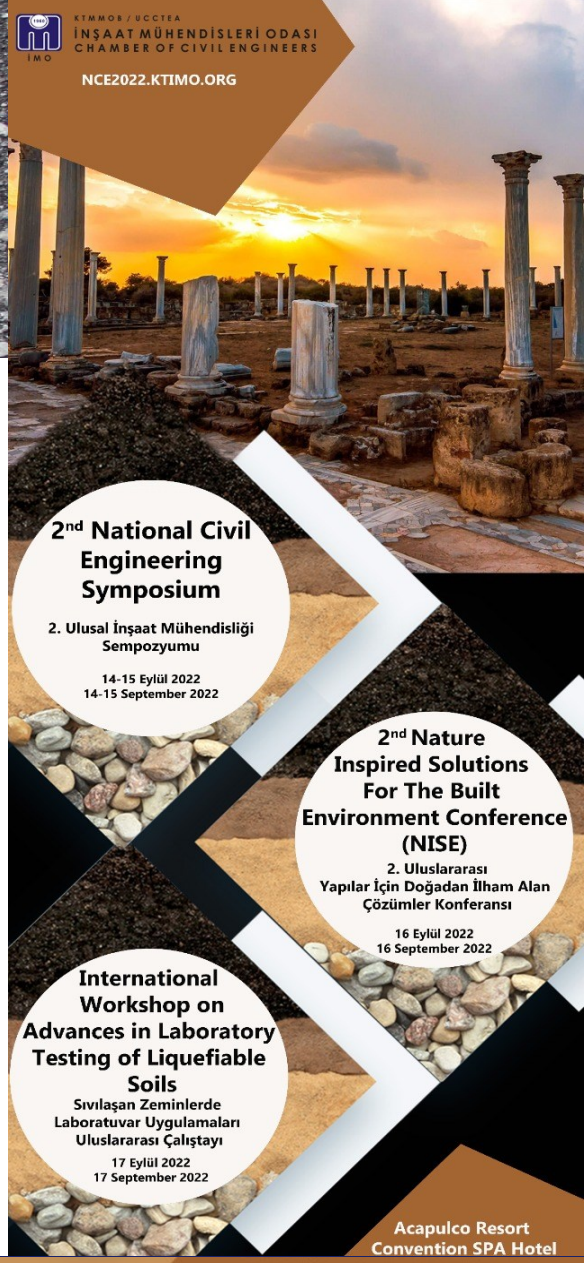
The Impact of Micro Bauxite Powder and Nano Bauxite Powder On the mechanical properties of asphalt mixture

Near East University

Hamza Abdulhamid
Ahmed Suliman

Allam Musbah Al llam
Shaban Ali Zangena



Outlines

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  - Asphalt modifiers & Problems
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Introduction

Asphalt modifiers & Problems

SBS (styrene-butadiene-styrene)

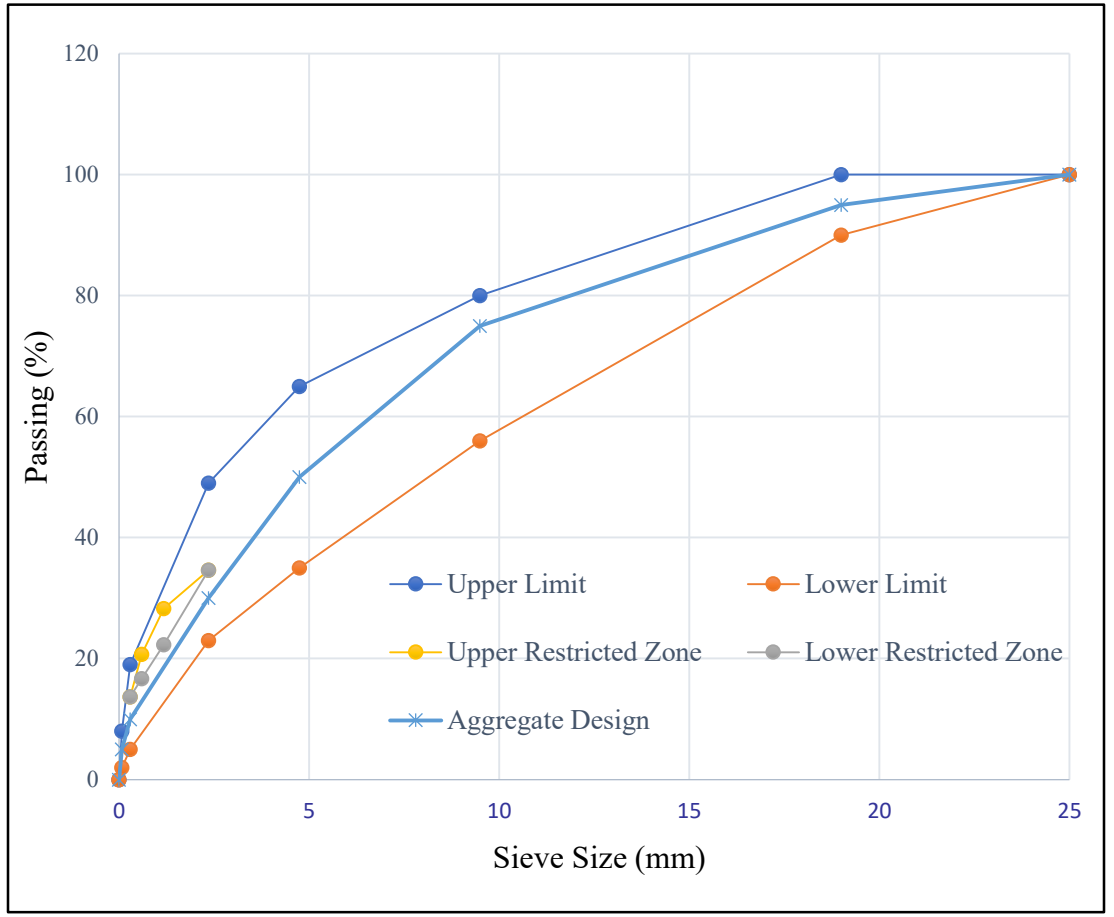
Nano Silica

ASA (Acrylonitrile Styrene Acrylate)

Nanoclay

Materials and Methods

80/100 Penetration grade



Materials and Methods

Parameter	Condition
Temperature (°C)	25 and 40
Loading pulse width (ms)	100
Pulse repetition period (ms)	1000
Applied load at 25 °C	10% of the indirect tensile strength (500 N)
Applied load at 40 °C	10% of the indirect tensile strength (300 N)

Parameter	Condition
Temperature (°C)	40
Loading pulse width (ms)	100
Applied load (KPa)	100
Termination	After 10000 με or 3600 cycles

Weather Simulation

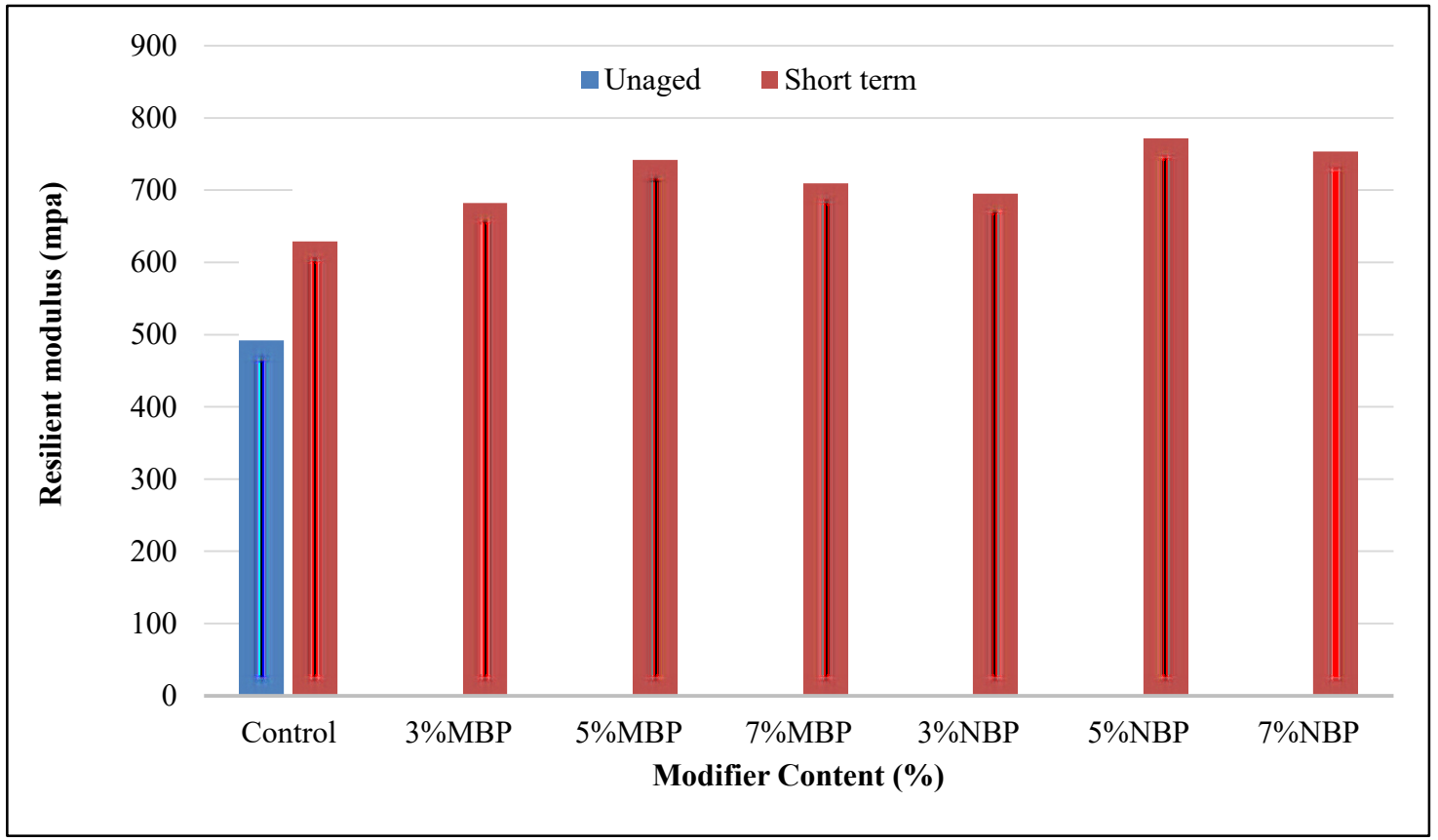
Short Term Aging

Mixing Period

Transport Period

Construction Period

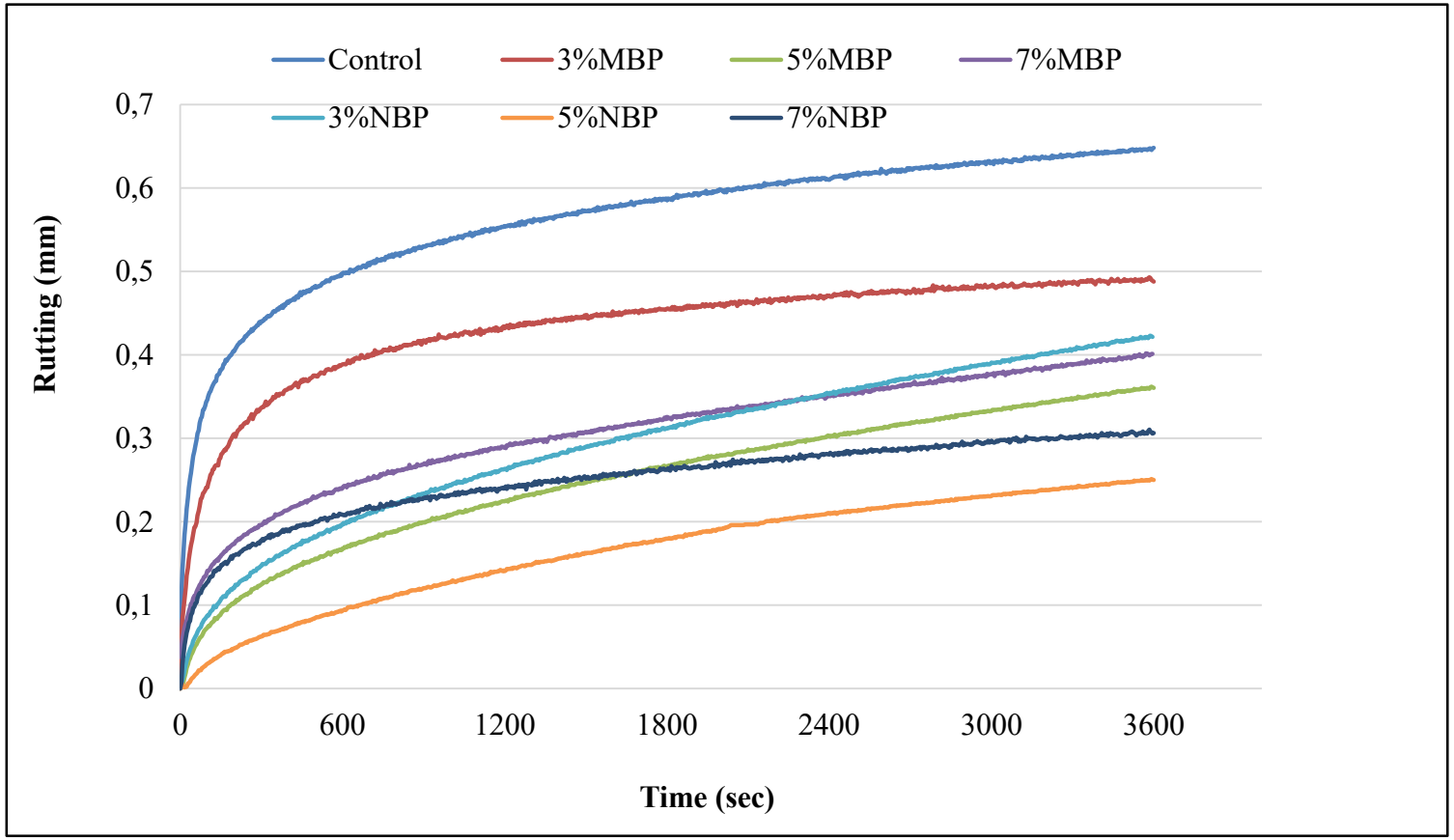
Resilient modulus



Aging index of the resilient modulus 40 ºC

Percentages (%)	Unaged	RTFO	Aging Index
			RTFO/Unaged
Control	491	629	1.28106
3% MBP	558	682	1.22222
5% MBP	618	741	1.19903
7% MBP	579	709	1.22453
3% NBP	562	695	1.23665
5% NBP	653	771	1.1807
7% NBP	631	753	1.19334

Dynamic Creep

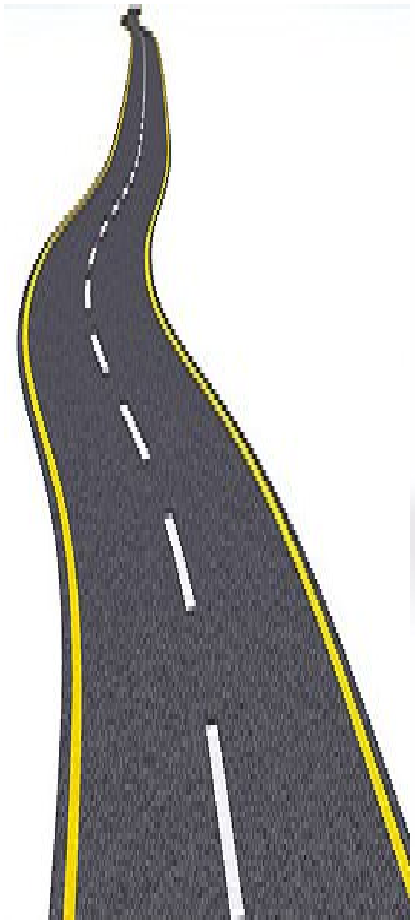


Aging index of the dynamic creep

Percentages (%)	Unaged	RTFO	Aging Index RTFO/Unaged
Control	0.65	0.46	0.71
3% MBP	0.49	0.32	0.66
5% MBP	0.36	0.22	0.61
7% MBP	0.40	0.26	0.64
3% NBP	0.42	0.29	0.68
5% NBP	0.25	0.14	0.54
7% NBP	0.31	0.18	0.58

Conclusion

- ✓ it was found that the asphalt mixtures modified with MBP and NBP consistently exhibited higher resilient modulus values than the base asphalt mixtures and 5% for both modifiers had the highest value.
- ✓ The improvement in resilient modulus at 25 °C for 5% MBP and 5% NBP is 22.10 % and 31.29 % while the enhancement for both concentration at 40 °C is 25.86% and 33% respectively
- ✓ For the dynamic creep results show that by adding 5% MBP and 5% NBP, the rutting resistance increased for 44.35% and 61.39% respectively compared to the base asphalt mixture.

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