Institute Aristotle University of Greece 1999.

[11] Vernon John : Introduction to Engineering Mabelvale , Atherto 1997