CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

Demonstration of RJSeal™
Baishazhou Bridge Deck, Wuhan, Hubei, Peoples Republic of China

November 2003

TS^2 Consulting Inc.
Lamma, Hong Kong

Crown Capital Enterprise Limited.
RJSeal Demo
Wuhan Bridge

Demo Date	24-Nov-03
Prepared by	Agui Li
Updated by	Agui Li
Updated	8-Jan-03

Assumptions

Panel Length	5.00	Metres
Panel Width	3.75	Metres
Panel Area	18.75	Sq Metres

Conversion Factors

US Gallon=	3.78	Litres
Sq Metre=	10.76	Sq Feet
Sq Metre=	1.20	Sq Yds
One Litre	1.04	kgs

Crew Consist	No
Labourers	2
Supervisor	1
Total	3

Weather Conditions

Temperature	**17 Celsius**
Humidity	32%
General	**Sunny**
Rd surface Temp	**17 Celsius**

Work Schedule	Work Time	No. of Panels	Test Length	Total Area	Total Area	RejuvaSeal Applied			Application Rate				3 Man Crew	
Bridge Deck am/pm	(hrs)		(m)	m^2	yd^2	US gals	litres	kilograms	USGal /yd^2	Litres/m^2	m^2 /Litre	m^2/Kg	m^2 /man hr	yd^2 /man hr
15.15-15.45	0.50	1	5.00	18.75	22.41	1.1	4.0	4.1	**0.047**	**0.21**	**4.71**	**4.53**	12.5	14.9
Totals	0.50	1	5.00	18.75	22.41	1.1	4.0	4.1	**0.047**	**0.21**	**4.71**	**4.53**	12.5	14.9

Assumptions

Panel Length	1.0	Metres
Panel Width	3.75	Metres
Panel Area	3.8	Sq Metres

Work Schedule	Work Time	No. of Panels	Test Length	Total Area	Total Area	RejuvaSeal Applied			Application Rate				3 Man Crew	
Highway am/pm	(hrs)		(m)	m^2	yd^2	US gals	litres	kilograms	USGal /yd^2	Litres/m^2	m^2 /Litre	m^2/Kg	m^2 /man hr	yd^2 /man hr
11.00-11.15	0.25	1	1.00	3.75	4.48	0.3	1.0	1.0	**0.059**	**0.27**	**3.75**	**3.61**	5.0	6.0

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No.	Description
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1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into an arrangement with the Baishazhou Bridge Maintenance Company of Wuhan, Hubei Province, China in November 2003. This arrangement calls for the analysis of the performance of RJSeal™, a sealer/rejuvenator for asphalt pavement on bridges within the Baishazhou Bridge Maintenance Company administrative district.

Hubei Province is situated immediately astraddle of the Yangtze (Chiang Jiang) River and is bordered by Henan, Anhui, JiangXi and Hunan and Shanxi Provinces as well as ChongQing Municipality. The province is generally quite mountainous and the capital city is Wuhan, which has a population of approximately 6 million. Wuhan is a port on the Chiang Jiang (Yangtze) River and has a container terminal as well. The city was originally comprised of three towns, which merged to become known as Wuhan during the 19th Century. The primary transportation route to Wuhan was originally via boats, which could travel upstream from Shanghai with Sampans and Junks initially powered by oar and sail being the traditional conveyance. Later these were replaced by ships initially powered with steam engines and finally combustion engines. However significant commercial transport activity really commenced when the rail-line was completed from Beijing to Wuhan in the 1890's. The subsequent the rail-line north from Guangzhou reached Wuhan in 1906. At that time, there was no direct connection between the two rail-lines and railcars and passengers had to be ferried across the Yangtze River. The completion in1957 of a high-level, rail/vehicular bridge across the Yangtze River meant that trains could travel uninterrupted without the aid of ferries. Recently, two more vehicular bridges have been completed across the Yangtze River in Wuhan. The original rail/vehicular bridge was of lattice girder construction whereas the more recent vehicular traffic bridges have been either suspension bridges or cable-stayed bridges. Hubei has seen a major growth in the highway system, in recent years, due to a government drive to build national highways linking Wuhan with major cities in the adjoining provinces. One of the principal industries in Wuhan is the Dong Feng-Citroen Joint Venture which manufactures several models of cars, principally four door, sedans and of note is the brewery which produces Budweiser Beer under license from the Anheuser Busch Brewery in St Louis, Missouri, USA.

See figure 1.0 for a map showing the location of Wuhan and Hubei Province. The majority of the area lies at 80 to 90 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 10 Celsius in the short winter. There is a rainy season per-se, with rainfall occurring primarily in May thru August, but can extend into September.

In the immediate Wuhan 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 Hubei Province straddles the Yangtze River and has sufficient depth for river vessels and barges to transport material from Shanghai and other coastal ports, the possibility of bitumen being sourced from offshore is a distinct possibility so refineries in Singapore and the like should not be forgotten.

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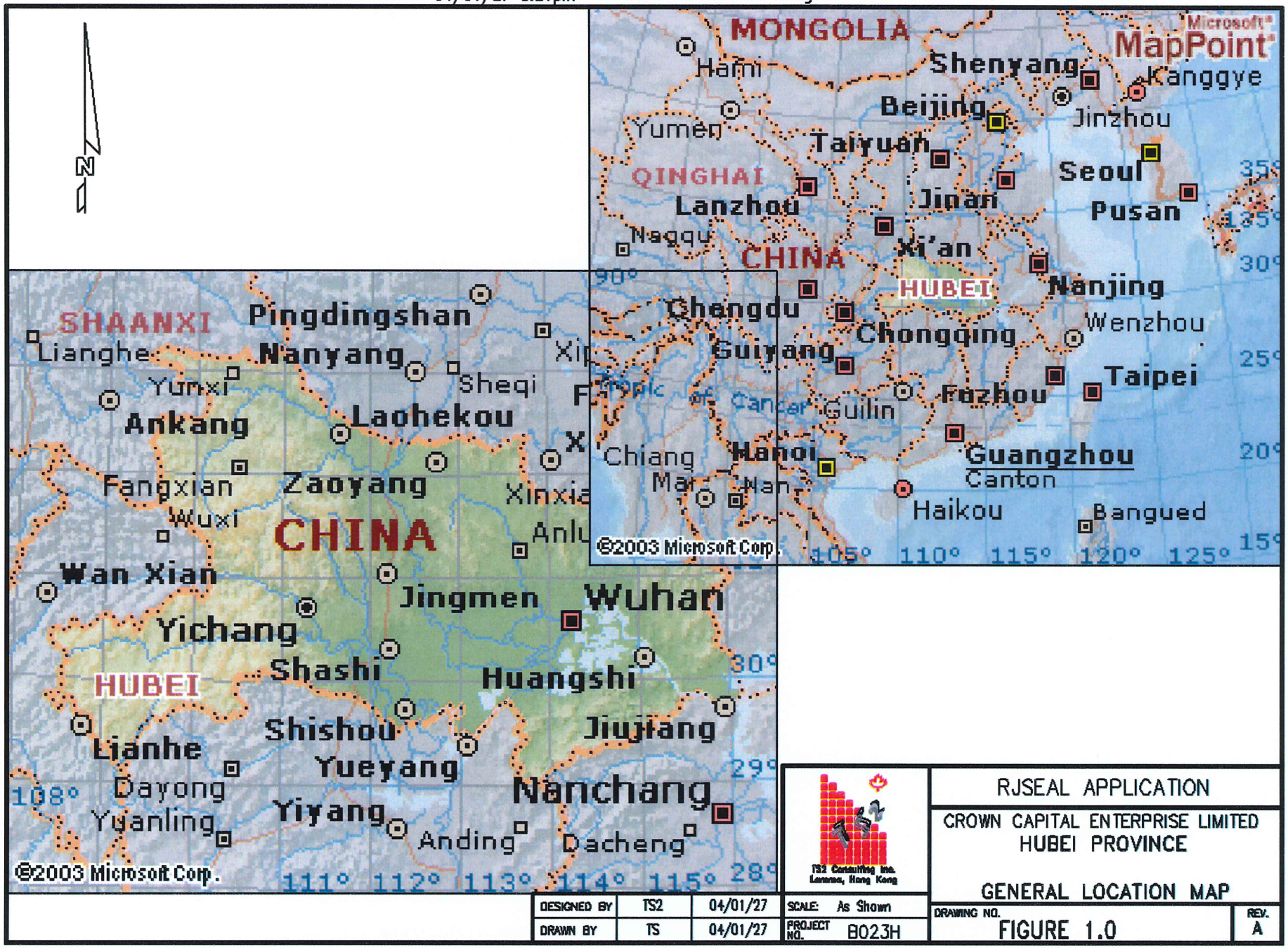


TS2 Consulting Inc. Lantau, Hong Kong

RJSEAL APPLICATION

CROWN CAPITAL ENTERPRISE LIMITED
HUBEI PROVINCE

GENERAL LOCATION MAP

DESIGNED BY	TS2	04/01/27	SCALE: As Shown	DRAWING NO. FIGURE 1.0	REV. A
DRAWN BY	TS	04/01/27	PROJECT NO. B023H		

2.0 CO-OPERATIVE PROGRAM

The intent of the arrangement with Baishazhou Bridge Maintenance Company. of Hubei Province is to demonstrate RJSeal™ at locations selected by the Baishazhou Bridge Maintenance Company.. The demonstration will subsequently allow analysis of the performance of RJSeal™ on a variety of asphalt pavement surfaces. A demonstration was undertaken on the center span of the Baishazhou Bridge Deck adjoining the city of Wuhan, on November 24, 2003. The test patch undertaken on the Baishazhou bridge deck, was in the center lane of the three northbound lanes of this six lane bridge. The asphalt pavement of mid-2000 vintage and a second test patch was also undertaken on the approach road to the bridge. The surface of the asphalt was quite rough with no lateral and longitudinal cracks, however there were several recent asphalt patches of note in proximity to the test patch. The primary concern expressed has been about water percolating through the asphalt pavement and corroding the bridge superstructure and furthermore they are interested in rejuvenating the asphalt deck as it's now approaching the end of it's useful life.

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 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 prepared by Crown Capital Enterprise Limited. This outlines the experience with RJSeal™ at various locations in China, North America and South America. 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 North Dakota and Texas, as well as other locations in the U.S.A. Since 2000, RJSeal™ has been demonstrated successfully at over thirty two (32) locations in China and fourteen (14) commercial-scale applications have taken place at various locations, including Shanghai and Kunming.

4.0 TEST PROGRAM

Since Hubei Province is located in a semi-tropical climate (Latitude: 30 North) at a low altitude (80 to 90 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.

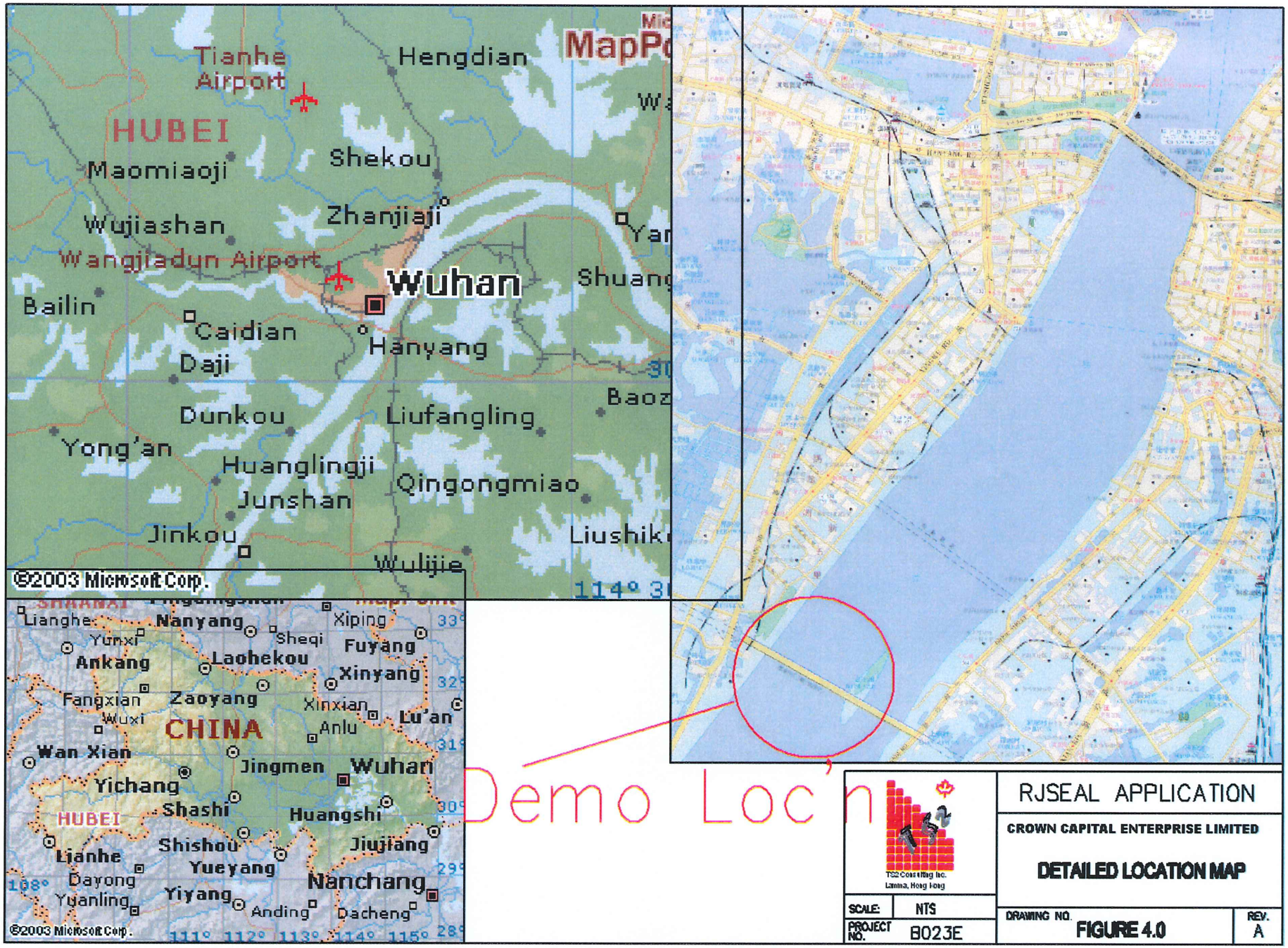
Hubei has the significant concentration of highways in China with some 4,000 kms of National and Provincial highway. Baishazhou Bridge Maintenance Company is responsible for one bridge and several kilometres of National Highway, within it's jurisdiction

In view of the water percolation thru the asphalt pavement and also the loss of ductility and aging of the asphalt pavement, the Baishazhou Bridge Maintenance Company Inc is definitely interested in determining how to economically reduce the permeability of the asphalt road surface and restore the ductility. To this end, Baishazhou Bridge Maintenance Company agreed to try RJSeal™ on the Baishazhou Bridge Deck, near Wuhan. See Figure 4.0, showing the location with respect to Wuhan and Hubei

On November 9, a test patch in the center northbound lane of the Baishazhou Bridge Deck (six lane, divided bridge deck with nominal shoulders) was treated with RJSeal™. This test patch was at the following geographic location:

Table 4.1 Baishazhou Bridge Deck	**Geographic Location of Test Patch Site**	
System	**Northing**	**Easting**
Geographic (deg, min)	30^0 22.594'	114^0 08.195'
Universal Transverse Mercator Grid (50R) (metres)	0224822	3364004

This test patch was at the center of the suspension portion of the bridge deck. On the northbound side lanes.



The Baishazhou Bridge Deck, test patch was undertaken on November 24, 2003 in the mid-afternoon. Work commenced at 3:15 pm. The section selected for the demonstration descends gradually from the crest of the Baishazhou as one proceeds north and has a slight camber to the Bridge Deck, which causes water to run-off toward the outside, 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 pavement that was purportedly 5 centimetres thick. The asphalt pavement on the section treated was reputedly 3 years old. RJSeal™ was applied using a paint roller with particulars contained in Appendix A. This demonstration patch dried in approximately 3 hours.

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

Table 4.2				**Details of RJSeal™ Test Patch Baishazhou Bridge Deck**							
Date Sept	Work Schedule	Work Time	Test Length	Total Area m^2	RJSeal™ Applied			Application Rate			
	am/pm	(hrs)	(m)		US gals	litres	Kilo grams	USGal /yd^2	Litres /m^2	m^2 /Litre	m^2/Kg
24	15:15-15:45	0.50	5.0	18.75	1.1	4.0	4.16	**0.047**	**0.21**	**4.71**	**4.53**

This test patch was primarily intended to show that water penetration could be appreciably stopped and the asphalt pavement ductility restored. See figure 4.1 showing the test patch during the application of RJSeal™

The site was visited on November 25 around 10:00 am and a difference was readily perceived between the RJSeal™ treated sections and the adjoining untreated lane. A screwdriver was used to dig two small holes in the asphalt pavement, to a depth of 3 centimetres. This was one day 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 1 millimetre thick. Below that depth, the grey, oxidized layer of asphalt was evident.

Figure 4.1 Test Patch on Bridge Deck.

TS2

Figure 4.2 Finished Test Patch.

Figure 4.3 Inspection of Bridge Deck - Three Months Later

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 at the test site on the Baishazhou Bridge Deck. 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.

- Water Dissipation (Hydroplaning Susceptibility)
- Water Penetration
- Fuel Resistance Comparison
- Ductility Testing

4.2 Water Dissipation

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 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 into the asphalt pavement is minimized by the application of RJSeal™ and a testing device to measure the flow of water from a graduated column into the pavement will be undertaken at a later date.

4.4 Fuel Resistance Comparison

Fuel Resistance Comparison will be undertaken on several sections of the untreated and RJSeal™ treated sections in close proximity to the Outflow meter tests in the near future. This comparison will consist of pouring about a cupful of diesel fuel onto the road surface and then later checking the penetration of the fuel. If the fuel readily penetrated the asphalt pavement surface, then resistance to this form of chemical attack was presumed to be lower than if the fuel pooled on the surface of the asphalt pavement and slowly evaporated.

4.5 Ductility/Penetration/Viscosity Testing

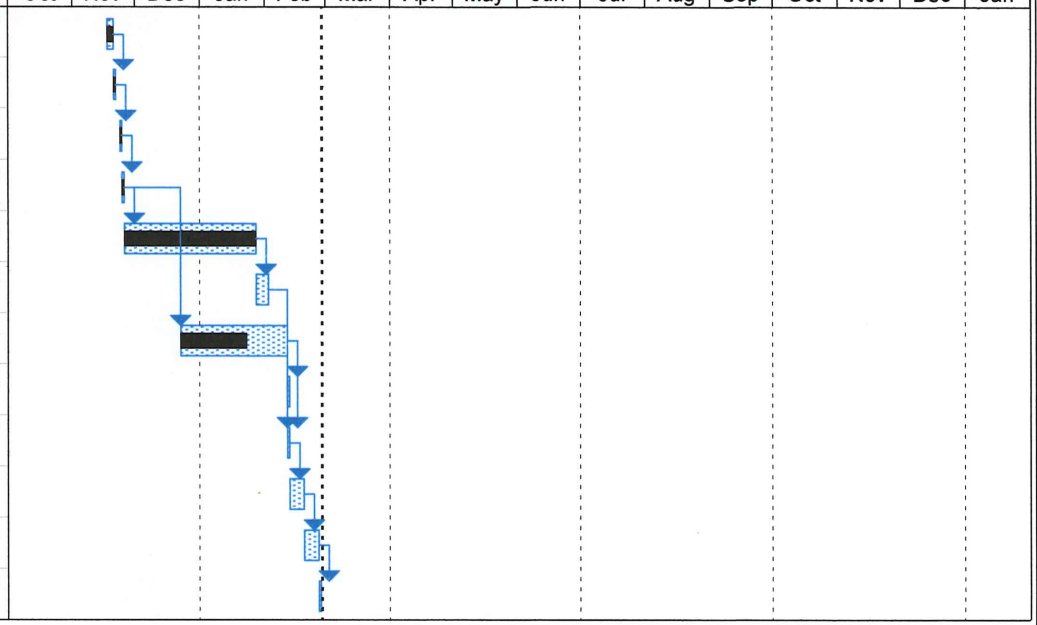
This aspect of the testing requires specialized laboratory equipment and is beyond the capabilities of both Crown Capital Enterprise Limited and RJSeal™ personnel and as such, external assistance has been sought from outside experts in the field of Asphalt Testing. To this end, Baishazhou Bridge Maintenance Company has contacted an independent laboratory for advise on asphalt pavement testing.

Figure 4.4
Humble Equipment Co. Outflow Meter

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.

ID	Task Name	Duration	Start
1	Travel to Wuhan and inspect Bridge	3d	Tue 11/18/03
2	Hiatus	1d	Fri 11/21/03
3	Patch of RJSeal applied to Bridge.	1d	Mon 11/24/03
4	Inspection of Demo Section	1d	Tue 11/25/03
5	Hiatus	45d	Wed 11/26/03
6	Prepare draft report	4d	Wed 1/28/04
7	Hiatus	37d	Tue 12/23/03
8	Inspection of Demo Section	1d	Thu 2/12/04
9	Seminar in Wuhan	1d	Thu 2/12/04
10	Hiatus	5d	Fri 2/13/04
11	Prepare final report on RJSeal Demo and Testing	5d	Fri 2/20/04
12	Submit final report	1d	Fri 2/27/04



Project: BaiShaZhou Bridge Project
Date: Sat 2/28/04

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

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

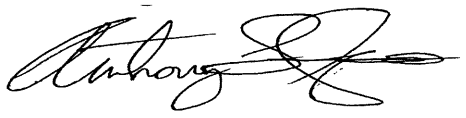
II. THAT I am a 1968 graduate of the University of Saskatchewan, Canada with a Bachelor of Science Degree in Mining Engineering.

III. THAT I am currently registered and in good standing as a Professional Engineer with the Association of Professional Engineers of Ontario, and New Brunswick, Canada

IV. THAT my 30 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 my collation of data and a visit on November 18 thru 19, 2003 to Hubei Province to view the Baishazhou Bridge as described in this report and details of the November 24, 2003 RJSeal™ application as recorded by Agui Lee, who was the project supervisor for Crown Capital Enterprise Limited. Furthermore I visited the City of Wuhan of February 12 thru 14 to see the test patch and ascertain results visually.

Dated at Hong Kong, this _____day of February, 2004



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

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Appendix A

RJSeal™ – Descriptive Literature

TS² Consulting Inc.
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