

Chemilink SS-141 Semi-Rigid Pavement for Airport Aprons & Heavy Traffic Roads



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1. Introduction

❑ Road pavement:

- Flexible pavement (**asphalt concrete pavement**)
- Rigid pavement (**cement concrete pavement**)
- Semi-rigid pavement (**asphalt concrete filled with cement mortar**)

Properties	Asphalt Concrete	Cement Concrete	Semi-Rigid Pavement
Rutting Resistance		√	√
Quick installation and short curing time	√		√
Easy to maintain and repair	√		√
High Skid Resistance	√		√
No joints required	√		√
Resistance to oil, chemicals and petrol, etc.		√	√
Resistance to moisture damage		√	√

1. Introduction

❑ Composition of semi rigid pavement:

open graded asphalt concrete (void content: 25-30% by volume) +
high strength high fluidity polymer modified mortar to resist rut and permanent deformation .

❑ Thickness of semi rigid pavement:

As for road, bus bay, etc., thickness of **50mm** is enough, but for **airport runway entry taxiway/taxiway junction**, because of heavy loading and high frequency of traffic, thickness of more than 50mm is needed.

2. Polymer Modified Mortar

2.1 The Requirements For Polymer Modified Mortar:

- ☐ **Good fluidity (Workability)**
- ☐ **High strength (compressive and flexural strength)**
- ☐ **Combination of the above two**

2. Polymer Modified Mortar

2.2 Chemilink Polymer Modified Mortar SS-141

□ Chemilink high performance polymer modified mortar

- **High fluidity** ➔ **Easy application**
- **High early strength** ➔ **Early opening to traffic**
- **High long-term strength** ➔ **Low maintenance**

Testing data is shown as table below:

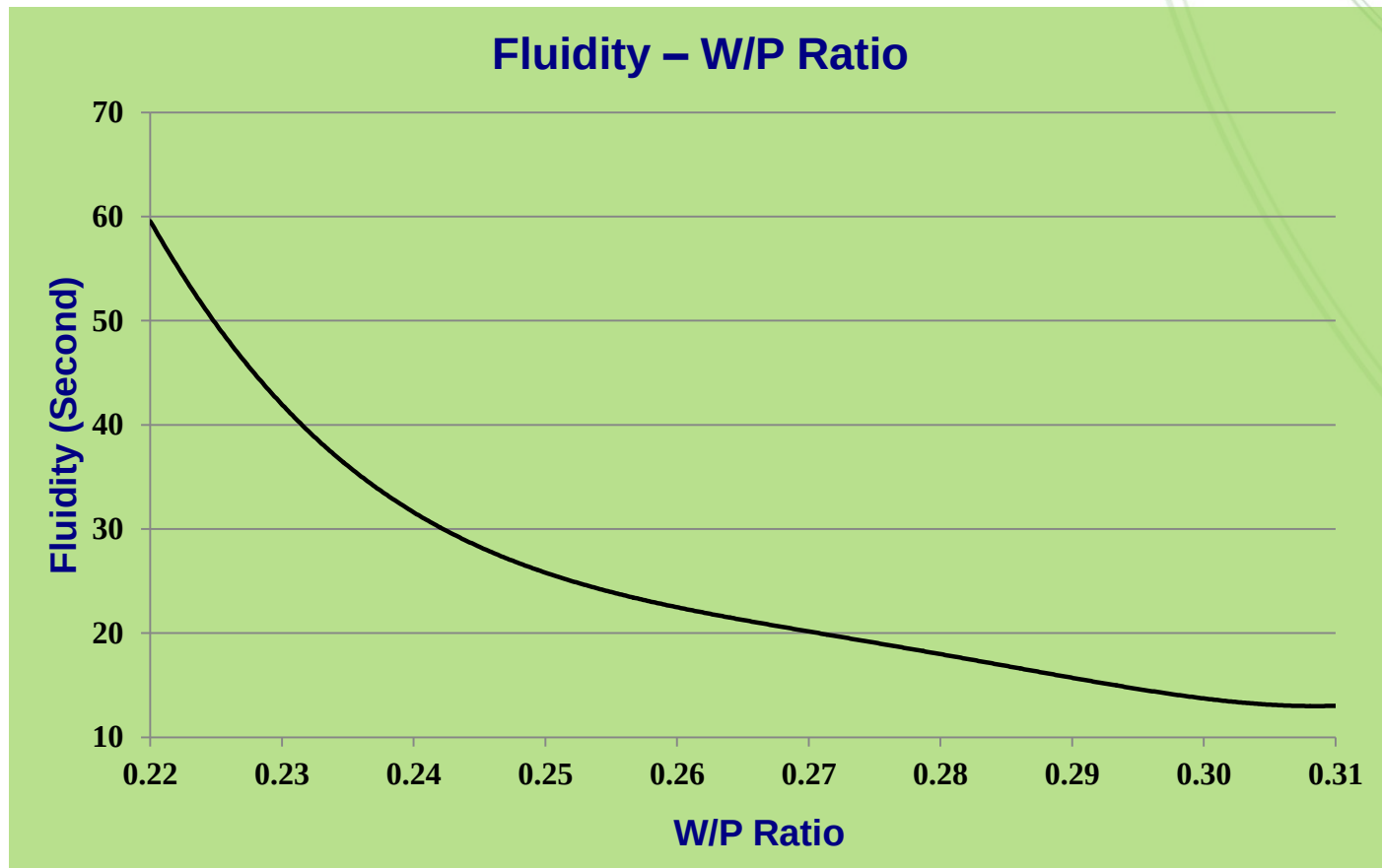
2. Polymer Modified Mortar

2.2 Chemilink Polymer Modified Mortar SS-141

Properties		Test Method	Chemilink SS-141	Spec (1) (from website)	Spec (2) (in tender document)	Spec (3) (in tender document)
Fluidity (Workability)		ASTM C939	13~27 Seconds	-	10-14 Seconds	10-14 Seconds
		JASS15-M103	27~31 cm	-	-	-
Compressive Strength	12 hrs	BS EN 12390	20~30 MPa	-	-	-
	1 day		55~85 MPa	55 MPa	-	-
	7 days		100~120 MPa	-	-	40MPa
	28 days		120~140 MPa	110 MPa	40~50 MPa	-
Flexural Strength at 28 days curing		BS EN 12190	7 ~ 15 MPa	15 MPa	6~8 MPa	6 MPa
Setting Time		EN 196 - 3	2~3h, 3~6h, 6~8h	8~12 hours	2~3 hours	2~3 hours

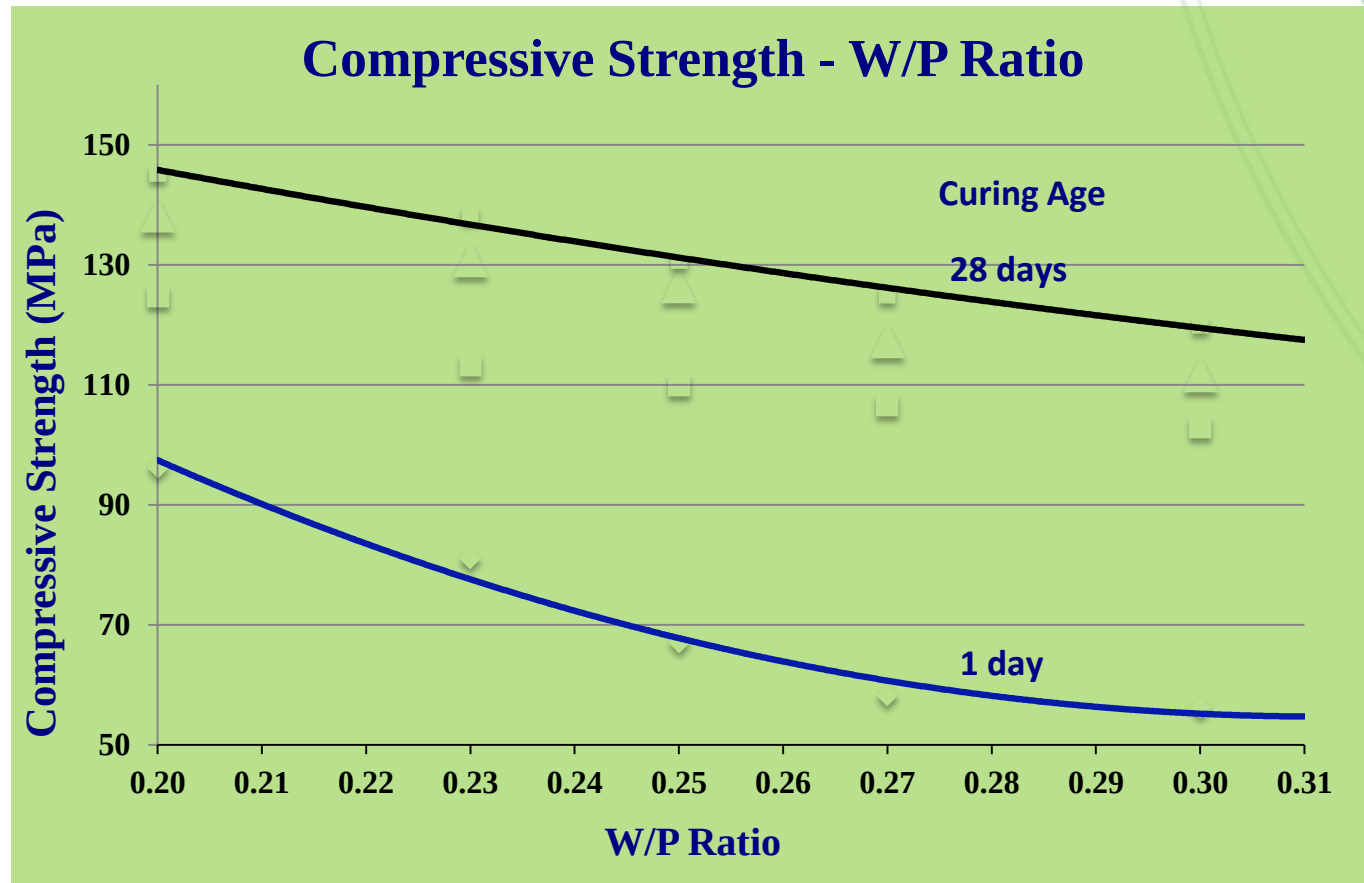
2. Polymer Modified Mortar

2.3 W/P Ratio Selection of Chemilink Polymer Modified Mortar SS-141



2. Polymer Modified Mortar

2.3 W/P Ratio Selection of Chemilink Polymer Modified Mortar SS-141



3. Semi-Rigid Pavement

3.1 Construction Procedures of Semi-Rigid Pavement



Milling



Spraying Primer



Laying Porous
Asphalt Concrete



Compacting Porous
Asphalt Concrete



Finished Surface of
Porous Asphalt Concrete

3. Semi-Rigid Pavement

3.1 Construction Procedures of Semi-Rigid Pavement



Loading Polymer Modified Mortar Into Mixer



Mixing Polymer Modified Mortar With Water

3. Semi-Rigid Pavement

3.1 Construction Procedures of Semi-Rigid Pavement



Filling Cement Mortar into Porous Asphalt Concrete



Spreading Cement Mortar



Vibrating



Surface Just After Filling



Hardened Surface

3. Semi-Rigid Pavement

3.2 Sample Coring



3. Semi-Rigid Pavement

3.3 Sample Cored For Testing



3. Semi-Rigid Pavement

3.4 Skid Resistance Testing



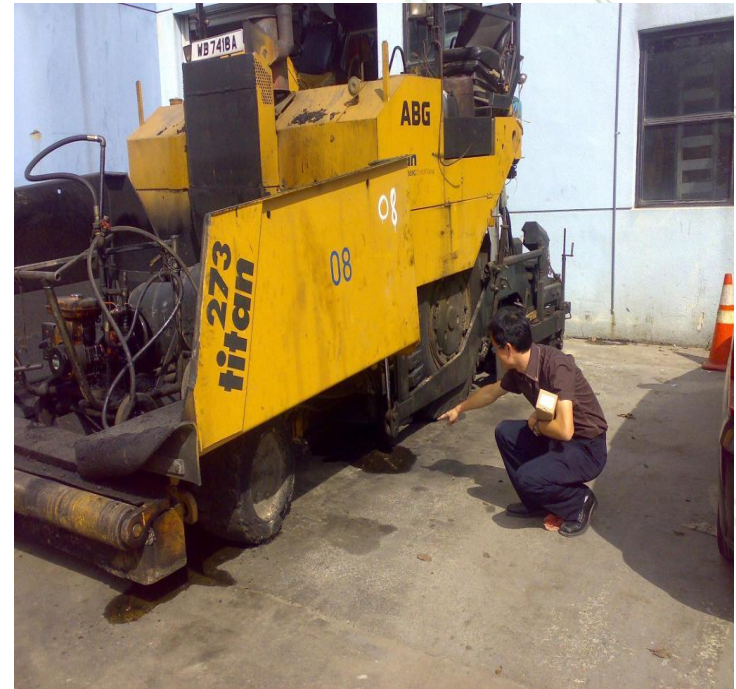
3. Semi-Rigid Pavement

3.5 Test Result of Semi-Rigid Pavement (Chemilink SS-141 as Grouting Material)

Properties	Test Method	Semi-Rigid Pavement (Chemilink SS-141)	Spec (1) (from website)	Spec (2) (in tender document)	Spec (3) (in tender document)
Compressive strength at 12 hrs	EN 12190	3 ~ 5 MPa	-	-	-
Compressive strength at 1 day		6 ~ 8 MPa	-	-	-
Compressive strength at 8 days		9~12.5 MPa	-	-	≥7 MPa
Compressive strength at 28 days		10 ~ 14.5 MPa	7~10 MPa	7~10 MPa	-
Flexural strength at 28 days	EN 12190	6~7 MPa	3.5 MPa	3.5 MPa	≥3 MPa
Modulus	ASTM D4123	≥ 6,500 MPa (25°C)	-	-	≥6500 MPa
Skid Resistance	ASTM E303	60 ~ 90 BPN	-	-	≥60 BPN
Impermeability	DIN 18130	impermeable	-	-	-
Curing time (after final setting)	-	4 ~ 8 hours	-	4~8 hours	4~8 hours

4. Completed Projects (Examples)

4.1 Heavy Loading Yard at Sungei Kadut Street 4 (2005)



4. Completed Projects (Examples)

4.2-a Singapore Changi International Airport Apron 1 (2007)



4. Completed Projects (Examples)

4.2-b Singapore Changi International Airport Apron 2 (2007)



4. Completed Projects (Examples)

4.3 Heavy Loading Yard at Sungei Kadut Street 1 (2010)



4. Completed Projects (Examples)

4.4 Heavy Loading Yard at Abingdon Road (2010)



4. Completed Projects (Examples)

4.5 Road Junction at Sungei Kadut Drive 1 (2010)



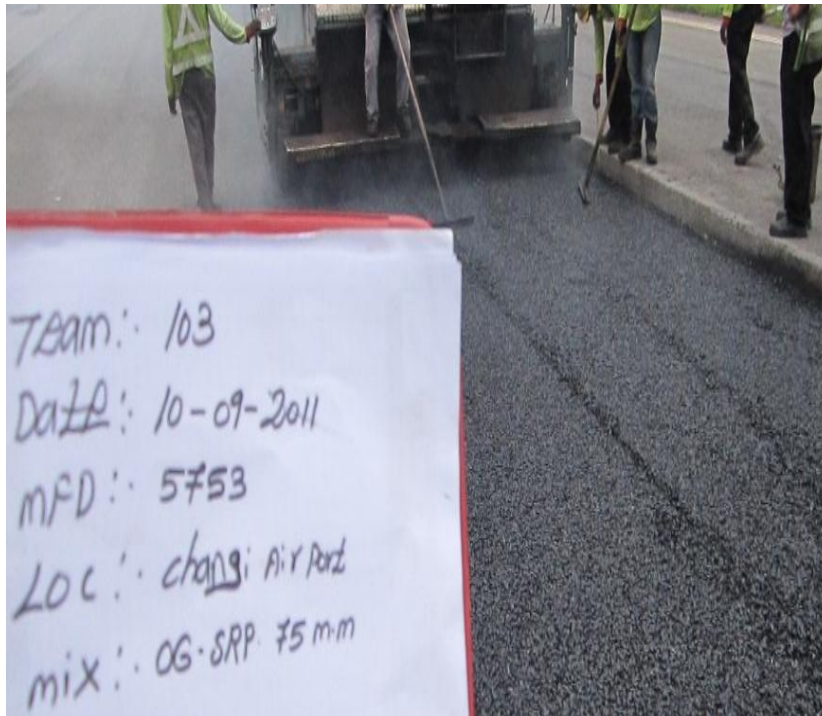
4. Completed Projects (Examples)

4.6 Road Junction at South Buona Vista Road (2011)



4. Completed Projects (Examples)

4.7 Junction of Taxiways (150mm thick of Semi Rigid Pavement in 2 layers as Base Course) in Singapore Changi International Airport (2011)



Laying Porous Asphalt Concrete, 75mm / layer



Filling Chemilink SS-141

4. Completed Projects (Examples)

4.7 Junction of Taxiways (150mm thick of Semi Rigid Pavement in 2 layers as Base Course) in Singapore Changi International Airport (2011)



Project Completion

5. Conclusions

1) Chemilink Polymer Modified Mortar SS-141

- Compressive Strength: $\geq 55\text{MPa}$ (1-d), $\geq 110\text{MPa}$ (28-d)
- Flexural Strength: 7~15MPa(28-d)

Meets all Singapore specs

2) Semi Rigid Pavement (Chemilink SS-141 as grouting)

- Compressive strength(28-d) , 10~14.5 MPa,
- Flexural strength(28-d), 6~8 MPa .

Much higher than all Singapore specs

3) Chemilink Can Adjust the formula of Polymer Modified Mortar SS-141 To Meet Different Requirements, and Chemilink Is The Only Manufacturer Of This Product In South East Asia.



Thank You for Your Attention!

