CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

RJSeal™ Application
JinHa Highway No. 102,
LiuShunTun, HeilongJiang,
Peoples Republic of China

September 2004

TS^2 Consulting Inc.
Lamma, Hong Kong

CROWN CAPITAL ENTERPRISE LIMITED

RJSeal™ Application
JinHa Highway No. 102, LiuShunTun, Heilongjiang, Peoples Republic of China

September 2004

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Application of RJSeal™
JinHa Highway No. 102, LiuShunTun, Heilongjiang
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1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into an arrangement in September 2004 with the ShuangChen Highway Maintenance Department, which is responsible for the maintenance of the Provincial Highway No. 102 in proximity to the village of LiuShunTun. This arrangement calls for the analysis of the performance of RJSeal™, a sealer/rejuvenator for asphalt pavement on Provincial Highway No. 102; near the village of LiuShunTun, some 60 km's south of Harbin, the Capital City of Heilongjiang Province.

Heilongjiang Province is situated in the extreme northeast corner of China, and is bounded by Russian (Siberia), North Korea and Mongolia as well as Jilin Province to the south. The capital city of Heilongjiang Province is Harbin with a population of approximately 8 million. Harbin has a different architectural appearance when compared to cities in southern China, and this is attributable to the fact that Russia occupied this part of China for many years and was the southern terminus of its' Manchurian Railroad in Harbin. After the 1917 Russian Revolution, the population of Harbin swelled as refugees fled to China In recent years, Heilongjiang has seen a major growth in the highway system, due to a government drive to build national highways linking Harbin with major cities in the adjoining provinces. .

The majority of the area lies at 150 metres in elevation, on the extensive plain that straddles the SongHuaJiang River that flows to the northeast and eventually into the HeilongJiang (Amur) River. The regions' latitude (45 degrees north), mean that there are four seasons, with temperatures ranging from 45 Celsius in the long, hot summer to minus 25 Celsius in the short winter. There is no rainy season per-se, just summer rain showers and thunderstorms and these occur primarily in May thru September. See figure 1.0 for a map showing the location of LiuShunTun, Harbin and Heilongjiang Province.

The predominant feature of the area is the extensive plains and glacial outwash and moraines from the last glacial period. The asphalt in the area is manufactured from imported materials, which is comprised of crushed and screened sandstone and diorites hauled in from quarries elsewhere in Heilongjiang Province, as well as washed gravels from the various rivers. The bitumen binder for the asphalt is probably sourced from refineries located outside China.

2.0 CO-OPERATIVE PROGRAM

The intent of the arrangement with ShuangChen Highway Maintenance Department, which is responsible for the Provincial highways, is to demonstrate RJSeal™ at a location selected by the Maintenance Division. The Application will subsequently allow analysis of the performance of RJSeal™ on a variety of asphalt surfaces. An application was undertaken on the JinHa Highway No. 102, between Kilometre 1256 and Kilometre 1257, immediately west of the village of LiuShunTun. The work was undertaken on September 9, 2004. The portion of the highway that was treated is composed of asphalt pavement, nominally 12 centimetres thick, which overlays a silty sand.

The age of the asphalt pavement is circa 2002. Keen interest was expressed in having the life of the asphalt pavement extended on this highway. The asphalt pavement has a number of lateral and linear cracks, which had recently been filled with road tar. However smaller cracks also exist and the road maintenance department wished to prevent water percolating through these smaller cracks in the asphalt pavement, thus 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 thirty seven (37) locations in China and fifteen (15) commercial-scale applications have taken place at various locations, including Shanghai, DaQing, Kunming and QinHuangDao.

4.0 TEST PROGRAM

Since Heilongjiang Province is located in a northern climate (Latitude: 43 to 53 North) at a low altitude (150 to 200 metres), it's a demanding setting for asphalt, given the climate (extremes of 45 Celsius in summer and minus 25 Celsius in the winter) and intense exposure to ultraviolet radiation, all which contribute to the oxidation and breakdown of the asphalt binder.

Heilongjiang has a significant concentration of highways in China, with some 5,000 kms of National and Provincial Highway. The Provincial Highway Maintenance Department is responsible for the maintenance of the Provincial Highway.

In view of this extensive network of roads and the relatively short life of the asphalt surface, The Highway Maintenance Department is definitely interested in determining how to economically extend the life of the asphalt road surface. To this end, they agreed to try RJSeal™ on JinHa Highway No. 102, immediately west of the village of LiuShunTun. See Figure 4.0, showing the location of this street with respect to LiuShunTun and Heilongjiang

On September 9, 2004 a test strip on both the northbound and southbound lanes of JinHa Highway No. 102, a two lane highway, was treated with RJSeal™. The location selected for an application of RJSeal™ was at the following geographic location:

Table 4.1		**Geographic Location of Test Strip on JinHa Highway No. 102**		
Test Strip		**System i.e. Geographic or Universal Transverse Mercator (UTM)**	**Northing**	**Easting**
Kilometre 1257	North End Actual	Geographic (deg, min)	45^0 19.840 '	126^0 19.370'
		UTM Grid (52T) (metres)	5023188	0290216
Kilometre 1256	South End Approximate	Geographic (deg, min)	45^0 19.412 '	126^0 19.184'
		UTM Grid (52T) (metres)	5022405	0289947

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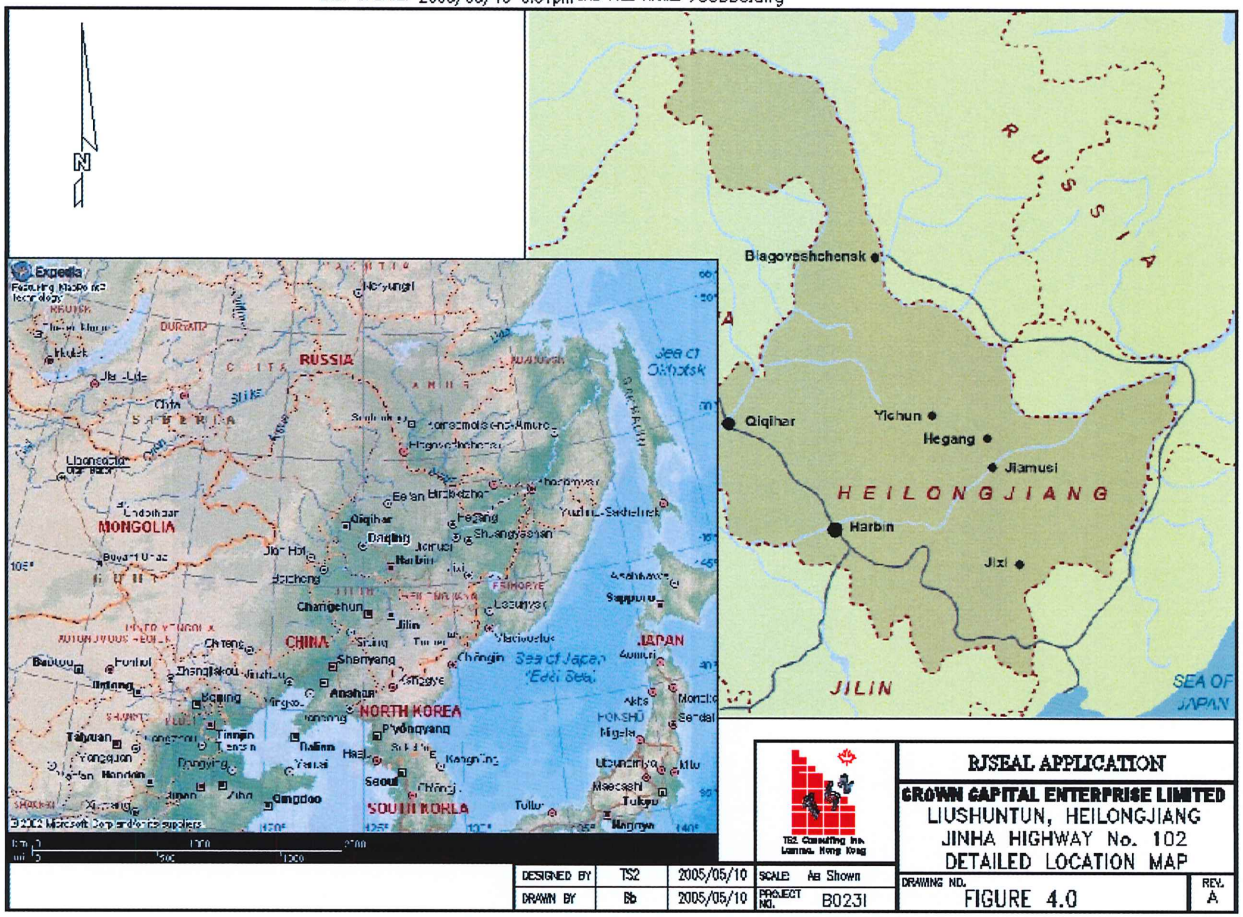

DESIGNED BY	TS2	2005/05/10	SCALE	As Shown	
DRAWN BY	Bb	2005/05/10	PROJECT NO.	B0231	

TS2 Consulting Inc. Lantau, Hong Kong

RJSEAL APPLICATION

GROWN CAPITAL ENTERPRISE LIMITED

LIUSHUNTUN, HEILONGJIANG
JINHA HIGHWAY No. 102
DETAILED LOCATION MAP

DRAWING NO. FIGURE 4.0

REV. A

Particulars of the test strips are shown in the table that follows:

Table 4.2				**Particulars of the Test Strip on JinHa Highway No. 102**							
Work Time	**Strip Width (m)**	**Strip Length (m)**	**Total Area (m^2)**	**Total Area ft^2 approx**	**RJSeal™ Applied**			**Application Rate**			
					US gals	Litres	Kgs	US Gal /yd^2	litres /m^2	m^2 /Litre	m^2 /Kg
07:00 – 18:00	9.0	1,000	9,000	10,800	475	1,730	1,800	0.044	0.19	5.2	5

Subsequent inspection of the test strips, showed that the application rate of 5 m^2/kg was adequate for the asphalt pavement at this location

The 1.0 kilometre long application section on JinHa Highway No. 102 is comprised entirely of asphalt pavement. See figure 4.0 for the location of the test strip with respect to the village of LiuShunTun is graphically shown in figure 4.1, which follows.

Figure 4.1 Test Strip on JinHa Highway No.102.

There is 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 aging and oxidation of the bitumen, which extended to a depth of several millimetres. There were longitudinal cracks, and also lateral cracks, which had recently been filled with tar. The entire portion of the treated asphalt pavement section overlies a compacted silty-clay, sub-grade

RJSeal™ was applied, using a Desco D200 Sprayer. See Appendix B for technical information on this unit. This unit can uniformly apply the RJSealTM in the application.

Ambient temperatures at the time of the application on September 9 were in the 22 degree Celsius range, with humidity in the 70% range. Photos showing the test application of RJSeal™ follow in figures 4.2, 4.3 and 4.4. on the following pages.

A site visit on May 1, 2005 (Refer to Appendix C for more details) was made to check to entire test section and evaluate the penetration of the RJSealTM. A difference was readily perceived between the RJSeal™ treated sections and the adjoining untreated lanes. A screwdriver was used to dig several small holes in the asphalt pavement, to determine the penetration of the RJSeal™. At these locations the rejuvenated surface was evident, by the black resilient surface layer, which was now approximately 1 centimetre thick. Below that depth, the grey, oxidized layer of asphalt was evident. This is pictorially shown in Figure 4.4 that follows.

Figure 4.2 Typical Application Procedure.

Figure 4.3 Finished Surface.

Figure 4.4 Site visit - May 2005

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 JinHa Highway No. 102.

Additional testing equipment will be brought to the site for comparison on a more disciplined, objective basis in the future, and to this end, the following tests will be undertaken.

- 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 Hydroplaning Potential

An "Outflow Meter" manufactured in the U.S.A. by Humble Equipment Company of Ruston, Louisiana and sold under the trademark "Outflow Meter" (see figure 4.5) will be used to measure the asphalt pavement's capability to dissipate water, as concern has been expressed about hydroplaning on the RJSeal™ treated surface, versus the untreated surface. The procedure is documented in the ASTM Standard E2380-05. 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 surface, if hydroplaning is to be minimized.

4.3 Water Penetration

Water Penetration Tests (China Testing Standard T 0730-2000) will be undertaken at several locations on the JinHa Highway on both treated and segment treated with RJSeal™. During the inspection on May 1, 2005, water was poured on the RJSeal™ treated segment and no water penetrated the asphalt pavement, whereas on the adjoining untreated segment water penetrated the pavement at the micro-cracks that laterally cross the highway

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) will be used to ascertain the Pavement Macrotexture (Depth of Structure). Comparison will be undertaken at several locations on the untreated section in close proximity to the Water Penetration Meter tests.

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

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 ShuangChen Highway maintenance Department has retained an independent testing company to conduct tests on the treated section. This will be reported separately.

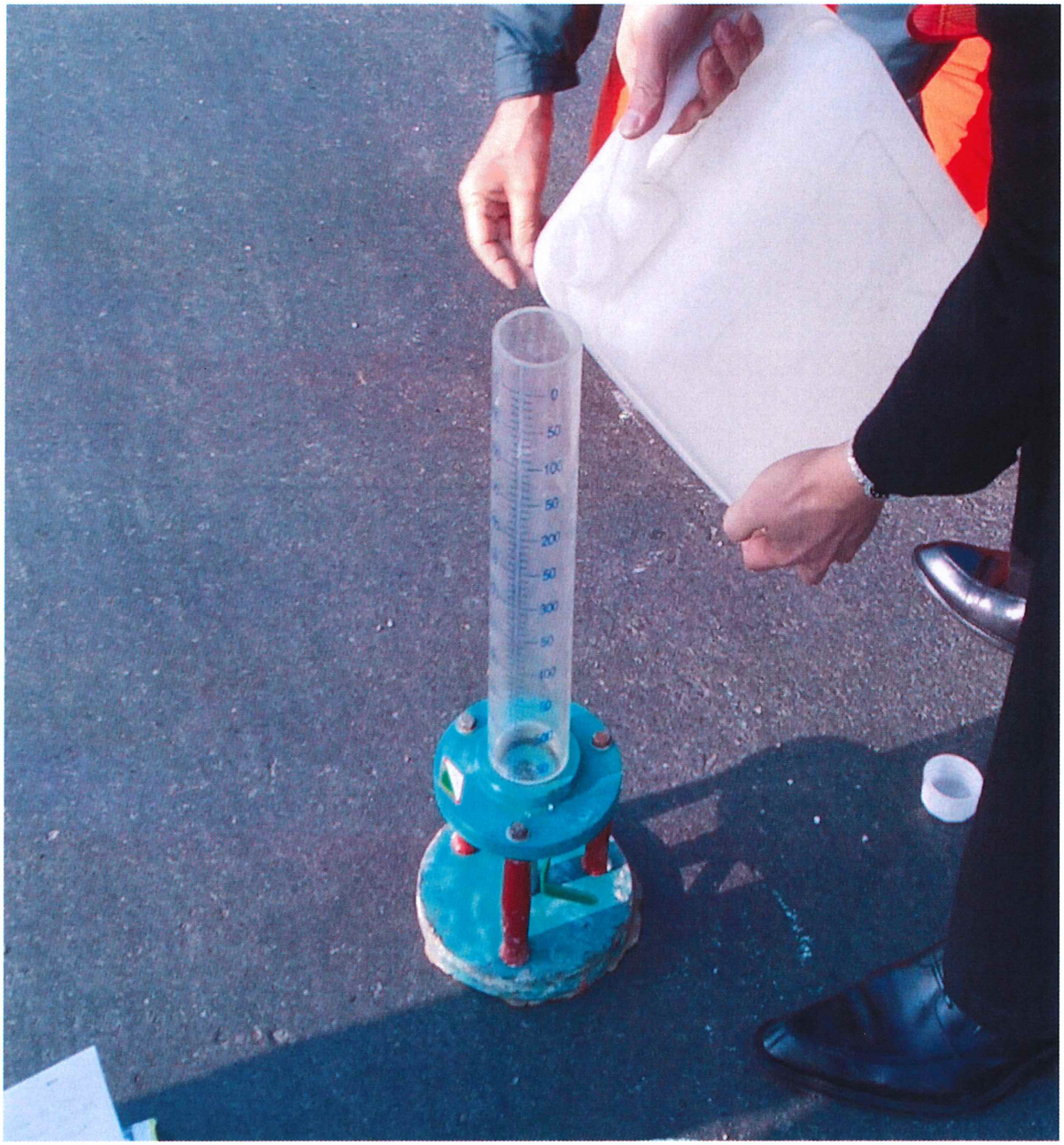

Figure 4.6 Water Penetration Test

Figure 4.7 Sand Patch Test

5.0 Test Completion Schedule

The technicians from the testing laboratory, retained by the ShuangChen Highway Maintenance Department will be dispatched to undertake further testing on the trial section in the near future. The projected completion of this testing is scheduled as shown in the following chart.

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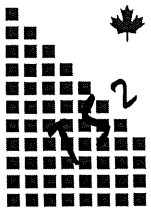

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Appendix A

RJSeal™ Descriptive Literature

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Appendix B

Desco D200 Sprayer

Technical Data

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Appendix C

Site Inspection – May 1, 2005

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