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Building the Perfect Parking Lot

The title of this article suggests that there is such a thing as a "Perfect Parking Lot." There is not. There are, however, five principles of design,

for need, the engineer must evaluate three significant influences on the pavement structure required for the project: Traffic, Life Expectancy, and Economy.



Furman Aquatic Center, Ames, IA paved by Manatts, Inc.

construction and maintenance that will insure that your parking lot will achieve long life, with minimum maintenance. These five principles include: designing for need, designing for the environment, building for success, paving for success and maintaining your investment. The following article will examine these principles in detail and will provide a framework for the design and construction of the "Perfect Parking Lot".

Design for Need

Building the perfect parking lot is a large capital expense for the property owner. It is also an investment in the appearance of their business and their customer's convenience and safety. When designing

A typical parking lot plan will show at least two, if not three pavement sections, typically identified as Heavy Duty, Medium Duty and Light Duty. Spending valuable time predicting vehicle loadings and designing traffic flow to accommodate the specific vehicles types, will allow the designer to build for need, as opposed to a generic pavement section.

Life Expectancy

A typical life-expectancy of a parking lot is 20-25 years. Designing for a 50 year life span on a parking lot is unrealistic and cost prohibitive in Iowa's freeze-thaw cycle. The design engineer should recognize the

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Traffic

Of the three influences, traffic is by far the most crucial, specifically truck traffic. A large commercial parking lot can adopt a much more economical pavement design thickness if there is little or no truck traffic, however, most commercial operations have dedicated loading areas and roadways that will accommodate the heavy, slow-moving loads.

Tales from the Road



Let's Be Great Again

My son Henry just finished the local nine year old Rec. basketball league. It was a great experience. For those of you that follow this column, you will remember that last year we signed Henry up for the local "club" basketball team and it was an unmitigated failure. Poor organization, weak coaching, and a team with a few players who never met a shot they wouldn't take, led to a disappointing season for both Henry and me. Henry was reluctant to even go out for basketball again this year, but he agreed to give it another chance in a different league. We are both glad that he did. This season found us with a stellar organization, a pair of great coaches and generous teammates. The new coaches preached teamwork, they practiced a dozen plays, and taught the boys to share the ball to get the best shot. Henry excelled in this environment and the team excelled as well. I believe this team philosophy is something that we can bring to our daily lives to raise each other up, to make the team better and to even change the current culture in our society.

I spent my first twelve years in this industry working on a paving crew. The tremendous amount of hours you spend together and the hard work that you share with the men and women on your crew, creates a very strong bond with the members of your team. The fundamentals of a great season on a

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Upcoming Events

(Click event for more information)

ConExpo-Con/AGG 2017

Date: March 7-11, 2017
Location: Las Vegas Convention Center, Las Vegas, NV

2017 APAI Road Show

Date: March 22, 2017
Location: Harrah's Casino & Convention Center, Council Bluffs, IA

2017 APAI Road Show

Date: March 23, 2017
Location: Stoney Creek Hotel & Conference Center, Sioux City, IA

2017 APAI Road Show

Date: April 4, 2017
Location: Rhythm City Casino, Davenport, IA

2017 APAI Road Show

Date: April 5, 2017
Location: Hotel Kirkwood, Cedar Rapids, IA

2017 APAI Road Show

Date: April 6, 2017
Location: Northern Iowa Regional Commerce Center, Mason City, IA

2017 APAI Road Show

Date: April 13, 2017
Location: Courtyard by Marriott, Ankeny, IA

2017 Eastern Iowa APAI Golf Outing

Date: June 28, 2017
Location: Amana Colonies Golf Course, Amana, IA

2017 NAPA Midyear Meeting

Dates: July 16-19, 2017
Location: Westin Michigan Avenue, Chicago, IL

2017 APAI Summer Meeting

Dates: July 27-28, 2017
Location: Okoboji, IA

2017 Western Iowa APAI Golf Outing

Date: August 29, 2017
Location: Majestic Hills Golf Course, Denison, IA

(Tales from the Road – Cont. from Pg. 1)

road crew is no different than Henry's successful basketball team. First, you need stellar organization: leadership from the top on safety, production and attitude. A great team has a management organization that



provides a culture of safety, plenty of work, sound equipment to build the projects and a game plan to accomplish the workload. The coaches of a paving crew are the foremen and the lead man/woman. They set the tone of the crew and they coach up the new players on the team. The strength of the leadership at this level defines the tone and attitude of the crew. Weak leadership, negative attitudes, political maneuvering and crew "favorites" will destroy the cohesiveness of the crew and doom the season to failure. Strong team leadership will define the goals for the season, build a positive work environment, and teach the new hires how to succeed on the crew. The

attitude of the crew members are the final part of the equation. The willingness to look out for each other, to lift each other up, to share the burden, to teach the new members the safety and skills needed to survive and excel, is the final piece needed to create the team.

The lessons from the leadership and the workings of the crew can be adopted into our daily lives and hopefully into America's culture as a whole. Our industry is made up of people of different colors, different religions and different beliefs, but the focus on the team trumps the differences between us. We, as Americans, need to listen to each other, we need to lift each other up, and we need to teach the new members of our society how to survive and excel. We were all once immigrants to this great land; our ancestors fled religious persecution, or left their homelands in hopes of finding an opportunity to succeed. They were outsiders, they made America great, and so can we.

Let's Be Great Again,

Bill Rosener

NOISE IS ONE PASSENGER TOO MANY

DRIVABILITY MATTERS



"Whether I'm training a Special Forces driver in tactical roadway maneuvers, or my son how to drive, I need to know my students can hear me. I choose to train on asphalt roads because they produce less pavement-tire noise, guaranteeing I'm heard, even when my son pretends he isn't listening. That matters."



-Guy Frank
Tactical Driving Instructor | Dad

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The Asphalt Pavement Alliance is a partnership of the Asphalt Institute, National Asphalt Pavement Association and the State Asphalt Pavement Associations.

(Build The Perfect Parking Log – Cont. from Page 1)

value of specifying a pavement thickness that will carry the traffic loadings identified above for 20-25 years. Some major box stores and shopping malls will design the initial parking lot for a ten year service life hoping to recoup their initial investment in the building before readdressing the surrounding parking areas. Skimping on the pavement's design structure will shorten the life of the investment and lead to higher repair and maintenance costs in the future.

Economy

When designing for economy, the first step should be a consultation with a local, quality engineer and a local quality contractor. The Asphalt Paving Association of Iowa (APAI) has a vetted list of engineers and contractors committed to quality design and construction, and service for their customers. A list of the APAI Consulting Engineers and APAI Contractor Members can be found by clicking on the highlighted text or by visiting the APAI website at www.apai.net. If you are rehabilitating an existing parking lot, local contractors can provide you with the most economical local designs based on their experience, expertise and locally available materials. Areas that have few local aggregate resources often utilize full-depth asphalt designs, those areas that are aggregate-rich will utilize a stronger stone base and a thinner HMA surface. To insure the most economical design and quality construction, listen to your local engineers and contractors, discuss the construction process, solicit multiple bids, determine the construction time frame, discuss contingencies, check references, and understand exactly what you are buying and building. "Quality, Quality, and Quality" should be your mantra. Choosing a quality contractor is always a good investment. Every construction project has unknowns, problems, and compromise. Selecting a reputable contractor will insure that you are treated fairly when you are at your most vulnerable and that your project will be completed in a timely manner. The construction world is rife with stories of unsuspecting business and home owners being bilked by unscrupulous contractors. Your due diligence will be well worth it.

Design for the Environment

This category is a double entendre. The

engineer should base his pavement design on the local soils environment, as well as, the local municipal rules regarding impermeable surfaces and their environmental impacts.

Authorizing a soils test of a new site is an absolute necessity prior to design and construction of the building and surrounding parking areas. The soil borings will identify structural loading capacity of the in situ materials, possible groundwater issues, and the variance in soil structures across the site. Water is the enemy of pavements. Designing the site to remove groundwater is the first responsibility of the engineer, followed by utilization of the existing subgrade structure (or lack thereof) to build the most economical parking lot. A good design engineer will identify potential weak areas and build contingencies into the design and bid.

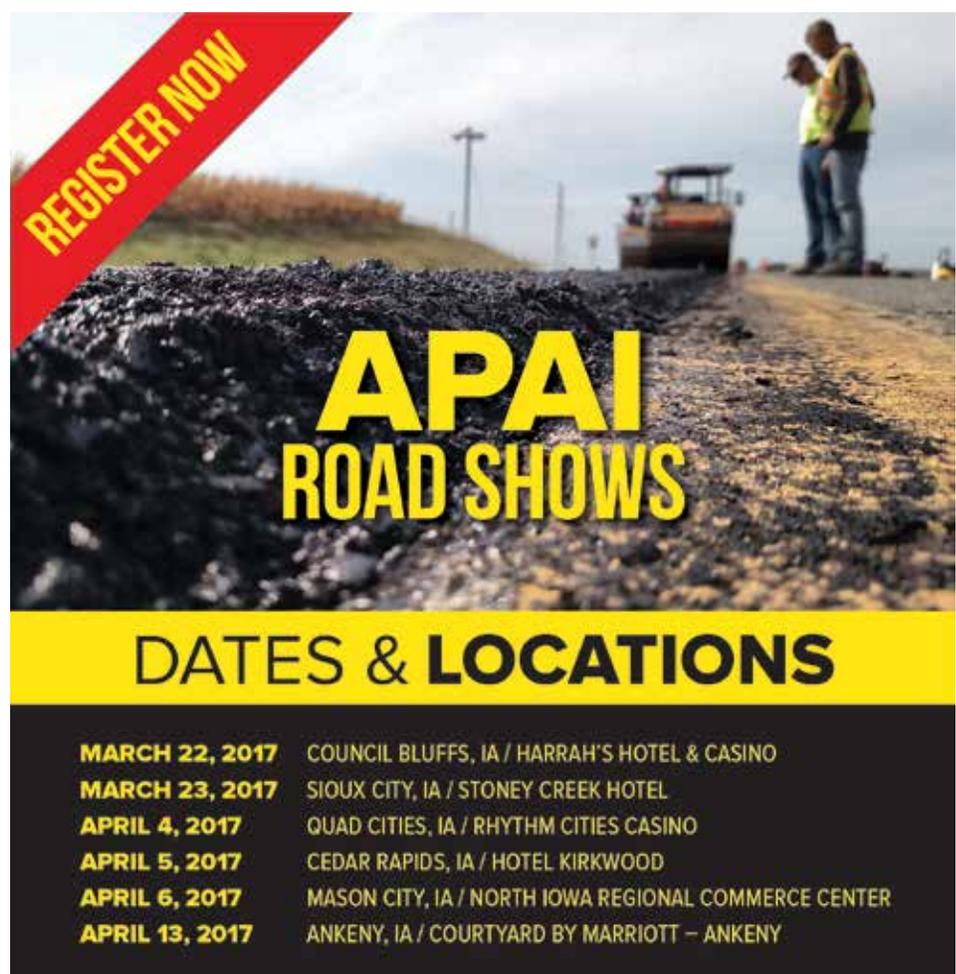
Many municipalities have rules or codes in place regarding requirements on the percentage of green space required for a

commercial development or a fee structure based on impermeable parking lot square footage. These requirements may decrease the environmental impact of the new parking lot but they can add extra issues and cost to the project.

The inclusion of trees and greenspace in a parking lot brings tremendous pressure on the underlying structure of the pavement. The green space areas allow water to infiltrate underneath the pavement structure and weaken the subgrade. Tree roots will eventually push up the surrounding pavement. In addition, irrigation systems must be carefully monitored and evaluated to insure they are not oversaturating the green space and undermining the subgrade.

When building to gain Stormwater or US Green Build LEED credits, the use of porous asphalt will provide the owner with a functional and environmentally

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REGISTER NOW

**APAI
ROAD SHOWS**

DATES & LOCATIONS

MARCH 22, 2017	COUNCIL BLUFFS, IA / HARRAH'S HOTEL & CASINO
MARCH 23, 2017	SIoux CITY, IA / STONEY CREEK HOTEL
APRIL 4, 2017	QUAD CITIES, IA / RHYTHM CITIES CASINO
APRIL 5, 2017	CEDAR RAPIDS, IA / HOTEL KIRKWOOD
APRIL 6, 2017	MASON CITY, IA / NORTH IOWA REGIONAL COMMERCE CENTER
APRIL 13, 2017	ANKENY, IA / COURTYARD BY MARRIOTT – ANKENY

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MARCH 1 - 3, 2017

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GREATER IOWA ASPHALT CONFERENCE

WEDNESDAY, MARCH 1 – FRIDAY, MARCH 3, 2017
AIRPORT HOLIDAY INN, 6111 FLEUR DRIVE, DES MOINES, IA

WEDNESDAY, MARCH 1, 2017

11:30 a.m.-4 p.m. Registration – Airport Holiday Inn, Fleur Drive, Des Moines, Iowa

1-4 p.m. Optional Pre-Conference Workshop: “ASPHALT 202 | Decision Matrix for Asphalt Design, Rehabilitation Analysis and Quality Construction”

1-4 p.m. Optional Pre-Conference Workshop: “SAFETY: Building the Smarter Highway Worker” \$125 per person – FREE for Greater Iowa Asphalt Conference registrants

1-4 p.m. Optional Pre-Conference Workshop: “Iowa DOT Technicians’ Update” FREE to those needing to update their HMA Certification

4-7 p.m. Working Man’s Break
Sponsored by the APAI

1:30 a.m. - Afternoon Breakout Sessions I

<u>Track A</u> Quality Asphalt Production	<u>Track B</u> Classic Rehabilitation Options for Cities / Counties	<u>Track C</u> Agency / Contractor Collaboration	<u>Track D</u> Leadership Series: Team Accountability for Results
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3:00 p.m. Refreshment Break in the Exhibit Area (Iowa Room)

3:30 p.m. Afternoon Breakout Sessions II

<u>Track A</u> Building Full-Depth Asphalt Highways and Streets	<u>Track B</u> New Initiatives	<u>Track C</u> Life Cycle Cost Analysis / Alternate Bid	<u>Track D</u> Leadership Series: The Five Dysfunctions of Exemplary Teams
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6:30-9:00 p.m. Asphalt Vegas in the Exhibit Area (Exhibit Hall)

THURSDAY, MARCH 2, 2017

7:30 a.m. Registration and Continental Breakfast

9:00 a.m. Welcome and Opening Remarks – Bill Rosener, Executive Vice President, APAI
“Building Tomorrow’s Leaders Today” – “Dozer” Dave Turin, Discovery Channel’s – Gold Rush

10:00 a.m. Refreshment Break in the Exhibit Area (Iowa Hall)

10:30 a.m. Des Moines Reconstruction Program – Full Depth Asphalt for Everyone – Dave Kamp, City of Des Moines
What is TSMO? – Scott Marler, Iowa DOT
How Thick Do We Really Need? – Scott Schram, Iowa DOT

12:00 p.m. APAI Smoothness Awards Luncheon (Banquet Room)
Iowa DOT Update – Charlie Purcell, Iowa DOT
Scott Dockstader and Charlie Purcell, Iowa DOT, Award Presentation

FRIDAY, MARCH 3, 2017

6:30 a.m. Conference Breakfast

7:45 a.m. Prize Drawing during Breakfast (must be present to win)

8:00 a.m. Update on University of Iowa’s Asphalt Pavement Research – Dr. David Lee, U of I
ISU Research – Dr. Chris Williams, ISU
Portable Rumble Strip Report – Skylar Knickerbocker, INTRANS, ISU
New Draft Portable Rumble Strip Spec – Willie Sorenson, Iowa DOT

9:45 a.m. Refreshment Break

10:00 a.m. Iowa’s Most Interesting Asphalt Projects

11:30 a.m. Grand Prize Drawings (must be present to win)

11:45 a.m. Adjourn

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sensitive pavement. The stone base below the porous asphalt acts as a stormwater detention pond that allows rainfall to slowly dissipate into the subgrade over time. Although porous asphalt is a tremendous environmental asset, this pavement choice does not come without additional costs

Build for Success

Pavement success is based on three basic principles: remove the groundwater and surface water, stabilize the subbase, and build your pavement section thick enough to carry the intended loading. Often, one or more of these principles are ignored



Blairsferry Rd. Target Store, Cedar Rapids, IA, paved by LL Pelling Co., Inc.

and responsibilities. All porous or pervious pavements must be maintained through vigorous cleaning a minimum of twice a year. For more information on porous asphalt, please click here.

due to cost or time constrictions. The life expectancy of your pavement **will** be decreased if they are ignored.

All three keys to pavement success are important, but the removal of the

groundwater and surface water may be the most important, and is the one principle that is ignored the most frequently. The incorporation of a subdrain system is the most cost-effective method to improve your pavements longevity. Based on the inherent site conditions, a 50' grid of lateral drains should remove the existing groundwater and keep new groundwater infiltration from damaging your pavement structure. Utilizing a drainable rock base will allow moisture to pass through the stone and be carried away by the subdrains. Make sure to specify a modified aggregate gradation that allows drainage but with enough – #200 fine material to compact and carry the construction equipment. Parking lots should be designed with a minimum of 2% slope to carry surface water to a drainage location. Flattening a parking lot slope below 2% may result in surface ponding and birdbaths.

A strong, stable dirt subgrade is the platform of your pavement structure. Think of it as the foundation of your house. If you build your house on an unstable foundation, your house will sag and heave and eventually collapse. Your parking lot is no different. Most projects call for 95% Standard Proctor Density. The truth is, these are random and limited tests that may not represent

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(Build The Perfect Parking Log – Cont. from Page 5)

the project site as a whole. Having built hundreds of parking lots in my career, the only 100% test is the proof-roll. Load a 15-ton dump truck and drive it slowly around the rough-graded subgrade. This method will **always** find the weak spots. Address these areas through the use of core-outs, subgrade fabrics or grids, or on a large-scale issue, utilize a pulverizer with a stabilization additive (i.e., fly ash, Portland cement or hydrated lime). Verify the success of the reworked areas with a second proof roll. Repeat if necessary. Make sure the subgrade is stable and ready for the next phase of construction.

When building the proper pavement structure, there are three distinct configurations of rock and asphalt combinations: 1) Full-depth asphalt eliminates the use of aggregates completely, and utilizes a thicker asphalt section than the other two options. There can be very little compromise on a stabilized dirt subgrade when using this method. 2) Blended Section. The blended section will utilize a 4"-6" aggregate base and a similar hot-mix asphalt structure on top of the rock base. The blended section does allow a little weakness in the subgrade due to the additional strength added through the aggregate base. The South Africa model utilizes an extra-thick aggregate base, generally 8"-12" with a very thin asphalt structure 3"-5". This method uses the HMA as a cap or wearing surface for the aggregate base. In this model, a larger macadam stone is often utilized for the bottom 5"-8" of the pavement and then capped a smaller ¾" chokestone. All of these methods can be constructed and utilized successfully. The key to your choice is often based on the first key principle, Design for Economy.

Pave for Success

Once the dirt subgrade has been established and the rock base placed, the quality asphalt contractor begins the paving of your parking lot. There are a few things to be cognizant of a quality paving project. Hot-mix asphalt is generally produced somewhere between 300°-325°F and should be placed and compacted between 300°-225°F. Using a finer aggregate for the surface lift, typically a 3/8" or ½" top size aggregate will give the mix a tight and



Urbandale Business Park, Urbandale, IA, paved by Grimes Asphalt

uniform appearance. Timely delivery of materials, and a constant flow of material through the paver, will provide the best opportunity to achieve density and tight joint compaction. Small projects do not require large compaction equipment but the use of a vibratory steel drum roller is a prerequisite to achieve proper density. The goal of every project is to move water away from the building and to a control collection point. Quality contractors will focus on that goal from design through construction.

Maintain your Investment

Timely and consistent maintenance of your parking lot will result in increased pavement life for your investment. The first, and most important of all maintenance activities, is crack sealing. All pavements crack, and due to Iowa's extreme freeze-thaw cycle, it is extremely important to deal with cracks early in the pavement's life. Within the first three years, hire a maintenance professional to rout and seal the cracks in your lot. The ideal time to do this maintenance is early spring when the cracks will be at their widest. As the ambient temperatures warm up, the crack will shrink and drive the crack filler deeper into the pavement. The use of crack sealing should be repeated every 2-3 years. This treatment is inexpensive and prevents water from penetrating into the subgrade and causing extensive damage.

The use of asphalt sealers can be an effective tool to not only improve the performance of your investment, but to also provide a nice aesthetic effect by making your pavement black again. This treatment can be especially effective on lots that are losing surface aggregate structure due to excessive oxidation. This treatment will also allow the opportunity to freshen the striping in your lot.

The final maintenance treatment is full-depth asphalt patching. This may be necessary as your lot nears its end-of-life, or if subgrade issues manifest themselves in the pavement surface. The process is simple: identify the areas, sawcut and remove the damaged pavement, over excavate and stabilize the underlying subgrade, fill in the area with hot-mix asphalt, and compact. These three maintenance treatments will provide the needed tools to achieve the maximum life for your parking lot.

The Perfect Parking Lot

Planning for success, building for success, and maintaining for success will insure that the investment in building the "Perfect Parking Lot" pays long-term dividends for the owner while providing the businesses' customers and employees with a safe and beautiful entry to the business. For more information, and references for your next project, contact the APAI at apai@apai.net or call 515-450-0100.

APAI Welcomes New Members

APAI continues to add new members. At their last Board Meeting, the Board of Directors elected four Associate Members to the Association. Thank you to those who have helped recruit these new members.



Bargen Incorporated was founded in 1981 by Bradley Bargen when he began selling a complete line of roofing and asphalt maintenance products for Texas Refinery. He realized that his product needed to be installed by knowledgeable people. Therefore, he began applying the product for customers in addition to selling it.

Going from a single proprietorship to an incorporated firm within eight years with multiple division has helped make Bargen Incorporated the company it is today. Currently Bargen Incorporated employ's around fifty-five people during peak season, asphalt maintenance division has six seasonal crews and one seasonal striping crew, commercial roofing division has one full-time crew, and the general construction division has two full-time crews.



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Fahrner Asphalt Sealers, LLC offers a complete range of pavement preservation products to increase the life span and appearance of your asphalt investment. Their work crews and sales representatives serve Wisconsin, Minnesota, Iowa and Upper Michigan from branch offices located in Plover, Eau Claire, Kaukauna, Waunakee, Saginaw MI, Dubuque IA, and Oakdale MN.



Mid Country Machinery was founded in 1997 and has become a premier equipment dealer located in Fort Dodge, Iowa and serving the Midwest. They are a privately-owned equipment dealer where the owners manage the day-to-day business and have developed business relationships based on competency, integrity, and prompt service. They offer preferred quality products, product support, and customer service; making them the best choice for all heavy equipment needs.

Mid Country Machinery has an extensive inventory of new equipment and high-quality, late model used equipment. They proudly represent the Kobelco, Kawasaki, JLG, Atlas Copco Powercrusher, and SkyTrak lines of equipment. In addition, they also carry inventory from industry leading names such as Caterpillar, John Deere and many others.



Since its establishment in 1997, Zydex has been developing, creating and providing sustainable eco-friendly chemical technologies for the Agriculture sector, Textiles sector, Roads sector and the Construction sector.

Zydex is deeply committed to the environment's sustenance and preservation of limiting resources. Innovative application is central to Science & Technology. With its unique products and innovative applications Zydex is on its way to leading a revolution World over.

Some of the breakthrough applications that have been developed for our industry are: Nanotechnology Waterproofing & Stabilized Soil bases; Nanotechnology Asphalt additives for Hot & Warm mixes; and, Nanotechnology Asphalt additives for Bitumen Emulsions.

Contact the Zydex representatives for further information.

Please welcome these new members and show your support for them, by contacting them and utilizing their services. To find contact information for these members, go to <http://www.apai.net/associate-members.aspx>.

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