AFTER THREE DECADES, AEMA-ARRA-ISSA'S KRISSOFF RETIRES AT END OF YEAR 07

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05 NOTES FROM HEADQUARTERS
07 EXECUTIVE DIRECTOR’S MESSAGE
11 AEMA PRESIDENT’S MESSAGE
12 ARRA PRESIDENT’S MESSAGE
16 ISSA PRESIDENT’S MESSAGE
18 THE PAVEMENT PRESERVATION AND RECYCLING ALLIANCE & CM SERVICES
19 UPDATE OF ARRA TECHNICAL DIRECTOR’S ACTIVITIES
21 HIR PRESERVES WAUKESHA COUNTY ROADS
23 REVIEW OF THE 2016 AEMA ISAET
27 REVIEW OF THE ARRA 2015 SEMI-ANNUAL MEETING AT NCAT
30 NEW RESEARCH DRIVES EMULSIFIED ASPHALT BOND COAT BEST PRACTICE
35 SAVING PUBLIC ROADS
38 GREEN ASPHALT: A LOOK AT GREEN ROADS RECYCLING
41 ISSA FORMS CHINA MEMBERSHIP COMMITTEE
42 ISSA REQUEST FOR PROPOSAL: EXECUTIVE TECHNICAL DIRECTOR
43 ISSA NORTHERN INSTALLATION BRIEF
45 SUMMARY OF JEAA NO. 199
48 ISSA SLURRY SYSTEMS WORKSHOP 2017
49 AEMA-ARRA-ISSA 2017 ANNUAL MEETING
51 ABOUT AEMA-ARRA-ISSA
52 MASTER CALENDAR
INDEX OF ADVERTISERS

10 BERGKAMP

17 BLS

50 CRAFCO

06 CATERPILLAR

02 HEATEC

53 RAYNER EQUIPMENT SYSTEMS

20 ROADTEC

14 VSS MACROPAVER

44 WIRTGEN
**NOTES FROM HEADQUARTERS**

**MESSAGE FROM THE IBEF PRESIDENT**

During the ExCo meeting on 6th October it was decided to postpone the members meeting scheduled on 2 November. A combination of availability and practicalities to organise a parallel meeting (Europe and US) within the programme of the ISAET conference proved to be too difficult on this occasion.

There will still be an opportunity for IBEF members attending the ISAET conference to meet up, which will be arranged at the venue by Etienne Le Bouteiller Executive Director of IBEF.

I would also like to announce that have agreed a date for our annual general meeting and it will be held in Paris on 28th February 2017.

There will be facilities for video conference participation. So please save the date!

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**OBITUARY: CHAUNCEY ELMER NANCE, JR.,**

Chauncey Elmer Nance, Jr., 63, Ringgold, went to be with his Lord and Savior on Sunday, September 18, 2016 after a courageous yearlong battle with cancer. Chauncey was born in Ironton, OH, graduated from Franklin Heights High School Class of 1972, and has resided in the North Georgia area for the past 5 years. Mr. Nance worked for 35 years in pavement preservation in Ohio and the last five years in the Chattanooga area with Hudson Construction. Chauncey is the face of the micro-surfacing pavement preservation industry. He was a faithful Christian. Chauncey was a devoted husband, father, and grandfather who loved sharing his free time with his grandchildren. He was an avid Ohio State Buckeye fan. Chauncey is preceded in death by his parents, Chauncey Elmer Nance Sr. and Mary June Phillips Nance; brother, Phillip Nance; and grandson, Wyatt Nance.

Survivors include his high school sweetheart and wife of 43 years Kathy Scaggs Nance; son, Todd (Natalie) Nance, Ringgold; daughter, Mary Kay (Barry) Bendall, Ringgold; brothers, David, Mark, and Matt Nance; sisters Connie Sines and Gail Nance; grandchildren, Allan (Nessy) Bendall, Chad Silvers, Shane Silvers, CJ Bendall, Joshua Burns, Tanner Nance and Katelyn Burns; great-grandchildren, Allysin, Whitney, and William Bendall; and several nieces and nephews.

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**MESSAGE FROM THE FHWA**

FHWA has several great things occurring in the Highway Construction, Project Management, and Maintenance Professions. The following is a list:

- Webinar, December 6, 2:00 – 3:30 pm ET, TRB Bridge Preservation in Corrosive Environments Using Cathodic Protection
  - Registration: [http://www.trb.org/Calendar/Blurbs/175211.aspx](http://www.trb.org/Calendar/Blurbs/175211.aspx)
- Webinar, December 7, 1:00 – 2:30 pm ET, AASHTO Geospatial Online Transportation User Group (GOTUG)
  - Registration: [https://attendee.gotowebinar.com/register/3704181385093034242](https://attendee.gotowebinar.com/register/3704181385093034242)
- Webinar, January 18, 1:30 – 3:00 pm ET, Michigan DOT “Prioritizing e-Construction Investments”
  - Registration: [Prioritizing e-Construction Investment](#)
- Conference, April 4 – 6, Reno Nevada, Innovative & Effective Partnering
  - Click to download the [Registration](#) and [draft agenda](#)
  - Location: [Volume 1 hyperlink](#)  [Volume 2 hyperlink](#)  [Volume 3 hyperlink](#)
- Iowa DOT “Improving Accountability in the Construction Process with e-Ticketing for Concrete Loads
  - Location: [ETICKETING FOR CONCRETE HYPERLINK](#)
WITH YOU FROM THE GROUND UP

The work may be under your feet, but you’re looking ahead—to the next challenge and the next deadline. We’re right there with you. You can count on our equipment to handle every task on your site, on our dealers to keep it running efficiently, and on our real-world training to help you master the latest techniques and technologies. Get the tools to tackle whatever challenges come your way. Visit our online resource center for mobile apps, calculators, application guides and more. Resources supporting you from the ground up—that’s what we’re built to deliver.

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AFTER THREE DECADES, AEMA-ARRA-ISSA’S KRISSOFF RETIRES AT END OF YEAR

BY MIKE KRISSOFF, EXECUTIVE DIRECTOR

It is with pride and humility that I use these pages to announce my retirement after 31 years in the pavement preservation industry and 42 years in association management. Pride because I was there as AEMA, ARRA, and ISSA became major forces amongst their constituencies ensuring quality workmanship and advanced technologies. Humility because of the caliber of smart, energetic, wonderful people with whom I’ve been privileged to work.

It was December 1984 when I informed ARRA President Dick Lowell, then with CMI, of my decision to resign from ARRA’s management company at year-end; I had been involved with ARRA for just a few months at the time, having recently taken the helm from another account executive. Dick said, “You’ve been good for ARRA, and if you want to start your own business, let me know and I’ll run it past the Board. Go home, crunch some numbers, and call me tomorrow.” That night, I went over everything with my wife of a few years, then three months pregnant with our first child; I called Dick the next morning and told him I’d do it for $45,000 a year, $5,000 less than what ARRA was paying its DC-based management company.

The 1985 Palm Springs Annual Meeting was less than two months away. Using my washer and dryer as a desk and work station, I collated the photocopied registration packets and mailed them using postage stamps. An IBM PC-XT with a 10-megabyte hard drive, a floppy drive, and a dot matrix printer cost me $10,000. There were no fax machines, and email and the internet were a gleam in no one’s eyes. Dick ordered me to bring my pregnant wife to the meeting, the highlight of which was the first theme party with a mariachi band marching us from the hotel to a rented Mexican restaurant while a cop held traffic as our whole ensemble crossed on the diagonal. I learned that night not to try to outdrink a highway contractor and not to eat too much guacamole the night before you have to moderate an early session.

AEMA came along in 1988, and provided enough additional income to provide for part-time help, a new computer, and a fax machine. The decision to hire me was made after a job interview in AEMA President George Mariani’s DC hotel room, flanked by Bill Brake and Dan Finocchi; I think it was the smallest hotel room I’ve ever been in, especially with those three industry giants crammed in.

ISSA began to ask me for proposals in the early 90s. I think I responded to five RFPs over
the course of seven years. Leaders of that charge were kingpins Phil Tarsovich, Barry Dunn, and Neil Guiles. It took seven years, typical for ISSA, but they joined my flock of pavement preservation clients in 2000. Somewhere along the way, we implemented a new means of communications...email...and urged all our members to set-up Compuserve accounts; that was a game-changer.

The advancements each group has achieved are countless: 4-page newsletters now 64-page, comprehensive websites with public and members-only sections, several hundred emails a week, online meeting registrations, establishing our place in the industry with the likes of FHWA, NAPA, NCAT, AHUA, TRB, TRIP, AI, NCPP, and innumerable state and local groups, agencies, and user/producer groups, making terms such as in-place recycling and pavement preservation household words.

Another significant milestone, and there were many, was helping to morph the Buckingham-founded and Ballou-driven FPRMR through various iterations until an AEMA-ARRA-ISSA June Board meeting at the Annapolis Yacht Club resulted in a new FP2 Inc., for pavement preservation, with a main focus on legislation and lobbying that actually got our words into the highway bill! With unparalleled foresight, the AEMA, ARRA, and ISSA Boards unanimously agreed to up the annual contributions and become charter founding members of the new FP2. Great things have happened ever since...the National Center for Pavement Preservation, the Pavement Preservation Journal, the National Pavement Preservation Conference, each association’s relevance on the national and local scenes, and the wealth of technology transfer and educational information conveyed over the internet.

Almost twenty years ago, we had the brainstorm to conduct joint meetings, the end result of which has been more content, more networking, less cost, less time. To maintain individual identity, AEMA now has its ISAET, ARRA an expanded Semi-Annual Meeting, ISSA an ever more powerful Slurry Systems Workshop, and the occasional PPRA Fall Meeting, birthed from the marketing program of the Pavement Preservation & Recycling Alliance.

I think it was the early 90s when AEMA’s Steve Muncy and I met during TRB with Alain LeCoroller to initiate the first World Congress on Emulsion, which eventually led to an AEMA-ARRA-ISSA-PPRA-IBEF World Congress in Paris in 2015. A few years before that, a meeting with ARRA’s John Anzalone, Joe Pennington, and Keith “Ironhead” Klingenberg launched ARRA’s first regional seminar in Baltimore, the first of many. I’ve had the pleasure of working with several father/son combinations, like Charlie & Chuck Valentine, Neil & Greg Arntson, Bill & Rex Eberly, John & John & Kelly Carrick, Neil & Justin & Garrett Guiles, Jim & Brett Towns, Fred & Carter Dabney, Byron & Jeremy Thomas, and more.

The first Basic Asphalt Emulsion Manual, the first and second Basic Asphalt Recycling Manuals (“we wrote the book on recycling!”), the Slurry Systems Inspectors Manual and FHWA funding to produce five modules of web-based training...and technical bulletins, pocket guides, marketing brochures, guideline specifications, and
probably a few thousand presentations from industry experts since 1985, then done with slides and carousel projectors, now done with laptops and tablets on powerpoints, often completed minutes before actually getting presented (you know who you are).

Not to forget the ever-present, over-powering, some would say overbearing, Jim Sorenson, FHWA’s bad boy. A phone call from Jim would often last an hour or more, him throwing out directives, ideas, and suggestions faster than I could take notes. Jim always started mid-sentence, mid-paragraph, mid-chapter, but he looked out for us like no one else and he mercilessly challenged us to greater heights.

The funny memories, like Al’s Bernie McCarthy bringing the new Al President, Ed Miller, to Annapolis for a get acquainted cocktail cruise on my boat, with Ed changing from suit to shorts in my home office’s living room, and doing it again with Pete Grass some years later. With Chuck Valentine getting thrown out of an after hours bar in the Buckhead section of Atlanta at a 4R Conference after the kitchen took too long to bring us our eggs. Visiting the top of the CN Tower in Toronto with AEMA’s Canadian second generation and discussing the perils of alcohol at high altitude. Rathbun’s tattoo in Cabo….

Fast forward to present day…there is more information out there than we can keep up with, our websites are overflowing, limited only by the amount of time our volunteer members have to generate content, we have more challenges and more opportunities facing us than ever before, and the expectation level of our members and our customers and the user/agencies and engineering firms never satisfied. AEMA, ARRA, and ISSA have bright futures, indeed!

As for me, I took my first two-week vacation in 32 years just a few months ago, putting about 500 miles on my boat from home to the July 4th celebration in our Nation’s Capitol. There is plenty to do in Annapolis, and I’m looking forward to racing a sailboat to Bermuda in June 2018, and in Spring of 2019 leaving in my boat Full Moon to do the Great Loop, a 6,000 mile circuit from Annapolis, up the Chesapeake, down the C & D Canal to Delaware Bay, up the Atlantic to NY, up the Hudson to the Erie Canal, down the Great Lakes, down the Mississippi to the Gulf of Mexico, around Key West and up to Miami, to the Inland Waterway though Georgia and Carolinas, and back home, none of which will involve asphalt. After that, maybe a cross country tour in a Chevy Suburban with kayaks and bikes on the roof. Might also have an opportunity to learn to read for fun again, and to start hitting more sporting clays than I miss. And I might teach my dog Bait some new tricks.

Let me leave you with two points: 1) You cannot run a productive, effective meeting without an agenda (and sticking to it); and 2) you cannot make things happen and meet expectations on time if you don’t make deadlines.

To all of you, and to my dedicated staff, Meredith Kennedy and Michael Dougherty, who have always put personalized member service and dedication to doing the right thing as the top priorities, thank you all for the ride. It has been a pleasure to serve your industries.
**Expand** your bid opportunities with our truck mounts and continuous pavers.

**Diversify** your capabilities with the addition of our pothole patchers.

**Improve** your efficiency with the addition of our electronic monitoring systems.

Bergkamp Paves The Way To *Increased Profits*
It’s hard to believe another year is drawing to a close, but what a year it has been for the emulsion manufacturers we represent.

With our longstanding Association Management Group, Mike Krissoff and Associates announcing in late 2015 of his intention to retire at the end of 2016, we began the journey, no easy task, to find a replacement recognizing Mike’s longevity with AEMA, since 1988.

Collectively with our industry partners at ISSA and ARRA we all recognized early on in the process that a bit of give and take in meeting our individual objectives was necessary.

Over many months, countless calls, plus individual meetings, over 30 or so proposals were received through the RFP process which were analyzed, evaluated and recommendations made to the individual Boards. As you all know by now, Rick Church and his company, CM Services of Glen Ellyn, Illinois was selected. More recently Kristi Olson has joined us as Senior Association Manager with CM Services and will be the main point of contact. All will have an opportunity to meet both Rick, Kristi and possibly other CM Services team members at our AGM Meeting in Tuscon, AZ (February 14th – 17th). Clearly we’re all very excited to have Rick and his team on board at AEMA and look forward to positive growth in the years ahead.

You will see in this publication, Mike Krissoff’s “farewell” to all, a great read, and somewhat historical for such a young guy!!!

While Mike has been with AEMA since 1988; I’ve personally only been engaged with him in the last several years, both as a Board Member and in particular the last two as President.

Mike has done some great work over the years for AEMA putting us on the map, so to speak, as our Executive Director. Mike, on behalf of the current Board and those before us, we say a sincere THANK-YOU for your commitment, dedication, and years of service to the Association. We wish you all the best, good health and happiness as you begin that next journey tackling the high seas.

To Meredith Kennedy and Michael Dougherty, who have been with us for a few short years, thank you both for your contributions and commitment to AEMA and its members. We wish you both the best of success on the road ahead.

Shifting gears, I’d like to thank Gaylon Baumgardner and his team for the recent ISAET Conference and Program in Crystal City, VA. I do not ever recall seeing attendance levels such as we had this year, a real reflection of the positive things happening within our industry. Gaylon just keeps pushing that bar a little higher every four years!

As most are aware, we have been working on a Synergy Project with our industry partners at ISSA and ARRA. This project is part of the overall marketing strategy plan which will assist in communicating effectively, and precisely demonstrating the value and benefits of both products and services to association members. A great initiative, moving us all forward. Over the next few months you’ll be hearing, seeing, and given an opportunity to provide voluntary input by way of a survey aimed at giving our clients a one stop shop and enhancing our overall brand. An important presentation will be on the schedule at our AGM in Tuscon around this timely and exciting project. We encourage all to attend.

Lastly as a reminder to all, your Board has, and continues to work hard on your behalf through various initiatives carrying forward throughout 2017. Please feel free to reach out to any of us, we’re only too glad to help. Thank you all for your continued support and commitment to AEMA. Have a safe and healthy Holiday Season and I look forward to seeing you this February in Tuscon.
Although the days may be getting shorter in terms of hours of sunlight, there has never been a “sunnier” time to be a part of ARRA because the future looks bright for the collective industries we represent. Coming off one of the warmest and driest construction seasons on record it is our hope that ARRA members were able to take advantage of more construction days to perform their art, provide their service to create a positive bottom line for your companies. Safe, productive crews building high quality infrastructure for our customers builds business and creates opportunities for growth while servicing our nation’s increasing infrastructure deficits in a responsible manner. What is responsible? Cost effective, engineered solutions built to last while meeting ever increasing demands of being socially and environmentally accountable. All of these important attributes were on full display at our ARRA Fall meeting in Auburn at NCAT where the saying “the proof is in the pudding” took on a very real meaning. Visiting the NCAT test track and test road sections to see in place, in service treatments performing beyond expectations was quite powerful and is a tool we should leverage further in the future. The more decision makers that see what we saw the better. The proof is indeed in the ARRA pudding. This Fall meeting was very well attended but what really stood out to me was the increased level of engagement by our members in the sessions, the full rooms at discipline committee meetings and the level of participation in all three of the NCAT tours. It was impressive. The ARRA meeting for ARRA by ARRA was a success and I thank all of those involved in not only planning the meeting but to everyone who participated in the meeting. Each and every one who participated truly contributed to the success of the overall gathering. When you consider we had a record setting PPRA Fall meeting last year in Niagara and now a record setting ARRA Fall meeting in Auburn, there are positive signs abound.

Your ARRA Board continues to focus on getting back to basics to ensure we are delivering value to each and every member through content and connections at our meetings while remaining the go to resource for everything related to in-place recycling (both hot and cold), cold planing, micro-milling, full depth reclamation and stabilization. We are working with our partner associations AEMA and ISSA to ensure we leverage the benefits of acting together when it makes the most sense to do so. I want to share three ways starting with the most obvious, our Annual meeting coming up in Tucson, Arizona February 14th to 17th, 2017 (a great place to spend Valentine’s day with your significant other). AEMA-ARRA-ISSA are committed to bringing you a program that ensures our members will be the first to know about rule changes, specification changes, equipment innovations and material advantages within in our collective industries. The agenda is packed with a focus on providing benefits to our members, real takeaways that each attendee can use and apply in their businesses. These takeaways will be delivered by industry leading professionals and keynote speakers brought in specifically with the purpose of providing thought provoking ideas and techniques to help your business grow and prosper. The program will maintain its strong networking opportunities including cross networking with AEMA & ISSA members. Suppliers of equipment & materials as well as associate member companies will be in attendance to relay their worldwide experiences and present the innovative materials and techniques being utilized currently to enhance the customers’ longevity of projects and improve bottom line dollars. Registration and hotel bookings are now open online and I personally hope to see you all there at this great event for our members.

Secondly, AEMA-ARRA-ISSA have been working closely together for the better part of 2016 on a synergy project of sorts. With the help of a professional consulting team we have been working diligently to create a succinct ultimate value proposition that will aid in clearly communicating the benefits of our products and services to end users. This is an exciting initiative that will truly strengthen our association and advance our role within the industry. This includes updating and enhancing the ARRA brand with stronger imagery and messaging to ensure our position as a cutting-edge leader. One of the outcomes of the synergy project is to provide agencies with a one-stop shop to learn more about the processes ARRA represents and ultimately give us savvier ways of helping our customers. All members will be able to contribute to this extremely important initiative by way of a member sur-
vey that you will see in your inbox very soon. You will hear a lot more about this and receive an important update at our annual meeting in Tucson as well as during a planned webinar on the subject.

Thirdly, AEMA-ARRA-ISSA worked very closely together on finding a new association management firm to replace Krissoff and Associates. As you know, Mike Krissoff announced his retirement after 31 years in the pavement preservation industry and 42 years in association management and the three associations worked collectively to put an RFP on the street that represented what we need to move forward. We agreed that we would evaluate the respondents’ proposals independently and come together to compare notes. No one association would "settle for" anything but what would be in the best interest of their association. Meaning, there was no guarantee that one association management firm could meet the distinct needs of the three associations and we would make no sacrifices in requirements just to ensure we selected the same firm. Over a period of many months, the 30+ proposals were reviewed, comparisons were made, references were checked, conference calls were frequent and interviews took place. It was an exhaustive review but one everyone took as crucial. In the end, we agreed that Rick Church and CM services was the best for ARRA and our path forward. AEMA and ISSA came to the same conclusion for their associations and together we have contracted with CM Services to fill our association management needs. We are excited to say the least at the opportunity to work with our Head Coach Rick Church and Senior Association Manager, Kristi Olson whom you will meet in Tucson. I encourage you to find Rick Church’s letter within these pages as Rick shares a 30,000 foot view of the world from CM Services perspective on the new relationship formed with AEMA-ARRA-ISSA as well as a brief overview of who CM Services is and what you can expect from his firm going forward. I also encourage you to find Mike Krissoff’s “goodbye” letter within these pages because it is fantastic read and is a real walk down memory lane. In my 20+ years with ARRA, I only knew Mike as our Executive Director so to me ARRA and Mike Krissoff were synonymous. From all of us here at ARRA, both past and present, Mike we sincerely thank you for your dedicated years of service to ARRA and wish you nothing but the absolute best in enjoying retirement while racing in Bermuda and tackling the Great Loop. To Meredith Kennedy and Michael Dougherty who we got to know over the past few years working with K&A, thank you for working with us and serving our members. Best of success in the future.

When I was tasked with writing my first President’s letter I was worried about hitting the number of words prescribed to me. Now I find myself having to edit because there is so much to talk about, so much to share about where we are and where we are going.
MACROPAAVER 12E

eco-friendly

Tier 4 emmissions requirements are driving up the costs of construction equipment with little benefit to the contractor other than compliance.

VSS Macropaver just introduced an alternative to Tier 4 with many additional benefits for the contractor.

The Macropaver 12E is powered from the truck engine through a Power Take Off (PTO) drive.

This system provides much quieter operation. The PTO drive automatically engages and disengages with main start. The new Macropaver provides the same high production rate as the Model 12B regardless of the road grade and this unit also has lower fuel consumption.

The Macropaver 12E includes many ergonomic improvements to the Operator station. These include an updated easier to read monitoring panel which is angled towards the operator, a new user friendly joystick and keypad mounted control switches with pictoral labeling.

These ergonomic improvements are also now available on the new Macropaver 12D.

sales@slurry.com    +1(209) 874-2357    slurry.com
I have thoroughly enjoyed my almost two years as your ARRA President and will continue to work with our Board and our members to ensure we are improving as an association. We are in a very good place. The majority of markets in the developed world are facing precedent setting infrastructure deficits. More and more, out of sheer necessity, infrastructure agencies are turning to ARRA processes to make use of materials they have already bought and paid for. They cannot afford conventional remove and replace, especially when ARRA processes are time tested, technically sound, offer social, environmental and economical efficiencies over conventional. More and more, infrastructure decision makers are impressed by our industry and technological advancements that provide engineering solutions to their deficits with predictable (and favourable) outcomes to manage their road assets. This predictability, the strong performance of our processes continues to be critical to the growth of our industry and to our ARRA member businesses. This is the real value of ARRA to the overall industry and has a positive impact on our members. Let’s make sure we are taking full advantage of this reality.

Finally, do not forget to sign up for news from AEMA, ARRA, ISSA, and PPRA by joining our E-Newsletter. Visit ppralliance.org and subscribe on the right side of the page.

I genuinely hope you enjoy our most recent AEMA-ARRA-ISSA newsletter in the pages that follow and in closing would like to take this time to thank all of our members for being a part of ARRA. In a message I will continue to repeat; to all ARRA members, continuing forward, you have my word and you have my number (905 726-9518) that myself and your ARRA Board of Directors are here to serve you as members of ARRA, here to further grow this association and continue to strengthen it. Do not ever hesitate to contact me or any of our Board members to discuss how we can better serve you and more importantly discuss how you can engage and help make ARRA an ever stronger association. I would add as what I view as a very important reminder; support ARRA members including our associates and our suppliers because they support what you support. They are a vital part of the Asphalt Recycling & Reclaiming Association so it is very important that we work together. Thank you for your commitment and participation in our association that contributes to keeping the Asphalt Recycling & Reclaiming Association strong, vibrant and responsive to current and emerging issues and priorities. Have a safe end to the 2016 calendar year, enjoy your holidays and see you this February in Tucson.
As I write this ISSA president's message, number 8 of 8 and my last, I was reviewing some neglected business in my office and found the ISSA dues invoice for 2017. While I proceeded to make the payment on behalf of Intermountain Slurry Seal, my thoughts reflected over the past ten plus years serving on the board of directors and particularly the previous two years functioning as president. If our history is correct, the association has been led by forty seven previous presidents. Early in my career, I was not involved with ISSA, however was inquisitive about what it was all about. When I joined the board of directors ten years ago, I became more interested and questioning. In my experience and judgement, if you really want to understand and appreciate what ISSA is all about, serve as a volunteer in elevating and inspiring the mission of the association. In my opinion, it is needed more today than anytime previously.

The last two years have been very eventful and active from my perspective, with many objectives that have been shared in previous newsletters. The highlights for 2016 are many, however I will focus on a few key priorities.

- We will be working with a new association management firm beginning December 1, 2016. CM Services, a mature company, delivering association management services to several national and international trade associations, located in Glen Ellyn, Illinois (a suburb of Chicago). Rick Church, CM Services Head Coach and President has been spending time attending board meetings, conference calls and other events this year learning what ISSA is all about in an effort to make this transition as smooth as possible. Kristi Olson, also with CM Services, will be the Senior Association Manager representing ISSA.
- ISSA’s relationship and partnership with the FHWA, AASHTO, AMRL and NCPP continues to grow and strengthen. This is of great significance and important going forward, building creditability and cooperation with training, education, best practices, performance measures, specifications while providing our knowledge and know-how to support quality assurance and management.
- The board of directors recently held a special board meeting in Dallas Texas on November 7, where we spent nine hours concentrating, analyzing, and discussing two additional priorities; Technical Director and Marketing. The RFP for the technical director was issued August 23, which received several proposals. Before the RFP was issued, the board was also determining a direction concerning a marketing strategy. The essential objectives of a new marketing strategy is to create more unity in the industry and reduce fragmentation. Establish a place (Website) where agencies can go to find the answers to their questions, more creditable and comprehensive place for support. By creating a “network or asset” management thought process, we should bring all agencies to the table to provide better access and value for the end user. This will also provide better value to the members of ISSA as well. At the same time strengthening and updating our brand, (not replacing or weakening) but becoming more relevant and respected than ever. This initiative will not come easy, it is very detailed, aggressive and will require a lot of volunteer work and effort. What about the technical director? The marketing objective was in its infancy when the Technical Director RFP was released. We felt that the right thing to do was to revise the RFP, resubmit and evaluate the technical and marketing as a whole in an effort to provide success and value to the members of ISSA. These two critical priorities are long overdue and I firmly believe will help ISSA reach a level of reliability and integrity, consequently provide benefit and merit to all stakeholders.

I would like thank Mike Krissoff for the last sixteen years of managing ISSA. The association was not in the best “state of affairs”
back in the year 2000 when he took over the management responsibilities and duties. Over time the health of the association improved, we formed an alliance with AEMA and ARRA (PPRA), attended some great conventions and workshops while working together to deliver the mission of ISSA to members and shareholders. Mike has made a decision to retire at the end of 2016. We certainly wish him the best in his retirement and appreciate the relationship during the past sixteen years.

As a wise man once said, “you will only get out what you put in to anything in life, make the most if it”. When asked if I would be willing to serve on the Board ten years ago, I agreed because of previous members’ dedication and hard work in making the Association what it is today, feeling the need to give back. This has provided leadership and networking experience with others that I am grateful for. I am very proud and honored to have served as the President of ISSA in 2015 and 2016. Also to have been associated and work with many great women and men who are very passionate about who we are, what we do and how we represent the industry we work in every day.

I also owe Intermountain Slurry Seal a sincere amount of appreciation and gratitude for allowing me to spend the last ten years travelling, spending time, resources, attending meetings, conferences, committees, etc. with ISSA and this great industry. I have progressed through life with an honest work ethic, committed to do what I said I would and at the same time, striving to do my best. As I close my message, I can genuinely say that I stood up for what I believed was the right thing to do and gave this honor my best.
THE PAVEMENT PRESERVATION AND RECYCLING ALLIANCE AND CM SERVICES — A NEW PARTNERSHIP

BY RICK CHURCH, CM SERVICES, INC

Beginning January 1, 2017, there will be a new staff for PPRA and its partner organizations (AEMA, ARRA and ISSA). After more than thirty years serving associations in the pavement preservation industry, Mike Krissoff is retiring and closing his association management business. CM Services, Inc., a Chicago, Illinois, based association management company, will be taking the reins and working with each association individually, and as allied organizations, to help achieve their goals.

The Boards of AEMA, ARRA and ISSA began their search to find a suitable replacement for Krissoff & Associates at the end of 2015. By May 2016, after receiving and reviewing dozens of proposals and interviewing several qualified finalists, each Board selected CM Services, Inc. to become the new management company.

CM Services is a nearly forty-year-old association management company. CM’s approach to association management, however, is not traditional. CM and its professional team of employees invest themselves in the industries they represent so that they become part of each industry. This allows CM’s team to deliver high quality and valuable services to the members of each organization. CM Services’ mission statement is, “We partner with associations to develop, maintain and advance their missions.” Simply put, CM Services is focused on making sure each of its association partners has a purpose in life and works every day to make that purpose a reality.

While CM Services officially becomes the new association management company January 1, 2017, their team of association management professionals have been learning about the pavement preservation and recycling industry, participating in various meetings of the PPRA organizations boards, and designing and implementing a transition plan since June.

CM’s association management team includes Rick Church, Head Coach of CM Services and Management Principal to PPRA, AEMA, ARRA and ISSA. Kristi Olson will serve as the Senior Association Manager. Kristi is a seasoned association management professional. She will manage the team and be responsible to the Boards for implementing the projects and programs of each organization. CM Services is also hiring an Association Coordinator to help with meeting planning, logistics and administration. In addition to the direct team, CM Services will also have accounting staff, reception staff and other association management professionals completing the PPRA team.

CM Services is looking forward to continuing the many great programs of the groups including the Annual Meeting, training seminars, Slurry Systems Workshop, fall meetings, quarterly newsletter and more. Additionally, CM Services will work with the Boards and committees to identify and implement new programs to add value to members such as: more frequent electronic communications, educational webinars, discounted business services such as insurance, shipping, credit card processing, and an Annual Safety program.

Beginning December 1, the new address and phone numbers for AEMA, ARRA and ISSA in Glen Ellyn, Illinois will be active. You can reach the new staff at:

AEMA
800 Roosevelt Road
Building C-312
Glen Ellyn, IL 60137
Phone: 630.942.6579
Fax: 630.790.3095

ARRA
800 Roosevelt Road
Building C-312
Glen Ellyn, IL 60137
Phone: 630.942.6578
Fax: 630.790.3095

ISSA
800 Roosevelt Road
Building C-312
Glen Ellyn, IL 60137
Phone: 630.942.6577
Fax: 630.790.3095

We look forward to working with all of you to grow the industry and ensure that AEMA, ARRA and ISSA provide a credible, unified voice for their segments of the industry and a considerable added value for all members.
UPDATE OF ARRA TECHNICAL DIRECTOR’S ACTIVITIES

BY STEPHEN A. CROSS, ARRA TECHNICAL DIRECTOR

The latest ARRA/FHWA In-place Recycling Conference was completed early this summer. The 2016 Northeast States In-place Recycling Conference was held in Burlington, VT on June 14-16, 2016. The conference was sponsored by ARRA, FHWA, Vermont Agency of Transportation (VTrans) and the National Center for Pavement Preservation (NCPP). The theme of the conference was Utilizing In-place Recycling Technologies: Engineering, Economic and Environmental Benefits. Attendees at the conference included representatives from the public and private sector. Approximately 90 participants attended from 11 states, Washington DC and Canada.

Along with the usual opening remarks from FHWA and ARRA, the Chief Engineer from VTrans and the Director of Public Works from Burlington discussed their recycling programs with the attendees. The conference featured presentations on Programmatic Considerations, Technical Considerations, Specifications and Construction Operations and Breakout Sessions. Copies of all technical presentations will be available on the NCPP web site soon.

The highlight of the conference, according to conference evaluations, was again the field trip to see demonstrations of the in-place recycling techniques. The attendees were able to see micro milling, cold in-place recycling with foam and with emulsified asphalt and full depth reclamation. Thanks to ARRA members Garrity Asphalt Reclaiming, Peckham Industries, Gorman Roads and Reclamation, LLC, respectively. A special thanks to Mark Woolaver and Mike Fowler of VTrans, Jason Dietz of FHWA and Darlene Lane and Patte Hahn of NCPP for their hard work on the conference.

The ARRA semi-annual meeting will be at NCAT November 8-10. This is shaping up to be a very exciting meeting with field trips scheduled to NCAT’s laboratories and test track facilities. You won’t want to miss this. Finally, ARRA will have several presentations at the National Pavement Preservation Conference in Nashville, TN, October 11-14, 2016. More information can be found on the NCPP web site at https://www.pavementpreservation.org.

A new brochure on Cold Recycling was developed by the CR CORE Committee and is on its way to the printer. The brochure contains recent updates from the BARM and should be ready in time for the National Pavement Preservation Conference in Nashville in October. A draft mix design method and specification for Cold Recycling using emulsified asphalt is working its way through the AASHTO approval process. If things go well we could have an AASHTO Provisional Standard in the near future. Finally, we are working on a Tech Brief for FHWA on Project Selection for In-place Recycling. If this all comes together we could see this publication by the end of the year or early next year.
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Hot In-Place Recycling (HIR) has many benefits. This process is an on-site, in-place method that rehabilitates deteriorated asphalt pavement and minimizes the use of new materials.

During this time of rapidly increasing costs and limited funding, HIR presents the opportunity to spread available dollars over a much greater area. Roadway deterioration can be suspended, pavement preserved and upgraded, and costly reconstruction avoided.

“HIR is a great option for many agencies,” says Mary Beth Howard, project engineer with Gallagher’s Hot In-Place Asphalt Recycling Division, which is considered a pioneer of HIR. “This process typically goes in lieu of milling, and because HIR does not take material away from the roadway, it helps build structure.

HIR also uses heat which penetrates below the depth of the scarification tines, says Howard. “This allows cracks, in an oil-rich environment, to mend together where they otherwise would not have been touched. In addition, HIR is a much more affordable option compared to other various road treatment options.”

Waukesha County Roads

Located in Southeastern Wisconsin, just west of Milwaukee, Waukesha County recognizes the many benefits of the HIR process and has worked with Gallagher for over 12 years preserving roads with this method. Over the course of a month in the summer of 2016, Gallagher recycled portions of five county highways for Waukesha County.

The roads featured myriad problems, including centerline distress, transverse cracking, wheel track rutting and alligator cracking. Classic symptoms of roads that can be fixed using HIR.

HIR can be performed as either a single-pass (one phase) operation that monolithically recombines the restored pavement with virgin material or as a two-pass procedure, where the restored material is recompacted and the application of the new wearing surface then follows a prescribed interim period that separates the process into two distinct phases.

In the case of the Waukesha County roads, Gallagher used an HIR process composed of two pre-heaters, one main-heater/recycler, and a roller for a single-pass operation.

During the operation, two pre-heaters go ahead of the recycler to gradually heat up the road and prep it for deep scarification. The recycler then follows in tandem.

The recycler has its own oven which increases the temperature of the road one final time before the rejuvenating agent is applied and the scarification tines pass through at a 1.5-inch nominal depth.
This rejuvenated material is then tumbled through an ever-spinning auger, which feeds right into the screed. The screed continues to lay the material in a semi-compacted fashion. This mat is called “complete” when the roller passes over the road to complete compaction.

“HIR requires an overlay of some sort in order for the entire road to be considered complete,” says Howard. “However, the road is open to traffic immediately after the roller passes, which is another added benefit to the HIR process.”

**Customized equipment**

All of Gallagher’s equipment is customized or has been turned customized over the course of many years. “Many changes have been done to the equipment to make the process safer, more cost effective, and to deliver a better product,” says Howard.

Gallagher’s trains typically run at a pace of 15 feet per minute. The speed can vary due to conditions such as ambient temperature, previous roadway conditions, residual precipitation on the roadway and more.

“If you were to drop a penny on the road, and timed the process from the time the first preheater reached the penny, to when the roller passed the penny, the entire interval should take around 15 minutes,” says Howard. “This includes engineered machine spacing and pace.”

One of the challenges of the Waukesha County project was heavy traffic. “It’s important to remember that safety comes first, and many cars get easily frustrated with construction and the workers,” she says. “It’s important to remember that the guys doing the work are at a very high-risk job. We very much appreciate slow-moving vehicles and patience.”

To combat this challenge, Gallagher has flaggers and traffic signs at all of its jobsites and makes sure all crew members are flagger-certified in case someone needs to step in as an additional flagger.

**Green benefits**

HIR enables public works officials and municipalities to effectively re-use existing materials by restoring the pavement in place, making it a very green process. The process is designed to reduce the overall carbon footprint by 28% versus conventional “mill & fill” resurfacing and overall trucking needs by over 50% or more.

“Our process does not require truck hauling or an asphalt plant to be operable,” says Howard. “This cuts out a lot of environmental emissions which otherwise would be present at a traditional mill-and-fill operation.

“The reduction in the amount of truck trips required versus conventional grind and overlay is typically by 75%,” she continues. “This translates to huge improvements in congestion and user delays, as well as the agency’s other roads not getting beaten up by the truck trips.”

Overall, the Waukesha County project with Gallagher was another success as it’s been for many years now, says Howard.

“We very much enjoy working for Waukesha County and look forward to continuing our work there,” she says.

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**THE HIR 5-STEP SCARIFICATION PROCESS**

- Two machines operate in tandem to deep-heat and soften the existing aged, worn pavement surface
- Application of a rejuvenating agent improves the viscosity of the aged asphalt
- Multiple rows of spring loaded ‘scarifiers’ penetrate the softened asphalt to the desired depth
- A full-width set of augers re-distributes the rejuvenated mix
- The rejuvenated, recycled surface course aggregate is uniformly leveled with a conventional paving screed in preparation for an overlay or seal coat
REVIEW OF THE 2016 AEMA INTERNATIONAL SYMPOSIUM ON ASPHALT EMULSION TECHNOLOGY

BY MICHAEL DOUGHERTY, AEMA-ARRA-ISSA


Thanks to support from the International Bitumen Emulsion Federation (IBEF), over twenty-eight speakers from all over the world provided three full days of content.

The first day of presentations began on Wednesday, November 2, 2016, and was kicked off by AEMA ISAET 2016 Program Chairman, Gaylon Baumgardner, welcoming everyone and announcing the record attendance for this year’s symposium. AEMA’s president Archie Reynolds acted as Wednesday’s moderator.

Wednesday's first presenter Etienne Le Bouteiller, IBEF, discussed “Emulsion Markets and Challenges.” He concluded that there is a need for continuous working, cross fertilization and sharing of information and experience, that innovation is a must, and, for our industry to succeed, we must not lose focus that pavement preservation is our first business.

Richard Kim, North Carolina State University, followed Etienne with a discussion on “Performance-Graded Specifications for Emulsions Used in Pavement Preservation Treatments.” During his presentation, he reviewed the NCHRP 09-50 Research objective, provided an overview of Emulsion PG (EPG) specification framework, discussed EPG Test Methods, EPG Specification Development and gave recommendations for future research into a Long-Term Aging Study and a Long-Term Field Validation Study.

Up next was Eurovia’s Bernard Eckmann with a presentation on “How Emulsion Technology Faces Bitumen Variability.” He concluded that bitumen variability (and other constraints) call for new solutions. His perspective is that the industry is active and successful in meeting those new challenges, but efficient adaptation to changes and design of new products call for a better fundamental understanding and more performance related test methods. He concluded that new products must also be understood and accepted by consulting engineers and road owners.

François Chaignon, Colas, followed that with a discussion on the “State of the Art of Cold-Mixes in France.” François gave an updated presentation of the French emulsion market. He provided some figures of bituminous cold mixes in France and the evolution of European and French standards. He concluded with some new developments such as strong evolutions in specifications and a scientific approach in view of designing pavement with cold mix base and a better knowledge of the evolution of the product. The last presentation before the afternoon break was given by Abdeltif Belkahia, Colas CST, presenting “A Structuring Grave Emulsion After 18 Years of Service.” His talk reviewed the main features of the grave-emulsion section. He concluded that long term feedback has improved their knowledge on structuring grave-emulsion. Structuring Grave-emulsion in-place behavior is excellent after 18 years of service and this road structure based on techniques using asphalt emulsion (Grave-Emulsion+Chip Seal) has completely fulfilled its maintenance role. He also noted that design methodologies have to be improved to highlight Grave-Emulsion behavior without forgetting its environmental advantages.

We returned from the afternoon break to a presentation on “Phosphoric Acid Based Micro Surfacing Systems” by Stephanie Hoogendoorn, Akzo Nobel. One of the highlights from her talk was the project done on the Confederation Bridge in Atlantic Canada on June 2015. She noted they found that “even at temperatures of about 16°C they could roll the micro surfacing with a pneumatic compactor in about 10-15 minutes, and allow traffic on it in 30-40 minutes.”

Andrew Braham, University of Arkansas, was up next discussing “Characterizing Emulsion Effects on Aged Asphalt Concrete Surfaces using Bending Beam Rheometer Mixture Beams.” He concluded his presentation noting that the Bending Beam Rheometer (BBR) can test asphalt mixtures and identify presence of lab applied emulsions. He found the m-value results follow expected trends while stiffness results were not as consistent. He noted that emulsions increased BBR sample ability to disperse stresses
Wednesday final presentation was given by Dr. Raber Inoubli, CECA Arkema, on “Conflicting Requirements: Technical Performance vs. Regulations.” His presentation noted that all CECA’s new developments will continue to take account of current and future regulations as regulations will be an innovation driver.

Wednesday concluded with an evening reception just outside the hall where presentations were given. Attendees gathered around for cocktails as they talked with fellow attendees and had a moment to catch up with the 2016 ISAET sponsors Heatec Inc., PRI Asphalt Technologies, Inc., and VSS International, Inc. at their booths.

Thursday began with talks focusing on Testing and Development. François Chaignon, Colas, started the day as moderator and introduced Amit Bhasin, Associate Professor at the University of Texas at Austin, as the first speaker of the day.

Amit discussed “Characterizing Stability of Asphalt Emulsions Using Electro-kinetic Techniques.” He discussed why we measure emulsion stability, the method and typical measurements, as well as other benefits and methods. He found that a rapid stability test based on the electro-kinetic method with minimal hardware can be used for formulation and QC purposes.

Miguel A. Montoya, Graduate Research Assistant at Purdue University, spoke next on “Using Electrical Properties to Quantify Chip Seal Cure Times.” He shared his evaluation of their results and next steps which included that normalized resistance measurement can be used to quantify chip seal cure times (NRI ≥ 10), longer-lasting chip seals that perform as designed, and electrical resistance measurements for quality control of asphalt emulsion applications.

Next was Huachun Zhai, Ph.D., P.E., Director of Technology at Idaho Asphalt Supply, discussing the “Difference in Properties of Residues of Polymer Modified and High Float Emulsions from Different Recovery Methods.” Some of his findings were that oven evaporation method and Low Temperature evaporation based AASHTO PP72 Method B produced stiffer materials than that from distillation and that polymer improves the resistances to both rutting and fatigue.

François introduced Gaylon Baumgardner, PhD, Executive Vice President of Paragon Technical Services, Inc., as the last speaker before the morning break. Gaylon discussed the “Specifications of Emulsion Residues Using Dynamic Shear Rheology (DSR): The Next Generation.” He discussed the background of, and an introduction to, Asphalt Emulsion Testing for Emulsion, Asphalt Emulsion Testing of Residue. From there he discussed Performance Grade Specifications for Asphalt Emulsions.

After the break, we came back to further discussions on Testing and Development when François introduced a discussion on the “Use of the 4mm DSR for Testing of Asphalt Emulsion Residue and Field Recovered Binders” by Gerald Reinke, MTE Services, Inc. Gerald offered some background on and reviewed the development of the 4 mm DSR test and reviewed the factors affecting 4 mm DSR test and results. He discussed the use for Characterizing Emulsion Residue, Characterizing Field Recovered Binders, and comparing the Field Torsion Bars to Recovered Binder. He concluded that for data reduction DSR manufacturers will need to collaborate on data analysis procedure so that data between labs can be reliably compared, but noted that this is one factor that is out of the hands of those of running the test.

From there Louay N. Mohammad, Ph.D., Louisiana State University, presented the “Effect of Tack Coats on Asphalt Pavement Performance.” He ended his talk noting that the ISS increased with an increase in application rate, interface bonding strength increased with service time in all field projects and for all surface types, and that laboratory ISS results correlated well with short-term cracking performance of field pavements.

Motofumi Tatsushita, JEAA, discussed “Trackless Tack Coats in Japan: Experience and Standard.” He reviewed the current situation for Asphalt Emulsion in Japan, the problems of current Tack Coat, discussed Trackless Tack Coat, and ended discussing the cutting-edge technologies for Asphalt Emulsion in Japan.

The last speaker before lunch was Arlis Kadrmas, BASF Corporation’s Technical Account Manager, with a presentation on “Asphalt Emulsion VOC Testing.” Arlis noted in his conclusion that TVOC procedures can be run on emulsions and their residues successfully, that Asphalt emulsions without petroleum distillate addition are well below the 5000 ppm that is the baseline for “VOC\textsuperscript{free}”
product designations, that using 2% (bwe) or less of any petroleum distillate will usually fall below 5000ppm measured VOC, and, finally, that the VOC measurements based on test measurements are lower than those based on VOC calculated on %oil distillate. We returned from lunch with five presentations on Manufacturing & Applications moderated by FP2 Inc.'s Jim Moulthrop.

The first presentation on this new topic was given by Ben C. Cox, Research Civil Engineer for the US Army Engineer Research & Development Center, discussing the “Balanced Mix Design Approach to Design of Cold-In-Place Recycling.” He began his presentation noting that cold in-place recycling (CIR) is more economical than reconstruction, but can address distresses which other rehabilitation techniques (e.g. overlay) cannot.

Next up was Alejandro Rosres, Idaho Asphalt, with an “Evaluation of the Amount of P200 on Water Resistance of Micro-Surfacing Mix Systems.” Alejandro noted that few studies have looked at the effect of fines on microsurfacing performance. Their goal of their evaluation was to understand the role fines play in WTAT performance and to understand how emulsion affects performance. He concluded that future research must be made to evaluate the effect of fines on Type III Fine Gradation, Type III Coarse Gradation, Vertical and Lateral Displacement, and SBR. He also discussed that they should continue evaluation of a possible Accelerated WTAT Procedure.

Before the afternoon break, Isaac Howard, Materials and Construction Industries Chair of Mississippi State University, reviewed the "Performance Oriented Guidance for Mississippi Chip Seals." The goal of his talk was to present performance oriented findings from the MDOT State Studies 202/211 and Ergon A&E Supported Infiltration Testing. He presented the findings from the Findings Presented, Structural Integrity Preservation from Sealing, Moisture Loss Monitoring for Traffic Opening, Compatibility Evaluation via Sweep Testing, BBR Mix Beams for Rejuvenation Assessment, and In Place Infiltration Measurements Over Cracks.

We returned from the afternoon break with a discussion on "Microsurfacing: Is Asphalt Film Thickness a Chemistry or Design Problem" by Paragon Technical Services, Inc.’s Walter Jordan. He opened remarking that Microsurfacing is a popular Pavement Preservation Application, but with design complexity, Asphalt Film Thickness (AFT) becomes an issue (similar to HMA designs and issues.). They have found that excessive AFT causes skid resistance failure, bleeding, and deformation issues, but insufficient AFT causes raveling and durability loss. He noted in his conclusion that a correlation exists between AFT and optimum conditions, but that AFT is highly dependent in both design and chemistry.

Thursday’s last presentation was given by Andrew Hanz, Technical Director at MTE Services Inc., on “Performance of Bio-Modified Rejuvenation Scrub Seal Emulsions.” He began his presentation acknowledging that there are thousands of lane-miles of asphalt pavements in moderate or poor condition in need of maintenance. His perspective was that crack sealing is not economical and chip sealing will not be as effective. He discussed that Scrub Seal was investigated as a maintenance alternative, relatively new to Wisconsin and other states in the region. Through his presentation, he provided a series of evaluations and results, concluded that the functional requirements of the Scrub Seal were met, but further monitoring is needed to document performance and quantify change in asphalt layer properties with time.

For Thursday’s evening reception, attendees gathered in the Sunlit Crystal City Restaurant on the top floor of Hyatt Regency Crystal City with a view of Washington, DC.

Friday brought the final six talks of ISAET 2016 which were focused on the topic of Applications. These final presentations were moderated by Codrin Daranga, Ergon Asphalt & Emulsions, Inc.

Amy Epps-Martin, Texas A&M University, kicked off Friday with a presentation on the "Implementation of the Surface Performance-Grade (SPG) Specification in Texas." She shared that they have completed 2016 verifications (11 Binders, 20 Sections in 7 Districts), completed Round Robin 2, and are continuing to gather industry input.

Elie Hajj, University of Nevada Reno, followed with a discussion on the "Performance Evaluation of Pavement Preservation Techniques used in Nevada over a 15 Year Period." He remarked on the Effectiveness and Optimum Time for Single (Phase I) and Sequential (Phase II) Applications of Slurry Seal and the Long-Term Field Performance of Cape Seals.

Yvon Gerbel, FAYAT Group, then reviewed the "Latest Developments for Chip Seal Equipment." He noted that wearing course rough-
ness, road exposure, winding road or not, altitude, and traffic are important parameters to define a dosing.

The last speaker before the morning break was Buzz Powell, National Center for Asphalt Technology, with "NCAT Test Track/Lee Road Pavement Preservation Research Update." Buzz reviewed the benefits of pavement preservation and the life extension ($\Delta x$) and condition improvement ($\Delta y$). He then shared results and next steps for their test on CR-159 and US-280.

We returned from the final break of the 2016 ISAET with a discussion on the "Preservation of Porous Asphalt" by Bert Jan Lommerts, Latexfalt. He concluded that, with porous asphalt, good rejuvenators have a stabilizing effect for oxidation and that rejuvenation of old porous asphalt is technically and commercially viable.

Akzo Nobel's Sundaram Logaraj gave the final presentation of the symposium on "Volatile Solvent Free Penetrating Prime Coat Emulsions with Higher Performance than Cutbacks." He concluded that with Prime Coat Emulsions cutbacks can be replaced with VOC free emulsions. Also, emulsions without volatile solvents can match cutback performance depending on the base material, emulsions with bio-solvents can surpass cutback performance depending on the base material, and with difficult base material top layer can be scarified, mixed in and compacted. He acknowledges that further work is planned with certain difficult base material.

AEMA's ISAET 2016 Program Chairman, Gaylon Baumgardner, returned to the stage to thank everyone for their attendance, thanked the sponsors for their support, and invited everyone to return in four years for the next International Symposium on Asphalt Emulsion Technology.

Thank you, again, to our sponsors Heatec, Inc., PRI Asphalt Technologies, Inc., and VSS Macropaver for sponsoring the 2016 ISAET!
Over one hundred twenty-five attendees from Canada, Germany, and the US gathered for the Asphalt Recycling & Reclaiming Association's (ARRA) 2016 Semi-Annual Meeting held November 7 – 10, 2016, at the Hotel at Auburn University & Dixon Conference in Auburn, Alabama.

The Semi-Annual Meeting was full of content including a tour of the National Center for Asphalt Technology at Auburn University testing facility, the NCAT Pavement Test Track, and one of its test roads.

There were several sponsors who made this event possible. The NCAT Tour was sponsored by Roadtec, Inc. Our reception at the Auburn Arena was sponsored by Caterpillar Global Paving and Wirtgen America. The Semi-Annual Meeting's internet was sponsored by Ergon Asphalt & Emulsions. Our Hotel at Auburn University Room Key Sponsorship was covered by Roadtec, Inc. Mintek Resources sponsored the Semi-Annual Meeting Branded Lanyard Sponsor. We want to thank our General Sponsors; Blount Construction Co., BLS Enterprises, Inc., Coughlin Company, Kennametal, Streumaster Maschinenbau GmbH, Superior Tire & Rubber Corp., The Miller Group, Inc., and The Sollami Company.

The Semi-Annual meeting kicked off on Tuesday with opening remarks from ARRA's President, and opening moderator, Ryan Essex, The Miller Group, who welcomed the attendees to the meeting and introduced the meeting’s keynote speaker, Coach Pat Dye from Auburn University. Coach Dye discussed some key fundamentals of leadership, stories from his life and career as a coach, and imparted the wisdom that “losing won't kill you.”

During the first break, Coach Dye spent a few minutes talking with, and signing footballs and books, for some of the attendees.

We returned from break for a talk by Dr. Buzz Powell, PE, NCAT Assistant Director on "ARRA at the NCAT Pavement Test Track: Great History of Results and a Look at the Future." Buzz briefly touched on NCAT’s recycling and reclaiming history. He empowered the attendees to focus on ”Innovative technologies in asphalt pavements” with a focus on mix and materials, structural pavement design, and pavement preservation. He also gave a look to the future of NCAT and a brief overview of what Wednesday’s tours would consist of.

The attendees gathered for a lunch and a bit of networking before, moderator Eric Baker, Roadtec, Inc., called everyone back to begin the remainder of Tuesday’s sessions.

The first presentation was given by Pat Kennedy, PE, of Denver Street Maintenance, who discussed "Hot-In-Place Recycling: A Valuable Tool For Denver Pavement Preservation." He focused on the Hot-In-Place Recycling processes, Pavement Management in 30 seconds, Heater Repaving Process, Unique Considerations, Life Cycle, and Sustainability and Economics.

The second presentation of the day was given by Brian Diefenderfer, PhD, PE, Associate Principal Research Scientist, on when "Opportunity Knocks – Implementing Cold Recycling and FDR Within a State Agency." He gave some wise insights on the steps to implementation. He suggested that you begin by building a familiarity by visiting field projects, site visits, and attending seminars, next develop design inputs by reviewing field and lab testing and reviewing literature summaries, then review specifications and project selection guidelines, and, finally, document lessons learned.

The final presentation of Tuesday was given by Dave Jones, University of California Pavement Research Center, discussing the "Long-Term Effects of Cement as an Additive in FDR and CR with Foam." In his conclusion, Dave discussed that foamed asphalt and cement have different roles. He said the primary role of cement is to speed up curing, provide early strength, and to enhance moisture resistance. Curing is critical to ensure good long-term performance, especially moisture resistance. Long-term field performance (15 years) and ALT (34 M ESALs) have shown that FDR-FA (and CIR-FA) with an appropriate mix design, good construction, and good drainage are excellent rehabilitation strategies.
Tuesday concluded with the ARRA Business Meeting and the ARRA Suppliers Meeting.

Wednesday began with ARRA’s FDR Committee Meeting and HIR Committee Meeting. After, attendees then gathered for the start of the general sessions moderated Todd Thomas, Colas Solutions, Inc.

The first presentation was given by Trevor Moore, Miller Paving Limited, who discussed "ARRA – Agency Interaction: The Ontario Experience." He shared how Ontario’s specification development in Ontario went from some failures to success through the support, and industry knowledge, of ARRA. Looking to the future, Trevor said the "group will continue to work together on improving in-place recycling specifications in Ontario."

The second presentation of the day was given by Steve Cross, ARRA Technical Director, who talked about "Regional ARRA Opportunities." Supporting what Trevor said, Steve said, "What is going on in Ontario is a good example of what can happen when we take a proactive approach."

Attendees took a short break and returned for the final three sessions before dispersing for the NCAT Tour.

Moderator Todd Thomas, Colas Solutions, Inc., welcomed Don Matthews, PRSI, presented on “Mix Design to Field Challenges.” He encouraged that, “Although we have had lots of successes, there is more in us to raise the bar higher.” He implored the attendees to improve “mix designs to better model construction and long term service” specifically with gradations, binder interaction, air voids, curing conditions, structural section interaction, and, of course, ultimate performance.

Next up was Renato Ceccovilli, Colas, presenting on “QC and Field Testing Challenges.” Renato noted, “Before the start of the CIR Project you MUST have a meeting with the Inspectors. Then go through the construction process and explain the differences between HMA and CIR.”

The final presentation of the day was given by Jason Wielinski, Heritage, who presented on “Performance Testing – Issues and Opportunities for ARRA Disciplines.” He discussed trends in Pavement Engineering focusing on Pavement Design and Materials Testing & Acceptance.

Attendees then gathered in front of the hotel, broke into three groups, and took busses to individually tour the NCAT facilities, the NCAT Test Track, and the Pavement Preservation work being done by NCAT on Lee Road 159 & US 280. One set of attendees toured the 40,000-square foot NCAT main facility designed for complete testing of asphalt binders and mixtures done using state-of-the-art equipment. The second group received a guided tour of the NCAT Test track for an up-close look at the test track instrumentation, failing weight deflectometer testing, dynamic friction testing, and other forensic equipment including NCAT’s mobile testing lab. The final group took a walking tour of the work NCAT was doing on Lee Road 159 & US 280, where research is underway to quantify the life-extending benefits of different pavement preservation treatments by determining the field performance of treatments applied at various stages of pavement life and decay. Each group rotated through these sections and were each guided by a representative from NCAT.

Everyone gathered Thursday for the final days of presentations. ARRA Board Member Jonathan Pease, Rock Solid Stabilization & Reclamation Inc. acted as the opening moderator and welcomed everyone back.

The first presentation was given by Kelly Steeves, Leica, who discussed the “Use of 3D Technology to Improve Your Business.” Kelly went over the history, and successes, of using Leica PaveSmart 3D for Milling.

Next up was Jeff Wiley, Wirtgen, with a conversation on "Milling Technologies From Around the World." His talk focused on the need for the use of technology for better efficiency.

James Bevil, Roadtec, Inc, gave the last talk before the am break. His presentation focused on “The Impact of Silica on our Business.” He closed his presentation stating that employers need to understand potential employee exposure as well as the status of machine fleet, develop action plans to comply with the OSHA rule, and give employees enhanced hazard communication on silica and its health effects.
We returned from the break to our final three presentations and new moderator in ARRA Board Member Darren Coughlin, Coughlin Company, Inc.

In the first presentation, Randy Dobson & Dave Peterson, Caterpillar, presented on “The Impact of Diamonds on ARRA Cutter Head & the Impact of Diamonds on the Paving Operation.” They reviewed the use of Diamonds vs Carbide Asphalt Picks, the evolution of cutting tools, current road milling specs, averaging systems for smoothness, and their vision for the future for paving contractors.

Next was Tom Chastain, Wirtgen, discussing “Milling for Quality – Pattern and RAP.” He concluded that “if we maintain our machine, we have bettered our chances to achieve quality. If we slow our fpm down, we have bettered our chances to achieve quality. If we communicate with our team regarding the job, we have bettered our chances to achieve quality. If we do all of these things while putting SAFETY first, we WILL achieve quality.”

The final presentation of the day was given by Eric Baker, Roadtec, who talked about the “Advance Machine Maintenance to Improve Your Bottom-Line.” He discussed the balancing act of success by focusing on production, quality, and maintenance and the concern of burning the candle from both ends between cost and price.

ARRA President Ryan Essex returned to provide some closing remarks. He thanked all for attending and took time to cite the work of Michael Krissoff, Meredith Kennedy, and Michael Dougherty in putting together a well-run event.
NEW RESEARCH DRIVES EMULSIFIED ASPHALT BOND COAT BEST PRACTICE

BY TOM KUENNEN

As new evidence of their usefulness unfolds, fresh attention is being paid to use of emulsified asphalt tack or bond coats in bituminous paving.

They’re commonly called “tack” coats, but as their purpose is to bond one layer of asphalt to another layer of pavement, industry is beginning to dub them “bond” coats. The same way that fragile, thin veneers of wood are glued to each other to form a robust sheet of plywood, research shows layers of asphalt pavement perform better when bonded to each other.

“An emulsified asphalt tack coat produces a strong adhesive bond without slippage between an existing pavement and a new overlay,” reports the Colorado Asphalt Pavement Association in its 2013 report, Best Practices for Applying Undiluted Emulsified Asphalt Tack Coats. But the performance of this adhesive bond can be endangered by poor placements.

- Underscoring this new attention to emulsified tack or bond coats was the recent release of National Cooperative Highway Research Council (NCHRP) Report 712, Optimization of Tack Coat for HMA Placement (for your copy, search “NCHRP Report 712”).

Successful bond or tack coat application will cover complete paving width and will have double or triple overlap by nozzles that are aligned the same way.

IMAGE CREDIT: Colorado Asphalt Pavement Association

- In cooperation with the Federal Highway Administration, since January 2015, the Asphalt Institute has been presenting workshops on the rationale for and proper placement of bond coats. They’ve been conducted for state DOTs from coast to coast, and a summary presentation was conducted at the October Pavement Preservation & Recycling Alliance conference in Niagara Falls, Ont.
- In a widely distributed spring 2015 report, the National Center for Asphalt Technology (NCAT) reiterated the importance of bond coats, and the need for correct placement.
- New value-added bond coat products have come into the market which enhance performance, and reduce undesirable tracking of emulsion onto adjacent roadways, curb cuts, parking lots and sidewalks.
- Computerized distributor trucks – replacing the old driver-controlled tachometer-based systems – are taking the guesswork out of on-the-job emulsion placement. In the meantime, “spray pavers” – which apply bond coats immediately in front of the screed – are getting new attention for use for thin and ultrathin bonded overlays.
NCHRP Sets Stage

NCHRP 712 set the stage for the current excitement in emulsified asphalt tack or bond coats. This practical study – developed by the Louisiana Transportation Research Council (LTRC) of Louisiana State University for the Transportation Research Board – looks at the existing state of bond coat application, and sets out guidelines for best practice.

The study was developed by LTRC researchers Louay N. Mohammad, Mostafa A. Elseifi, Abraham Bae, and Nachiketa Patel; Joe Button of Texas A&M University; and consulting engineer Jim Scherocman. In the past, application of tack or bond coats mostly has been a “seat of the pants” operation, but this is changing, the report says.

“Selection of an optimum tack coat material and application rate are crucial in the development of proper bond strength between pavement layers, says NCHRP 712. “In general, selection of tack coats has been mainly based on experience, convenience, and empirical judgment. In addition, quality-control and quality-assurance testing of the tack coat construction process is rarely conducted, resulting in the possibility of unacceptable performance at the interface and even premature pavement failure.”

To this end, the report articulates optimum application methods, equipment type and calibration procedures, application rates, and asphalt binder materials for the application of bond coats, and recommends revisions to AASHTO methods and practices. A significant driver in this report is the development of two new devices for testing of bond coats, the Louisiana Tack Coat Quality Tester (LTCQT) and the Louisiana Interlayer Shear Strength Tester (LISST), the former for field use, and the latter for lab use.

The LTCQT evaluates the quality of the adhesive strength of bond coat on the job site, and adds a new dimension of quantification of field testing of bond coat applications. To complement this device, the LISST was developed for the characterization of interface shear strength of cylindrical specimens in the laboratory.

“The LTCQT is a small test unit that can measure the bond strength of a tack coat in the field,” said Edward Harrigan, TRB staff officer. “The LISST is a test fixture fitted into a universal testing machine to measure the interface shear strength of a tack coat in a field or laboratory specimen. With the LISST, the effects of pavement surface types and conditions, tack coat material types, and tack coat application rates and methods on tack coat performance can be assessed.”

LTRC’s research for this project also resulted in the development of a training manual, presented as an appendix in the report. The training manual provides a comprehensive presentation of the recommended construction and testing procedures for tack coat materials.

Need for Bond Coats

The need for bond coats is clear, but their application is inconsistent and varies widely among both contractors and road agencies.

Some local road agencies don’t provide detailed bond coat specs. In its own way, at least one DOT doesn’t require them on milled surfaces. If tack coats are not a contract pay item, their application may be at the mercy of the contractor, who might consider bond coats an additional expense that is not specified.

Nonetheless, best practices are established. For example, for maximum service, bond coats should be evenly distributed across the full width of clean pavement, not just as the commonly seen narrow spritzes on the substrate. Spray bar nozzles must overlap,
ideally in multiples of three; triple overlap is recommended for higher application rates such as chip seal, but may not be achievable for lower rates of bond coats.

The emulsion must be dispersed with the right spray pattern, at the right temperature and volume. Long after the paving is completed, inadequate adhesion between two layers of bituminous mix may cause problems in the mat above.

“For the effect of tack coat coverage, the use of 50 percent coverage significantly reduced the interface shear strength by a factor ranging from 50 to 70 percent,” says NCHRP 712. “In addition, the use of 50 percent tack coat coverage resulted in inconsistent and non-uniform interface bonding behavior for tacked surfaces.”

“If [the overlay] can’t stick it’s not going to bond,” said consulting engineer Dale Decker, P.E., at a seminar on tack coats during World of Asphalt 2015 in Baltimore. “And if we don’t get the bond, we’re wasting our money.”

Moreover, from the owner and contractor point of view, this bonding of layers via asphalt emulsions comes at a relatively small price.

“An analysis of bid tabs using 2013 data shows that the cost of tack coat is relatively minor compared to other components of a typical paving project,” Decker said. “Therefore, the risk of a poor or a compromised bond from not applying tack should be deemed too great when one considers the ramifications of the loss of fatigue life from this condition. Tack is such a cheap component that it makes little sense to shortchange this critical step and introduce so much risk.”

As indicated, the possibility of skipping the bond coat arises with milled surfaces. “While some research indicates the skipping of tack on a milled surface will still result in adequate bonding of layers,” Decker said, “the weight of research indicates that the use of tack improves the bond of a milled surface that has been properly cleaned. As with the first scenario, the cost of tack is so small relative to the cost of premature pavement failure, it is foolhardy to skip applying tack.”

Do new pavements need tack coats? “NCHRP recommends applying tack coat always,” Decker said. “I don’t disagree with that. Tack coat is the cheapest insurance you can possibly buy as a contractor. It just makes a lot of sense.” The Asphalt Institute also recommends tacking between all lifts.

**Types of Bond Coats**

Bond coats utilize either straight liquid asphalt, cutback asphalt, or asphalt emulsions, but for a number of reasons, asphalt emulsions constitute the lion’s share of bond coat applications by far.
“The most widely used tack coat material in the world is emulsified asphalt,” NCHRP reports, adding emulsified asphalt, or asphalt emulsion, is a nonflammable liquid substance that is produced by combining asphalt and water with an emulsifying agent. A survey in the report indicated that worldwide, approximately 92 percent of tack coat applications utilized asphalt emulsions.

It’s easy to see why asphalt emulsions are preferred for bond coats. Straight or “neat” liquid asphalt must be kept heated to stay liquefied, and that poses burn hazards and other safety problems as the distributor moves around on the site.

Asphalt – what remains after lighter hydrocarbons have been distilled from the crude oil at a refinery – also may be liquefied by reintroducing some of those lighter hydrocarbons, such as kerosene or diesel, as a solvent. These “cutback” asphalts have been widely used in the past for tack coats, but today are discouraged because as the solvents evaporate, volatile organic hydrocarbons are released which contribute to smog and other environmental ills.

An asphalt emulsion is a homogeneous mixture of two insoluble substances, oil and water. In it particles of liquid asphalt (the dispersed phase) are surrounded by molecules of water (the continuous phase). Compared to hot liquid asphalt, asphalt emulsions have greatly reduced viscosity, are safe to use at lower temperatures, and allow liquid asphalt to be spread more evenly and thinly.

Emulsified asphalt is produced by dispersing tiny globules of asphalt cement into water treated with a small quantity of emulsifying agent. The dispersion takes place in a powerful blender, called a colloid mill, where spinning blades break or shear the liquid asphalt into suspended microscopic particles. The water, or soap solution, is immediately introduced to form the emulsion.

The emulsifier – an engineered surfactant (detergent) or surface-active agent – maintains the microscopic asphalt droplets in a stable suspension, keeping them from recombining. The amount and type of surfactant used, along with other variables, controls properties of the emulsion critical to performance in the field application.

For example, emulsifiers affect the “break” time following placement on a road, in which the water evaporates, leaving the residual asphalt behind. Asphalt emulsions partially are categorized as rapid setting (RS), medium setting (MS), slow setting (SS) and quick setting (QS) emulsions.

Today, the most common types of emulsions used for bond coats include slow-setting grades of emulsion such as SS-1, SS-1h, CSS-1, and CSS-1h and the rapid-setting grades of emulsion such as RS-1, RS-2 and CRS-1.
Tips for Successful Bonding

The correct placement of asphalt emulsion as a bond coat is important for long-lived asphalt pavements. Here are some tips for a successful bond coat.

- The correct application depends on four variables, according to manufacturer E.D. Etnyre & Co. They are the desired application rate, in fractions of a gallon per square yard; the forward ground speed, in feet per minute; the asphalt pump output, in gallons per minute; and the width of the spray in feet. The onboard metering system gives the operator precise control of the application of asphalt, with either manual or computer control.

- The spray temperature of the emulsion is important. If it’s too cold the asphalt emulsion may not flow properly and can cause issues with the distributor pumps. If it’s too hot, the emulsion may separate or “break” in the tank. The temperature depends on the particular emulsion used, consult with the emulsion manufacturer for specific recommendations. Document the details in case you have to reconstruct what you did.

- Keep the storage and distributor tanks clean, especially when changing from one emulsion to another, for example, emulsion for a bond coat to emulsion for a chip seal. “Empty that tank and clean it,” Decker urges.

- Nozzle alignment is an important part of the process; get all nozzles at the same angle. If not, a non-uniform spray pattern will result. “Try to achieve a triple overlap,” Decker said. “A double overlap can work too, but triple is the most common and a little more forgiving. A triple overlap ensures uniform placement of material, and that’s what we want.”

- Not only do the nozzles have to be aligned the same way, all nozzles need to be the same size and type. Understand what kind of nozzle you have, and make sure they are designed for the intended application rate. Nozzles used for chip seal operations typically will not perform well in a bond coat application.

- Height of the spray bar is important. In the old tachometer-based system, as the amount and weight of emulsion in the tank decreased, the spray bar rose. The operator had to account for the rising height of the spray bar, but today’s computer-driven systems do that automatically, Decker said.

- Calibrate your distributor to confirm what’s being put down. “This is not rocket science,” Decker said. “Before you spray, weigh some pads that are flat and absorbent. Cotton diapers are a good option. Lay them down flat on the roadway, drive over them with the distributor, and pick them up and weigh them again. That will indicate whether the distributor is working at the right distribution rate.” ASTM D2995-14: Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors is a test standard that describes this process.

- Clean or sweep the pavement before application. Adjust the application rate as you need to, depending on the age and condition of the pavement.

- The amount of the bond coat material applied is important. “If we don’t use enough tack, we will get sliding between layers,” Decker said. “If we use too much tack, we can get a slip plane that will cause the same problem.”

- If a fine milled surface texture is present, less tack will be required than a standard texture. A really rugged surface will use more tack coat to cover as it presents more surface area. Don’t use tack coats over open graded mixes.

For more information about bond or tack coats, or about asphalt emulsions, visit the Asphalt Emulsion Manufacturers Association at [www.aema.org](http://www.aema.org).
SAVING PUBLIC ROADS:
HOW TECHNOLOGY CAN SAVE TAX DOLLARS AND IMPROVE THE QUALITY OF OUR MUNICIPAL ROADS

BY DR. MICHAEL MAHER, AFFILIATE

Data from the Association of Municipalities of Ontario (AMO) indicates that 67 per cent of the roads in the province are under municipal jurisdiction, amounting to 140,000 km of public roads. It is estimated that the combined operating budget for these municipalities is in the range of $40 billion per year. Transportation is the single largest item, accounting for approximately 23 per cent of the budget. If we conservatively assume that of this 23 per cent, 15 per cent is spent on road maintenance, then each one per cent in savings attained provides an extra $60 million to be re-invested into our roads or other municipal assets. When determining the cleverest way to spend an annual road budget, consideration must be given to the full toolbox of road preservation and rehabilitation treatments, in conjunction with capital planning optimization strategies. Beyond financial savings, a good road capital plan can simultaneously deliver a higher level of service to the community and a safer road network.

The value of preventive maintenance for any expensive asset is well understood, and we would never dream of running our cars without periodic oil changes and other regular maintenance. In this context, it is disturbing to learn the results of a recent Canada-wide survey of municipal road maintenance practices. The 171 municipalities that responded to the survey represented 45,000 km of paved road, 15 per cent of Canada’s population, and a wide range of municipalities by region and population. The survey established that while 98 per cent of respondents perceive preventive maintenance as an important and cost-effective approach to extend the service life of their pavements, a majority of the municipalities do not apply preventive maintenance treatments and have no clear understanding of when these treatments should be applied.

The policy of reconstructing “worst roads first” appears ingrained in our capital planning process, with serious cost consequence. Watching a municipality pour capital into its worst roads while allowing preventive maintenance to lapse is like watching a dog chase its tail. While the worst roads are being reconstructed at huge expense, the good roads are rapidly deteriorating due to lack of maintenance and will become the worst roads in a few years. It is clear that the vast majority of municipal councils have insufficient funds to do everything, but the overriding question is why they would give road reconstruction a priority over preventive maintenance.

In some cases, councils respond to public pressure for road reconstruction and to not have an effective communication strategy to defend why they would work on good roads while bad roads continue to deteriorate. Even within my own profession, engineers need to take some of the responsibility for the current situation. As engineers we like to design things, and most preservation treatments don’t require any engineering design. It should also be noted that there is inertia within every industry and many practitioners have failed to keep up to date with the extent of new road preservation treatments that have been introduced within the last 10 to 15 years and their proven efficacy in extending pavement life.

We can illustrate the financial folly of the pervasive road management practices with a simplified example. If we assume that it costs about $1 million to build one kilometer of road. Without any maintenance it will probably last about 20 years. At that stage it will need major rehabilitation, costing about $500,000. Thus by year 20, the municipality has spent $1.5 million in providing this one-kilometre of road. If we consider an alternative scenario where timely preservation treatments are applied, we again start with the same initial cost of $1 million. Then in years five, 10, 15 and 20 we apply out pavement preservation treatments comprising, for example, crack sealing and microsurfacing.

A municipal asset is not solely based on its intrinsic value, but also on its ability to deliver a cost effective service to the public. In Scenario 1 above, after about year 12, the road condition is in rapid decline with extensive cracking, rutting, and probably potholes. The more frequent renewal of a road surface, also improves safety and reduces accidents, especially in wet weather. Studies have also shown that vehicle operating costs increase significantly as road condition deteriorates. Preservation maintenance treatments can be applied very quickly and can even be done overnight without significant disruption to traffic flows whereas major rehabilitation requires lane closures and detours that are highly disruptive. From an environmental perspective, a study by the
Ministry of Transportation Ontario (MTO) also demonstrated that thin preservation treatments, such as microsurfacing and seal coats, use only about 15 per cent of the energy and produce only 15 per cent of the carbon emissions of more expensive rehabilitation treatments involving conventional hot mix asphalt.

For municipal governments to achieve the greatest possible financial and socioeconomic benefit, a reorientation in favour of preventive maintenance is only part of the equation. Municipalities need better capital planning tools which recognize the vast array of preservation and rehabilitation treatments currently available, model the full complexity of any road network from the point of view of age and condition and realistically predict how each potential treatment will perform under those conditions. Exciting and groundbreaking research undertaken at the University of Waterloo’s civil engineering department over the past 10 years, now provides linear and non-linear optimization and a patent-pending process for analyzing “big data.” The process uses non-linear algorithms, powerful computing processes that can find optimized solutions for complex problems involving a large volume of data. Alan Turing of “The Imitation Game” fame, pioneered the concept in the 1950s and called it a “learning machine”. Recently, a strategic alliance has been forged between the University of Waterloo, Golder Associates Ltd., Miller Paving, and Infrastructure Solutions Inc. (ISI), to employ this technology to advance development of a municipal road network capital planning tool. For such a tool to be widely adopted, it needs to incorporate advanced mathematics, and be based on sound engineering principles and real-world road construction expertise. ISI, having completed some 60 asset management plans for Ontario municipalities, is building the user-friendly interface for the University’s optimizer and defining user requirements. Fifty Canadian municipalities have stepped forward as beta clients to assist in the evolution of this road network capital planning tool.

Golder Associates was drawn to this initiative by the prospect of helping to develop a revolutionary approach to road capital planning and ensuring that its planning incorporated robust models of how road preservation and rehabilitation treatments perform in practice, based on variable road condition, traffic mix and past performance history. Miller Paving, with 75 years of construction experience, is providing data on geographic price variations and preventive maintenance treatment availability as input to the optimizer’s decision tree. From trial applications using real municipal data, the optimizer is proving able to identify 7-17 per cent in capital savings when a municipality is already engaged in preventive maintenance strategies. If a municipality is still trapped in a “worst roads first” approach, the savings can be substantially higher.

The University of Waterloo’s optimization engine is now fully functional. The resulting capital planning tool provides a robust decision-making process, identifying the best possible course of action, and considering both the short-term needs and the long-term goals of a municipality. It includes an advanced decision-making process called optimization or prescriptive modelling, which is the most powerful and effective way of finding the best possible solution to a decision making problem. A capital planning tool
with optimization capability can maximize the overall performance of a network in terms of physical condition (or any other criteria) over a multiyear analysis horizon and provides municipalities with the best possible course of action in terms of timing and selection of different maintenance, rehabilitation, or reconstruction treatments considering all municipal goals and constraints. The improvements achieved through an optimized solution, which highlights the critical importance of preventive maintenance, can be translated into substantial savings or increased socioeconomic benefit or both.

Within the context of a comprehensive capital planning methodology, the results of periodic condition assessment and data collection will be used by engineers to develop adequate models of time-dependent pavement performance. These engineering models alongside long range financial and socio-economic analyses are used to perform a multi-year and multi constraint optimization that provides municipalities with the most cost-effective capital plan possible considering their budget limits and organizational policies. The optimized plan is then verified through rigorous engineering analysis to confirm practicality and adequacy of the selected treatments. The implementation of the optimized plan is also monitored to ensure municipalities achieve maximum benefits and to record data for model calibration in subsequent years. We believe that the worst-first approach to road capital planning has significantly magnified our Canadian road network infrastructure deficit, and will continue to do so without corrective action. As Canadian municipalities build asset management plans which assist in attaining financial self-sufficiency, a focus on road preventive maintenance over reconstruction will provide significant savings. The University of Waterloo’s new and powerful analytical tools will also help cash-strapped municipalities to achieve practical, implementable and defensible road network capital plans based on the municipality’s budget, and service level objectives. The objective of our asset management strategic alliance is to help our communities gain control over their infrastructure deficit, improve prospects for municipal self-sufficiency by spending road maintenance dollars more wisely, and protect the safety and life quality of our citizens.

Dr. Michael Maher is a principal and specialist pavement and materials engineer with Golder Associates Ltd., based in their Greater Toronto Area office in Whitby, Ont.

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The equipment train creeps along as it continuously heats and grinds off 50 millimetres of old asphalt surface. A conveyor passes it back into a twin-shafted pug mill where it is thoroughly mixed with a rejuvenating agent and 20 per cent virgin asphalt. Another conveyor dumps it into a paving hopper. It is laid down and compacted to the correct density. Twenty minutes later, the freshly recycled layer of pavement is ready to drive on.

This is the essence of a 64 lane-kilometre resurfacing project carried out this past spring, between May 9 and June 22 by Fernie, B.C.-based Green Roads Recycling Ltd. The work took place on two sections of highway, one 14-kilometres long, the other 18-kilometres long, a few kilometres east of Kamloops. With this project, Green Roads Recycling has now resurfaced 5,000 lane kilometres of road using hot-in-place asphalt recycling (HIP AR), a method it has used for 27 years.

“We are working with what is already in the road,” says Shane Stothert, general manager for Green Roads Recycling. “Only 20 per cent of the material is new.”

Green Roads Recycling estimates that over 13,000 kilometres of B.C. roads have been repaved using HIP AR.

“You can’t drive anywhere in British Columbia without driving on recycled road,” Stothert says. “We are the only place in the world with contractors bidding competitively in hot-in-place roads. The British Columbia government has been one of the main proponents in adopting this technology.”

The company figures that this amounts to around six million tonnes of recycled asphalt, which adds up to 360,000 tonnes of oil and 5.64 million tonnes of rock and sand that has not been trucked away and downcycled for uses such as surfacing side roads.

“This is not a new technology,” Stothert says. “The original innovator of HIP recycling was RW Blacktop. HIP AR has been in place for 50 years. His father bought RW Blacktop, the innovators of the technique, in 1989. In 2005, Shane changed the name to Green Roads Recycling.”
HIP AP, which is an on-the-spot version of mill and refill road repair, is fast and convenient. For example, Stothert says of this one-step, in-and-out process, “We come along, block off an intersection, and 20 minutes later the restaurant or gas station is reopened. It minimizes retail inconvenience.”

Despite the advantages of HIP AR that Stothert touts, the competition from traditional paving companies is ever-present, and his company must be vigilant about correcting misinformation about the method. For instance, the word “recycling,” clouds some people’s appreciation of the quality of the work.

“We are recycling, so the work is not seen as valuable as regular paving,” Stothert says. Yet, he says, “The specifications are very strict: density, voids, smoothness. The governments are not accommodating us. They are working with us.”

A constant with the company is educating new government people about HIP AR, something that keeps Shane's brother Jamie busy handling most of the government bureaucratic relations. Their father spends most of his company time maintaining their contacts and connections with the government.

Stothert is very aware of the need to dispel myths about HIP AR – like the claim that the method overheats the asphalt, for example.

“The reality is that the material we lay at the back of the screed is as cool, or cooler, than the traditional paving methods,” he says. “We can lay recycled asphalt at around 100C, out the back - around 40 to 50 degrees lower than conventional paving. “Conventional paving lays the material at 150 degrees, [and] you see some black and blue smoke. We are laying our material at 100 degrees. The white smoke you see is coming from the moisture in the road,” he says.

When they heat the asphalt prior to grinding it off, the temperature in the top one to two millimetres is high, Stothert admits, to drive heat into the lower two inches, which is the depth to which the equipment operator wants to remove the old asphalt. But two or three feet back, the temperature is down.

“It is a fallacy that we are burning the road,” Stothert says.

While not all old asphalt roads are in suitable condition for HIP AR, Green Roads Recycling has resurrected some pretty beat up
roads. (It is the Ministry of Transport’s job to select the roads that are suitable for recycling, and other contractors fill and patch any potholes before the Green Roads Recycling train comes along.)

Stothert describes the conditions for one project the company did:

“The centre seam was completely blown out,” he says. “There were patches, potholes. This was one of the most challenging jobs we’ve ever done. There were sections of the road where it was not even two inches deep. Our operator sees that, raises the grinders up so we don’t grind up dirt. A lot of add mix is used to fill the ruts, to raise the road back up to grade and stabilize the crown.”

Discussing this spring’s HIP AR project, Stothert says, “Some sections of the road didn’t have 50 millimetres of asphalt. Our operator needed to pay attention to that and raise the cutting edge above the dirt.”

In the past 27 years, Green Roads Recycling has only had one contract where HIP AR was not appropriate, and that had to do with the previous paving contractor having put cutbacks into the asphalt.

Stothert also recalls a case where sulphur and coke had been put in the asphalt. It caused problems, but the company was still able to recycle some of the asphalt.

“We couldn’t mill that material,” he says. “It was cold-milled off, so we could recycle the bottom. We just bumped up the percentage of the new material to bring the road back up to grade.”

Because of the advantages of HIP AR, including fewer emissions and fewer dump trucks on the road, Stothert would like to see the process more widely adopted.

“There are 160 barrels of oil in a kilometre of road,” he says. “The oil and aggregate has a huge half-life. The material’s value is going up with time; it is an appreciating asset. If it can be milled and filled, we should consider recycling it in place first. We are recycling as we go along. It lasts as long as new material. It is completely baffling that this process is not being done all the time. It makes no sense to me.

“Right now, with the price of oil, our savings is about 20 per cent over regular paving. When oil prices are higher, the savings can be as high as 40 per cent. I don’t need a fancy life cycle cost analysis to tell me we are saving millions of dollars.”

This article was originally printed on rocktoroad.com.
ISSA FORMS CHINA MEMBERSHIP COMMITTEE

BY REX W. EBERLY, BERGKAMP INC.

The ISSA Board of Directors has approved a cooperation agreement between ISSA and JSTI Group of Nanjing, China to form a ISSA China Membership Committee. The intent of this agreement is to increase the level of support that ISSA gives to its Chinese members. The secondary purpose is to increase the number of ISSA members in China.

Formed in 1978 in Nanjing, Jiangsu Transportation Institute (JSTI for short) has core technologies in fields such as highway planning, consulting, exploration and design, testing and detection, technical research and development, and project supervision. They understand the importance of pavement preservation and believe that this agreement will lead to further cooperation between ISSA, its members and Chinese contractors, material suppliers and buyer agencies.

As part of this agreement, JSTI will form and manage the ISSA China Committee to lead China activities. They will commit to:

- Signing at least ten new members in 2017.
- Continually developing new members and while maintaining existing members.
- Develop an ISSA China website that mirrors the content of the ISSA website.
- Translate relevant ISSA documents into Mandarin and other necessary dialects.
- Plan and host the annual ISSA China workshop.
- Plan and host regional training courses to support members’ efforts to promote Micro surfacing and other ISSA processes.

ISSA will rebate fifty percent of all Chinese memberships to JSTI Group for use in promoting ISSA programs and processes in China. We will also provide technical and marketing support for ISSA China activities.

Mr. Li Hao, Manager of Pavement Preservation at JSTI Group has been named Chairman of the ISSA China Committee and will work directly with the ISSA International Committee Chairman.
ISSA REQUEST FOR PROPOSAL: EXECUTIVE TECHNICAL DIRECTOR

BY RUSTY PRICE, INTERMOUNTAIN SLURRY SEAL, INC.

REVISED: DECEMBER 2016

This request for proposal, originally issued in August 2016, has been revised and reissued to provide additional clarity regarding the roles and responsibilities sought, terms, conditions, and additional document requirements to provide for consistency of information in proposals received.

ISSA issued a request for proposal aimed at hiring a technical director in August. After the proposal was issued, and prior to receiving RFP’s, our situation changed along with the conditions of the request for a technical director. It was determined that scope of work and terms and conditions needed to be revised. The document has been reviewed, revised and condensed, eliminating some themes that appeared to provide emphasis on subjects and matters that were not the priority or intent of the request while adding additional duties that were not included. We apologize for any inconvenience this has created. The “Revised” RFP was reissued on December 9, 2016 with a timeline for proposals due by January 18, 2017.

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After 50+ years as an association and many well qualified, capable “volunteers” serving as the ISSA Technical Director, the time has come that our association requires a full time independent, self-employed individual who is professional, experienced and properly qualified, with the responsibility of providing this service to all shareholders in our association and industry in general.

As our industry continues to change and progress, the time and effort needed to meet the obligation and requirements of technical director has also changed; committees, task groups, specifications, technical inquiries, research and development, education and training just to mention a few, require a tremendous amount of time.

Membership dues were increased in 2016 for this purpose. The RFP will be released and available for potential candidates on August 22, 2016. The RFP will provide specific details, timeline for responses and contract award date. This is a very important step in our history, yet much needed and a significant measure to our future success and growth. Please communicate this message to those who are qualified and interested.

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ISSA NORTHERN INSTALLATION BRIEF

TIM HARRAWOOD, VANCE BROTHERS, INC.

The northern pavement preservation installations for the 2015 Preservation Group Study designed to evaluate the benefits of thin non-structural surface treatments in both southern and northern climates was recently completed in central Minnesota. On August 1st 2016, Vance Brothers, Inc. began installing various treatments that included; Conventional Fog Seals, Rejuvenating Fog Seals, Routing and Crack Sealing, Mastic One Crack Treatment, Fiber Mat (with Midland Asphalt), Rejuvenating Scrub Seal, Conventional Chip Seal (including single, double and triple seals) and Microsurfacing (including single lift, double lift, fiberized and various cape seals with both type II & type III aggregate). These treatments were placed at two different locations which included CR-8 (low volume traffic, east bound lane) and US-169 (high volume traffic, north bound outside lane). Ideal weather conditions along with better than expected production led to project completion in six days.

The logistical issues that one might expect on such a diverse project were greatly minimized due to the great effort put forth by all parties involved. Those that contributed to the successful completion of this project include, four different emulsion suppliers from five different states, two sources of aggregate (both from MN), Microsurfacing mix designs/McLeodoud chip seal designs performed by three different laboratories including MNDOT and technical support from equipment manufacturers and material suppliers from nine different states. In addition to the enormous contributions provided by the industry professionals involved with this project I must also mention that both MNDOT/MNROADS and the National Center for Asphalt Technology at Auburn University played an integral role in the successful completion of this project.

The main objective of this preservation group research that is sponsored by seventeen different states and industry is to evaluate and quantify the life extending benefits as well as the condition improving benefits of the treatments applied as compared to the untreated control sections. Over time and as the data becomes available it will provide agencies the tools necessary to better choose the treatments that will most likely provide the desired benefits. As a direct result of this research the Right Treatment, Right Road, Right Timing approach is closer to becoming a reality.

For performance related information about the preservation group study go to [http://www.pavetrack.com/performance.htm](http://www.pavetrack.com/performance.htm)
Two in One: The WR 240i from Wirtgen makes a convincing impression when it comes to soil stabilization and cold recycling. In addition to perfect ergonomics and operation, clever automatic functions and outstanding terrain accessibility, the efficient engine and powerful milling and mixing performance ensure optimal results. You too can benefit from the technology leader’s solutions.
1. Looking Back the Age of Asphalt Emulsion
Masaharu Tanaka, Senior Managing Director, Shinreki Industry, Co., Ltd.

In this essay of asphalt emulsion, the author recalls the day when he first saw surface dressing using asphalt emulsion during 1950s. Looking back to 1970s, HMA is becoming popular in urban area but the demand for asphalt emulsion still exist for stabilization, surface dressing, and armor coat especially in rural area. At present, asphalt emulsion is mostly used for prime coat, tack coat, and base stabilization only. Considering the importance of environmental preservation, asphalt emulsion still has potential possibility and the author insists promoting new preservative maintenance with asphalt emulsion.

2. Pavement Rehabilitation Using Asphalt Emulsion
Tominari Yamamoto, Manager of Research Laboratory, Maeda Road Construction Co. Ltd.

Sponsored by The Japan Asphalt Association, 93rd Asphalt Seminar was held in Osaka on February 25 – 26, 2016. This seminar is held annual and JEAA gives a presentation on asphalt emulsion every time. According to the theme of this year “Management of asphalt pavement in future,” Mr. Tomonari Yamamoto from Technical Committee gave a presentation “Pavement rehabilitation using asphalt emulsion.” This article introduces the abstract of presentation, including 1) Outline of asphalt emulsion, 2) Maintenance and rehabilitation methods using asphalt emulsion, and 3) Benefits of rehabilitation methods using asphalt emulsion.

3. Introduction of Paper from 5th Eurasphalt & Eurobitume Congress (13)
Overseas Documents Working Group, Technical Committee, JEAA

This is the introduction of paper from 5th Eurasphalt & Eurobitume Congress in 2012, introducing following paper:
A5EE-325 Investigation of Adhesion Properties in Chip Seals with Pull Out Test
  LA lev Akylly, Mehmet Saltan, Mustafa Karapahin, Cahit Curree (Turkey)

4. Article from AEMA Newsletter

This is a Japanese translation of the article “2016 AEMA-ARRA-ISSA Annual Meeting Review” which was originally published by AEMA Newsletter No. 1 in 2016.

5. Pavement Rehabilitation by Thin Slag Porous Pavement (TSP)
K. Sakaguchi, Construction Bureau, Himeji Pref.,
A. Adachi and H. Sugahara, Showa Rekisei Industries Co. Ltd.

As many local cities and prefectures in Japan, Himeji city is facing at declining financial resources for road maintenance. Since we have developed Thin Porous Slag Pavement (TSP) for safe and comfortable pavement in 2007, it has been applied 65,000m2 at 62 sections until today. TSP mixture uses electric furnace slag as aggregate and polymer modified asphalt for binder. At the construction, cut existing surface layer of 30mm, then thermal bonding type modified asphalt emulsion is applied to permeate into the existing crack to form impervious layer, then TSP mixture is laid. An example of test construction and follow-up survey is introduced.

6. Questions and Answers

Questions from readers and answers from JEAA committee.

• Difference of properties between PK-3 and PK-4 based on penetration degree range of evaporated residue.
• Top coat application using emulsified asphalt for preventing aggregate stripping from porous asphalt pavement.
• How non-ionic emulsified asphalt kept stability without ion.

7. Topics and JEAA News

a. 36th JEAA Annual Meeting was held at Toshi Center Hotel in Tokyo on June 22, 2016.

The following JEAA activities plan in 2016 was approved.

• Standardization of asphalt emulsion quality, surveying manufacturing technology.
• Developing and promoting multilateral demand of asphalt emulsion.
  1. Committee for promoting surface dressing
  2. Promoting modified asphalt emulsion for impermeable layer in porous asphalt pavement
  3. Surveying technology to expand use of asphalt emulsion
• Survey and research of manufacturing/application of asphalt emulsion.
Survey demand and technical trend of asphalt emulsion, providing information, promotion, and education of research result.

1. Publishing bulletin “Asphalt Emulsion” (three times a year, 3,400 copies in January, 3,100 copies in April and August)
2. Translation and reprinting of the paper on 5th E&E Congress
3. Providing document for technical seminar, including its revision
4. Presentation and co-sponsoring 94th Asphalt Seminar
5. Discussion with authorities and associations
6. Enhancing and updating JEAA website

Other associated activities.

b. JEAA donated through Japan Red Cross Society for Kumamoto Prefecture where was hit by severe earthquake in April 14th, 2016.

Asphalt emulsion production amount by JEAA members in FY2015 is shown below: (ton)

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<thead>
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<th>Division</th>
<th>Items</th>
<th>Total</th>
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Asphalt emulsion production amount by JEAA members from April to May 2016 is shown below: (ton)

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<td>10,166</td>
<td>1,811</td>
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AEMA-ARRA-ISSA AWARDS

AEMA Hall of Fame Award
Hall of Fame Award is presented to an individual, active or retired, who is or was employed by a member firm, who has made a substantial contribution over the long term to the development of the Association or the advancement of the emulsion industry.

AEMA Recognition of Achievement Award
Recognition of Achievement Award is presented to an individual, active or retired, who has made a significant contribution to emulsion technology or the advancement of the emulsion industry.

AEMA Presidents Award
The AEMA President's Award: given at the discretion of the AEMA president for special recognition not afforded by the AEMA Hall of Fame or Recognition of Achievement Awards.

AEMA Past Presidents Award
The AEMA’s Past Presidents' Award for Emulsion Excellence is presented in recognition of a specific project utilizing asphalt emulsions, completed in the past calendar year. Projects submitted could include the use of emulsions in pavement preservation applications, pavement rehabilitation applications or the use of emulsions in building pavement structure.

ARRA Special Recognition Award
Each year, ARRA has presented special recognition awards to deserving public officials and consulting engineers for their overall professional contribution to and their recognition and their promotion of the asphalt recycling & reclaiming industry.

ARRA President's Award
The ARRA President's Award is presented periodically, at the discretion of the President, to an individual who has, through long term involvement, worked to advance the goals of the Asphalt Recycling & Reclaiming Association and to promote the growth and technological advances of the industry. This award was officially renamed in 1996 to honor Richard E. Lowell.

2016 Roads & Bridges/ARRA Asphalt Recycling/Reclaiming Awards
See on Page 21 for more details of this joint award.

ISSA President’s Award for Excellence
Created with the beginning of the new millennium in mind, the ISSA President’s Award for Excellence was established to recognize those contracting achievements that exemplify the International Slurry Surfacing Association – the highest quality, workmanship and best standards of practice.

ISSA Award for Excellence in Pavement Preservation
The International Slurry Surfacing Association will honor public officials and agencies that have made outstanding contributions to the Pavement Preservation industry. The award is presented to an Owner/Agency or Engineering Firm responsible for specifying and managing a pavement preservation program utilizing the applications represented by ISSA (slurry surfacing, micro surfacing, chip sealing, cape sealing, crack treating, and other asphalt emulsion-based surface treatments).
Roll up your sleeves and get ready for ISSA’s Spring Training with the 2017 Slurry Systems Workshop at the Texas Station Hotel & Casino in Las Vegas, Nevada.

The Slurry Systems Workshop is a study course offering a challenging and informative program on slurry seal, micro surfacing, chip seals and crack treatments with “hands-on” operation demonstrations and workshop-type discussions. Highly qualified Pavement Preservation Specialists will cover topics on the above listed processes, including materials and equipment, specifications, hand mixes, calibration, quality control, and inspection.

Attendees will also be able to view state of the art slurry, micro surfacing, chip seals and crack treatment equipment, independent of the paving demonstrations.

This year, we have included four individual breakout sessions focused on the ISSA disciplines. Attendees can choose to attend the Crack Treatments, Chip Seal, Micro & Slurry Surfacing, or Technical breakout sessions to get a more in-depth understanding of each of these applications or technical aspects.

ISSA encourages all ISSA members, and non-members who are contractors, suppliers, engineers, consultants as well as government agencies to attend this valuable workshop. A certificate of achievement will be awarded to all participants at the completion of the workshop.

In addition to attending the workshop, your company or organization can become a workshop sponsor. Your company name will be listed in the final program as a sponsor, displayed on signage, and you’ll have the opportunity to bring company literature to display.

Register for the 2017 Slurry Systems Workshop at slurry.org
The Asphalt Emulsion Manufacturers Association, the Asphalt Recycling & Reclaiming Association and the International Slurry Surfacing Association are about to meet together for the 14th consecutive year. The reasons that brought these three associations together from 2004 – 2016 still exist today with even more relevance than ever before. AEMA, ARRA and ISSA are strongly invested in the maintenance and preservation of our highways in ways that are economically beneficial, soundly engineered, and friendly to the environment at the same time. Through our marketing program, the Pavement Preservation & Recycling Alliance, we are well prepared to meet the challenges ahead with a united front.

Industry speakers and cutting edge topics equal the best in technology transfer. Attendees at this meeting will have the opportunity to enjoy the general sessions and then choose the topics on which they want to focus. This scheduling allows everyone to keep abreast of new developments that may be valuable for future business expansion or simply pertinent for current customer satisfaction.

WHEN
Tuesday, February 14, 2017 – Friday, February 17, 2017

WHERE:
The Westin La Paloma Resort & Spa
3800 E Sunrise Dr
Tucson, Arizona 85718
USA

MAKE YOUR RESERVATIONS EARLY! AEMA-ARRA-ISSA have negotiated a special room rate. In order to receive the group rate, you must make your reservation by January 25, 2017. Subject to availability.

SPONSORS

We would like to thank our sponsors of the 2017 AEMA-ARRA-ISSA Annual Meeting

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Register for the 2017 AEMA-ARRA-ISSA Annual Meeting at ppralliance.org/2017-aema-arra-issa-annual-meeting
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ABOUT ARRA

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• BASIC ASPHALT RECYCLING MANUAL – 2ND EDITION, NOW AVAILABLE TO MEMBERS
• RECOMMENDED CONSTRUCTION GUIDELINES FOR ASPHALT RECYCLING AVAILABLE FOR DOWNLOAD – FREE OF CHARGE
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• FOR A COMPLETE LIST OF OUR COMMITTEES CLICK HERE
• FOR A COMPLETE LIST OF OUR MEMBERS CLICK HERE

ABOUT ISSA

• RECOMMENDED PERFORMANCE GUIDELINES – AVAILABLE FOR DOWNLOAD FREE OF CHARGE
• WEB-BASED TRAINING ON SLURRY/MICRO, CHIP SEAL, CRACK TREATMENT, AND SPREADER BOX PRINCIPLES
• DISCOUNTED REGISTRATION TO EVENTS LIKE THE SLURRY SYSTEMS WORKSHOP IN LAS VEGAS, NV, JAN 18 – 21, 2016
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• FOR A COMPLETE LIST OF OUR COMMITTEES CLICK HERE
• FOR A COMPLETE LIST OF OUR MEMBERS CLICK HERE
MASTER CALENDAR

**2017**

Jan 8 – 12  TRB 96th Annual Meeting - Washington, DC

Jan 23 – 26  Slurry Systems Workshop - Las Vegas, Nevada

Feb 14 – 17  AEMA-ARRA-ISSA Annual Meeting - Tucson, Arizona

Mar 7 – 11  Con Expo – Con/AGG - Las Vegas, NV

**2018**

Feb 20 – 23  AEMA-ARRA-ISSA Annual Meeting - Indian Wells, California

Mar 6 – 8  NCAT Pavement Test Track Conference - Auburn, AL
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