

Airport Improvement



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Exterior Jet Bridge Coating Saves Energy, Increases Passenger Comfort at Harry Reid Int'l



Toronto City Airport Leads the Move to Fluorine-Free Firefighting Foam

HARRY REID
INTERNATIONAL
IAS VEGAS



FACTS&FIGURES

Project: Solar Heat-Resistant Coating
for Boarding Bridges

Location: Harry Reid Int'l Airport in Las Vegas

Scope: About 100 jet bridges

Status: 70 have been coated since 2017; remaining
44 will be treated as they come due for electronic
refurbishment in next 2 years

Cost Per Bridge: Similar to standard paint

Product: **SuperTherm[®]**, by SPI Coatings

Application Contractor: Southwest Specialty
Coatings Inc., sister company of Car-Ray Painting

Timeline: Application takes 7-10 days per bridge;
coating is applied when bridge is taken out of service
for electronic refurbishments

Key Benefits: Reduces cooling time & energy
consumption; improves passenger comfort; reduces
wear & tear on preconditioned air units; extends life
of jet bridges

Associated SPI Coatings Products: **Eramo**
Grip topcoat for sides of bridges; **Eramo Grip 5000**
topcoat for rotating rotunda segments; **Rust Grip[™]**
corrosion protection for components showing signs
of rust

Exterior Jet Bridge Coating Saves Energy, Increases Passenger Comfort at Harry Reid Int'l

BY KRISTEN RINDFLEISCH

Harry Reid International (LAS) in Las Vegas regularly sees temperatures of more than 100 degrees Fahrenheit throughout the summer, requiring significant energy to cool its passenger boarding bridges. The Clark County Department of Aviation, which operates LAS, has opted to have a reflective ceramic coating applied to bridge exteriors to help keep the interiors more comfortable for passengers. The strategy will also save energy and prolong the life of the airport's preconditioned air units, as well as the jet bridges themselves.

When temperatures at the southwest desert airport soar, the external surface temperature of its metal boarding bridges

can exceed 200 degrees Fahrenheit, and most of that heat radiates into the boarding bridges. "We wanted not only more efficient preconditioned air units, which we're looking into, but it was really more about how we could reduce the cooling curve, if you will, to get that temperature down to better ambient temperatures," says Doug McMahan, managing director for Facilities and Maintenance with the Clark County Department of Aviation. "So, we wanted to look at something innovative."



DOUG McMAHAN



McMahan found just that through a construction management consultant who was discussing a coating product while working with other local public entities.

Testing and Results

Aviation Department personnel began general testing of Super Therm[®], a reflective ceramic coating manufactured by SPI Coatings, in 2017. For reference, the company offers two kinds of ceramic coatings generally applicable to jet bridges: HPC[®] Coating, which is a thick-film, insulating coating applied on the inside to block conductive heat transfer; and Super Therm[®], a thin-film, reflective coating usually applied on the exterior to block and repel 95% of solar radiation heat.

SPI Coatings Vice President of Business Development and Technology Timothy Cappel explains that Super Therm[®] does not absorb heat from the sun. "That's the benefit," he remarks. "If it doesn't absorb the heat, then there is no heat transfer to the inside of the passenger walkways."



TIMOTHY CAPPEL

In 2018, LAS began testing the ceramic coating on passenger boarding bridges that face southwest, because they receive the most radiant heat. Typically, a

preconditioned air unit starts cooling the jet bridge 20 to 30 minutes before a flight arrives. It does so by taking hot outside air and chilling it with air between 28 and 34 degrees Fahrenheit. After the aircraft parks at the gate, it is connected with exterior hoses, and the cooling system is switched from bridge mode to aircraft mode so the aircraft can turn off its auxiliary power unit and stop burning fuel to cool the air on board.

To test the performance of Super Therm[®], the project team recorded temperatures inside the bridges before starting the preconditioned air units, and also measured the time needed to cool them. McMahan reports that coated bridges were cooler to begin with—staying with a few degrees of ambient temperatures even as the day warmed up—and also cooled down faster. "The bridge was able to maintain a lower setpoint when we switched over to the aircraft mode," he adds.

Phased Implementation

After extensive testing for the better part of two years, the Clark County Department of Aviation decided to incorporate Super Therm[®] into the ongoing refurbishment of all JBT AeroTech boarding bridges at LAS. The coating manufacturer recruited Southwest Specialty Coatings for installation. And in 2019, the contractor began applying Super Therm[®] to jet bridges as they were pulled from service to receive updated electronic components and controls.

PHOTO: SOUTHWEST SPECIALTY COATINGS INC



The new coating reflects rather than absorbs heat from the sun.

"We try to take advantage of when those bridges are going to be closed anyways," McMahan explains.

So far, crews have coated approximately 70 jet bridges; the remaining 44 will be coated over the next two years as they come due for other refurbishment.

McMahan notes that the cost is about the same as repainting bridges with a standard paint product. "It's obviously well worth that for the benefits we derive," he says.

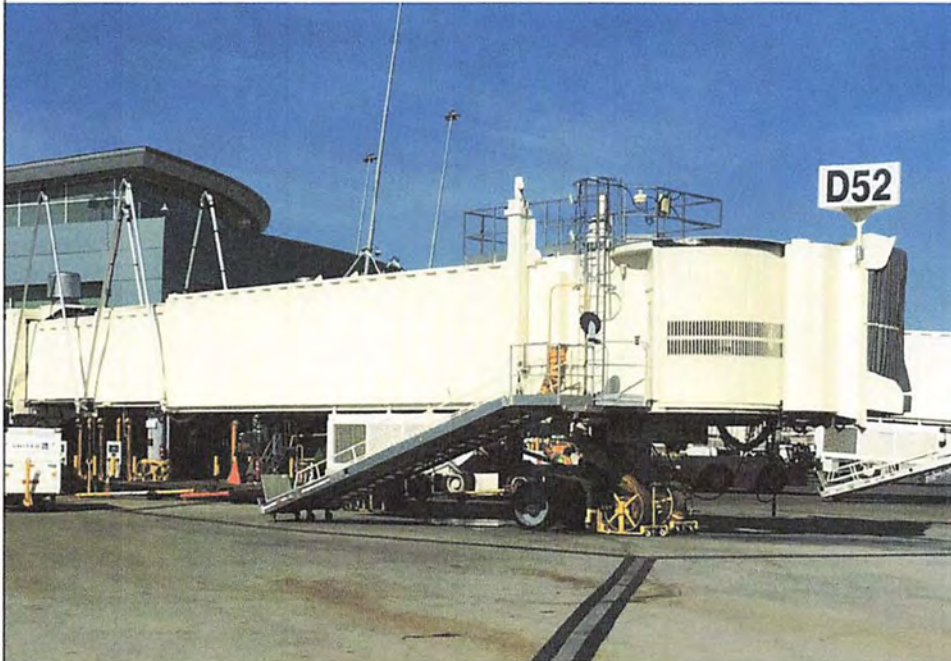
The reflective ceramic coating helps drop the interior temperature of the jet bridges to within three or four degrees of the ambient air temperature, but that is still quite hot many days. "Usually on the inside of a metal shell like that, it can climb up to 130 or 140 degrees easily,"

says Justin Leavitt, operations manager at Southwest Specialty Coatings. In general, travelers are unlikely to notice the temperature on a jet bridge unless it's extremely hot or cold. If passengers at LAS don't notice extreme heat, that indicates the coating is doing its job. "Even though they may be walking through and not even realize it, it's more comfortable," Leavitt notes.



JUSTIN LEAVITT

IT'S NOT JUST PAINT!



Do you want to cool your jetways?

We have a solution!

- Ceramic-based coating applied to exterior of jetway to block solar radiational heat load
- Coating prevents surfaces from absorbing heat from the sun and keeps the surface cool throughout the year
- Blocks and repels about 95% of solar radiational heat load (heat from the sun) and maintains an exterior surface temperature within approximately 5 °F of ambient air temperature, according to the manufacturer's representative Timothy Cappel
- Helps reduce energy costs and keeps jetways comfortable for passengers
- Coating is UL tested and approved with a 30-year lifespan with less than 10% reduction in effectiveness



COR-RAY PAINTING/SOUTHWEST SPECIALTY COATINGS

A sister company of Cor-Ray Painting located in Las Vegas, Nevada

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Application Process

Crews apply Super Therm[®] onto the roof and exterior sides of the jet bridges and also onto the rotating rotunda segments. Enamo Grip, another product from SPI Coatings, is applied on the sides of the bridges as a topcoat, but the roofs do not need it, Cappel advises. Enamo Grip 5000 is used as a topcoat on the rotunda segments for added protection against the additional movement and wear. Rust Gripe, a corrosion protection coating from SPI Coatings, is applied to any rails or other components showing signs of rust.

Applying Super Therm[®] isn't as simple as spraying on a fresh coat of paint, McMahan notes. The physical composition and viscosity of the material are unique, requiring special equipment and techniques. Contractors consequently need to be trained and certified by SPI Coatings to ensure quality and guarantee integrity of the product throughout its 10-year general product limited warranty. "SPI Coatings was definitely the firm that just knocked it out of the park for us," McMahan remarks. "Their quality was phenomenal, and they stand behind their product."

Naturally, coordination has been crucial during the phased applications at LAS. "We have to communicate well, so the [boarding bridge] is down for as minimal time as possible," says Leavitt. "It's really just sequencing-making sure we schedule

things correctly with the intricacies of getting in and out of the airport property."

Each boarding bridge takes about seven to 10 days to coat, and work is completed onsite at LAS. The only preparation for airport personnel is extending the bridge to its full length so technicians can work on the entire structure. Crews from Southwest Specialty Coatings set up a barrier to protect the area around the jet bridge as they work. There is virtually no impact on travelers or airport operations.

Barring extreme weather conditions or bonding problems during application, Super Therm[®] can last 25 to 30 years before it may need to be reapplied, says Cappel. When that time comes, a new layer can be applied directly over the previous coating.

Efficiencies and Benefits

Because it takes less time to cool coated bridges, the airport's preconditioned air units will consume less energy and presumably last longer because they are running for shorter periods of time. Moreover, the ceramic coating is expected to extend the life of the bridges because it is thicker than regular paint, eliminates expansion and contraction of the metal structure and provides a buffer to everyday wear and corrosion.



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SUPERIOR PRODUCTS
International 11,Inc.

TUCSON AIRPORT



374,804 sq.ft. of Roofing
Coated with the
Super Base(HS) | Super Therm System

Submitted by:
Jim Williams
Arizona Superior Coatings

SPI CASE HISTORY

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ENERGY AUDIT AND REPORT

Attached are comparisons of our terminal electric bills for August and September 2008/2009. I was trying to get a feel for the potential gains made by the application of the Super Therm roof coating product that was completed in early August 2009. I calculated the Cooling Degree Days (CCD) for each month and compared the kWh used per COD for each month.

There was a 22% savings in August 2009, and a 8% savings in September 2009. The temperature change was +3.3°F over 2008 in August and +1.4°F over 2008 in September. According to ConEdison Energy, a 6°F change can relate to a 40% change in A/C cost. With the ambient temperature in 2009 being 3.3°F hotter, this could push the A/C cost up another 20% before SUPER THERM was applied.

Therefore, the savings reported could be 20% to the benefit more than reported.

Chris Wilt
Airport Facilities Manager

ADDITIONAL NOTES by J.E. Pritchett (SPI) concerning the results:

A very important point is that the 22% savings for the airport was on the TOTAL energy bill (lighting, elevators, food facilities, etc). This simply means that the SUPER THERM made a 40% reduction in the A/C costs.

From the ENERGY UTILITIES companies, the A/C portion of a total energy bill is 55% which when calculated on the 22% savings of the total relates to the 40% savings in pure A/C costs. This is very substantial savings in the A/C cost savings. It also means that the NC tonnage can be reduced to save more money.

Equipment savings: Run time on the units is reduced which extends their life cycle and saves a tremendous amount of money on replacement or repair of equipment.

Maintenance and repair savings: Therefore, the cost savings is much more than just the 40% savings for A/C.



Tucson International Airport Terminal Electric Usage

Tucson International Airport Terminal Electric Usage
 To assess potential gains made by Super Thenn Roof Coating
 11/21/2009

Terminal	kWh August 2008	kWh August 2009	kWh August 2009	% 2009	\$\$\$ August 2008	\$\$\$ August 2009
Terminal 1 West Central Plant	533,200	375,200	(155,000)	-30%	\$42,612	\$32,257
East Concourse	620,400	503,700	(116,700)	-18%	\$51,114	\$44,480
West Concourse	1,174,900	1,235,900	61,000	5%	\$129,534	\$107,390
Totals:	1,603,000	1,235,900	-367,100	-23%	August 2009 kWh Used Versus August 2008	
Cooling Degree Days (COD):	690	684				
kWh/COD:	2.323	1.807				-22% August 2009 kWh/CO Savings Versus August 2008

August 2008 was the 30th warmest August on record. 85.4 average temperature
 TEP August 2008 Invoice is from 8/11/08 - 9/13/08, 34 days

August 2009 was the 2nd warmest August on record. 68.7 average temperature
 TEP August 2009 Invoice is from 8/14/09 - 9/11/09, 29 days

Terminal	kWh September 2008	kWh September 2009	kWh September 2009	% 2009	\$\$\$ September 2008	\$\$\$ September 2009
Terminal 1 West Central Plant	331,600	338,000	6,400	2%	\$27,987	\$29,284
East Concourse	487,800	527,400	39,600	8%	\$41,557	\$45,950
West Concourse	1,174,900	1,244,600	69,700	6%	\$129,534	\$107,005
Totals:	1,174,900	1,244,600	69,700	6%	September 2009 kWh Used Versus September 2008	
Cooling Degree Days (COD):	492	568				
kWh/COD:	2.388	2.191				-6% September 2009 kWh/CO Savings Versus September 2008

September 2008: 82.1 average temperature
 TEP September 2008 Invoice is from 9/14/08 - 10/11/08, 28 days

September 2009: 83.8 average temperature
 TEP September 2009 Invoice is from 9/21/09 - 10/10/09, 21 days

Notes: East and West Concourse Remodel Complete. Started 8/31/08. August 2009 usage reflects this improvement (Included new lighting, HVAC with VAVs, EMCS, 2U new chiller)

Super Thenn roof coating completed on 8/11/09 but was still 99% complete as of 8/4/09



SPI CASE HISTORY

SAVINGS:

With the total utility savings of \$22,144 (22%) in August for the total facility and the A/C portion of the total utility being 55%, this relates to a 40% savings in A/C operational cost. The savings are beyond the A/C running cost, the units cycle more giving long life, less maintenance work and less tonnage to take care of the main terminal and wings.

ROI:

The total roof area of the terminal is 374,804 sq.ft., at a cost of \$2.10/sq.ft., for a total job cost of \$787,008.

NOTE: "Super Therm® works by reflecting and not absorbing solar heat. The results achieved in this [test/field report] are unique to the structure, geographic location, weather conditions, and time period of Super Therm®'s application. Results may vary depending on these factors."

With a cost reduction of \$22,144 / month, it results in a 36 month return. If the savings is averaged at less at \$15,000/month, the result is 52 months return.

No matter whether the return is calculated on 36 months or 52 months, this savings amount is now available to offset budget needs without the need to find new funding.

RENTAL CAR WASH BAYS:

The car wash bays were done first, and we had to remove the existing elastomeric coating which was not adhering, was not water proofing and was not insulating.



Rental Car Wash roof Before Pressure Wash



Roof Before Pressure Wash



Pressure Washer Removing Elastic Coating



Elastic Coating removed by pressure washing



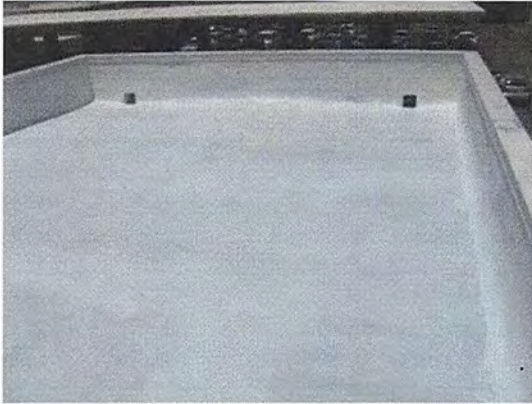
Rental Car RoqfDun-ng Pressure Wash



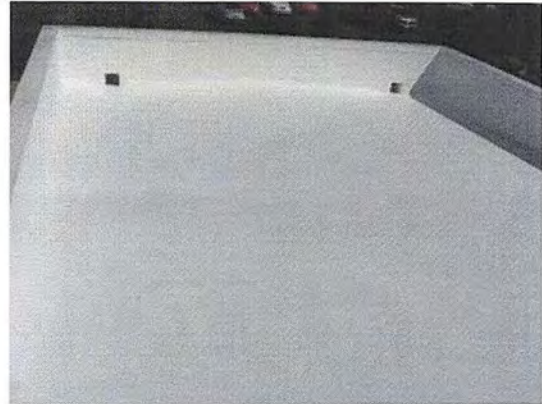
RoqfDuring Pressure Wash



SPI CASE HISTORY



RoefA.fter Super Base



RoefA.fter Super Thenn

MAIN TERMINAL ROOF COMPLEX: 374,804 sq.ft.

We coated the entire Tucson Airport complex of roofing in Tucson, Arizona.

The attached pictures show the beginning with the center roof coated and the remaining roofing sections.

There are also additional buildings off site that are scheduled to be coated as well.

The roofing is "cap sheet" which is tar paper and this requires SUPER BASE (HS) at 9 sq.m (100 sq.ft.) per gallon and then overcoated with SUPER THERM at 9 sq.m (100 sq.ft.) per gallon.

Other parts of the roofing is PVC or a plastic type material which is weathered but is in good condition and provides good adhesion to accept SUPER THERM easily at the 9 sq.m (100 sq.ft.) per gallon.

Preparation was the use of "Simple Green" concentrate cleaner and power wash.

The roof was power washed to wet down, the simple green cleaner was sprayed over the roof and large hard bristled push brooms were used to clean the surface and then the power washer was used to rinse this all off before it dried. The power washer was working behind the push brooms to assure nothing dried before it could be washed off. When the roof surface dried, the SUPER BASE (HS) adhered very strongly and tightly to the surface.



SPI CASE HISTORY



Car wash unit roofs are located efl to the right of the main terminal as shown in white roofing



Comparative Before and After Views of the Terminal



Finished Coating Of Airport Terminal



Areas of Activity on the Tucson Airport Project



Munich **Airport Carpark**

Problem: condensation, causing mold and mildew growth on concrete ceiling of car park due to heat and moisture from car-wash upper level.



Solution: **MOIST METAL GRIP** as primer
SUPER THERM® to stop condensation
ENAMO GRIP as top coat



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SUPER THERM over Chengdu Shuangliu International Airport

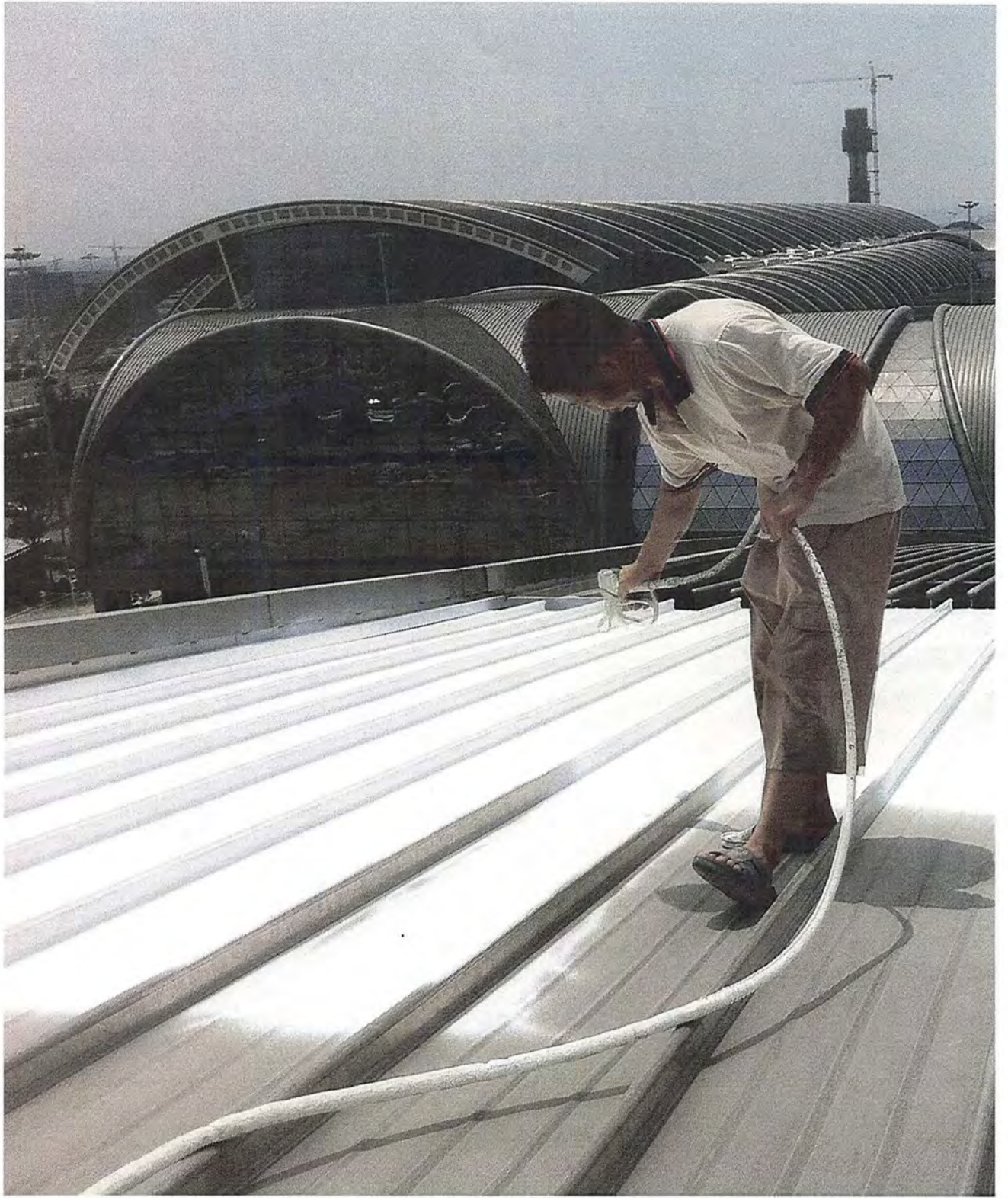
At present, we are applying the terminal roof of Chengdu Shuangliu International Airport with Super Therm (some pictures in attached file), and will finish the project in the end of this month. We have tested the temperature in part of the roof,

but the difference between uncoated and coated ST is only about 10 °C. Then we also checked the thickness of ST, and all the thickness are more than 250 microns. According to your experience, would you please tell us what's the problem?

Answer: The uncoated portion of roof is hot and transferring this heat under the interior side of the coated roof. Until you have all the roof coated, the roof cannot cool down completely to give you the full effect.

Best Regards,

Guide Ye









**Please see attached files which are the airport owner's
Approval documents.**

成都双流国际机场建设工程指挥部文件

成都双流国际机场建设工程指挥部
二〇一一年十一月十八日

成都双流国际机场建设工程指挥部 二〇一一年十一月十八日

2011年11月18日上午10:00,由成都双流国际机场建设工程指挥部总工程师伍丁在指挥部第一会议室主持召开了关于在C、D指廊金属屋面试用美国原产SUPER THERM超级瓷质节能环保涂料的会议。参会单位有:成都双流国际机场建设工程指挥部、中国建筑西南设计研究院和四川安信捷节能技术有限公司,会议纪要如下:

四川安信捷公司介绍了SUPER THERM超级瓷质节能环保涂料系列产品的性能及其使用效果。该涂料具有高反射率、高发射率、低导热系数、低蓄热系数、双向反射性(一方面可以反射来自太阳光95%以上的热辐射,另一方面可将介质的辐射热反射回去)等热工性能,使用厚度很薄(只0.25mm),真正实现了隔热、防水和外护的一体化。

该涂料是美国“凉屋面计划 CRRC”、“节能之星计划 ENERGY STAR PROGRAM”和“绿建筑 GREEN BUILDING”荣誉称号为1号推

成都双流国际机场建设工程指挥部文件

I n§I2011 J074%

关于C.D指廊金属屋面节能环保涂料 工程施工的委托函

四川安信捷节能技术有限公司:

根据指挥部签发的《关于在C.D指廊金属屋面试用美国原产 SUPER THERM 超级瓷质节能环保涂料的会议纪要》的精神, C.D指廊金属屋面节能环保涂料工程委托贵单位进行施工。请贵单位尽快将施工方案和报价报指挥部审批后签订合同, 抓紧时间施工。

此 函



二〇一一年十二月八日

(联系人: 郑 阔, 电话: 85205268 13518113220)

主题词: 机场 建设 环保涂料 施工 委托 函

成都双流国际机场建设工程指挥部

2011年12月8日印发