STUDY ON PERFORMANCE AND TEST METHODS OF ASPHALT MIXTURES FOR AIRPORT PAVEMENTS
空港舗装用アスファルト混合物の性能と試験法に関する研究

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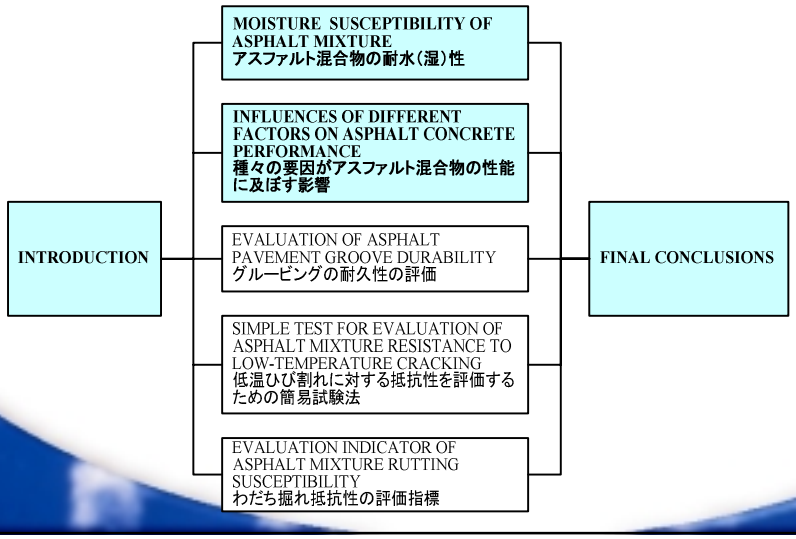
2004. 2. 24

FLOWCHART OF THE STUDY
研究のフロー



INTRODUCTION

To perform satisfactorily in pavement systems, bituminous mixtures should exhibit

(a) Ability to distribute stresses; 荷重分散

(b) Stability when resisting permanent deformation; 変形抵抗性

(c) Resistance to cracking; and ひび割れ抵抗性

(d) Resistance to freeze-thaw and moisture damage 耐候性

MOISTURE SUSCEPTIBILITY OF ASPHALT MIXTURE

アスファルト混合物の耐水(湿)性

Properties of asphalts

Item	KL	LH	MM	SJ	SL
Density (15°C), g/cm³	0.9815	1.005	1.013	0.9978	1.001
Solution, %	99.10	99.53	99.91	99.08	99.78
Wax content, %	1.28	3.85	4.08	4.19	5.55
Flash point, °C	300	280	350	320	296
Fraass breaking point, °C	-15	-19.8	-13	-14.8	-16.7
Softening point, °C	49.5	46	50	50.5	49
Penetration (25°C), 1/10 mm	89	138	81	97	96
PI	0.19	-1.43	-0.8	-1.07	-1.69
Ductility (15°C), cm	>150	>150	>100	58	22
Viscosity (60°C), pa·s	309.9	65	129.1	62.4	59.3
Acid value, ml·mol/L/g	2.510	1.256	0.273	1.789	0.564

Physical properties of aggregate
骨材の物理特性

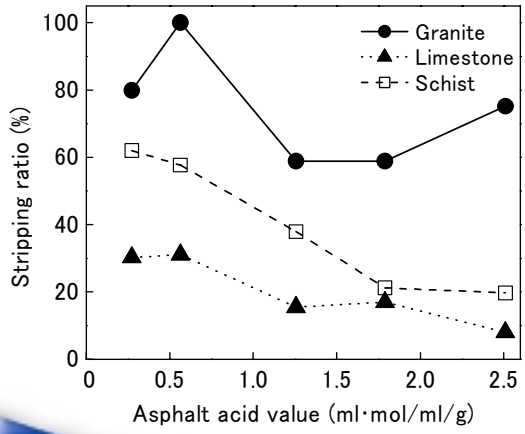
Aggregate	Specific gravity, g/cm^3	Absorption, %	SiO_2 content, %
Granite	2.751	0.43	76.5
Schist	2.834	0.49	63.1
Limestone	2.712	0.51	6.5
Filler	2.745	—	—

Test methods

- Water immersion test; 浸水試験
- Electro-optic colorimetry test; 電気光学比色定量試験
- Net adsorption test; 吸着試験
- Retained Marshall stability test; 水浸マーシャル試験
- Lottman test; 割裂試験
- Immersed wheel tracking test. 水浸WT試験

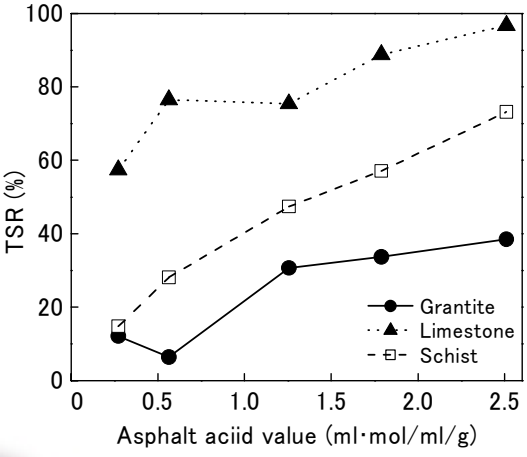
Acid value and stripping ratio in net adsorption test

アスファルト酸価と骨材剥離率



Asphalt acid value and TSR

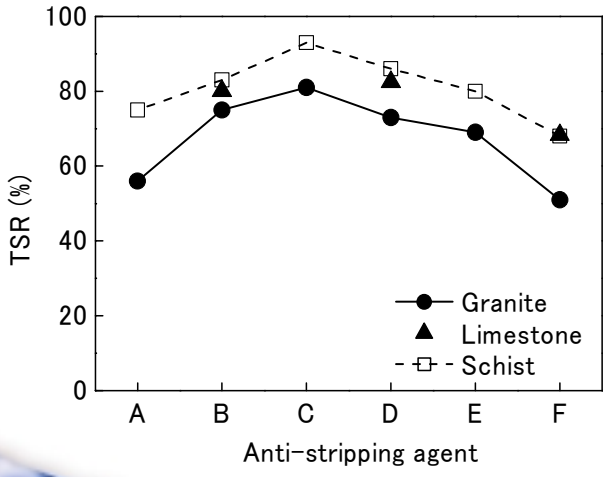
アスファルト酸価と引張強度比



Anti-stripping additives
剥離防止剤

ID	Additive	Amount
A	Portland cement	1% of aggregates
B	Hydrated lime	1% of aggregates
C	Lime slurry	1% of aggregates
D	AST-3	0.3% of asphalt
E	PA-1	0.3% of asphalt
F	No	-

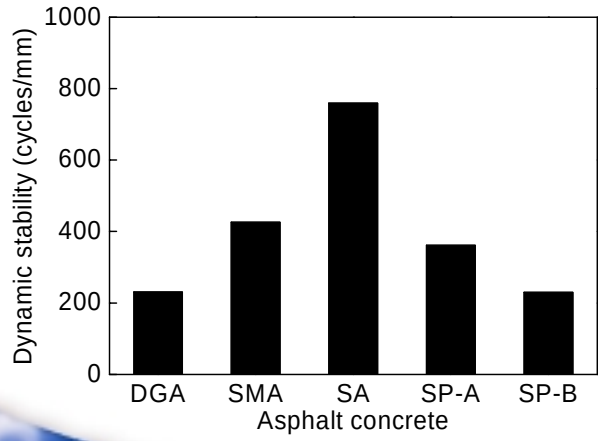
Anti-stripping additives and TSR
剥離防止剤と引張強度比



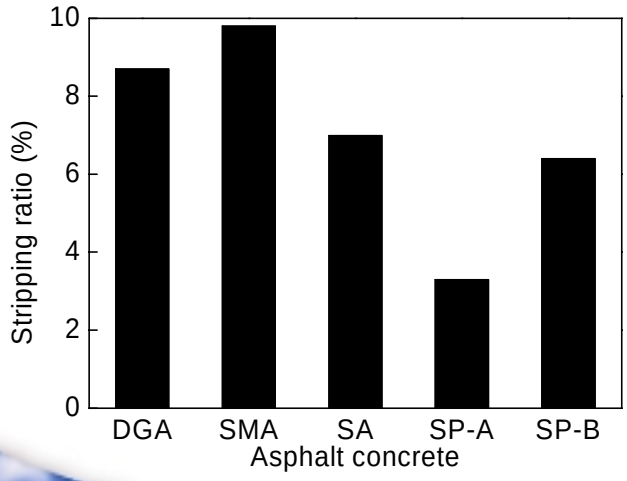
INFLUENCES OF DIFFERENT FACTORS ON ASPHALT CONCRETE PERFORMANCE
種々の要因がアスファルト混合物の性能に及ぼす影響

Sieve size (mm)	DGA	SMA	SA	SP-A	SP-B
26.5	100	100	100	100	100
19	97.5	97.5	97.5	95	95
16	-	-	86	-	-
13.2	82.5	82.5	74.5	-	-
9.5	-	-	58.5	-	-
4.75	55	35	35	-	-
2.36	42.5	27.5	26.5	33	38
1.18	-	-	20	20	30
0.6	24	-	16	15	22
0.3	15.5	16.5	13.5	11	15
0.15	11	-	11.5	-	-
0.075	6	10.5	8	4	5

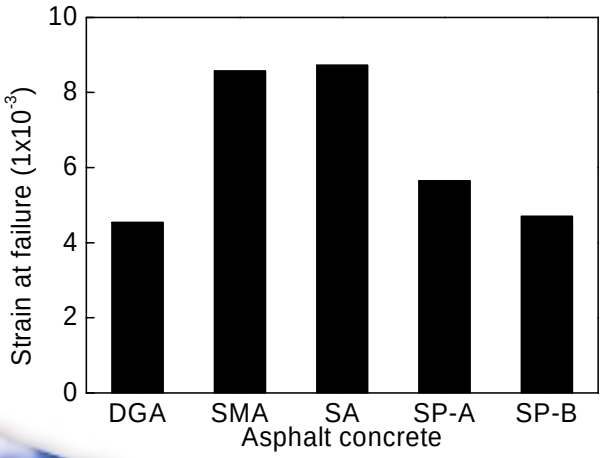
Dynamic stability in the high-pressured condition
高圧車輪荷重下での動的安定度



Stripping ratio
剥離率



Failure strain at low Temperature
低温時における破断ひずみ



FINAL CONCLUSIONS

- **1. Asphalt acid value can be used to evaluate the moisture susceptibility of asphalt mixture.**
  アスファルト酸価と耐水（湿）性
- **2. The treat of asphalt mixture with hydrated lime slurry is a more effective method for decreasing moisture susceptibility.** **消石灰スラリーにより耐水性向上**
- **3. The modified asphalt can significantly increase the stability and durability of asphalt mixture.**
  改質アスファルトにより安定性向上
- **4. The gradation of aggregates highly influences the resistance of asphalt concrete to rutting at a high temperature and cracking at a low temperature.**
  骨材粒度とわだち掘れ・ひび割れ