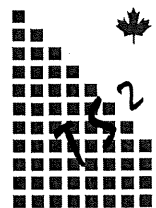


**CROWN CAPITAL ENTERPRISE
LIMITED**

WANCHAI, HONG KONG

**Demonstration of RJSeal™
HangJinQu Expressway, Quzhou, ZheJiang,
Peoples Republic of China**

September 2005



**TS² Consulting Inc.
Lamma, Hong Kong**

TS² CONSULTING INC. <

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October 2, 2005

Crown Capital Enterprise Limited
B5, Centre Point Building
181 – 185 Gloucester Road,
Wanchai, Hong Kong.
Attn: Charence Chiang
General Manager

Dear Charence

Re: Demonstration of RJSealTM on the HangJinQu Expressway, Zhejiang.

This is the final report on the demonstration of RJSealTM on the HangJinQu Expressway, southwest of the city of Quzhou, Zhejiang Province. This demonstration was undertaken on September 15 and 16 and encompassed a 1.1 kilometre long section, on the two northbound lanes of this four lane, divided expressway. The principal interest of HangJinQu Expressway Company was restoration of the asphalt pavement's ductility plus sealing of transverse and longitudinal cracks to minimize water penetration. Initial indications are that these requirements have been readily met.

Yours Sincerely

Anthony G. Speed, P.Eng. (Ontario and New Brunswick, Canada)

CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal™ HangJinQu Expressway, Quzhou, ZheJiang, Peoples Republic of China

September 2005

TABLE OF CONTENTS

Section	Description	Page
1.0	Introduction	1
2.0	Co-operative Program	3
3.0	RJSeal™	4
3.1	Prior Experience	4
4.0	Test Program	5
4.1	RJSeal™ Testing	12
4.2	Hydroplaning potential	12
4.3	Water Penetration	14
4.4	Macrotexture (Depth of Texture)	14
4.5	Ductility/Penetration/Viscosity Testing	16
5.0	Project Completion Schedule	18
6.0	Statement of Qualifications	20

FIGURES

No.	Description	Page
1.0	General Location Map	3
4.0	Specific Location Map	7
4.1	Test Strip At Demonstration Site	8
4.2	Typical Application Procedure	10
4.3	Finished Surface	11
4.4	Slag Application	12
4.5	Outflow Meter	13
4.6	Water Penetration Meter	15
4.7	Sand Patch Testing	16
5.0	Project Completion Schedule	19

TABLES

No.	Description	Page
4.1	Location of Test Strip: K288+400 - K289+500	5
4.2	Details of RJSeal™ Demonstration on HangJinQu Expressway, Quzhou, ZheJiang	8
4.3	Outflow Meter Testing	12
4.4	Water Penetration Meter Testing	14
4.5	Sand Patch Testing	14

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**Demonstration of RJSeal™
HangJinQu Expressway, Quzhou, ZheJiang,
Peoples Republic of China**

September 2005

APPENDICES

No.	Description
A	RJSeal™ – Descriptive Literature
B	Desco D200 Sprayer Technical Specifications
C	HangJinQu Expressway Company - Testing Report – September 2004



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CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal™ HangJinQu Expressway, Quzhou, Zhejiang Peoples Republic of China

September 2005

1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into an arrangement with the Zhejiang HangJinQu Expressway Co. Ltd, China in September 2005. This arrangement calls for the analysis of the performance of RJSeal™, a sealer/rejuvenator for asphalt pavement on highways within the Zhejiang HangJinQu Expressway Company administrative district.

Zhejiang Province is situated immediately south of the municipality of Shanghai, which straddles the Yangtze (Chiang Jiang) River at it's mouth tht enters the Yellow Sea. Zhejiang has a lengthy history related to the sea, with fishing villages and ports along the coastline that have supported trade with foreign countries since recorded time. Zhejiang province is bordered by Anhui, JiangXi and Fujian Provinces as well as Shanghai Municipality. The province is generally quite mountainous and the principal city is Hangzhou, which has a population of approximately 3 million and is also the capital city. Zhejiang has seen a major growth in the highway system, in recent years, due to a government drive to build national highways linking Shanghai with major cities in the adjoining provinces and the massive increase in the world export trade. Quzhou, lies some 300 kms south west of Hangzhou and some 500 kilometres south west of Shanghai. See figure 1.0 for a map showing the location of Quzhou and Zhejiang Province. The majority of the area lies at 60 to 70 metres in elevation. The regions' latitude (30 degrees north), mean that there are four seasons, with temperatures ranging from 45 Celsius in the long, hot summer to minus 2 Celsius in the short winter. There is a rainy season per-se, that occurs primarily in May thru August, but can extend into September and throughout the winter there are numerous showers and thunderstorms

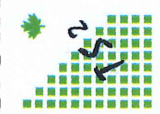
In the immediate Quzhou area, a significant consolidated sedimentary sequence predominates. Due to mountain building a significant number of hills and small mountains prevail, that have been gradually eroded and . afford excellent opportunities to see the bedrock. The asphalt in the area is manufactured from local materials, which is comprised of crushed and screened sandstone hauled in from local quarries, as well as washed gravels from the various rivers. The bitumen binder for the asphalt is sourced from various locations. Since Zhejiang Province borders the Yellow Sea, the possibility of bitumen being sourced from offshore is a distinct possibility so refineries in Singapore and the like should not be forgotten.



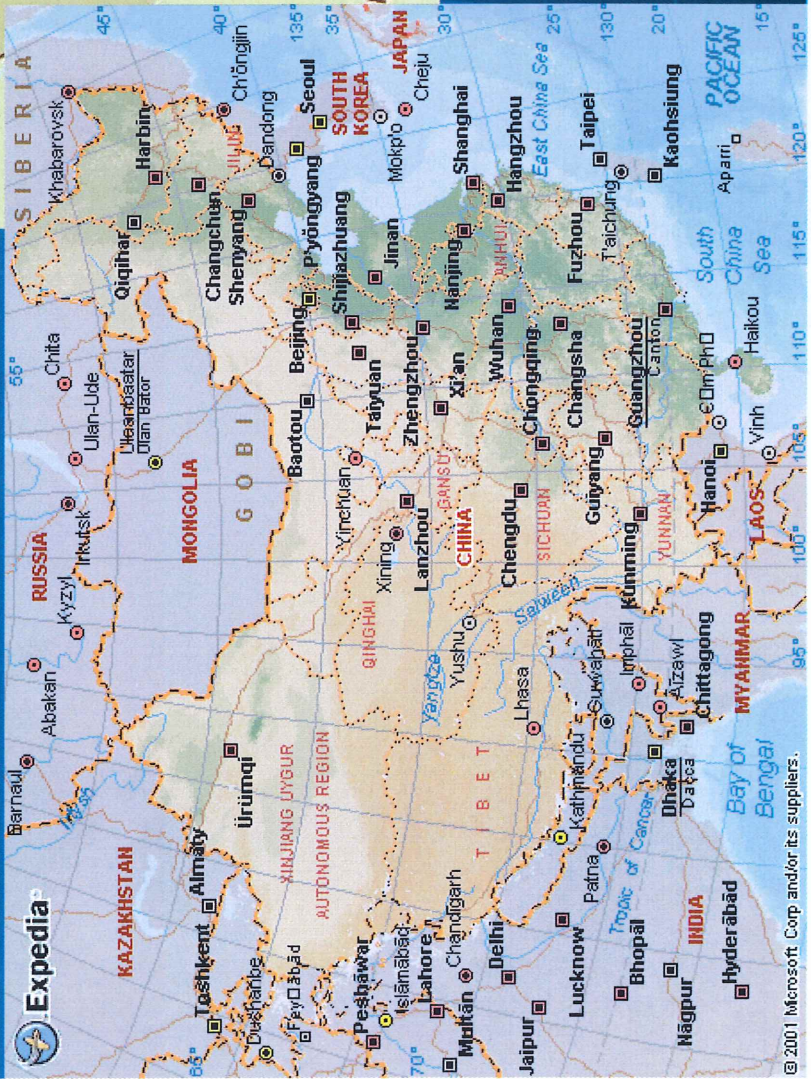
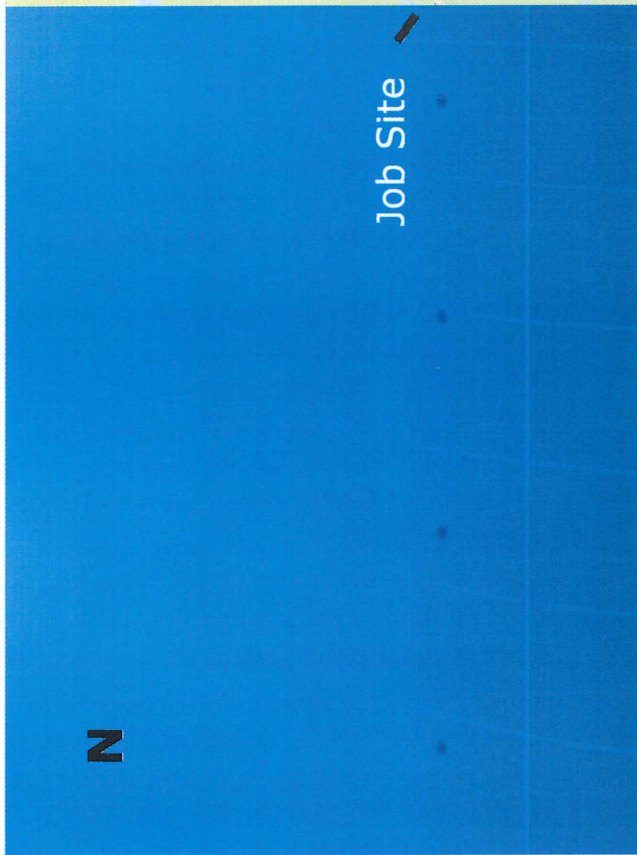
Crown Capital Enterprise Limited



HangJinQu Expressway



General Location Map
Figure 1.0



2.0 CO-OPERATIVE PROGRAM

The intent of the arrangement with Zhejiang HangJinQu Expressway Co. Ltd is to demonstrate RJSeal™ at different locations selected by the Zhejiang HangJinQu Expressway. The demonstration will subsequently allow analysis of the performance of RJSeal™ on a variety of asphalt surfaces. A demonstration was undertaken at two different locations on the HangJinQu Expressway, near the city of Quzhou, on September 9, 2005. The portion of the Expressway that were treated was of mid-2000 vintage. No details are known about the sub-grade. Knowing construction techniques in highways in China in general, minimal gravel would be used for an immediate coarse base, beneath the asphalt pavement. The exposed pebbles on the surface of the asphalt were quite smooth with some lateral and longitudinal cracks and concern had been expressed about water percolating through the asphalt pavement and softening the sub-grade.

3.0 RJSEAL™

RJSeal™ is a proprietary product that is supplied by Crown Capital Enterprise Limited of Wanchai, Hong Kong. RJSeal™ has been proven in numerous applications in North and South America and recently in China to rejuvenate asphalt pavement at various stages of its life and economically extend the life of the pavement. RJSeal™ is a three component, asphalt sealer rejuvenator that is comprised of Coal Tar, Coal Tar Oils and Petroleum Solvents.

3.1 PRIOR EXPERIENCE

Refer to Appendix A for a copy of the brochure that outlines the experience with RJSeal™ at various locations in North America and South America as well as China. Further information is available from Crown Capital Enterprise Limited. RJSeal™ has been used at numerous airports in North and South America, as well as highways in Alberta, Canada; Cearo State, Brazil and other locations in the U.S.A. Since 2000, RJSeal™ has been demonstrated successfully at over fifty (50) locations in China and fifty eight (58) commercial-scale applications have taken place at various locations, including Beijing, Shanghai, Shenzhen, Kunming, Harbin, QinHuangDao, Plus Hangzhou, KeQiao and the Shangsang Highway in Zhejiang Province.

4.0 TEST PROGRAM

Since Zhejiang Province is located in a semi-tropical climate (Latitude: 30 degrees North) at a low altitude (50 to 70 metres), it's a demanding setting for asphalt, given the year round warm climate (extremes of 45 Celsius in summer and minus 2 Celsius in the winter) and intense exposure to ultraviolet radiation, all which contribute to the oxidation and breakdown of the asphalt binder.

Zhejiang has the significant concentration of highways in China with some 4,000 kms of National and Provincial highway. Zhejiang HangJinQu Expressway is responsible for 200 kilometres of National Highway, within it's jurisdiction (distances as of year-end 2000).

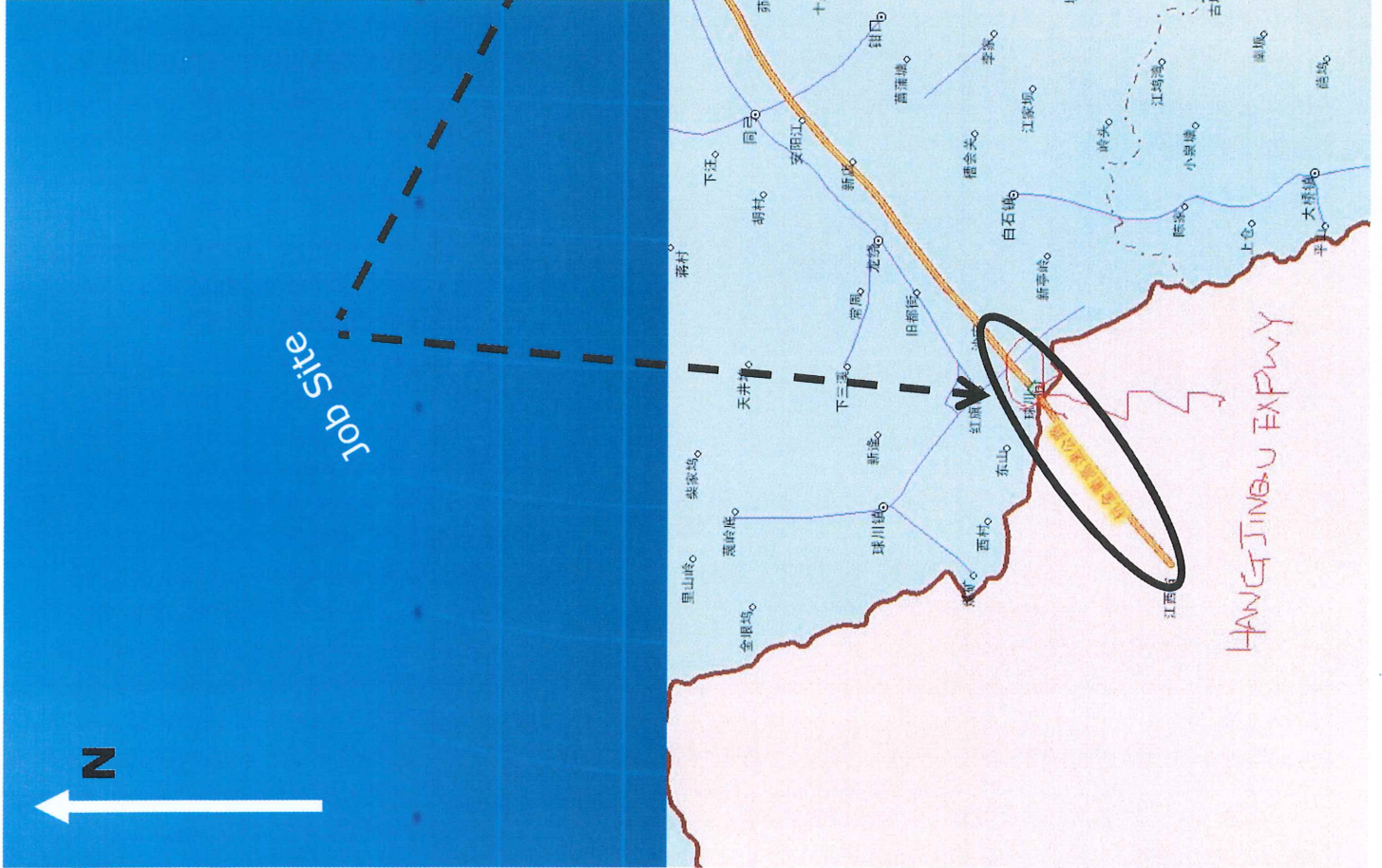
In view of this network of roads and the relatively short life of the asphalt surface Zhejiang HangJinQu Expressway is definitely interested in determining how to economically extend the life of the asphalt road surface. To this end, Zhejiang HangJinQu Expressway has agreed to try RJSeal™ on the HangJinQu Expressway, near Quzhou. See Figure 4.0, showing the location of this highway with respect to Quzhou and Zhejiang

On September 15 and 16, a test strip extending from kilometre marker 288+400 to kilometre marker 289+500 in the two, inside Hangzhou bound lanes of the HangJinQu Expressway (four lane, divided highway with paved shoulders) was treated with RJSeal™. This test strip was at the following geographic location:

Table 4.1		Location of Test Strip on HangJinQu Expressway	
Kilometre Marker	Location	Northing (Lat/Long & UTM)	Easting (Lat/Long & UTM)
K289+500	South End	28° 49.107'	118° 21.004'
		3188631	0631733
K288+400	North End	28° 21.391	118° 21.391'
		3189546	0632351

See figure 4.0, which follows, for a location of the general locale.

See Figure No 4.1 for a photo showing the test strip as implemented. Inspection of the test strip, showed that the application rate of 4 m²/kilogram was appropriate for the asphalt pavement at this location.



Crown Capital Enterprise Limited

HangJinQu Expressway

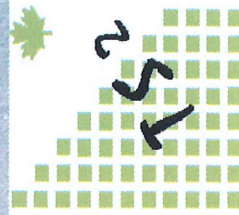
Specific Location Map

Figure 4.0





Figure 4.1 Test Strip on HangJinQu Expressway.



Work commenced on the demonstration section at 8:20 am on September 15, on a sunny day, where the mid-day temperature reached 32 Celsius. The road section selected for the demonstration climbs gradually as one proceeds from Quzhou to Hangzhou and has a slight camber to the road, which causes water to run-off toward the shoulder, rather than puddle on the road. No significant oil spills were observed, just the occasional drop of transmission oil, crankcase oil or hydraulic fluid. The asphalt pavement surface was not appreciably worn with no rutting due to traffic wear. There was some aging and oxidation of the bitumen, which extended to a depth of several millimetres. The entire portion of the treated highway had an asphalt underlay that was purportedly 15 centimetres thick and underlain by a gravel base, which was on a compacted silty-clay, sub-grade. The asphalt pavement on the section treated was reputedly 5 years old. RJSeal™ was applied using a Desco D200 Sprayer and technical specifications for this unit are contained in Appendix B. This demonstration section dried in approximately 3 hours.

Details of the application are summarized in the table that follows:

Table 4.2		Details of RJSeal™ Demonstration on HangJinQu Expressway								
Date	Work Time (hrs)	Total Area m ²	Total Area yd ²	RJSeal Applied			Application Rate			
				US gals	litres	Kilo grams	USGal /yd ²	Litres /m ²	m ² /Litre	m ² /Kg
15-Sept-05	2.00	4,289	5,127	286	1,079	1,144	0.056	0.25	3.97	3.75
16-Sept-05	3.50	3,960	4,752	263	996	1,056	0.560	0.25	3.98	3.75
Total	5.50	8,249	9,879	549	2,075	2,200	0.056	0.25	3.98	3.75

Photos showing the test application of RJSeal™ follow in figures 4.2 and 4.3 on the following pages. A trial section some 20 metres long at kilometre 91 had copper slag applied to demonstrate an improvement in skid resistance once this material is applied and becomes embedded in the asphalt surface, see figure 4.4 showing the asphalt pavement after treatment with the slag.

The site was visited on March 13, 2004 around 10:00 am and a difference was readily perceived between the RJSeal™ treated sections and the untreated lane, just north of the test section. A knife was used to dig two small holes in the asphalt pavement, to a depth of 3 centimetres, some 200 metres south of the bridge that crosses the Men Xi River at the north end of the demonstration section (adjacent to kilometer marker 90+400) to determine the penetration of the RJSeal™. This was five (5) months after the application of RJSeal™ and at this location, the newly rejuvenated surface was evident, by the black resilient surface layer, which was now approximately 5 millimetres thick. Since it was a very cold day (5 Celsius) a deeper hole could not be dug in the asphalt pavement.



Figure 4.2 Typical Application Procedure.

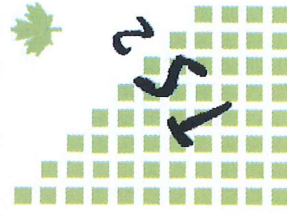


Figure 4.3 Finished Surface - Northbound Lane -
Km 288.4 to Km 289.5

152



Figure 4.4 Slag Application



4.1 RJSeal™ Testing

To date the comparison of the asphalt treated with RJSeal™ has been compared on a subjective basis over a very short period on Highway near ChangChun. Testing equipment was brought to the site for comparison on a more disciplined, objective basis included the following tests.

- Hydroplaning Potential
- Water Penetration
- Macrotexture (Depth of Texture)

At a later date, cores will be acquired from the asphalt pavement for laboratory testing and the following properties of the asphalt pavement will be determined:

- Viscosity
- Ductility
- Penetration
- Softening Point

4.2 Water Penetration

An “Outflow Meter” manufactured in the U.S.A. by Humble Equipment Company of Ruston, Louisiana and sold under the trademark “Outflow Meter” was used to measure the asphalt pavement’s macrotexture, to ascertain the hydroplaning potential on the RJSeal™ treated surface, versus the untreated surface. The procedure is documented in the ASTM working paper, WK-364. The Outflow Meter gives readings in seconds for the dissipation of a known quantity of water. It is suggested that any readings between 3 and 10 seconds are satisfactory results for an asphalt pavement surface, if hydroplaning is to be minimized. Results of the testing are shown in the table below:

Table 4.3	Test Location	Outflow Meter	
		Before	After
		sec	sec
Kilometre Marker			
Marker K289+450 slow lane	Left wheel track	6	6
	Right wheel track	6	7
Marker K289+450 fast lane	Left wheel track	n/a	n/a
	Right wheel track	n/a	n/a

See Figure 4.5 that follows for a pictorial presentation of the Outflow Meter.

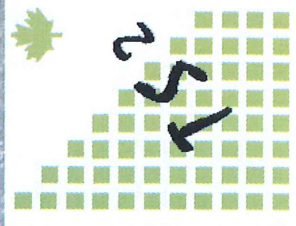


Figure 4.5 Outflow Meter

4.3 Water Penetration

Water Penetration Tests (China Testing Standard T 0730-2000) should be undertaken at several locations on the untreated portion of the road, in close proximity to the test strip and later on the RJSeal™ treated section, in close proximity to the Outflow Meter tests.

Table 4.4	Test Location	Water Penetration	
		Before	After
		ml/min	ml/min
Kilometre Marker			
Marker K289+450 slow lane	Left wheel track	0	0
	Right wheel track	0	0
Marker K289+450 fast lane	Left wheel track	0	0
	Right wheel track	0	0

See Figure 4.6 that follows for a pictorial presentation of the Water Penetration Meter.

4.4 Macrotexture (Depth of Texture)

The sand patch test (ASTM Standard E965-96 OR China Standard T 0961-95) should be used to ascertain the Pavement Macrotexture Depth. Comparison should be undertaken at several locations on both the untreated and RJSeal™ treated sections. The results of the testing are documented in the table that follows:

Table 4.5	Test Location	Sand Patch Test			
		Before		After	
		Dia (mm)	Depth (mm)	Dia (mm)	Depth (mm)
Marker K289+450 slow lane	Left wheel track	225	0.62	230	0.60
	Right wheel track	215	0.69	225	0.62
Marker K289+450 fast lane	Left wheel track	212.5	0.70	215	0.69
	Right wheel track	220	0.65	225	0.62

See Figure 4.7 which follows, showing the sand patch testing procedure.

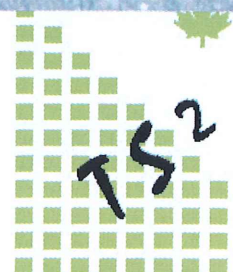


Figure 4.6 Water Penetration Test





Figure 4.7 Sand Patch Test



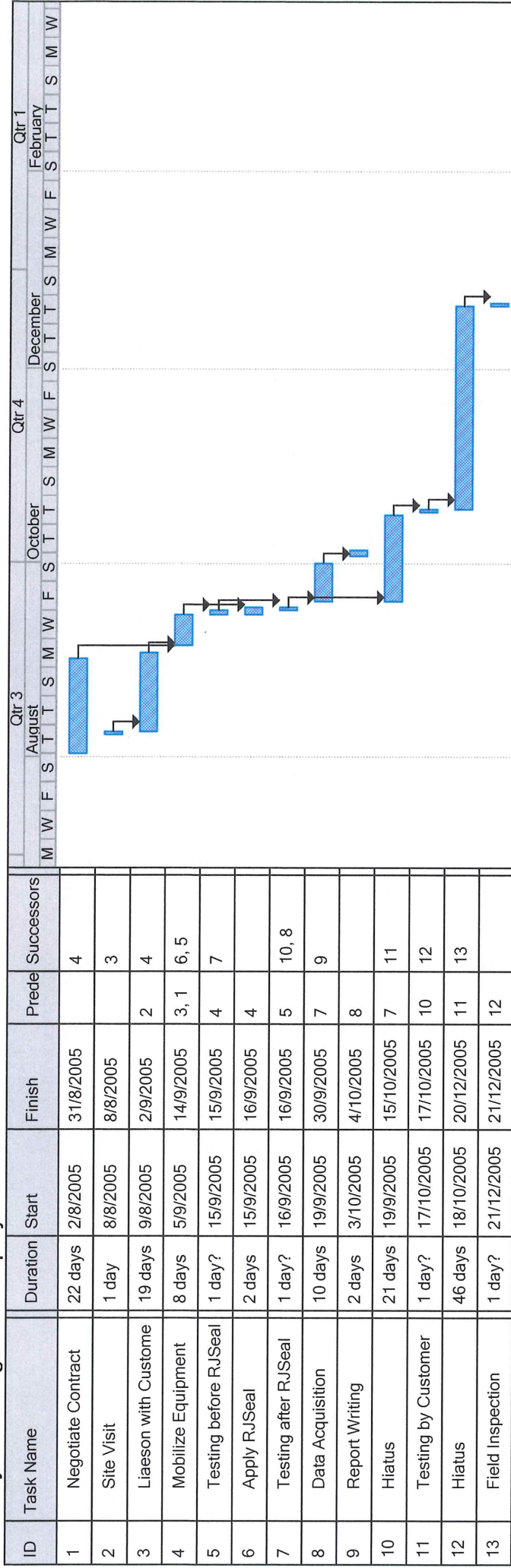
4.5 Ductility/Viscosity/Penetration Testing

This aspect of the testing is beyond the capabilities Crown Capital Enterprise Limited personnel and external assistance has been sought from outside experts in the field of Asphalt Testing. To this end, the Provincial Highways Maintenance Department has retained an independent testing company to conduct tests on the treated section. This will be reported separately.

5.0 Test Completion Schedule

Technicians from the independent testing agency will be dispatched to undertake further testing on the trial sections in the following winter. The projected completion of this testing is scheduled as shown in the following chart.

LiveProject - HangJinQu Expwy sched



Normal task:



% complete:



Milestone:



Split task:



Summary task:



External task:



Critical task:



Rollled up Summary task:



Deadline:



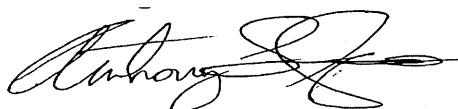
6.0 Qualifications

STATEMENT OF QUALIFICATIONS

I, Anthony G. Speed of Hong Kong in the Special Administrative Region of China, DO HEREBY CERTIFY.

- I. THAT I am a Consulting Engineer, with offices at 2/F, 81 Po Wah Yuen, Lamma Island, Hong Kong
- II. THAT I am a 1968 graduate of the University of Saskatchewan, Canada with a Bachelor of Science Degree in Mining Engineering.
- III. THAT I am currently registered and in good standing as a Professional Engineer with the Association of Professional Engineers (PEO) of Ontario and the Association of Professional Engineers and Geologists of New Brunswick (APEGNB), Canada. I am a corporate member of the Hong Kong Institute of Engineers - Civil Engineering.
- IV. THAT my 37 years of continuous experience in mining, major civil engineering works (earth moving, highway and mining construction) has exposed me to a broad knowledge of mining and heavy civil engineering construction and allowed considerable familiarization with road construction and asphalt pavement.
- V. THAT this report is based on a visit on December 21, 2005, to Zhejiang Province to view the HangJinQu Expressway segment that was treated with RJSealTM and details of the September 15 and 16, 2005 RJSealTM application, as recorded by Ekman Tang, who was the project supervisor for Crown Capital Enterprise Limited

Dated at Hong Kong, this _____ day of December, 2005



Ir. Anthony G. Speed, MHKIE, P.Eng. (Ontario and New Brunswick, Canada)

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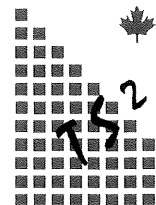
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APPENDICES

No.	Description
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B	Desco D200 Technical Specifications
C	HangJinQu Expressway Company. Testing Report, September 2004



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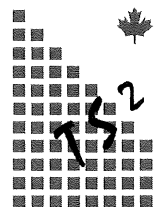
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Appendix A

RJSeal™ – Descriptive Literature



**TS² Consulting Inc.
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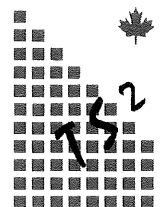
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Appendix B

**Desco D200 Sprayer
Technical Specifications**



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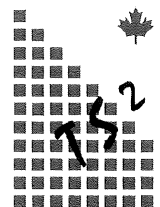
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Appendix C

**HangJinQu Expressway Company
Testing Report,
September 2004**



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