

RejuvaSeal[®]



Proven Performance



Lab & Field Test Compendium

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Simply stated, RejuvaSeal® reduces costs and extends performance associated with asphalt pavements.

A revolutionary 3-in-1 product, RejuvaSeal stops raveling and the loss of fines, provides protection, and adds longevity to the life cycle of asphalt pavements.

Rejuvenation is possible because RejuvaSeal, unlike seal coats, is designed to penetrate the surface of asphalt. Once it has penetrated, RejuvaSeal dramatically reduces the viscosity and brittleness in the top one-half inch of asphalt while significantly increasing ductility and flexibility—key properties found in new asphalt pavement.

In addition to its ability to rejuvenate, RejuvaSeal is a very effective sealer. The capability to penetrate gives RejuvaSeal unique sealing characteristics. Firstly, asphalt surfaces treated with RejuvaSeal are fuel, water, and chemical resistant.

Secondly, the penetration allows RejuvaSeal to seal and rejuvenate without changing the surface structure of the asphalt. Grooved runways or roads do not have to be re-grooved, nor is PFC asphalt degraded.

Thirdly, RejuvaSeal is durable. During thermal cycles, RejuvaSeal contracts and expands at the same rate as the asphalt. In comparison, coal-tar emulsions and other seal coats simply lay on the surface. They undergo a markedly differing expansion and contraction rate from the asphalt. This eventually leads to cracking, pin-holing, and delamination. RejuvaSeal does not suffer from these problems; through penetration, it becomes an integral part of the asphalt.

RejuvaSeal should be applied to pavements before they begin to show the deleterious signs of age. The sooner the aging process is arrested, the easier and less expensive it will be to maintain the pavement. Application of RejuvaSeal every four to five years will not only extend the life of the asphalt pavement indefinitely, but can reduce the life-cycle cost by sixty-seven percent or more.

With its superior field performance on roads, parking lots, and airfield pavements—a performance verified by independent laboratories—RejuvaSeal is revolutionizing the approach to long-term maintenance of asphalt.

For additional information, please visit www.rejuvaseal.com

Test results contained within this publication are based on studies conducted by Independent Engineers using the following standards and methodologies.

Core Testing

The procedures outlined here describe the proper method for the collection and testing of core samples. Such procedures help insure consistent and comparable test results to those obtained by independent laboratories as documented within this publication.

First, it is very important to decide on the exact area to be tested and then prescribe to the following specifications.

A. Standard Coring Test Site

The asphalt comparison is to be made in an area that will permit the evaluation of both a treated and an untreated surface. A contiguous area of the same aged asphalt with not more than ten feet separating the treated from the untreated surface must be selected.

B. Standard Core Test

The Coal-Tar Rejuvenator Sealer will be applied at an application rate as determined by the supplier of the product. The product must be permitted to penetrate the asphalt fully. This will require a minimum of 72 hours at 70° F average minimum temperature. Treated and untreated cores are to be taken on the same day to create a valid comparative test. In some instances it will be necessary to leave an untreated area within the overall application site.

The comparison sample must be an asphalt surface that has had no other surface treatment applied in the past.

C. Standard Core Quantity

The core size will govern how many cores are necessary for the standard battery of tests. The following core size and number of cores has been determined by surveying several independent testing labs. These core sizes also appear to be standard for most coring companies.

Core Testing Procedure (Cont.)

Core size and Number of Cores Needed from each area:

Six inch (6") diameter
Treated area - 6 cores
Untreated area - 6 cores
Total required - 12 cores

Four inch (4") diameter
Treated area - 8 cores
Untreated area - 8 cores
Total required - 16 cores

D. Core Treatment

Using a diamond blade wet saw, cut off the top 3/8 inch of each treated and untreated core sample keeping the treated and untreated samples segregated.

IMPORTANT: THE EXTRACTED CORES MUST BE PLACED IN DOUBLE SEALED PLASTIC BAGS IMMEDIATELY AFTER REMOVAL FROM THE PAVEMENT, EXPLICITLY MARKED AS TREATED OR UNTREATED.

The untreated cores should be accompanied with a statement regarding location, type of asphalt, age or estimated age of existing asphalt, and condition of the asphalt surface (i.e. loss of fines, oxidized, etc.). These observations will generate a more meaningful report.

By following the above criteria you will receive a report that can be compared with other reports that have been issued in the past.

Core Testing Procedure (Cont.)

The following ASTM tests are useful. These tests validate the advantages of using RejuvaSeal on your asphalt surfaces.

Test Parameters and Procedures (Absorption Method):

Absolute Viscosity
140° F (Poise)
ASTM: D-2171

Asphalt Content
(%)
ASTM: D-2172

Ductility
77° F on Res., 5m/min,cm
ASTM: D-113

Optional Comparisons
Softening Point
ASTM: D-36

Penetration
77° F on Res.,100gm/5sec
ASTM: D-5

Application Procedures

All asphalt pavement differs in age, locale, and composition, thus the rejuvenator required will also vary. Therefore, Pavement Technology International recommends testing each asphalt pavement prior to the application of RejuvaSeal.

Surface treatments such as coal tar emulsions, slurry seal, chip seals, etc. can dramatically impact performance and drying time of RejuvaSeal. The rejuvenator in RejuvaSeal can cause previous emulsions to become sticky and slow drying. If such an event happens, applying 1 to 1.5 pounds of sand (black slag) per square yard can minimize the stickiness. The sanded surface can then be rolled in with a pneumatic rubber tire roller. This will reduce the time required to open the treated pavement area. Applications over existing sealers or slurry coats is not recommended without thorough evaluation.

New asphalt is more sensitive to abrasion than aged untreated asphalt. The same is true with rejuvenated asphalt. When significant fuel resistance is sought, an application of 0.07 gallons per square yard (SY) is recommended. Apply one half of this rate in two steps, with each application separated by four weeks if time permits. If this timeframe is not available, an application of 0.05 gallons per square yard should be evaluated.

RejuvaSeal contains no fillers. Neither sand nor other aggregate needs to be added to the surface. On aged asphalt pavements where friction tests indicate marginal results, sand may be added to the surface of freshly applied RejuvaSeal and rolled in. Significant increases in skid resistance have been achieved with such a process.

The objective is to add as much RejuvaSeal as will penetrate and cure within 24 hours of the application. If site operations requires a shorter cure time this can be evaluated with differing rates. Typically rates of 0.05, 0.065, and 0.08 GSY are utilized. In locations subject to high temperatures and greater sun exposure, a higher rate should be evaluated.

C O P Y

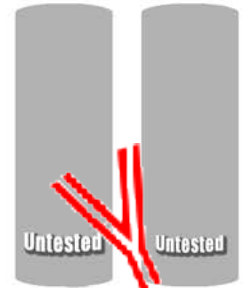
Core Testing



RejuvaSeal



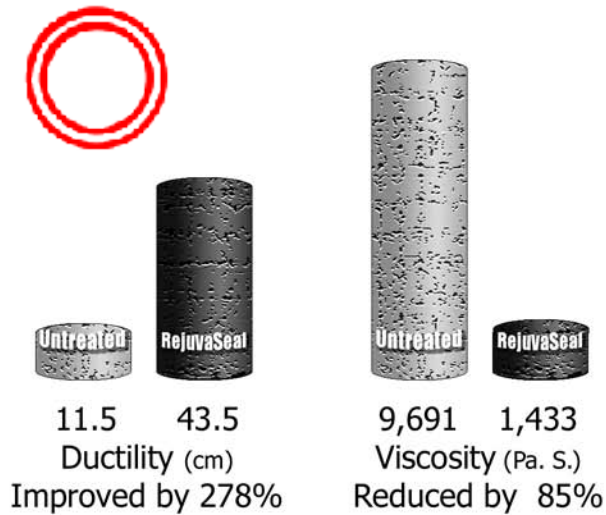
Livermore Airport
Livermore, CA



Penetration (dmm)
Untested



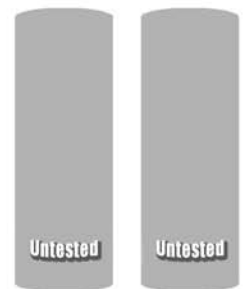
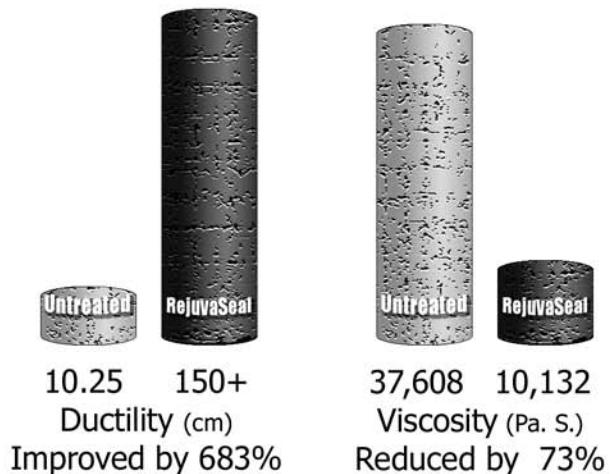
Sierra Blanca Airport
Ruidoso, NM



Penetration (dmm)
Improved by 156 %



Yuba City Airport
Yuba City, CA

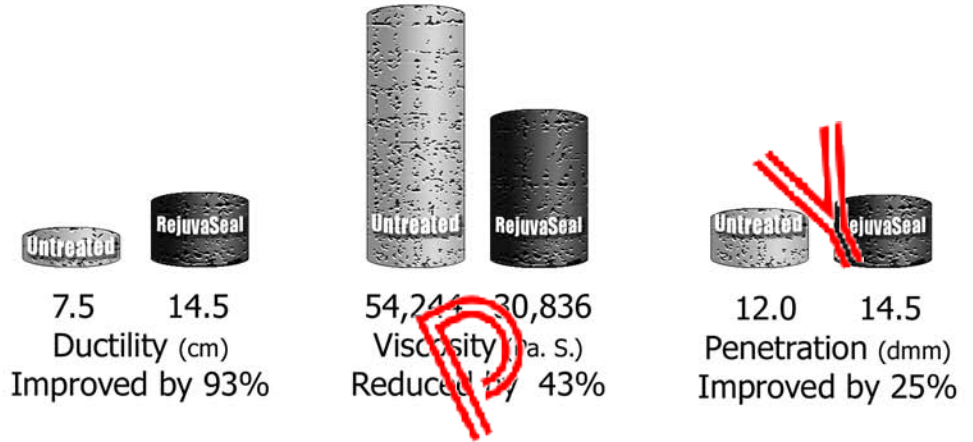


Penetration (dmm)
Untested

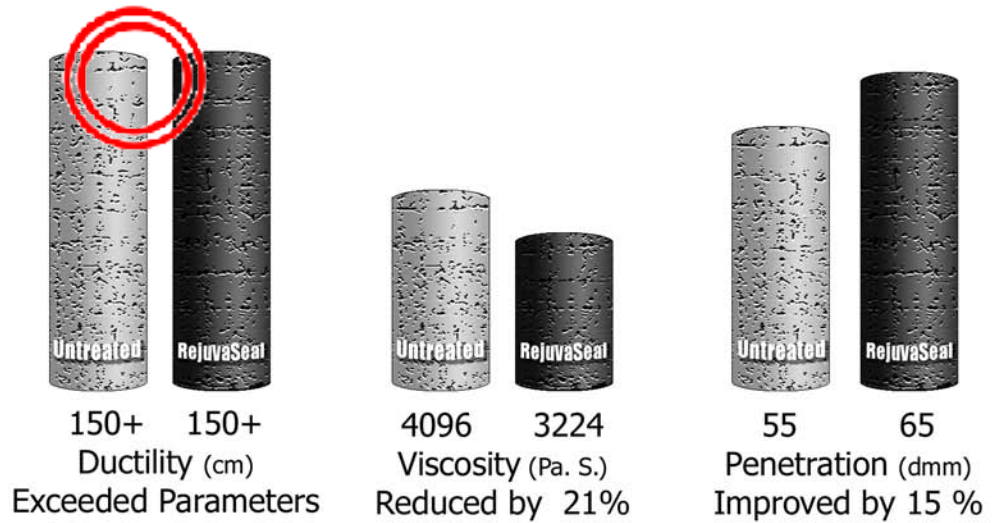
RejuvaSeal



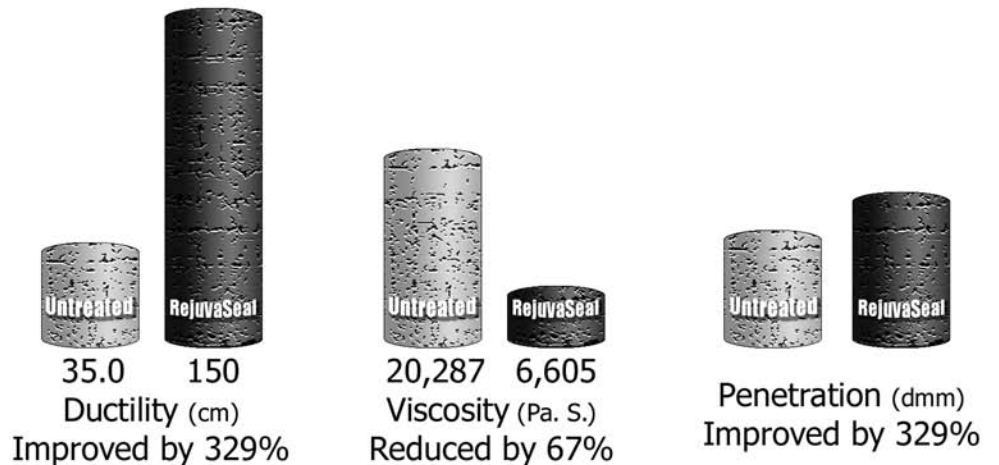
Ceara State Roads
Ceara, Brazil

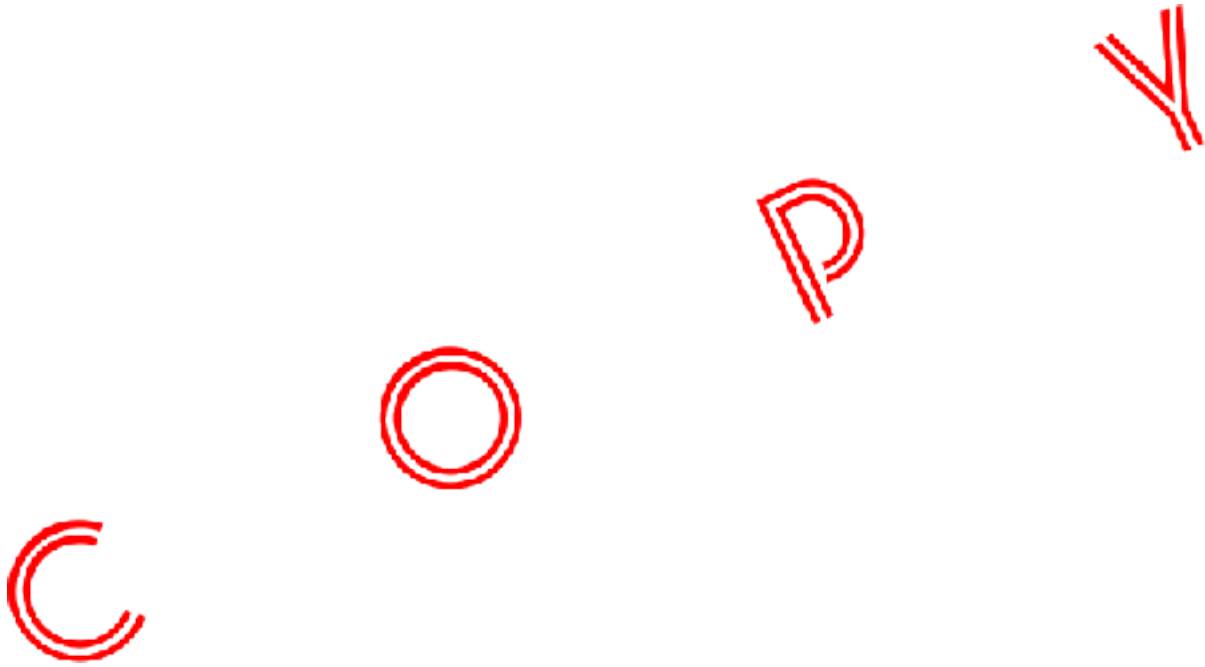


4 Wing CFB
Cold Lake, Canada



CFB Goose Bay
Goose Bay, Canada

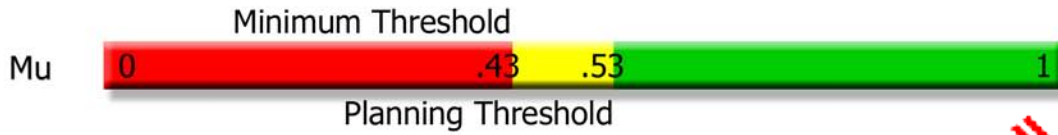




Friction Testing



Friction Testing Canada, 4 Wing - 04



Runway 04 - 22; TESTED at 3M R



Runway 04 - 22; TESTED at 3M L



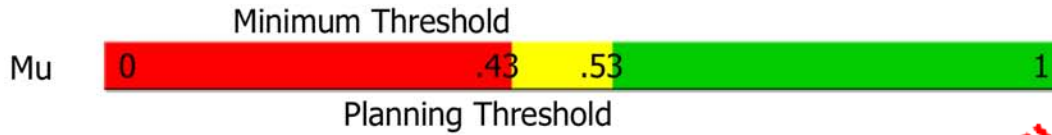
Runway 04 - 22; TESTED at 6M R



Runway 04 - 22; TESTED at 6M L



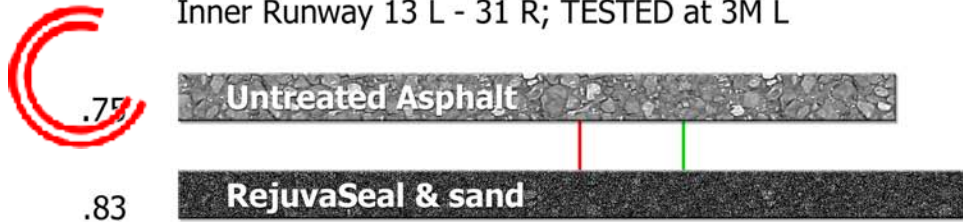
Friction Testing Canada, 4 Wing - 13L



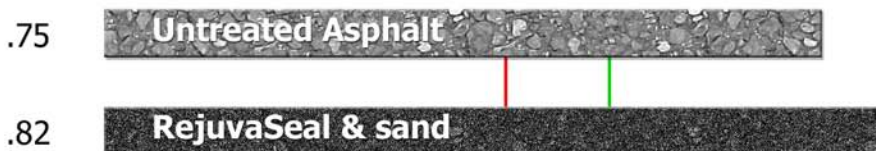
Inner Runway 13 L - 31 R; TESTED at 3M R



Inner Runway 13 L - 31 R; TESTED at 3M L



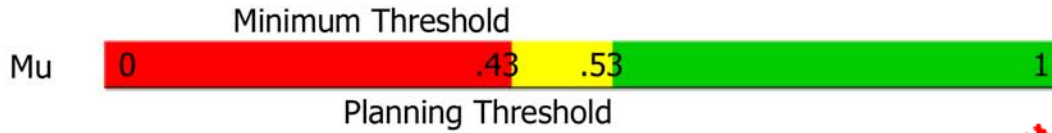
Inner Runway 13 L - 31 R; TESTED at 6M R



Inner Runway 13 L - 31 R; TESTED at 6M L



Friction Testing Canada, 4 Wing - 13R



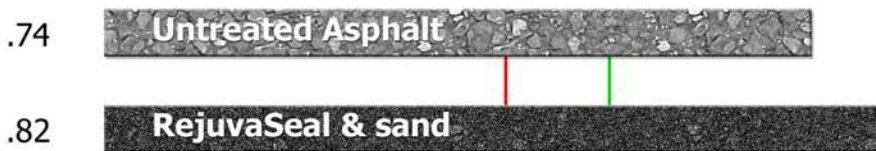
Outer Runway 13 R - 31 L; TESTED at 3M R



Outer Runway 13 R - 31 L; TESTED at 3M L



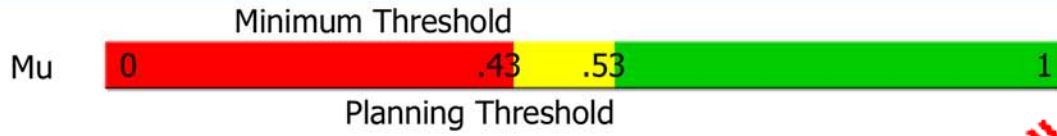
Outer Runway 13 L - 31 R; TESTED at 6M R



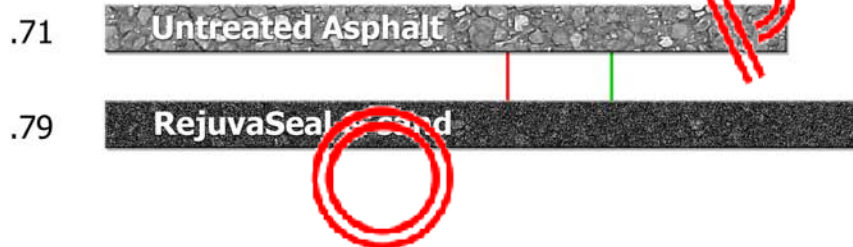
Outer Runway 13 L - 31 R; TESTED at 6M L



Friction Testing Canada, 4 Wing - 31R



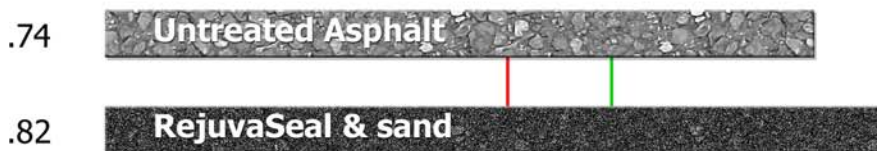
High Speed Taxiway 31 R; TESTED at 3M R



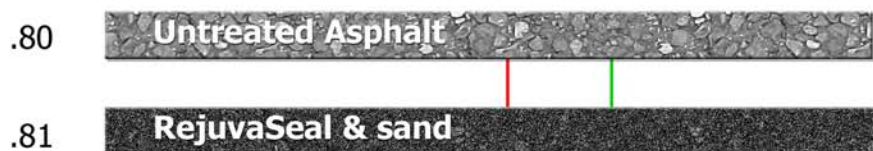
High Speed Taxiway 31 R; TESTED at 3M L



High Speed Taxiway 31 R; TESTED at 6M R

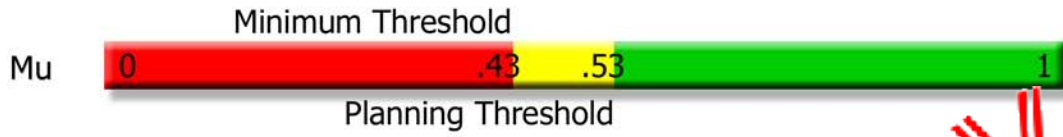


High Speed Taxiway 31 R; TESTED at 6M L



Friction Testing

Canada, 4 Wing - R 04



Runway 04 - 22; TESTED at 3M R



Runway 04 - 22; TESTED at 3M L



Runway 04 - 22; TESTED at 6M R



Runway 04 - 22; TESTED at 6M L

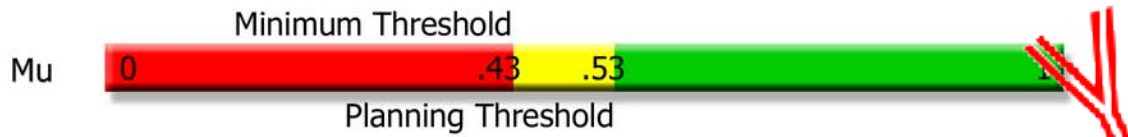


Friction Testing

Canada, 15 Wing R 11L



Two Year Study



15 Wing Moose Jaw, Runway 11 L-29 R: 3M R



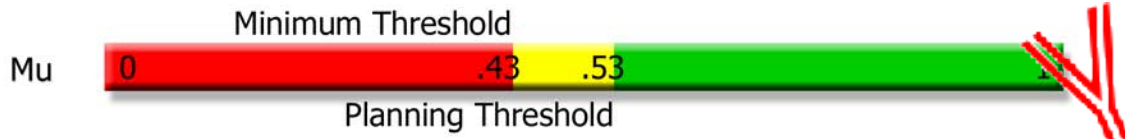
15 Wing Moose Jaw, Runway 11 L-29 R: 3M L



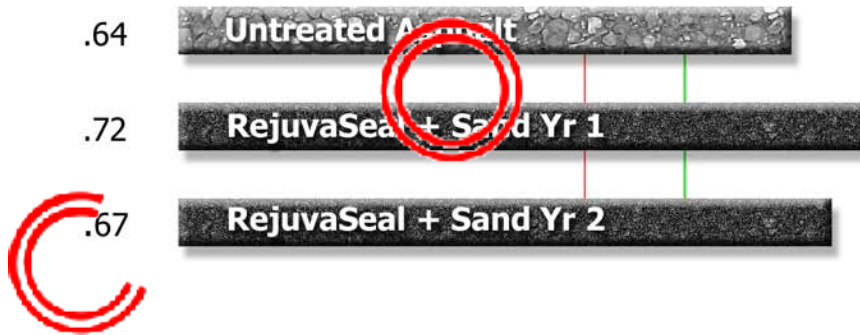
Friction Testing Canada, 15 Wing R 11R



Two Year Study



15 Wing Moose Jaw, Runway 11 R-29 L: 3M R



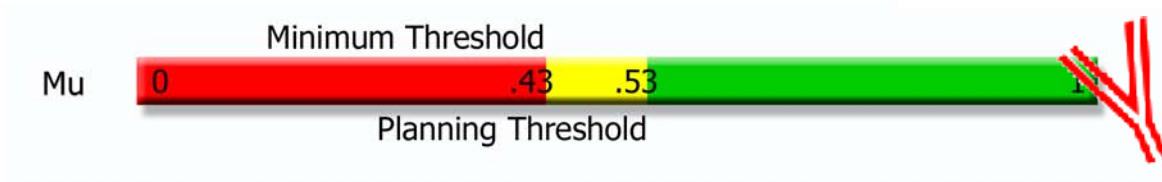
15 Wing Moose Jaw, Runway 11 R-29 L: 3M L



Friction Testing Canada, 15 Wing R 11L



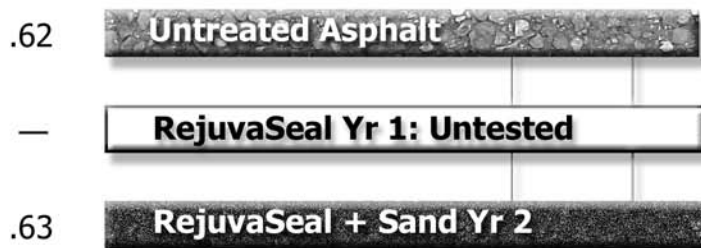
Two Year Study



15 Wing Moose Jaw, Runway 11 L-29 R: 6M P



15 Wing Moose Jaw, Runway 11 L-29 R: 6M L

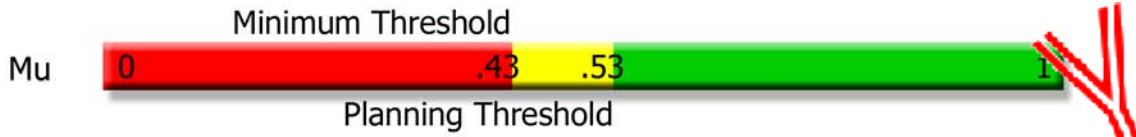


Friction Testing

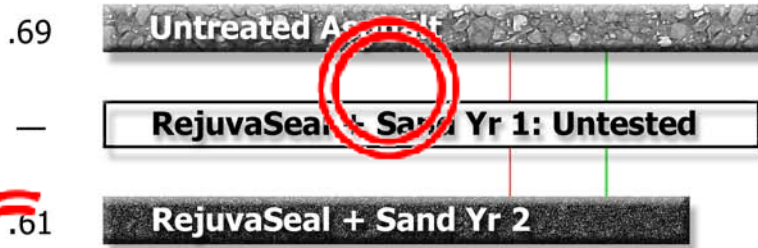
Canada, 15 Wing R 11R



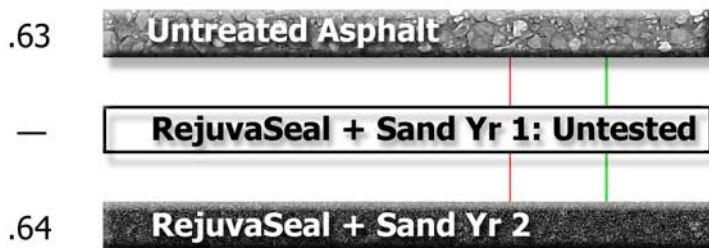
Two Year Study



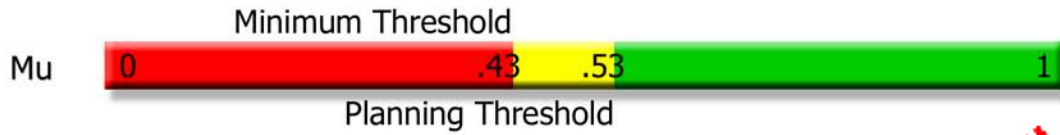
15 Wing Moose Jaw, Runway 11 R-29 L: 6M L



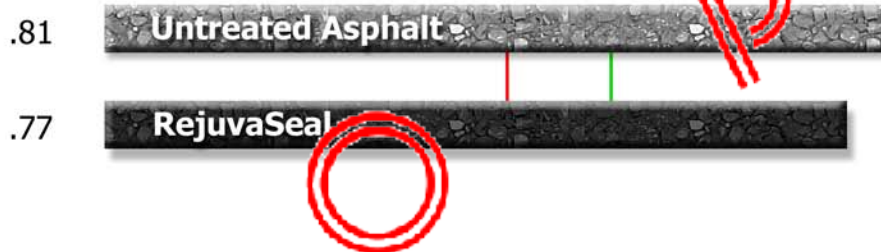
15 Wing Moose Jaw, Runway 11 R-29 L: 6M L



Friction Testing North Dakota, USA



Carrington Municipal Airport, North Dakota USA



Dickenson Municipal Airport, North Dakota USA



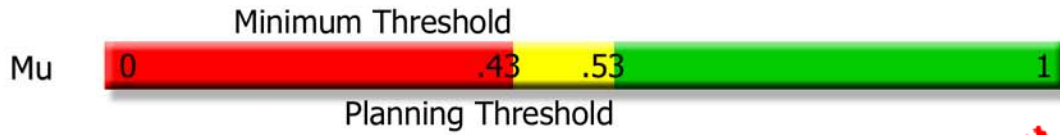
Ellendale Municipal Airport, North Dakota USA



Grafton Municipal Airport, North Dakota USA



Friction Testing North Dakota, USA



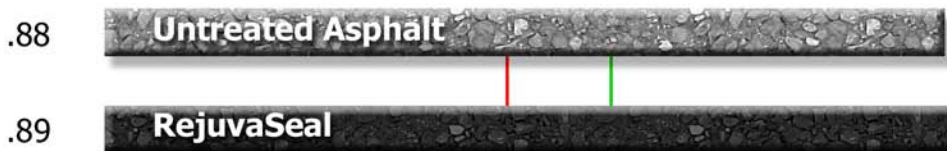
Gwinner Municipal Airport, North Dakota USA



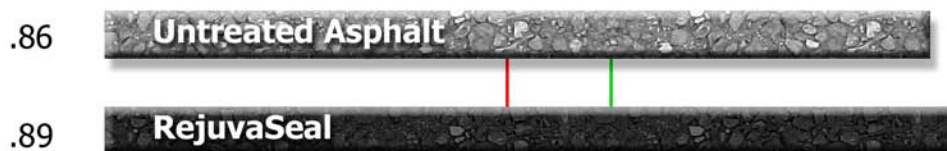
Hazen Municipal Airport, North Dakota USA



Mohall Municipal Airport, North Dakota USA



Mott Municipal Airport, North Dakota USA



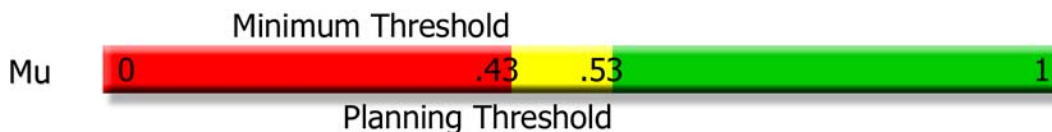
Friction Testing Wallops Island FAA



FAA & NASA FRICTION TESTING WORKSHOP WALLOPS ISLAND, Virginia USA

The personnel of PTI attended the fifth annual NASA Tire/Runway Friction Workshop held at Wallops Island, Virginia. Over 100 participants from 10 countries attended the workshop. During the week long workshop, ten technical presentations were made and over two hundred friction test runs were conducted using 10 different vehicles on twenty-four runway and taxiway test surfaces.

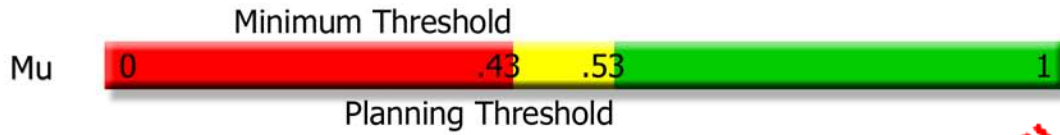
In addition to the friction tests, over fifty surface texture and roughness measurements were collected using four devices. The NASA Langley Research Center instrument tire test vehicle participated in the tests. Prior to this year's workshop, four new overlay test surfaces were installed on the north/south and east/west taxiways. RejuvaSeal was applied to marginal asphalt, which had an initial friction value of .56. The test engineer was Tom Yager, Langley Research Center and the Wallops project coordinator was Joan Selby, Computer Sciences Corporation.



FAA & NASA Friction Testing, Wallops Island, VA USA

.56	Untreated Asphalt
.53	RejuvaSeal +
.51	RejuvaSeal

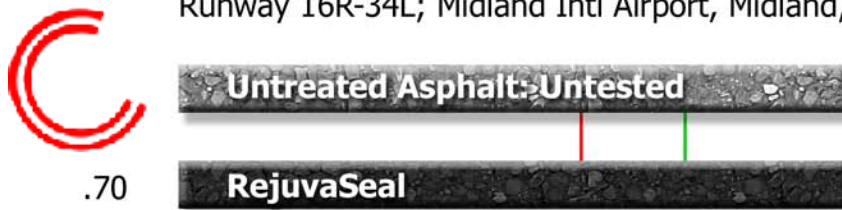
Friction Testing Midland, Tx USA



Runway 10-28; Midland Intl Airport, Midland, Texas USA



Runway 16R-34L; Midland Intl Airport, Midland, Texas USA




Fuel Resistance




RejuvaSeal is highly resistant to fuels and other contaminants that can damage asphalt pavements. Surface wear and abrasions do not diminish the effectiveness of RejuvaSeal, which protects to the depth of penetration.

In field and lab tests, asphalt pavements treated with RejuvaSeal have been subjected to fuel contaminants for various lengths of time. Observations and measurements of the asphalt pavements have provided the following results.

Contaminants	15 Min	30 Min	60 Min	24 HR
Aviation Fuel	Green	Green	Green	Green
Jet Fuel	Green	Green	Green	Green
Hydraulic Fluid	Green	Green	Green	Yellow
Diesel Fuel	Green	Green	Green	Green

 Passed: No Damage.

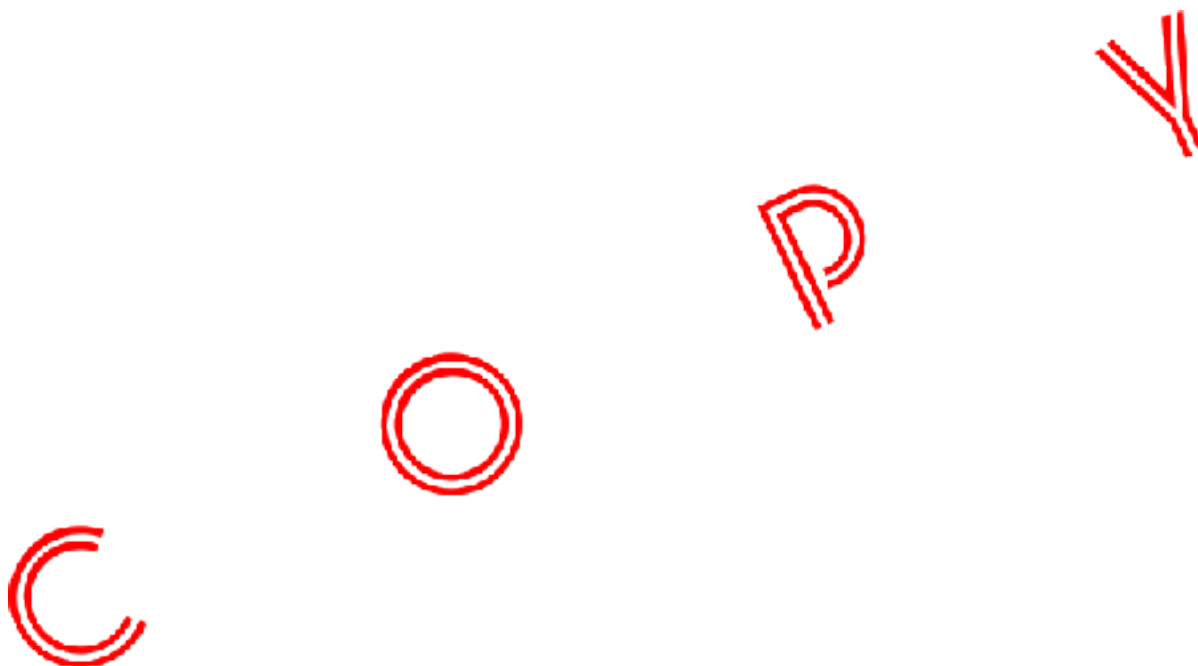
 Passed: Slight Softening. Recovery after cleanup.



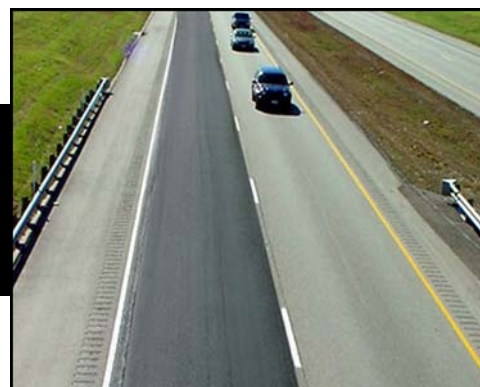
In an empirical test, two core samples were immersed in aviation fuel. Prior to immersion, one core was treated with RejuvaSeal. The other remained untreated.

After twenty-four hours the cores were extracted from the fuel and examined. The untreated core was heavily damaged with loss of binder and aggregate. The core treated with RejuvaSeal was virtually unharmed.





Field Observations



Field Observations –Roads



JEGEL 199232
April 27, 2001

SAND REJUVASEAL PERFORMANCE MONITORING REPORT ENTWISTLE SAND REJUVASEAL DEMONSTRATION PROJECT

John Emery Geotechnical Engineering Limited (JEGEL)

BACKGROUND

As requested by [William Vandemark of PTI] John Emery Geotechnical Engineering (JEGEL), Consulting Engineers, (John Emery, Ph.D., P. Eng., President) has been monitoring the Alberta Infrastructure (AI) Entwistle Sand RejuvaSeal™ demonstration project since August 1999. This performance monitoring report covers the Sand RejuvaSeal technology for the Entwistle demonstration project (JEGEL, [PTI] and Alberta Infrastructure) and our site visit field observations of August, October and December 1999 and October 2000. The Alberta Infrastructure one year (one winter cycle) observations (ABTR/RD/T-00/02 RejuvaSeal Demonstration Project, Entwistle, Alberta, September 12, 2000, Ted Harrison, P. Eng.) are very similar to JEGEL's. Our monitoring will be updated through a site visit later this year to cover two years (two winter cycles). For ease in following this JEGEL monitoring report, eight photographs, with descriptive notes, showing the Entwistle demonstration project site before Sand RejuvaSeal application and about one month, two months and one year after Sand RejuvaSeal application to the chip seal surface are attached.

There is considerable technical information on the growing, successful use of RejuvaSeal (coal tar rejuvenator/sealer to US Federal Aviation Administration requirements) and Sanded RejuvaSeal (RejuvaSeal plus sand such as fine boiler slag (black beauty) or nonferrous slag) for airport asphalt pavement preventative maintenance, sealing and rejuvenation of aged (oxidized), deteriorated surfaces. Similar use of Sanded RejuvaSeal for highway asphalt pavement maintenance represents a natural extension of the airport experience and the need for higher quality road sand seals and scrub seals. The Sand RejuvaSeal rejuvenates the surface of the old asphalt pavement or chip seal (surface treatments) so that it both mitigates the surface oxidation (age hardening) and provides strong adhesion to the old surface. By incorporating a fine sand, the Sand Rejuvaseal provides wear resistance to traffic and maintenance wear and tear. Of particular importance for ravelling old asphalt surfaces or surface treatments (coarse aggregate loss for instance), the Sand RejuvaSeal tends to 'lock up' the surface coarse aggregate with an enhanced

Field Observations –Roads (cont.)



matrix and reduce the rate of surface deterioration. From Sand RejuvaSeal airport experience and conventional emulsion sand seals and scrub seals, it is anticipated that Sand RejuvaSeal (quality controlled coal tar rejuvenator/sealer) should be effective for five to seven years in highway applications. The September 1999 Alberta Infrastructure Endwise Sand RejuvaSeal demonstration project, in cooperation with [PTI], was completed in order to assess the technical benefits of Sand RejuvaSeal as a surface maintenance (preservation) treatment.

DEMONSTRATION PROJECT SITE AND DETAILS

The Sand RejuvaSeal demonstration site is Alberta Infrastructure Highway 16A:08 (Junction of Highway 16 to Junction of Highway 22) near Entwistle, some 100 km west of Edmonton. Highway 16A:08 is essentially a fairly low traffic volume, old highway pavement section parallel to the major provincial Highway 16. The Highway 16A:08 asphalt concrete pavement is 44 years old, with an aged deteriorating chip seal surface (surface treatment) as shown in Photographs I and 2. There has been significant loss of chip seal fines, resulting in the coarse aggregate being readily removed by traffic action and maintenance activities. The surface treated old asphalt pavement is in overall very poor condition with cracking, patching, surface flushing, chip seal loss and some wheel path rutting. At best, the chip seal surface is at its terminal serviceability condition (very poor condition) and presents a real challenge to demonstrate the effectiveness of Sand RejuvaSeal. This pavement section would normally be repaired and resurfaced with hot mix asphalt as was done recently for the pavement section to the east of the demonstration project site.

The Sand RejuvaSeal was placed on September 29, 1999, with the westbound lane chip seal surface treated and the eastbound lane left untreated as a control. As documented by Alberta Infrastructure and [PTI], the westbound lane was first swept to remove all loose material from the chip seal surface. Then, RejuvaSeal test patches were applied at 0.18, 0.23 and 0.27 l/m² to evaluate the appropriate application rate. Based on these test patches, a RejuvaSeal application rate of 0.27 l/m² was selected. For comparative purposes, the first 287 m of the westbound lane (from east to west, 3.2 m wide) was treated with 0.23 l/m² of RejuvaSeal and then the next 1357 m were treated at the selected application rate of 0.27 l/m². A total of 5260 m² of chip seal surface was treated with RejuvaSeal. Approximately 0.48 kg of fine sand (fine boiler slag 'black beauty') per m² was then applied to complete the Sand RejuvaSeal treatment of the chip seal surface. While ambient conditions were rather cool (about 15° C) and damp (light on and off drizzle), the Sand RejuvaSeal cured satisfactorily in two to four hours.

Field Observations –Roads (cont.)



SITE VISIT FIELD OBSERVATIONS

The JEGEL site visit observations are best summarized through the descriptions given with Photographs 3 to 8 taken one month, two months and one year after the Sand RejuvaSeal treatment of the chip seal surface. After one year (one winter cycle), the Sand RejuvaSeal treated chip seal surface is in better condition, with a much lower rate of deterioration, than the untreated control chip seal surface. As also noted by Alberta Infrastructure, the surface of the treated chip seal is somewhat softer than the untreated control, indicating that the Sand RejuvaSeal has mitigated some of the asphalt age hardening and provided strong adhesion to the chip seal surface. The chip seal coarse aggregate is well coated with Sand RejuvaSeal, so that the coarse aggregate is 'locked in' by the improved matrix. This reduction in ravelling potential (coarse aggregate loss) is very important. The sand has resulted in an overall 'sandpaper' like texture. The Sand RejuvaSeal also appears to have mitigated some of the secondary cracking through some edge softening.

It is JEGEL's technical opinion that the one-year performance of the Sand RejuvaSeal for the Entwistle Sand RejuvaSeal demonstration project exceeds our expectations from experience with conventional sand seals, and is most promising particularly given the terminal serviceability condition of the chip seal surface prior to Sand RejuvaSeal treatment. Further performance monitoring is, of course, necessary to check the effective life of the Sand RejuvaSeal for highway applications, but about five years (similar to quality highway scrub seal) appears to be a reasonable assumption at this time. In summary, rejuvenation, adhesion, sealing, friction and wearing resistance are now demonstrated attributes of Sand RejuvaSeal for highway applications.

JOHN EMERY GEOTECHNICAL ENGINEERING LIMITED

John J. Emery, Ph.D., P. Eng.
President, Consulting Engineer

Field Observations –Airports



Texas Department of Transportation

P.O. BOX 150 • ABILENE, TEXAS 79604-0150 (915) 676-6851

April 20, 2001

To Whom It May Concern:

In my capacity as an Aviation Project Manager for the Texas Department Of Transportation (TxDOT), Aviation Division, we have specified and utilized sealer/rejuvenators on many airport projects. Those airports which have been directly under my supervision include: Sweetwater Municipal Airport, Sweetwater, Texas, La Porte Municipal Airpote La Porte, Texas, Hereford Municipal Airport, Hereford, Texas, Scurry County Airport, Snyder, Texas.

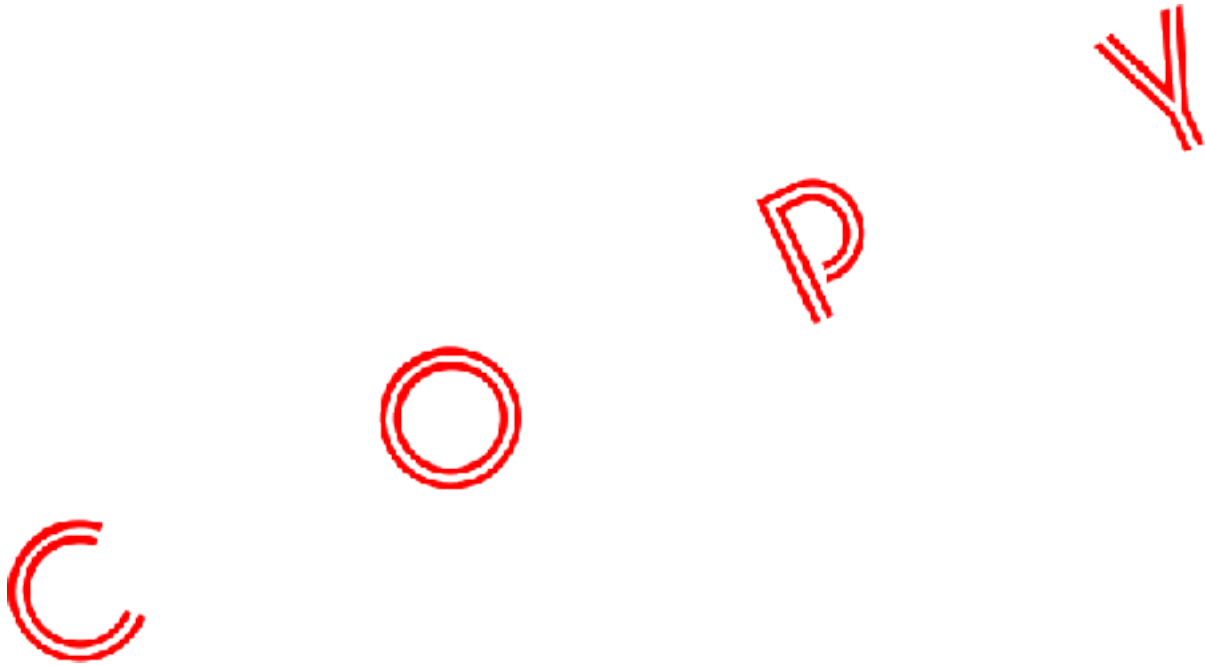
The contractor for these projects, BC&L Pavement Services, has utilized a sealer/rejuvenator which has been certified by the manufacturer to meet the FAA Engineering Bried 44. On the projects identified above, we have observed no problems with the products intended performance. After application of RejuvaSeal, the asphalt surface has a very black appearance with exceptional contrast to the new or existing airport paint markings. RejuvaSeal has assisted stopping oxidation and the loss of fines that some older asphalt surfaces experience. Reports from airports which have been treated RejuvaSeal acknowledged that the product maintains its appearance for more than 3 years.

We are very pleased with the use of the RejuvaSeal product and anticipate specifying sealer/rejuvenators on other upcoming work on airport pavements.

Sincerely,

Steve Roth
Aviation Project Manager
Texas Department of Transportation
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An Equal Opportunity Employer



Application Sites



Application Sites



A Partial Listing of RejuvaSeal Application Sites

Avenger Field Sweetwater, TX	RUNWAY/TAXIWAY/APRON 200,000 SY
Chicago O'Hare International Airport Chicago, IL	SHOULDERS 32,000 SY
Chicago Midway Airport Chicago, IL	SHOULDERS 35,000 SY
Conchas State Airport Conchas, NM	RUNWAY/TAXIWAY 27,000 SY
Corpus Christi International Airport Corpus Christi, TX	RUNWAY 78,000 SY
Dixon Municipal Airport Dixon, IA	RUNWAY/TAXIWAY 50,000 SY
Deming Municipal Airport Deming, NM	RUNWAY/TAXIWAY 50,000 SY
Double Eagle Airport Albuquerque, NM	RUNWAY/TAXIWAY/APRON 220,000 SY
Easterwood Airport, Texas A&M University College Station, TX	RUNWAY 100,000 SY
Grand Prairie Municipal Airport Grand Prairie, TX	APRON 33,000 SY
Houston County Airport Crockett TX	RUNWAY/APRON 40,000 SY
I-10 Project Waco, Tx	Highway

Application Sites



Jonesboro Municipal Airport
Jonesboro, AR

RUNWAY
62,000 SY

Levelland Municipal Airport
Levelland TX

RUNWAY
57,000 SY

Maverick County Airport
Eagle Pass, TX

RUNWAY/TAXIWAY
100,000 SY

McMahon Municipal Airport
Big Springs, TX

RUNWAY/TAXIWAY/APRON
200,000 SY

Ogden-Hinckley Municipal Airport
Ogden, UT

RUNWAY/TAXIWAY/APRON
220,000 SY

McMahon Municipal Airport
Big Springs, TX

RUNWAY/TAXIWAY/APRON
200,000 SY

Petaluma Airport
Petaluma, CA

RUNWAY/TAXIWAY/APRON
40,000 SY

Red Bluff Airport
Red Bluff, CA

RUNWAY
35,000 SY

Russellville Municipal Airport
Russellville, AR

RUNWAY
40,000 SY

SAM's Club
Corpus Christi, Tx

Parking Lot

San Angelo International Airport
San Angelo, TX

RUNWAY
115,000 SY

San Antonio International Airport
San Antonio TX

TAXIWAYS/APRON
50,000 SY

Sacramento Intl Airport
Sacramento, CA

RUNWAY/APRON
300,000 SY

Application Sites



Santa Fe Municipal Airport
Santa Fe, NM

RUNWAY/TAXIWAY
140,000 SY

Scurry County Airport
Snyder, TX

RUNWAY/TAXIWAY/APRON
200,000 SY

Sierra Blanca Airport
Ruidoso, NM

APRON/TAXIWAY
175,000 SY

Victorville Airport
Victorville, CA

RUNWAY/TAXIWAY/APRON
200,000 SY

WalMart
Corpus Christi, TX

Parking Lots
25,000 SY

WalMart SuperCenters
Corpus Christi, TX

Parking Lot and Roads
40,000SY

Department of National Defense
Carlsbad

RUNWAY/TAXIWAYS
2,000,000 SY

Airports and Roads in Central and South America

2,000,000+ SY

Airports and Highways in The Peoples Republic of China

1,000,000+ SY

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Additional sites in the USA includes public roads, airports pavements, private roadways, and commercial-industrial parking lots.



Q & A



Questions & Answers



1. When is the best time to apply RejuvaSeal?

As long as an asphalt pavement is structurally sound. RejuvaSeal can be applied to extend pavement life. Ideally RejuvaSeal should be applied before the pavement shows deleterious effects. Age wise, it is recommended that RejuvaSeal be applied approximately 2 years after pavement installation depending on the surface condition of the asphalt at that time. For fuel resistance on newly installed asphalt, RejuvaSeal can be applied within days after installation. Application to new asphalt must be under the direction of an experienced applicator or technician.

2. What are the application rates?

Application rates vary based on inspections and test patches. The average rate across the country has been approximately 0.065/gallons per square yard. Normally, the higher the oxidation rate, the higher the application rate. Porosity also plays a major role in determining application rates. For example, porous friction coarse (PFC) asphalt takes as much as 0.10 gallons per SY.

3. How do you know what application rate to use in applying RejuvaSeal?

In a bidding situation the application rate is estimated and then when the project is begun the application rate is determined by using the application equipment to test each different asphalt surface on the site. It takes in reality, approximately two hours to determine the proper rate. Most specifications require a 24 hour period to choose the proper rate.

4. How far does RejuvaSeal penetrate?

Penetration cannot be seen visually. The penetrating elements of RejuvaSeal are not the rich black tar but rather colorless distillates. To measure the penetration, it is necessary to take slices of core samples at varying depths and chemically measure changes between treated and untreated samples. Historically, we have found that 3/8 inch (9.5 mm) is a realistic result. Greater depths of penetration are usually due to porosity of the pavement. But it is the top 3/8 inch (9.5 mm) that is most important for this is where most oxidation is concentrated. If this is rejuvenated then an extension in life of the asphalt is possible.

Questions & Answers



5. How long does the product take to cure?

Drying or curing time is related to how porous and how oxidized the asphalt surface happens to be. As mentioned above, high humidity may slow the penetration and curing time. We always request 12 to 24 hours for proper drying time. However, we have seen it cure out as quickly as 3 to 6 hours. Normally it will take approximately 12 hours to cure properly. Another factor that effects when the surface can accept traffic is if we use sand for friction. Sand many times will speed the curing time.

6. What about striping and special paint and how long to wait before re-striping?

Painting on a coal tar rejuvenator/sealer requires the use of a water base paint as coal tar will turn a white oil base paint yellow if applied before the coal tar is completely cured. Since airports need to open a runway in a very short period of time we recommend that they apply a half application rate the next day and then a second coat of paint within 14 days or longer to prevent event the water base paint from discoloring. Basically, the surface needs to be dry before striping which is normally the next morning.

7. Will RejuvaSeal lower (raise?) friction?

Anytime a sealer is applied to an asphalt surface it can lower the coefficient of friction. It has been our experience that the percent loss of friction averages 10%. The key thing here is that if poor friction is suspected, the surface should be tested with an FAA certified or slip friction tester or a state approved lock wheel tester. Using a crushed black copper and black iron slag we have had great success in even improving the initial friction numbers.

8. How does RejuvaSeal affect the macro surface texture?

Micro texture and macro texture together impact friction resistance on pavements. Simply stated, macro texture of sufficient quantity aids in the evacuation of water thereby lessening the propensity to hydroplane. Micro texture represents the pin points of aggregate which puncture the water layer allowing for friction to take place.

RejuvaSeal has no impact on macro texture. It contains no fillers or aggregate. It is designed to penetrate the surface. The impact of RejuvaSeal on macro texture has been studied extensively. Many tests utilizing the Outflow meter have been undertaken. The Outflow meter measures the rate of water evacuation from a cylinder placed on the pavement. The higher the macro texture the faster is the rate of evacuation.

Questions & Answers



Micro texture however is reduced with the use of any pavement coating. Again, because RejuvaSeal is designed to penetrate the asphalt cement, only the amount adhering to the aggregate impacts or lowers micro texture. Generally, if the micro texture is above safety minimums the reduction is not significant. Usually a 10% to 15% decrease is initially evident. With use (traffic), the friction level increases as the surface of the aggregate is abraded. However, if the texture is borderline the post application of a fine sharp mineral aggregate can be used to restore the micro texture back to its pre application level. These features have been confirmed through studies utilizing FAA certified CFME equipment precisely calibrated to measure micro texture.

The RejuvaSeal system can be used to improve the surface texture of a pavement. Studies of heavily used airports in Canada confirm this feature as do studies taking place some 2 years after the application. Added fines are still evident on the surface and the friction remains at or above the level that it was prior to treatment.

9. Can RejuvaSeal be applied over fog sealer; Slurry seal, Coal tar emulsion sealer, and Chip seal?

Allowing for extended dry times, RejuvaSeal can be applied to various coatings. The age of the previously sealer and the condition of the pavement surface needs to be evaluated. Normally a previously sealed surface will require a slightly lower application rate. A previously sealed surface can greatly affect the drying time because RejuvaSeal, in some cases, may rejuvenate the existing sealer. It is recommended that RejuvaSeal not be applied to a previously sealed surface unless it is extremely oxidized or worn.

10. Will RejuvaSeal fill cracks?

The coal tar in RejuvaSeal will only fill micro cracks which have not opened up yet. RejuvaSeal will coat the walls of an open crack with the proper application rate. As a result of not having fillers, RejuvaSeal will not level out low areas. The product is designed to penetrate, not to lay on the surface, and not to fill voids. RejuvaSeal will not alter the surface integrity of the asphalt surface.

11. What is the recommended process for crack filling?

RejuvaSeal can be applied before or after crack filling. However, the recommended procedure is to rout, apply RejuvaSeal, then crack fill. RejuvaSeal promotes a stronger binding action between the crack filler and asphalt.

Questions & Answers



12. What kinds of crack fillers are compatible with RejuvaSeal?

Most rubberized hot pour crack fillers are compatible with RejuvaSeal.

When applying over most crack fillers, RejuvaSeal can temporarily soften the crack filler for a short time before complete recovery. Obviously the fresher the crack filler is, the more likely it is to soften.

13. Can an AC overlay be applied after using RejuvaSeal?

The unique benefit in using RejuvaSeal is that the surface can be overlaid at any-time. RejuvaSeal is an excellent binder for asphalt and rubberized crack filler products. This is why crack filling after the application of RejuvaSeal is recommended.

14. How many years has RejuvaSeal been used?

RejuvaSeal has been in use for more than 7 years. RejuvaSeal has been applied to well over 150 airports world wide and on highway projects in and out of the US.

RejuvaSeal has been used by the U.S. Military, The Canadian Armed Forces, and has been specified for use at numerous airports, parking lots, and roadways throughout the world.

15. How long will RejuvaSeal stay black?

RejuvaSeal is an organic product so it will eventually gray out. The more intense sun, the faster the graying. Even in intense UV areas, RejuvaSeal has remained very dark for seven years. RejuvaSeal should be reapplied every 5 to 7 years to maintain the rejuvenation of the asphalt binder.