



**Don't miss the
A-R technology
Seminars coming
near you!**

See dates on pg. 12

**A-R surface
improvements
reduce accidents**

Climatic & Accident Data IH 35 San Antonio
Before and After Asphalt-Rubber Overlay

	July 2001 – June 2002	November 2002- October 2003	Δ
Precipitation	80.7 cm 31.78"	82.9 cm 32.63"	+2.2cm +0.85"
Days with Precipitation	69	99	+30
Major Accidents	85	48	-37
Major Accidents on Days with Precipitation	39	19	-20

Climate data obtained from National Oceanographic and Atmospheric Administration
Accident Data collected from San Antonio Police Department
Major Accidents Involve Emergency Medical Response (Ambulance)



RPA news

Dedicated to encouraging greater usage
of high quality, cost effective asphalt
pavements containing recycled tire rubber.

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Summer 2007**



RPA news

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President's Letter

An Industry Working Together
 By Michael Hoag



It is a great privilege to lead an outstanding group of innovative companies and individuals involved in the rubberized asphalt industry through the RPA. This year is going by quickly and the members are experiencing one of the busiest years ever. But many found time to travel to Puerto Rico to participate in a workshop sponsored in part by a visionary, long time RPA Member REMA. While in Puerto Rico, the Executive Committee members met to review RPA's vision and efforts. Listed below are the issues the leadership focused on.

Increase Membership: This industry has been growing rapidly since the first AR conference in Phoenix in 1999. RPA has seen an influx of new members from outside of the US, where innovative agencies are recognizing the numerous benefits of asphalt rubber hot mix and chip seals. The number of AR blending equipment manufacturers has matched the world-wide growth with four manufacturers in RPA membership. For both newcomers to the industry and those with more experience, the RPA can be a tremendous resource, providing knowledge-base, contacts, and market updates. The RPA Executive Committee elected to initiate a New Membership Drive, which allows new entries in the industry to participate in the RPA at greatly reduced rates. For information on this opportunity, visit our website:

<http://www.rubberpavements.org/membership.html>

Raise Quality: Another way the RPA plans to help members is through an Asphalt-Rubber blender certification program to help raise the standards of excellence for the blending plant operators. Since the traveling public depends on material producers for safer, quiet and durable roadways, we owe them the assurance of excellence in quality. Ultimately, an RPA certified binder and mix design course will be established to help train industry and highway officials on the many unique characteristics of asphalt-rubber. Since the rubber particles don't dissolve, the end result pavement is really a composite material consisting of asphalt, rubber and rocks all working together with their own engineering benefits. Knowledge is a powerful tool that the RPA believes is a critical component to achieving a consistently high-quality product. The Nevada DOT has recently tapped into the RPA's willingness to help. The RPA and NDOT partnered to inform and train state and industry engineers alike through workshops in advance of the Quiet Pavement Project on I-515 in Las Vegas this summer.

Improve Testing: The RPA Technical Advisory Board (TAB) is made up of the leading experts in the use of scrap tire rubber in asphalt pavements. They are looking into the tests available today to determine the best way to describe asphalt-rubber's performance characteristics such as stability, moisture sensitivity, resistance to cracking, and fatigue. (Continued on page 8)

The Rubber Pavements Association is a nonprofit organization committed to increased awareness and advancement of Asphalt-Rubber technology through seminars, research and publications. The association only supports proven paving processes which meet the ASTM definition D8-88 and standard specification D-6114-97 (2002) or public processes which are routinely used by two or more states. The RPA is governed by a Board of Directors from member companies throughout the world. For membership, library or meeting information, visit the RPA website at www.rubberpavements.org.

Welcome

NEW MARKET USER MEMBER

King Tech Development Company Ltd., an Asphalt-Rubber design and build company headquartered in Hong Kong has taken up the challenge of providing a sustainable solution to the scrap tire problems in China. King Tech is introducing the Asphalt-Rubber Technology with professional pavement engineering services as well as introducing specialized production and application equipment for the exploding pavement market in China. The Company headquartered at Room 1501-02, AIA Plaza, 18 Hysan Ave., Hong Kong and the Company representative on the RPA Board is **Alan Hung**, Vice President. He can be reached at 852 (2) 5454502 or by fax at 852 (2) 5595945 or by email: alan.hung@kingtechgp.com

PRODUCER MEMBER

Golden By-Products, Inc. collects scrap tires of every size, shape and form from all of Northern California. At this time, they collect nearly half of the tires generated in their area or 4.5 million tires. Their collection options include trailer(s) spotted on location or regular route-truck pick-up. At Golden, their focus is RECYCLING which includes crumb rubber production for use in pavement and products as well as material for TDF and TDA. The company address is P.O. Box 1, 13000 Newport Rd., Ballico, CA 95303 and the Company representative on the RPA Board off Directors is **Jana Nairn**. She can be reached at (209) 668-4855 or by fax at (209) 667-4854. Jana's e-mail address is: jana@goldenscraptime.com

ASSOCIATE MEMBERS

Pavement Preservation Systems, LLC, a Consulting and marketing company operating in the Americas, offers expertise in selecting additives to meet your modified asphalt requirements, including optimizing processes. This expertise extends to the complex world of

asphalt emulsion chemistry where they show you how to optimize your process while meeting specifications and reducing costs. The company is located at 8881 W. River Beach Lane, P.O. Box 140614, Boise, ID 83714-0614. **Delmar R. Salomon**. Is the company's representative and he can be reached at ((208) 672-1977 or by email at Delmar@technopave.com.

Phoenix Environmental, Ltd., was established in 1988 to develop remediation technology for specific waste streams. Over the years PEL has matured into a full service, design-build company with offices in Chicago, Illinois; Phoenix, Arizona and Los Angeles, California that provides cost effective, environmentally sound solutions to a wide variety of secondary materials, including waste tire processing and asphalt rubber. PEL is currently building asphalt rubber blending equipment at their fabrication facilities in Poland and China and hopes to establish another factory in Mexico by late 2007. The company is located at 8436 E. Shea Blvd., Suite 102-B, Scottsdale, AZ 85260 and the company representative is **Kelly R. Sockwell**, V.P. of Project Development. He can be reached at (480) 686-9743 or by fax at (480) 659-2852 or by email krs@phoenix-Environmental.com.

PQ Corporation, a 175 year old global company based in Valley Forge, PA., is a leading producer of silicate, zeolite, and other performance materials serving the detergent, pulp and paper, chemical, petroleum, catalyst, water treatment, construction, and beverage markets. It is a global enterprise, operating in 19 countries on five continents, and along with its chemical businesses, includes **Potters Industries**, a wholly owned subsidiary, which is a leading producer of engineered glass materials serving the highway safety, polymer additive, metal finishing, and conductive particle markets. The company is located at P.O. Box 840, Valley Forge, PA 19482-0840, and the company representative is

Annette Smith. Ms. Smith can be reached at (610) 651-4469, fax at (610) 651-4500 or email: annette.smith@pqcorp.com.

Twining Laboratories of Southern California, Inc., provides comprehensive asphalt testing and quality assurance programs. They are also a full service materials testing and inspection firm, our goal is to provide the asphalt paving industry a reliable, state of the art, testing facility and engineering support. The company is located at 2883 Spring Street 3rd. Floor, Long Beach, CA 90806, and the company representative is **Chris C. Gerber**, Asphalt Pavement Division Manager. He can be reached at (562) 426-3355, by fax at (562) 426-6424 or by email cgerber@twininglabs.com.

AFFILIATE MEMBERS

Outagamie County Department of Solid Waste, Wisconsin— The agency address is 1419 Holland Road, Appleton, WI 54911 and the agency representative is Sue Gau. She can be reached at (920) 968-5721, fax at (920) 788-4130 or by email gause@co.outagamie.wi.us.

Suffolk County, New York — The agency address is 335 Yaphank Ave., Yaphank, NY 11980 and the agency representative is Richard Carioto of Public Works Department. He can be reached at (631) 852-4280 or by fax at (631) 852-4764 or by email cariotor@suffolkcountyny.gov.

INDIVIDUAL MEMBERS

Wayne Byard, Kingston, New York

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Rahul Nandi, Scarborough Ontario CANADA

RPA Leader Makes it happen in RAC Grants Increase and Global Technology Transfer

By Douglas D. Carlson

Based upon the leadership of RPA Member Barry Takallou, President and CEO of CRM Companies, the California Asphalt Pavement Association and the Rubber Pavements Association presented a joint proposal to the CIWMB to increase the funding per ton for program RAC Grants. The proposal was accepted by the Waste Management Board and the grants were increased to \$5/ton. California Cities and Counties can apply for RAC usage grants that will provide up to \$250,000 in funding from the State Scrap Tire Recycling Fund from the state's tire disposal fee.

Thanks to the work of Dr. Takallou, California agencies have a great incentive to close the loop on their scrap tire waste stream by recycling their tires back into the streets. In California the average generation of scrap tires is 1.1 tires per person per year. A city with a population of 100,000 would generate 110,000 scrap tires each year. RAC can use up to 3 tires ton. A 37,000 ton RAC paving project or program would use up the agency's annual scrap tire generation and get back \$183,000 through the grant program.

Dr. Takallou also receives industry kudos for presenting four major papers since the beginning of the year. He presented technical papers at the annual European Tyre Recycling Association (ETRA) in Brussels, Belgium; The American Chemical Society, 3rd Annual Rubber Modified Conference, Akron, Ohio, and San Juan, Puerto Rico. He also presented a paper at the Synthetic Turf Council in Atlanta, Georgia.

Dr. Takallou, currently Secretary for RPA, is the only Director with expertise in Asphalt-Rubber design and construction as well as crumb rubber production.



Caltrans Steps up its use of Rubberized Roads

Prior to the passage of AB338, the California Department of Transportation began an aggressive use of rubberized asphalt concrete (RAC) based upon their positive experiences with the material. Each year, Caltrans describes the benefits the agency realizes by using RAC. Some comments from the most recent State Of The Pavement Report: *"In 2003, the Department set a statewide goal that 15% of the asphalt concrete pavement contracts awarded will incorporate rubberized asphalt concrete (RAC). Rubberized asphalt concrete usage can produce a more durable pavement with the same service life of conventional dense graded asphalt concrete, at half the thickness. Some benefits of RAC are a longer lasting pavement, with resistance to reflective cracking, and a smoother ride. In addition, RAC has the potential of significantly reducing tire noise. Utilizing RAC saves valuable resources and reduces the number of tires entering landfills."* To see the full report please visit: http://www.dot.ca.gov/hq/maint/2004_SOP.pdf

AB 338, signed by Gov. Schwarzenegger on October 7, 2005 took effect January 01, 2007.

The law requires Caltrans to meet minimum usage targets of crumb rubber in asphalt pavements expressed in total pounds of rubber/total tons of asphalt paving materials.

For 2007 the target is 6.62 pounds, 2010, 8.72 pounds, 2013, 11.58 pounds. According to contracts cost information provided on the Caltrans Office Engineer web site the usage for 2006 was 33% RAC to Total AC, dropping slightly from 2005 all-time-high of 36%. The drop was largely due to increased costs of oil, fuel and liquid asphalt.

But the State moves forward in greater usage of recycled tire rubber. RPA Member Granite Construction was awarded Caltrans' fourth largest Gap Graded Overlay project to date in June 2006. The project is located in Los Angeles County on Highway 2, the Angeles Forest Highway. The 116 lane mile project requires over 122,000 metric tons of the asphalt-rubber hot mix material recycling over 360,000 California scrap tires.

Members on the Move



Associate Member engineering company, Nolte Associates, of Walnut Creek, CA. wins the “gold star” recognition of RPA for services above and beyond the norm for its clients.

According to Kanda Raj, former Caltrans District 4 engineer, and now Associate /Engineering Manager for Nolte, the company helped the City of Pittsburg and SR4 Bypass Authority, prepare an application to the California Integrated Waste Management Board (CIWMB) for a RAC rebate grant. Nolte also pitched in with the preparation of a “recycled content purchasing policy” resolution for adoption of the Board of the Bypass Authority. Raj said the City of Pittsburg and the SR4 Bypass Authority are very proactive in implementing sustainable practices and have shown great enthusiasm in using RAC-G.

Furthermore, there is public interest in implementing “quiet pavement” strategies on the Authority project.

Nolte takes pride in their excellent client services and considered their assistance in preparing the applications for the City and the Authority as important as the traditional engineering services they provide. The grant was awarded and the Rubberized Asphalt Concrete –Type G project will be built soon. Raj, who participated in the nations largest RAC projects when he was with Caltrans District 4, said the CIWMB RAC grant program, which is for local government agencies only, certainly will help foster other sustainable practices.

Countries Seek Out United States Technologies on Tire Recycling and Rubberized Pavements

Visitors from Hong Kong World renowned tire/pavement noise expert, Ulf Sandberg Senior Research Scientist at the Swedish National Road and Transport Research Institute (VTI), Linköping, Sweden, led teams of engineers from the Environmental and Highway Departments of Hong Kong on a Quiet Pavement Technology Scan in Europe and the US. Alvin Yip-kei and Eddy Kam visited the California RT 138 test site monitored by Caltrans and research sites in Phoenix, Arizona as part of the Quiet Pavement Pilot Program. The stop in Phoenix included a visit with Sam Elters, the State Engineer for ADOT, Dr. Barry Takallou at the CRM Tire Recycling Facility in Queen Creek and the close observation of the placement of Quiet Pavement on I-10 near Sky Harbor Airport.



Visitors with G.Way, F. Garcia and Sam Elters, ADOT State Eng.

Eddy Kam: “The trip to Arizona was extremely beneficial. Witnessing the manufacture and placement of an asphalt-rubber quiet pavement system will help in our efforts to reduce traffic noise, specifically tire noise in Hong Kong, since construction of sound walls is sometimes not a viable option due to site constraints.”

Officials from the **State of Chihuahua, Mexico** engaged in a feasibility study for the construction of a tire recycling facility and implementation of A-R paving technology made the trek to Phoenix in July. **John Deer**, RPA member with **International Surfacing Systems**, showed them some blenders in action for a hot mix project and AR distributor trucks built for spraying the thick (0.6 gallon/sqyd) membrane.



(from left to right; Dr. Takallou, CRM, Ulf Sandberg, Eddy Kam, Alvin Yip-kei)



(from left to right: Eduardo Suarez, Samuel Young, Manuel Portillo and John Deer, ISS)

Highway Safety—It is simple!



Big Bucks for Safety

In the US there has been a significant investment of time, effort and money to get motorists “buckled up”. This summer over \$124 million dollars was allocated by the FHWA to State Highways for awareness and enforcement campaigns. Additionally, millions of dollars are being spent on crash barriers and cables, rumble strips and reflectors, guard rails and the like. All this is done to reduce the number of accidents that occur on the highways each year.

Safety has become a very high concern of the Federal Highway Administration with over 40,000 fatalities recorded each year in the US as a result of accidents upon the nation’s highways. According to the National Transportation and Safety Bureau, the number of fatalities as a result of automobile accidents by 1950 had exceeded the number of Americans killed in action during both World Wars. To improve highway safety, the US FHWA encouraged the states to implement the use of friction courses in the year 1980 under the Skid Action Reduction Program Technical Advisory T 5040.17 and T 5040.13 for the Open Graded Friction Course. Friction courses provide greater traction to vehicle tires, resisting skid. However, because the materials available for use in the friction courses did not have adequate durability, lasting only 5-7 years before needing replacement, and the funding for the maintenance and replacement was not given to the states, the states moved away from the open graded technology.

Arizona Innovates

The state of Arizona continued to use the friction courses because it had developed durable mixtures with asphalt-rubber binders that lasted 10-15 years before needing maintenance or replacement. [MOR 01] States now use many different materials and devices in highway construction to improve safety. For example significant expenditures are made to install and maintain bridge rails, guard rails, rumble strips, shoulders, median barriers and crash cushions. With materials like asphalt-rubber that can provide a more durable binder due to the presence of recycled tire rubber, safety improvements in the pavement surface are being reconsidered.

Texas Joins In

In the state of Texas, a rubberized permeable friction course (PFC) was used for the first time to place a thin, 38 mm (1.5 in), surface treatment on an aged continuously reinforced concrete pavement (CRCP) that was built in the late 1970s. By 2002, the existing structure of the CRCP was sufficient, but the surface was badly deteriorated due to prolonged exposure to heavy truck traffic and weather. The project is located in San Antonio Texas on Interstate Highway 35 which serves as a major North/South commercial truck route for the North American Free Trade Agreement (NAFTA) between Canada, USA, and Mexico. The pavement surface was considered extremely rough, in the range of 3.3 m/km (209 inches/mile) on the International Roughness Index (IRI). This measurement

indicates the amount of up and down movement experienced by a vehicle as it travels along a given length of highway. A marker traces the up and down motion on a scroll of paper similar to a seismograph. Measurements above an IRI of 2.7 m/km (170 in/mi) are considered to be Poor. Measurements in the range of 1.5- 2.7 m/km (95-170 in/mi) IRI are fair and IRI rating of 1.5 m/km (95 in/mi) and below are good. The old pavement, though still serviceable, was also producing too many wet weather accidents.

Finding the right solution for the problem

According to the Texas State Bituminous Materials Engineer, Dale Rand, asphalt-rubber is selected as the binder of choice for a permeable friction course over lay of concrete because it is so “sticky”. Also, the Arizona experience with good performance interested the engineer. No other binders in the state inventory allow the PFC material to stick to the aged concrete underneath. When other binders have been selected, the PFC material de-laminates, or detaches in large sections 0.3-0.6 m² (1-2 ft²) in a short period of time, most likely due to water intrusion in the bond between the PFC and the Concrete below. [RAN 04] Therefore, with out the durable A-R material, friction courses will not be used on top of concrete because of their extremely poor durability and high maintenance costs.

Seeing the results

During construction, after one direction of travel had been paved with the asphalt-rubber PFC, a rain shower occurred and the reduced splash and spray on the A-R PFC compared to the pre-existing surface was captured in the cover photo of this publication.

After the project was completed in both directions, noticeable decreases in wet weather accidents was also observed. Gary Fitts of the Asphalt Institute’s regional office in San Antonio, Texas, collected the weather station information for the year leading up to the A-R PFC overlay and the year after the A-R PFC overlay was completed. Accident data within the boundaries of the project were also collected from the San Antonio Police Department. [FIT 04] See Figure 8.

In the year before the placement of the A-R PFC, July 01, 2001 to June 30, 2002 there were 69 days with measurable precipitation for an accumulation of 80.7 cm (31.78”). During that time, the San Antonio Police Department responded to 85 major accidents. A major accident is defined as one where emergency response vehicles, such as an ambulance or paramedic unit, are dispatched to treat potential injuries on site. Of the 85 major accidents, 39 occurred on days with precipitation. In the year following the completion of the A-R PFC, from November 01, 2002 to October 31, 2003, 82.9 cm (32.63”) of precipitation was recorded over 99 days. The number of major accidents was reduced to 48 and the number of major accidents occurring with precipitation was cut in half to 19.

Even though the number of wet weather days had increased, the number of major accidents had decreased significantly. It is easy to hypothesize that the increased visibility during wet weather by using the permeable friction course had enhanced the public safety of the roadway. This would not have been accomplished without the tough and durable addition of recycled tire rubber in the permeable mix.

Texas overlays an old concrete pavement with A-R PFC

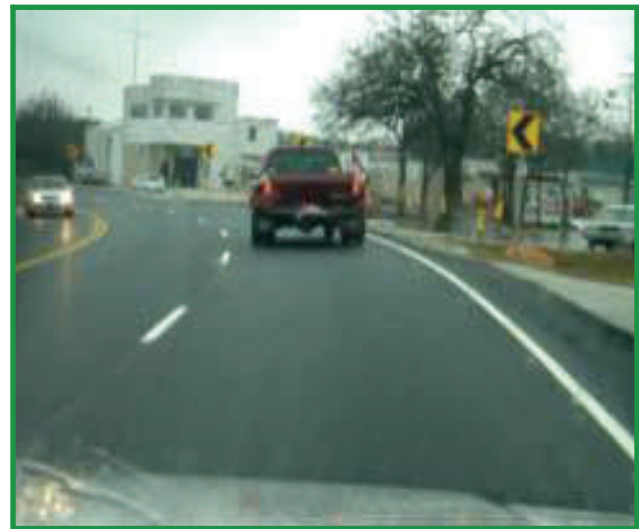
Climatic & Accident Data IH 35 San Antonio Before and After Asphalt-Rubber Overlay			
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Climate data obtained from National Oceanographic and Atmospheric Administration
 Accident Data collected from San Antonio Police Department
 Major Accidents Involve Emergency Medical Response (Ambulance)

The state of Texas has also examined other projects for similar before and after data where permeable friction courses have been placed. In one example, on a Farm to Market (FM) road number 1434 near the state capitol city of Austin, a two mile stretch of roadway that had numerous curves and intersections, a PFC was placed under an emergency contract because of numerous fatalities in the year 2003. The existing surface was a traditional dense graded asphalt concrete. The climatic conditions and accident data were examined before (years 2001-3) and after (2004-5) the PFC overlay.

The results of the A-R PFC overlay was very striking. *Prior to the overlay, an average of 21 wet weather accidents were recorded, 20 injuries and an average 2 fatalities. Following the overlay, with very similar weather conditions recorded, the average number of wet weather accidents had dropped to 1.5, injuries to 4, and fatalities to 0.* The photos below were taken from the cab of TXDOT vehicle following a typical pick up truck as it transitions from the dense graded material onto the FM 1431 PFC project.

Figure 8. Accident and Climate data before and after placement of A-R PFC.



Visibility during a rain shower on a standard asphalt surface (left) and on a PFC (right).

Clearly, public safety is tremendously enhanced through the use of permeable friction courses. With the aging concrete highway infrastructure in many urbanized area, the use of scrap tire rubber will offer the highway engineer an alternative for greater safety. Of the quality of life issues that highway engineers contemplate, safety is number one.

The San Antonio A-R PFC project generated a great deal of public interest, but not due to the enhanced safety. The public noticed the quiet ride. According to Dale Rand, some motorists commented that they had thought their vehicles had "fallen off of a cliff" as they drove onto the A-R PFC surface because it had gotten so quiet. Despite the noise reduction noticed by the Texas motorists, Rand states, "When it comes to pavements, safety trumps it all!"

President's Letter Continued

Conventional performance tests often under predict asphalt-rubber. For example, RPA TAB Vice Chairman, Kamil Kaloush, at Arizona State University, noticed that the AR mixtures were severely underperforming in the Simple Performance Test, yet the mixtures in the AR pavements all around ASU were performing extremely well. Something was wrong. He ended up putting all samples in confinement during the tests and the AR mixes ranked out the best, matching the experience in the field.

Another example, the Dynamic Shear Rheometer can not grade out AR binder because of the presence of rubber particles 1mm or more in size. The FHWA did the Accelerated Loading Facility tests to see where AR mixes would fit among the PG mixes and other modified mixes. This was covered in the last issue of the RPA News. The AR mix just did not crack and did not fit into any performance model. It is clear AR will require new models to help engineers around the world figure out the true value of AR paving systems. **We are looking forward to the FHWA recommendations for implementation as a result of this experiment.** Texas has started using the overlay tester to predict the performance of the thin friction course material. Through the TAB, a dedicated group of volunteers, the rubberized asphalt industry will move forward with advances to help engineers around the world to better understand AR properties and benefits.

PUERTO RICO SEMINAR

By Douglas D. Carlson

On May 31, 2007, RPA teamed up with a member company, REMA, and several Puerto Rican Engineering organizations and Universities to hosted the first Caribbean Island workshop on crumb rubber production from scrap tires and its use in asphalt pavements.

Over 48 engineers, contractors and technicians attended the day long workshop which detailed the history of research on Asphalt-Rubber, followed by practical sessions on crumb rubber production, specifications, application processes, testing procedures, quality control and the environmental benefits of developing a "closed loop" tire recycling and AR paving program in Puerto Rico.



Noise Reduction: One great benefit that is garnering a lot of public attention is noise. Reduction. The Quiet Pavement Pilot Program in Arizona continues to hush the critics. Similar tests are under way in Nevada and Washington state. It is a great disservice to the communities served by highways to have an antiquated Federal noise policy that does not recognize the tremendous differences thin AR friction courses can make.

With the exception of Arizona, no DOT in the US can get credit for noise reduction from AR friction courses, they have to spend millions more instead building walls or insulating schools or homes from excess noise. The RPA will work with the FHWA and USDOT at the highest levels to change the noise policies so that the states can have AR friction courses as a tool to mitigate noise. Currently, the use of AR friction courses is not allowed in the policy as a noise mitigation strategy because they don't last forever. They do need to be replaced eventually. But with performance data in the 10-20 year range, the RPA can lead the way to change.

Working Together in the RPA, we can accomplish much more than working apart. **Join the RPA in our efforts to provide the most safe, quiet and cost effective asphalt roads that use high quality crumb rubber.**



Technical Presenters

Front row from left Joseph Alvino, General Manager REMA; Marie Ramirez, Vice President- REMA; Jorge Sousa, Ph.D., P.E., Portugal; H. Barry Takallou, PhD, P.E., President, CRM AZ/CA/ NY; Edgardo Valequez, President, REMA; Douglas D. Carlson, Executive Director, RPA. Back row: Sidney Cox, Cox Paving, Texas; Mark Belshe, P.E. FNF Construction, Arizona; Cliff Ashcroft, FNF Construction, California and Michael Hoag, RPA President, Granite Construction.

Don't Miss This Opportunity!



OCTOBER 1 – 3, 2007
 ARIZONA STATE UNIVERSITY
 TEMPE CAMPUS
 Visit our website at
www.fulton.asu.edu/paving
 for more information.

2007 Arizona
 Pavements/Materials
 Conference

and
 TRANSPORTATION

ARIZONA'S TRANSPORTATION FUTURE – WHAT'S DOWN THE ROAD?

A three-day conference on "Arizona's Transportation Future - What's Down the Road" sponsored by Arizona State University (ASU), Arizona Department of Transportation (ADOT), Arizona Industry and Local Governments will be held October 1 - 3, 2007 on the ASU Tempe Campus, Memorial Union.

Rubber Recycling and Manufacturing, Inc. (REMA) Puerto Rico

By Marie Ramirez, VP—REMA

Rubber Recycling and Manufacturing, Inc. (REMA) is a Puerto Rican company dedicated to recycling scrap tires and manufacturing products with recycled rubber. REMA was formed in 1999 as a research and development company. They began looking at scrap tires, not as a problem, but as an opportunity.

According to the Environmental Quality Board, over four million tires are discarded on Puerto Rico on an annual basis. REMA processes more than half of all tires discarded on the island and turns them into a broad range of products used worldwide. Since the opening of the crumb rubber operation in 2002, they have recycled 10.5 million tires.

REMA uses three phases of operation. The first phase is the gathering and transportation of the scarp tires from the distributors/ sellers to their plant.

The second phase consists of the processing. Tires received at REMA enter the processing system on an in-feed conveyor with a recirculation system where they are reduced to 2 inch chips. The chips are routed for secondary processing down to ½ to 5/8 inch chips. Pieces with steel are removed from the processing line by a transverse magnet. A clean wire system removes and recovers rubber particles from the tire wire to produce 98% clean steel. The rubber is deposited into the chip bin. A walking floor in the chip bin feeds the granulator to manufacture crumb rubber ranging from 5 to 30 mesh.

REMA has developed markets for landfill applications, sound walls, loose playground material, sports surfaces and eco friendly recreational parks. Crumb rubber is used for asphalt-rubber markets in the United States and has been advancing the concept of using AR on Puerto Rico's roads and highways.

The third operation is product molding and manufacturing into finished goods at the plant. Urethane binders are mixed with crumb rubber and pressed into products such as wheel stops and traffic control bases.

REMA has contributed towards research at the University of Puerto Rico, Mayagüez Campus. One investigation evaluated the use of crumb rubber in the extraction of polluting agents (heavy metals) in water systems. Another studied antibiotic nutrient recovery in bird husbandry operations.

Additional details can be found on the web at:

www.uprm.edu/graduate_studies/digitalthesis www.grad.edu/thesisquim.html

Alamo-Nole, Luis A. 2006 [Sorptions of Ethylbenzene, Toluene and Xylene onto crumb rubber from aqueous solutions.](#) For more information about REMA please visit their website: www.rema-pr.com

RPA ADVANCES ENERGY SAVINGS

Caltrans lowers Asphalt-Rubber binder temperature in specifications

The Rubber Pavements Association has partnered with Caltrans in the refinement of the HMA specifications related to asphalt-rubber materials. A result of the partnership brought forward the idea to reduce the production temperatures of asphalt-rubber binder in the specifications. The objective of the proposal is to reduce the minimum A-R production and testing temperature by 25° F while maintaining material quality, engineering properties and to save energy.

The RPA recommended implementing a 350° F minimum reaction temperature for the A-R binders which is consistent with other major A-R user agencies worldwide. Material properties for A-R binders on current projects were tested at both 375° F and the

proposed 350° F minimum temperatures and are provided in the table one below.

The ARB testing was conducted by MACTEC Engineering. It was apparent that very little change in properties is experienced with the 25 degree temperature reduction.

The reduction in temperature will provide a savings in energy consumption. It is estimated that 3,200,000 less BTUs would be consumed by each blender unit per 8 hour day by implementing this proposal. With 20 or more blender units operating within California, the totals energy savings in BTUs could be tremendous, over 64,000,000 BTUs in one 8 hour day

Table 1. A-R Binder Properties From Samples Mixed at 375° F and 350°F

Average Viscosity (Spec limits 1500-4000 cP)	Minutes of Reaction					
	45	60	90	240	360	1440
All Binders @ 375	1967	--	2400	2500	2500	2167
All Binders @ 350	1667	2233	2667	3300	3300	3200
Average Resilience (Spec 18 minimum)	45	60	90	240	360	1440
All Binders @ 375	39	--	--	39	--	36
All Binders @ 350	38	40	--	44	--	39
Average Softening Point (Spec limits 52-74)	45	60	90	240	360	1440
All Binders @ 375	63	--	64	65	65	65
All Binders @ 350	63	65	65	67	66	65
Average Cone Penetration (Spec limits 25-70)	45	60	90	240	360	1440
All Binders @ 375	41	--	--	42	--	43
All Binders @ 350	39	38	--	41	--	42

A-R Binder Temperature Reduction Study Shows Engineering Properties and Quality Are Maintained and Energy is Saved!

Special Thanks to Jerry Rodarmel RPA Association Council Board Member , CEI Enterprises, for energy savings data and Tim Kramer, Project Scientist, MACTEC Engineering and Consulting for binder testing.



Nevada DOT does it Right

The Nevada DOT was among the early states to give Asphalt-Rubber (AR) a try. In fact this was before Asphalt-Rubber Hot Mix so the NDOT “experimental” projects were chip seals. Things did not go well so they were not

anxious to use any rubber in their pavements. As the years went by and they watched the neighboring states of Arizona and California moving forward with rubberized material and they heard a lot about ADOT’s successful and popular use of an AR Open-graded friction course over old concrete pavements. They finally decided to give it a try in the Las Vegas area, on a surface improvement to I-515.

Prior to starting the project, Dean Wetzel, NDOT, Materials engineer armed the agency with as much information as possible. They attended workshops in California and they met with knowledgeable ADOT personnel. Then in February 2006 they contracted with the Rubber Pavements Association to provide educational workshops for the Las Vegas district engineers and contractors. Part of the contract also called for a Pre-paving



conference which was mandatory for the successful prime contractor and material supplier. RPA Executive Director, Douglas Carlson; Dr Julie Kliever, ADOT Testing Laboratory and Mark Belshe, P.E. of FNF attended for the industry association. Belshe’s company was the binder supplier for the project.

According to Belshe, the one inch AR overlay was “a beautiful job” which was an immediate hit with the motorists due to the quiet and smooth ride.

It is reported that a local television station sent a reporter out to drive the new Asphalt-Rubber section, armed with a hand held noise meter. The results of this test conducted inside the vehicle were pretty impressive. There was a highly noticeable reduction of pavement noise.

Following the project, Dean Wetzel sent the RPA the following message: “Thanks for all your help in presenting the AR Workshops. I think they really helped in achieving a quality project.” RPA is hoping the strong public approval will lead to a demand for AR overlays on all concrete freeways and interstates in Nevada!



RPA news

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