CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

RJSeal™ Application
HongQiao Airport, Shanghai, Peoples Republic of China

October 2003

TS² Consulting Inc.
Lamma, Hong Kong

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November 30th, 2003

Crown Capital Enterprise Limited
B5, Centre Point Building
181 – 185 Gloucestor Road,
Wanchai, Hong Kong.

Attn: Charence Chiang
General Manager

Dear Charence

Re: Application of RJSeal™ at HongQiao Airport, Shanghai.

This is the final report on the demonstration of RJSeal™ at the HongQiao Airport in Shanghai. Commencing on November 20th, 2003, a 300 metre long segment was completed just south of the midpoint of this 3400 metre long runway. This initial RJSeal™ treated segment was 30 metres wide and covered the 1998 vintage asphalt pavement. This was covered with copper slag at a rate of 0.5 kgs/square metre and an 11 tonne rubber-tired roller was subsequently used to embed the slag in the treated surface.

On subsequent evenings from Nov 21 thru November 27, the balance of the runway was treated with RJSeal™ and copper slag applied in lesser amounts of 0.3 kgs/square metre. I anticipate that a supplementary report will be issued by the HongQiao Airport operations people on their observations and follow up inspection in late 2003, following coring of the runway's asphalt surface and testing in an independent laboratory in Shanghai. In general the workmanship and the appearance of the job impressed the Airport maintenance personnel and they highly recommended the work to the people from other airports in China that visited on several occasions throughout the duration of the work.

Yours Sincerely

Anthony G. Speed, P.Eng. (Ontario, Canada)

Crown Capital Enterprise Limited.
RejuvaSeal Demo
HongQiao Airport
Date of Work October 22-29
Prepared by A.G. Speed
Updated by A.G. Speed
Updated 1-Dec-03

Weather Conditions

Temperature 24 Celsius
Humidity 40%
Cloud Cover Cloudy

Assumptions

Night	Length	Width	Area
20-Oct-03	270	30.0	8100
21-Oct-03	300	30.0	9000
22-Oct-03	500	30.0	15000
23-Oct-03	500	30.0	15000
24-Oct-03	361.5	30.0	10845
25-Oct-03	500	30.0	15000
26-Oct-03	425	30.0	12750
27-Oct-03	330	30.0	9900
	3186.5	30.0	95595

Conversion Factors

US Gallon=	3.78	Litres	
Sq Metre=	10.76	Sq Feet	
Sq Metre=	1.20	Sq Yds	
One Litre	1.04	kgs	
One Full Drum	208	Litres	
One Full`Drum	55	US Gallon	
90% full drum	50	US Gallon	

Crew Consist	No
Desco Op	1
Desco Help	2
Labourers	8
Truck Driver	2
Supervisor	3
Total	16

Work Schedule	Work Time	Work Time	Test Length (m)	Total Area m^2	Total Area yd^2	RejuvaSeal Applied			Application Rate				16 Man Crew	
am/pm						US gals	litres	kilograms	USGal /yd^2	Litres/m^2	m^2 /Litre	m^2/Kg	m^2 /man hr	yd^2 /man hr
20-Oct-03	23.00-03.00	4.0	270.0	8,100	9,683	529	2,000	2,080	**0.055**	**0.25**	**4.05**	**3.89**	126.6	151.3
21-Oct-03	23.30-03.00	3.5	300.0	9,000	10,758	582	2,200	2,288	**0.054**	**0.24**	**4.09**	**3.93**	160.7	192.1
22-Oct-03	23.30-03.15	3.8	500.0	15,000	17,931	1,005	3,800	3,952	**0.056**	**0.25**	**3.95**	**3.80**	250.0	298.8
23-Oct-03	23.30-03.00	3.3	500.0	15,000	17,931	899	3,400	3,536	**0.050**	**0.23**	**4.41**	**4.24**	284.1	339.6
24-Oct-03	23.30-04.10	4.7	361.5	10,845	12,964	635	2,400	2,496	**0.049**	**0.22**	**4.52**	**4.34**	145.2	173.6
25-Oct-03	23.30-03.50	4.3	500.0	15,000	17,931	1,085	4,100	4,264	**0.060**	**0.27**	**3.66**	**3.52**	216.3	258.6
26-Oct-03	00.10-03.30	3.3	425.0	12,750	15,241	1,111	4,200	4,368	**0.073**	**0.33**	**3.04**	**2.92**	239.1	285.8
27-Oct-03	23.50-3.00	3.2	330.0	9,900	11,834	1,058	4,000	4,160	**0.089**	**0.40**	**2.48**	**2.38**	195.4	233.6
Totals		30.1	3,186.5	95,595.0	114,272.1	6905	26100	27,144	**0.060**	**0.27**	**3.66**	**3.52**	198.8	237.7
							barrels	130.5						

FlowMeter Readings	Time (sec)	Location
October 23, 2002	Time	Location
Untreated	4	West Shoulder
Treated	6	Centre

CROWN CAPITAL ENTERPRISE LIMITED

RJSeal ™ Application
HongQiao Airport, Shanghai,
Peoples Republic of China

October 2003

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TS² Consulting Inc.
Lamma, Hong Kong

CROWN CAPITAL ENTERPRISE LIMITED
RJSeal™ Application
HongQiao International Airport, Shanghai Municipality
Peoples Republic of China

October 2003

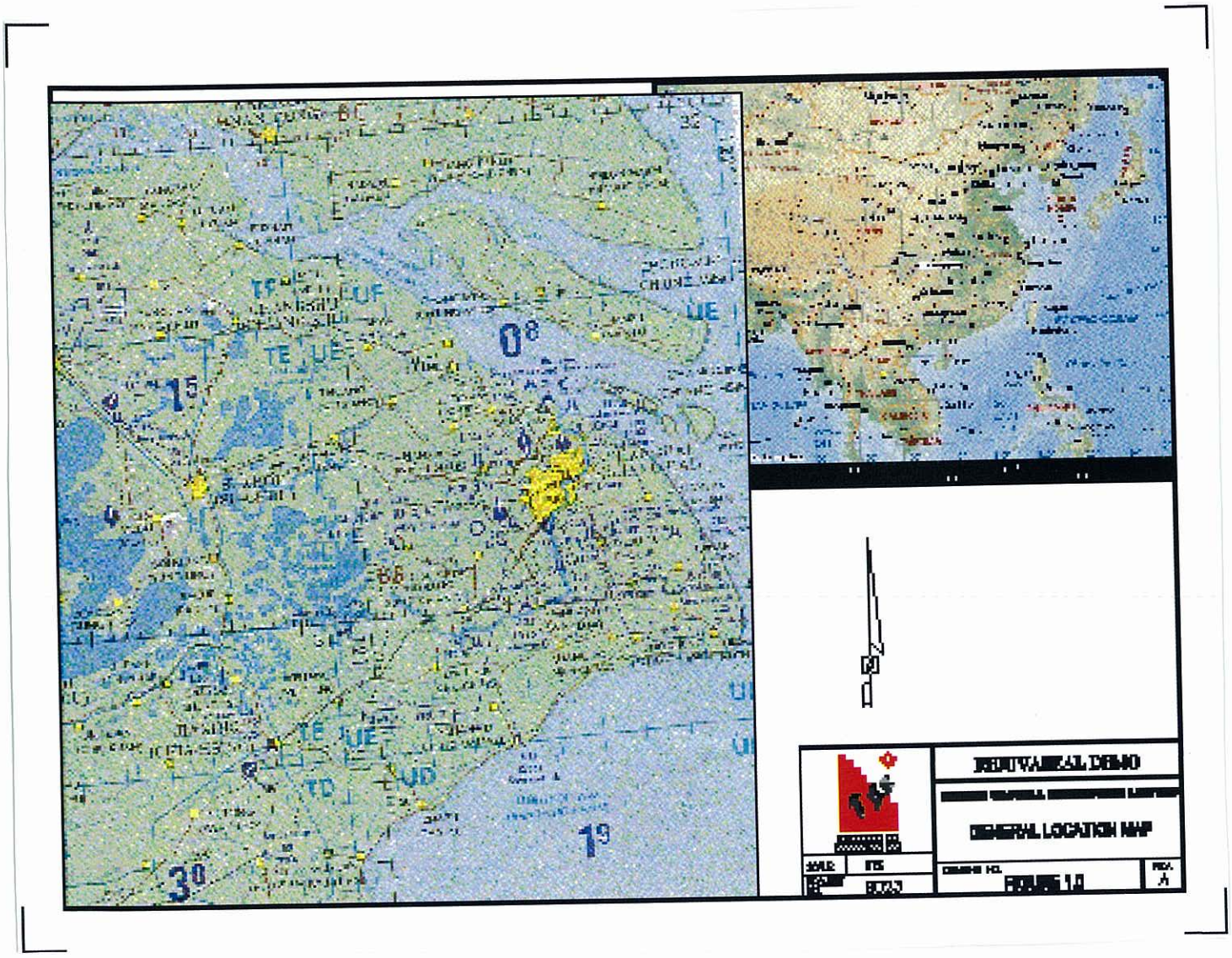
1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into a contract in October 2003, with the Shanghai Airport Authority Operations and Management Company who manage the HongQiao Airport in Shanghai, China. This arrangement calls for the application of RJSeal™, a sealer/rejuvenator for asphalt pavement on the sole (north-south) runway at this airport.

Shanghai is located on the Huangpu River near its confluence with the Yangtze (Chang Jiang) River and near the coast of the East China Sea. Shanghai is a Municipal District and reports directly to the Central Government in Beijing. Shanghai Municipality is bordered by JiangSu and Zhejiang Provinces. Shanghai has a unique history in that portions of it at one time hosted enclaves ceded to the American, British and French in 1842 by the Treaty of Nanjing following the Opium Wars. The presence of these nationals spurred the growth of Shanghai as a major trading center through the latter part of the 19th Century and into the early part of the 20th Century. More recently, Shanghai has seen a major growth due to a government drive to introduce High Technology Industries. This has been most evident in the Pudong area, which lies across the Huangpu River from central Shanghai. The present population of Shanghai is estimated at approximately 13 million. See figure 1.0 for a map showing the location of Shanghai. The majority of the area lies at 10 to 20 metres in elevation, on the extensive plain that borders the East China Sea. The regions' latitude (31 degrees north), mean that there are four seasons, with temperatures ranging from 45 Celsius in the long, hot summer to minus 5 Celsius in the short winter. The rainy season is primarily May thru August, but can extend into September.

In the immediate Shanghai area, a significant unconsolidated sedimentary sequence predominates and this is due to the site adjoining the delta of the Yangtze River. There are no outcrop exposures available. Drainage channels such as Wusong River (a.k.a. 'Suzhou Creek'), also afford no opportunities to see the bedrock. The asphalt in the area is manufactured from imported materials, which is comprised of crushed and screened sandstone hauled in from quarries in Zhejiang Province, as well as washed gravels from the various rivers. The bitumen binder for the asphalt is sourced from various locations. Since Shanghai is only 25 kilometres from the mouth of Yangtze River, which is navigable by ocean vessels, the possibility of bitumen being sourced from offshore is a distinct possibility so refineries in Singapore and the like should not be forgotten.

Figure 1.0 General Location Plan



2.0 CO-OPERATIVE PROGRAM

The intent of the contract with the Shanghai Airport Authority Operation & Management Company was to apply RJSeal™ to the North-South Runway to rejuvenate the asphalt pavement and prevent water infiltration. An application was undertaken at HongQiao Airport, on the central 30-metre segment of the runway, commencing on October 20, 2003, with completion on October 27. The north-south runway is 56 metres wide and 3400 metres long and composed of two different asphalt pavements. A central, 30 metre wide portion, which is an 8-centimetre overlay of 1998 vintage on top of a 8 centimetre base of 1992 vintage. The portions of asphalt pavement on either side of the 30-metre overlay are the original (1992 Vintage) 16-centimetre thick, asphalt pavement. Both asphalt pavements overlay cast-in-place concrete slabs. No details are known about the subgrade, but inspection of the shoulders show a sandy-silty material. No significant ditches are evident immediate to the runway (just the airport perimeter) and it can be assumed that the water table is fairly high. The surface of the 1992 asphalt is quite smooth and concern had been expressed about hydroplaning during heavy rains. The 1992 asphalt pavement shoulders are approaching the end of their useful life and keen interest was expressed in having the life extended. An emulsified asphalt was applied to these shoulders in 1998 and it appears to have almost completely disappeared. The central 30-metre portion of the runway (1998 overlay) is quite porous and the airport authority is concerned about water percolating through the asphalt 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 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. 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 one (31) locations in China and twelve (12) commercial-scale applications have taken place at various locations, including Shanghai, Shandong and Kunming.

4.0 TEST PROGRAM

Since Shanghai is located in a semi-tropical climate (Latitude: 31 North) at a low altitude (10 to 20 metres), it's a demanding setting for asphalt, given the year round warm climate (extremes of 45 Celsius in summer and minus 5 Celsius in the winter) and intense exposure to ultraviolet radiation, all which contribute to the oxidation and breakdown of the asphalt binder.

The Shanghai Airport Authority Operation & Management Company is responsible for the maintenance and operation of the HongQiao Airport in Shanghai, which has seen a major growth in passenger and freight traffic in the last 10 years. The Shanghai Airport Authority is definitely interested in economically extending the life of the asphalt runway for at least another 5 years and to this end, has agreed to try RJSeal™ on the sole runway at HongQiao Airport, which is located in western Shanghai Municipality. The arrangement with Crown Capital led to the airport authority selecting an appropriate location for the testing of RJSeal™. See Figure 4.0, showing the location of this airport with respect to Shanghai.

A 170-metre long demonstration strip on the eastern shoulder of the runway was undertaken, on November 22, 2001. The demonstration strip was 5 metres wide and straddled the joint between the 1998 overlay and the original 1992 asphalt surface. This strip covered approximately 2 metres of the 1998 overlay and 3 metres of the original asphalt pavement. The strip started 31 metres south of the center of the 3400 metre long runway. The location of the demonstration strip is graphically shown in figure 4.1, and is geographically located as follows:

Table 4.1	**Location of Demo Site**	
System	**Northing**	**Easting**
Geographic (deg, min)	31^0 15.884'	121^0 36.707'
Universal Transverse Mercator Grid (metres) 51R	3459785	0367833

Details of this RJSeal™ demonstration are summarized in the table that follows:

Table 4.2				**Details on RejuvaSeal™ Demonstration Section on HongQiao International Airport**						
Work Schedule	Work Time (hrs)	No. of Panels	Test Length (m)	Total Area m^2	Total Area yd^2	RejuvaSeal™ Applied		Application Rate		
						US gals	litres	US Gal /yd2	Litres /m2	m2 /Litre
23:30-01:25	1.92	17	170	850	1,016	95	359	0.093	0.42	2.37
Totals	1.92	17	170	850	1,016	95	359	0.093	0.42	2.37

Inspection of this demonstration strip in early October, 2003 by Crown Capital personnel, led to the assumption that an application rate of 4.0 m^2/kilogram

Figure 4.0 Specific Location Plan

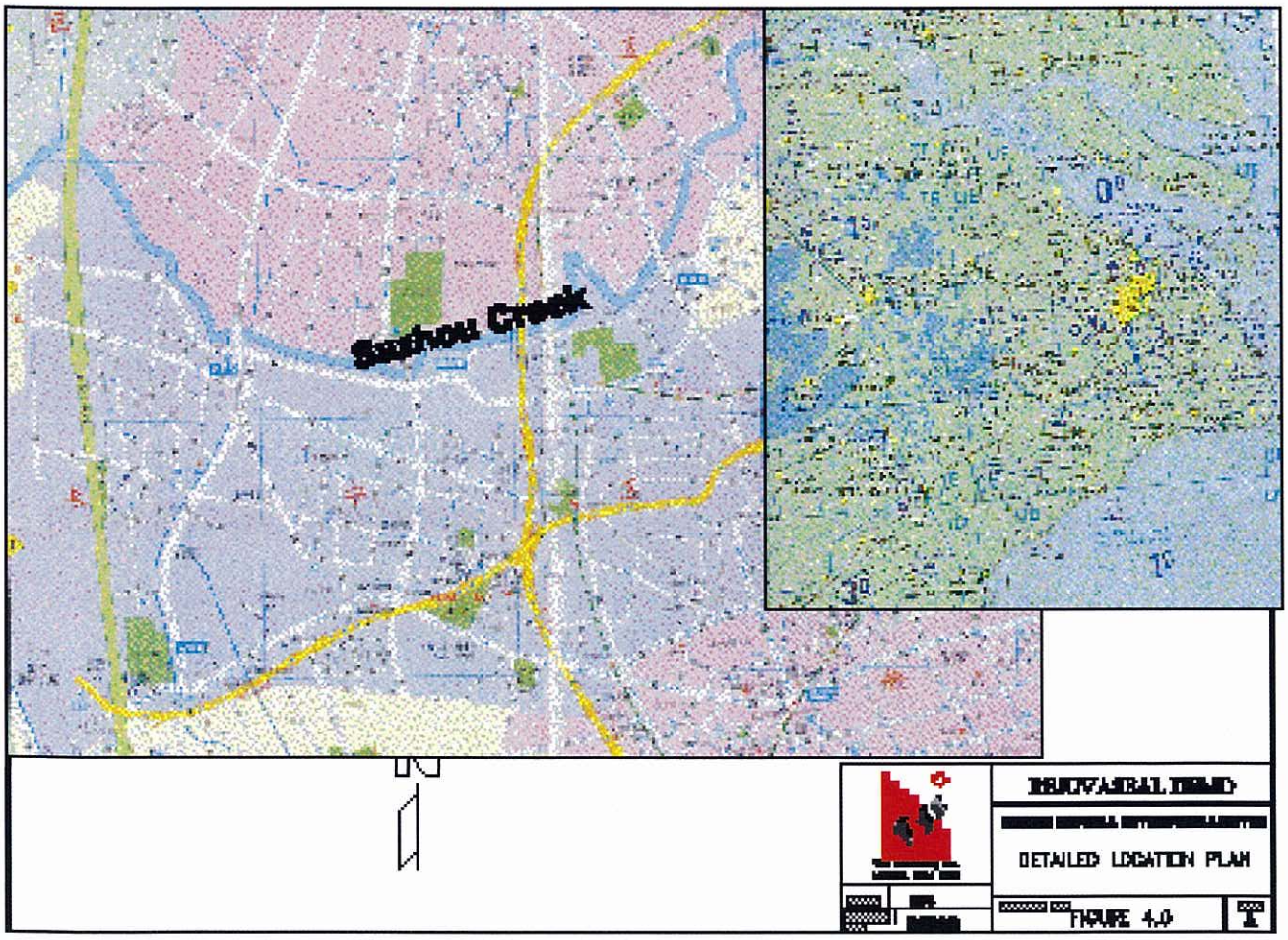


Figure 4.1 Demo Strip, HongQiao Airport - 2001

would be appropriate for the central portion of the asphalt pavement on the runway. At the request of the Shanghai Airport Authority Operation & Management Company, the RJSealTM application at HongQiao Airport was limited to the center 30 metres of the entire runway, which is the entire 1998 overlay and is geographically located as follows:

Table 4.3		**Location of Runway**	
System		**Northing**	**Easting**
North End of Runway	Geographic (deg, min)	31^0 12.747'	121^0 20.132'
	Universal Transverse Mercator Grid (metres) 51R	3454353	0341442
South End of Runway	Geographic (deg, min)	31^0 11.018'	121^0 20.225'
	Universal Transverse Mercator Grid (metres) 51R	3451156	0341542

Work commenced on the application at 00:30 am on October 20, on a cool, clear evening, where the air temperature was around 14 Celsius. There were minor longitudinal cracks (parallel to the centerline of the runway) near the centerline of the runway and lateral cracks, which match the joints in the underlying, cast in place concrete slabs. These had been filled with bitumen crack filler previously. The aging and oxidation of the bitumen extends to a depth of several millimetres. The entire portion of the runway was on a compacted silty-clay, sub-grade

On October 22, an initial 300 metre long segment was marked off with a width of 30 metres. This was immediately south of the center point of the runway. The white lines denoting the runway markings were covered with packing tape and similarly the yellow lines showing the taxi routes for aircraft. Three (3) Desco D200 sprayers were deployed on this evening to undertake the work. The initial 300-metre segment was completed by 03:00 and concurrently with the application copper slag from Kunming was applied at a rate of 0.5-kgs/square metre, using a Sno-Way PT-9 Sand Spreader. An 11 tonne, rubber tired roller was subsequently used to roll the slag and ensure it was affixed to the RJSeal™ treated surface.

Further work ensued on the evenings of October 21, thru Nov 24 on segments progressively moving south of the initial evenings work, until the entire southern end of the runway was completed. At this time, the laborious work of taping the white lines and the yellow lines, was reduced by the introduction of large strips of linoleum, that were affixed to the white lines and yellow lines with double sided tape. This was utilized throughout the remainder of the job, considerably reducing the laborious job of applying tape and then stripping the tape later. Eventually the only deployment of tape, was for the delineation of the 30 metre wide segment and the start and completion lines for the segment length to be sprayed that evening with RJSeal™

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

Table 4.4				Details on RJSeal™ Application on HongQiao Airport						
Work Schedule	Work Time (hrs)	Length (m)	Width (m)	Total Area m^2	RJSeal™ Applied			Application Rate		
					US gals	litres	kgs	US Gal /yd^2	m^2 /Litre	m^2/Kg
Nov 22	4.0	270	30	8,100	529	2,000	2,080	0.055	0.25	3.89
Nov 23	3.5	300	30	9,000	582	2,200	2,288	0.054	0.24	3.93
Nov 24	3.8	500	30	15,000	1005	3,800	3,592	0.056	0.25	3.8
Nov 25	3.3	500	30	15,000	899	3,400	3,536	0.050	0.23	4.24
Nov 26	4.7	361.5	30	10,485	635	2,400	2,496	0.049	0.22	4.34
Nov 27	4.3	500	30	15,000	1085	4,100	4,264	0.060	0.27	3.52
Nov 28	3.3	425	30	12,750	1111	4,200	4,368	0.073	0.33	2.92
Nov 29	3.2	330	30	9,900	1058	4,000	4,160	0.089	0.40	2.38
Totals	30.1	3,186.5		95,595	6,905	26,100	27,144	0.060	0.27	3.52

In view of concern expressed by the Shanghai Airport Authority Operation & Management Company that the RJSeal™ should not degrade the treated asphalt pavement with respect to its skid characteristics, Copper Slag was applied to the surface immediately following the application of RJSeal™. The application rate was approximately 0.5-kgs/sq metre initially but experience showed this was somewhat excessive and gradually reduced to 0.3-kgs/ sq. metre. An information sheet for this product is located in Appendix C. The approximate size consist for the copper slag is as follows: >98% passing #8 mesh (2.5 mm) and <5% passing #30 mesh (0.5mm).

Ambient temperatures at the time of the application were in the 12-17 degree Celsius range, with humidity in the 50% range. The RJSeal™ application work ceased at 3:00 am although an 11 tonne, rubber tired roller continued work unit around 5:30 am. The runway remained closed until 6:00 am, when flights resumed. Photos showing the test application of RJSeal™ follow in figures 4.2, 4.3 and 4.4. on the following pages.

The site was visited on October 28 around 3:00 pm and a difference Was readily perceived between the RJSeal™ treated section and the adjoining untreated asphalt. The copper slag remained on the surface of the runway and had cemented to the RejuvSeal™, however until more traffic has had the opportunity to travel over this section, retention of the product cannot be assessed. Little to no carryover of the RJSeal™ was observed from the airplane tires. So it can be assumed that the RJSeal™ was dry by time the airport resumed flights at 6 am.

Figure 4.2 Typical Application Procedure.

Figure 4.3 Slag Application to RJSeal surface with Sand Spreader.

Figure 4.4 Finished Surface.

4.1 RJSealTM Testing

To date the comparison of the asphalt treated with RJSeal™ has been compared on a subjective basis over a very short period at HongQiao International Airport. Testing equipment brought to the site for comparison solely consisted of an Outflow meter manufactured by Humble Equipment Co. of Reston, Louisiana, U.S.A. This was to establish the Water Dissipation (Hydroplaning Comparison).

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.

- Fuel Resistance Comparison
- Elasticity/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) was 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.

Readings were taken with this aforesaid Outflow Meter at two locations immediately south of the Application portion of the runway. These readings were taken at 3:00 am on October 25. The results are shown in the table that follows:

Table 4.5		**Outflow Meter Readings**			
Test	Vintage of Asphalt Surface	Location relative to center line of the runway	Location relative to center point of runway	Untreated asphalt surface (secs)	Asphalt after RJSeal™ treatment (secs)
One	1998	14 metres west	30 m north	4	n/a
Two	1992	17 metres west	30 m north	n/a	6

- **These readings are quite acceptable from a skid resistance viewpoint.**

Testing by the Shanghai Airport Authority Operation and Management Company using a trailer mounted, skid tester showed that there was negligible difference between the runway before RJSealTM application and after the application of RJSealTM with copper slag. These results were only confirmed verbally and not in writing.

Figure 4.5
Humble Equipment Co. Outflow Meter

4.3 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.

4.4 Elasticity/Ductility Testing

This aspect of the testing is beyond the capabilities of the field equipment available to 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.

5.0 Test Completion Schedule

The technicians from the laboratory in Shanghai that will be dispatched to undertake further testing is scheduled as shown in the following chart.

Hong Qiao Airport, Shanghai, China

RJSeal Application

Date: 20 - 28 October 2003

Prepared by Jason Kwok

Prepared 11-Nov-03

Revised 17-Nov-03

Revised by Tony Speed

Conversion Factors

One Drum	208.0	kilograms

Date	Time	Desco Time	Temperature	Length (m)	Area (m^2)	Consumption of RJSeal (drum)	Application Rate (m^2 / kg)
20 - 21Oct 2003	2300 - 0250	0030 - 0245	15.0 °C	270.0	8,100	10.0	3.9
21 - 22 Oct 2003	2330 - 0300	0050 - 0210	11.1 °C	300.0	9,000	11.0	3.9
22 - 23 Oct 2003	2330 - 0315	0040 - 0245	13.0 °C	500.0	15,000	19.0	3.8
23 - 24 Oct 2003	2330 - 0240	0040 - 0220	12.0 °C	500.0	15,000	17.0	4.2
24 - 25 Oct 2003	2330 - 0410	0030 - 0335	14.0 °C	361.5	10,845	12.0	4.3
25 - 26 Oct 2003	2330 - 0350	0030 - 0335	13.4 °C	500.0	15,000	20.5	3.5
26 - 27 Oct 2003	0010 - 0330	0055 - 0300	14.7 °C	425.0	12,750	21.0	2.9
27 - 28 Oct 2003	2350 - 0300	0050 - 0230	15.5 °C	330.0	9,900	20.0	2.4
					95,595	130.5	3.5

Total Length: 3,186.5 m

Total Width: 30 m

Total Area: 95,595 m^2

Total of RJSeal drum: 130.5 pails

Average Application Rate: 3.5 m^2 / kg

Present: Paul Li, Li Bao Liang, Tony Speed, C.K. Ho, Qu Jiang, Jason Kwok

Remark:

Desco Time: Starting and finish time of spraying RJSeal by Desco.

CROWN CAPITAL ENTERPRISE LIMITED

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HongQiao Airport, Shanghai, Peoples Republic of China

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APPENDICES

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Appendix A

RJSeal™ Descriptive Literature

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Appendix B

Desco D200 Sprayer Technical Specifications

Specification Sheet

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Appendix C

Copper Slag
Technical Specifications

Specification Sheet

TS² Consulting Inc.
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