The Pennsylvania Asphalt Pavement Association will be celebrating its 75th Anniversary on Saturday, June 16, 2007, at the Hotel Hershey, Hershey, PA. We hope you and your organization will join us to celebrate Hot-Mix Asphalt achievements in the construction industry with PAPA as the driving force.

As we at PAPA kick off our 75th Anniversary, we want you to know that your business means the world to us. It is a special year for the Association. We wish to thank you for letting us be of service to you and your company.

This calls for a special celebration, so please help us celebrate! A reception/dinner has been scheduled for Saturday, June 16, 2007 at the Hotel Hershey, Hershey, Pennsylvania. There will be a reception in the Fountain Lobby from 6 – 7:00 P.M., and dinner in the Garden Terrace Ballroom from 7 – 11:00 P.M. The Nightlite Trio will be performing for the evening and we will have several well known speakers. Also, those interested in playing golf will be able to tee-off at 9:30 A.M. at the Hershey Country Club.

This year is the time to strengthen the friendship with our members, and we will make every effort to continue to service the membership. You, our members, are important to the success of the Association.

We invite you to be part of this special celebration. More details will become available in separate e-mails and mailings over the next several months.
Non-Destructive Testing Technology for Quality Control and Acceptance of Flexible Pavement Construction NCHRP Project 10-65

By Harold von Quintus, Principal Engineer

Introduction to Study

Traditional pavement construction quality control and quality acceptance (QC/QA) procedures include a variety of laboratory and field test methods that measure volumetric and surface properties of pavement materials. The test methods for measuring the volumetric properties have changed little within the past couple of decades. In fact, many acceptance procedures rely on cores for volumetric measurements. Few agencies, if any, use mechanistic properties for judging the quality of flexible pavement layers.

Nondestructive testing (NDT) of construction quality offers an excellent, high production method of estimating the structural and volumetric properties of pavement layers that can be tied directly back to the same properties that are required for both mixture and structural design. This direct relationship to the mixture and structural design methods is important when developing and implementing Performance-Related Specifications (PRS). The Mechanistic-Empirical Pavement Design Guide (M-E PDG), developed under NCHRP Project 1-37A and the simple performance tests (developed under NCHRP Project 9-19) in support of the SUPERPAVE volumetric mixture design procedure use modulus and other fundamental engineering properties for characterizing the materials. Thus, it is advantageous that the quality assurance (QA) programs use similar tests for estimating construction quality of flexible pavements.

The purpose of NCHRP Project 10-65 is to identify NDT technologies that have immediate application for routine, practical QA operations to assist agency and contractor personnel in judging the quality of the individual pavement layers and overall flexible pavement construction.

Study Objectives

The two objectives of this study are:

1. Conduct a field evaluation of selected NDT technologies to determine their effectiveness and practicality for quality control and acceptance of flexible pavement construction.
2. Recommend appropriate test protocols, based on the evaluation of field test results.

Study Approach

The approach taken for NCHRP Project 10-65 is to use fundamental properties that are needed for mixture and structural design to control and accept flexible pavements and HMA overlays. The materials properties measured within this project include those included in traditional QA programs, as well as those needed for the M-E PDG to assist in structural and volumetric mixture design.

In summary, promising NDT technologies were assessed from field projects for their effectiveness and practicality to determine the quality of pavement layers during or immediately after placement or to accept the entire pavement at its completion. Effectiveness of the NDT technology is defined as the ability or capability of the NDT device to detect changes in unbound materials or HMA mixtures that affect the performance and design life of flexible pavements and HMA overlays. Practicality of the NDT device is defined as its capability to collect and interpret data on a real-time basis to assist project construction personnel (quality control and acceptance) in making accurate decisions in controlling and accepting the final product.

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NDT Technologies and Devices Used in Field Study

The NDT technologies and devices selected for use in the study are listed below.

<table>
<thead>
<tr>
<th>NDT Technology/Device</th>
<th>Reasons for Using NDT Technology/Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deflection Based; trailer mounted falling weight deflectometer (FWD) &amp; light weight deflectometer (LWD)</td>
<td>Large number of devices being used to test flexible pavements, and the database created under the FHWA-LTPP program. LWD used to evaluate individual unbound layers, while the FWD was used to evaluate the entire pavement structure at completion to ensure that the flexible pavement structure or HMA overlay have met the overall strength requirements used in the structural design process.</td>
</tr>
<tr>
<td>Dynamic Cone Penetrometer (DCP)</td>
<td>Current use in QA operations in selected agencies and ability to measure the in place strength of unbound materials. In addition, the DCP does not require extensive support software for evaluating the test results.</td>
</tr>
<tr>
<td>Seismic; Portable Seismic Pavement Analyzer (PSPA) &amp; Dirt Seismic Pavement Analyzer (DSPA)</td>
<td>Provides a measure of the layer modulus and can be used to test thin layers shortly after placement. The PSPA is used to test HMA mixtures, while the DSPA is used to test unbound materials and soils.</td>
</tr>
<tr>
<td>Geogauge; Humbolt Geogauge</td>
<td>Provides a measure of the in place modulus of unbound materials and soils; Evaluated as part of the seismic technology.</td>
</tr>
<tr>
<td>Ground Penetrating Radar (GPR)</td>
<td>Current use in pavement forensic and evaluation studies for rehabilitation design and for estimating both the thickness and air voids of pavement layers.</td>
</tr>
<tr>
<td>Non-Nuclear Density Gauges</td>
<td>Many agencies allow their use by contractors on a quality control (QC) basis. They also represent the baseline comparison to the results from the nuclear gauges for measuring density. The two gauges selected for initial use were the Pavement Quality Indicator (PQI) and PaveTracker for HMA mixtures, while the Electrical density gauge (EDG) was selected for unbound materials.</td>
</tr>
<tr>
<td>Intelligent Compaction (IC)</td>
<td>The non-nuclear density monitoring devices attached to rollers (referred to as intelligent compaction [IC] devices) were used in selected field projects. Not all field projects included the IC rollers, because these devices have not been used for QC application. The IC devices were provided by the manufacturers for use on some of the field projects. An evaluation of IC devices for HMA and unbound materials was included to analyze layer stiffness-growth relationships.</td>
</tr>
</tbody>
</table>

Materials Included in the Field Projects

The following is a listing of the projects and NDT technologies and devices included in the field projects and studies.

Projects & Materials Included Under the Initial Field Testing Plan to Identify Anomalies

<table>
<thead>
<tr>
<th>Project Identification</th>
<th>Material</th>
<th>Evaluated</th>
<th>DCP</th>
<th>Deflect.</th>
<th>Seismic</th>
<th>GPR</th>
<th>Density</th>
<th>IC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MnRoad, MN</td>
<td>Embankment</td>
<td>NA</td>
<td>√</td>
<td>√</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>√</td>
</tr>
<tr>
<td>2 TH-23 Reconstruction Project; Wilmar, MN</td>
<td>HMA – Surface Aggregate Base Embankment</td>
<td>NA NA √</td>
<td>√ √ √</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>3 I-85 Overlay; Auburn</td>
<td>SMA Overlay</td>
<td>NA</td>
<td>FWD</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>4 US-280 Reconstruction Project; Opelika, AL</td>
<td>HMA – Base Aggregate Base</td>
<td>NA NA √</td>
<td>√ √ √</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>5 I-85 Ramp; Auburn</td>
<td>Embankment</td>
<td>NA</td>
<td>FWD</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>6 SH-130 New Construction; Austin</td>
<td>HMA Base Embankment</td>
<td>NA NA √</td>
<td>√ √ √</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7 SH-21 Widening Project; Caldwell, TX</td>
<td>High Plasticity Clay</td>
<td>NA</td>
<td>FWD</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Continued on page 4…
### Projects & Materials Included in the Field Testing Plan to Develop the Test Protocols

<table>
<thead>
<tr>
<th>Project Identification</th>
<th>Material</th>
<th>NDT Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evaluated</td>
<td>DCP</td>
</tr>
<tr>
<td>8 Alabama Overlay; NCAT</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td>9 Florida, New Construction; NCAT</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Limerock Base</td>
<td>√</td>
</tr>
<tr>
<td>10 Ohio, Reconstruction</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Crushed Stone</td>
<td>√</td>
</tr>
<tr>
<td>11 Oklahoma, New Construction; NCAT</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>High Plasticity Clay</td>
<td>√</td>
</tr>
<tr>
<td>12 Missouri, Reconstruction Crushed Stone</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td>13 Michigan, Rubblization &amp; Overlay</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td>14 North Dakota, New Construction; Minot, ND</td>
<td>HMA</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Crushed Stone</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Embankment</td>
<td>√</td>
</tr>
<tr>
<td>15 South Carolina, New Construction; NCAT</td>
<td>HMA-Binder</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>HMA-Base</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Crushed Stone</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Caliche Base</td>
<td>√</td>
</tr>
</tbody>
</table>

**DCP** = Dynamic Cone Penetrometer, manual.  
**Deflect.** = Deflections measured with the Falling Weight Deflectometer and/or Light Weight Deflectometer.  
**Seismic** = Responses measured with the DSPA, PSPA, or GeoGauge.  
**GPR** = Ground Penetrating Radar, air-coupled antenna.  
**Density** = Non-Nuclear density measurements with PaveTracker, Pavement Quality Indicator, or Electrical Density Gauge.  
**IC** = Intelligent Compaction.

### Study Findings and Recommendations

The hypotheses for the NDT technologies and devices selected for the initial field testing plan was to confirm that the NDT device can consistently identify anomalies or physical changes in materials that affect performance and design life of flexible pavements. A standard t-test and the Student-Newman-Keuls (SNK) mean separation procedure using a 95 percent confidence level were used to determine whether the areas with anomalies were significantly different from the other areas tested. The study findings and preliminary recommendations found from the field studies are summarized below for unbound layers and HMA mixtures.

#### Unbound Materials and Soils

The chart below summarizes the overall success rate for identifying the physical differences of the unbound material within a project for the different NDT devices.

The DSPA did identify nearly all areas with anomalies. The Geogauge did a reasonable job followed by the DCP and LWD. The EDG and GPR devices did a poor job in identifying the areas with anomalies in the unbound layers. Although both the DSPA and Geogauge can be used for QA applications, the Geogauge was the primary device recommended for use based on the following reasons.

- The Geogauge is a self-contained NDT device (shown in figure 1) that can be easily incorporated into a QA program for both control and acceptance testing. This conclusion is based on the following reasons:
  - It provides an immediate measure of the resilient

<table>
<thead>
<tr>
<th>NDT Device</th>
<th>DSPA</th>
<th>Geogauge</th>
<th>DCP</th>
<th>LWD</th>
<th>GPR</th>
<th>EDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Rate, %</td>
<td>86</td>
<td>79</td>
<td>64</td>
<td>64</td>
<td>43</td>
<td>36</td>
</tr>
</tbody>
</table>
modulus of the in place unbound material (refer to figure 2).

- It identified those areas with anomalies at an acceptable success rate; only second to the DSPA. The DSPA can also be used, but is not the primary recommendation because of the support software that is needed and sensitivity of the modulus to the moisture content near the surface of the layer.
- It adequately ranked the relative order of increasing strength or stiffness of the unbound materials.
- It provided resilient modulus values that were correlated to dry density over a diverse range of material types.

The Geogauge needs to be calibrated to the project materials and conditions to improve on its accuracy to estimate the target resilient modulus, but not for identifying construction defects or anomalies. This calibration issue requires that laboratory repeated load resilient modulus tests be performed on each unbound layer for judging the quality of construction. Most agencies, however, do not routinely perform resilient modulus tests for design.

For those agencies that do not have access to or the capability to perform resilient modulus tests, the DCP is an option that can be used to estimate the resilient modulus at beginning of construction. The DCP requires more time and effort to conduct the test, decreasing it desirability of use in a QA program. The moisture content should be measured for the unbound materials on a periodic basis because the resilient modulus estimated with the Geogauge is heavily dependent on moisture content.

**HMA Mixtures**

The following summarizes the success rates for identifying the physical differences of the HMA mixtures within a project.

<table>
<thead>
<tr>
<th>NDT Device</th>
<th>PSPA</th>
<th>Non-Nuclear</th>
<th>GPR</th>
<th>FWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Rate, %</td>
<td>92</td>
<td>77</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

The PSPA did identify all but one of the areas with anomalies or differences. The non-nuclear density gauge did a reasonable job, while the GPR and FWD only identified about 50 percent of the areas with differences. The GPR, however, did measure the HMA lift thickness placed that was confirmed through field cores.

Figure 1. Geogauge used for modulus testing of all unbound materials and soils.

Figure 2. Comparison between the laboratory measured resilient modulus values and those measured with the Geogauge and DSPA that have been adjusted to laboratory conditions.

Figure 3. Portable Seismic Pavement Analyzer for seismic testing of HMA layers.

The PSPA and non-nuclear density gauges have acceptable success rates, while the GPR and FWD have low rates. The PSPA is the NDT device and technology suggested for use in QA applications for the following reasons.

- The PSPA is a self-contained NDT device that can be incorporated into a QA program for both control and acceptance testing of HMA mixtures (shown in figure 3).
- The PSPA adequately identified all areas, but one, with anomalies.
- The PSPA provides a measure of the dynamic modulus that is needed for pavement structural designs, even before adjusting the seismic modulus for laboratory conditions.
- Similar seismic modulus values were measured at elevated temperatures when corrected for temperature...
using a master curve in comparison to those measured in the laboratory.

- An important condition that the NDT device needs to consider is the effect of time and varying moisture content on the properties of the HMA mixture near construction and how those properties will change over time. There have been various studies completed on using the PSPA to detect stripping in HMA mixtures.

As for unbound materials, the PSPA needs to be calibrated to the specific HMA mixtures being tested. This calibration procedure allows the PSPA to be used to detect volumetric, as well as physical changes in the materials during construction. In short, the PSPA can be used in day to day operations to assist contractor and agency personnel in judging construction and materials quality by itself or in tandem with other geophysical and/or ground truth sampling programs.

The PSPA does have some limitations that must be addressed prior to full-scale use in QA programs. One of the recommendations is to delay all testing for one day after HMA placement and compaction. If required, this time restriction is considered a disadvantage for use in QA program.

Figure 4.
Non-nuclear density measuring devices for HMA materials.

(a) PQI device
(b) Pavetracker device

Project Status
All field work has been completed and the laboratory modulus testing is underway and should be completed in the near future. The draft of the final report is under preparation and should be submitted to NCHRP for review by the end of March 2007.

NAPA’S DIAMOND ACHIEVEMENT

CONGRATULATIONS

Golden Eagle Construction Company, Inc.’s Coolspring Plant II and Eight Four Plant

IA Construction Corporation’s Homer City HMA Plant

The following PAPA members have earned NAPA’s Diamond Achievement Commendation for Excellence in Hot-Mix Asphalt Plant/Site Operations: Golden Eagle Construction Company, Inc.’s Coolspring Plant II and Eight Four Plant, IA Construction Corporation’s Homer City HMA Plant.

The commendation is designed to recognize Hot-Mix Asphalt (HMA) production facilities that operate in an exemplary manner. Earning the Diamond Achievement Commendation serves as a signal to neighbors that an HMA facility is a good neighbor. The self-assessment process addresses six aspects of the plant/site: appearance, operations, environmental practices, safety, permitting and compliance, and community relations. By earning the Diamond Achievement, IA Construction Corporation, The Lane Construction Corporation, HRI, Inc., and Independence Construction Materials have shown the community that it will go the extra mile for excellence.
In Memoriam

Vincent P. Angelo

1943 - 2007

The Pennsylvania Asphalt Pavement Association and Pennsylvania’s Hot-Mix Asphalt (HMA) Industry have lost a dedicated professional and friend – Vincent P. Angelo. Vince (affectionately known as “Vinnie” to some of us) passed away on February 23, 2007.

Truly Vince has left a legacy within the hot-mix asphalt industry in Pennsylvania. He worked in the HMA business for over 40 years. Vince began his career at the Pennsylvania Department of Highways’ (PDH), Bureau of Materials, Testing and Research. He then became an assistant District Materials Engineer for PDH’s District 5-0. Subsequently he worked for Stabler Construction Company, Highway Materials, Inc., and Lehigh Asphalt Paving and Construction Company/Glasgow, Inc.

Vince was exceptionally dedicated to PAPA. He served as PAPA’s Technical Committee Chairman from 1985 to 1992. During his tenure as chairman, Vince established the Regional Technical Committee format (East, Central, and West); a concept presently followed by PAPA. His committee worked with PENNDOT to resolve the rutting (pavement deformation) issues by implementing the ID-3 Heavy Duty Mixes prior to the SUPERPAVE technology. Vince and his committee were instrumental in establishing, with PENNDOT’s Materials and Testing Division, experimental projects on I-80 to evaluate these so-called anti-rutting mixes. As Chairman of the PAPA Technical Committee, he was the leader in the development of the Asphalt Treated Permeable Base Course Specification.

Vince served as PAPA’s President from 1994 – 1995. His primary focus as President was on hot-mix asphalt quality and the Association’s membership. He actively promoted the National Quality Initiative. As president, he was instrumental in developing PAPA’s quality statement. The PAPA membership increased significantly during his presidency.

The Asphalt Paving Quality Improvement Task Force (APQITF) was formed by PENNDOT in 1994 to solve rutting in asphalt pavements. Since its beginning the AP ITF has become a model for partnering and quality. Vince was a co-chairman since inception. The “Task Force” is recognized as the premier forum for effectively addressing common issues important to both Industry and PENNDOT. Some of the more significant accomplishments under Vince’s leadership were reduction in paver segregation, SUPERPAVE implementation, asphalt ride quality specification, perpetual asphalt pavement design and construction, and HMA Plant and Field Technician certification programs and implementation.

He assumed the chairman position of PAPA’s Environmental Committee in 1997. Vince spearheaded the development and issuance of PAPA’s “Environmental Guide.” This guide provided a single source document information to PAPA Producer and Paving Contractor Member Companies on contingency plans, asphalt fumes, General Permits, noise issues, storage tanks, and other pertinent matters. Training sessions are provided along with periodic updates to the topic areas. His committee worked diligently with the Pennsylvania Department of Environmental Protection (DEP) to establish a Cleanfill Policy, General Beneficial Use Permits, and Waste Derived Liquid Fuel Guidance Document.

Through the ongoing system of seminars under Vince’s direction as Environmental Committee Chairman, the HMA industry has achieved high levels of environmental compliance using a Pennsylvania-specific regulation based approach. The PAPA Environmental Management System designed and implemented has been positively recognized by DEP and the Pennsylvania Chamber of Business and Industry.

Good-bye dear friend. You will be sorely missed by all of us. May you rest in peace!
Improving Pennsylvania’s Longitudinal Joint Performance

By Carlos Rosenberger, Senior Field Engineer, Asphalt Institute

Improving longitudinal joint performance has been on Pennsylvania’s Asphalt Pavement Quality Improvement Task Force’s (APQITF) radar screen for two years. In 2006 it was elevated to a high priority agenda item. That high priority resulted in:

1) A literature search of how other states were constructing and specifying their longitudinal joints.
2) A visit, by some members of the Task Force, to Maryland; a state which has a history of excellent joint performance.

The literature search highlighted the fact Pennsylvania is not alone in their quest for improved joint performance. In 1992 the National Center for Asphalt Technology conducted a study that looked at joint construction in several states, one of which was Pennsylvania. In recent years, Virginia, Colorado, Kentucky and other states have looked to improve their joint construction. The Kentucky Transportation Center study noted, “In recent years, it has become evident how critical longitudinal joint construction is to the life of the pavement……Many pavements have been or are in the process of being resurfaced as a direct or indirect result of longitudinal joint deterioration”. The premature failure of longitudinal joints can have a significant impact on state highway budgets and more importantly the satisfaction of the motoring public.

This photo clearly illustrates why there is concern over longitudinal joint deterioration. With the exception of the longitudinal joints, which had to be milled and replaced, the pavement is exhibiting good performance. Repairing the joint increased the agency’s life cycle cost, resulted in significant user delay costs and gave a “black eye” to the hot-mix industry.

In-place joint air voids are typically 2-percent +/- higher than the rest of the mat; couple high air voids with abutting vertical faces and you get a weak point in the pavement. As such, it is important joints be constructed using the best paving practices. An entire Sunday afternoon at the 2007 Transportation Research Board was devoted to longitudinal joint construction and specifications. That session pointed out there is consensus on some aspects of longitudinal joint construction, but there are other aspects, particularly rolling the unsupported and supported edges, where opinions differ. Everyone agreed that the first pass of the paver needs to be as straight as possible; it is critical to achieving the proper overlap on the next pass. (A reference point for the paver operator is helpful in getting an initial pass that makes uniform overlap of subsequent passes easier.)

Opinions differ on how to roll the unsupported edges of the mat.

1) One opinion is to make the first pass staying away from the edge, 6 to 12-inches, followed by a second pass with the drum extended over the edge. The concept is the first pass will support the roller on the second pass resulting in less lateral displacement and improved joint density.

2) A differing opinion suggests the first pass should extend out over the unsupported edge to avoid creating a shear plane (future crack) at the edge of the drum.

Pennsylvania’s specification requires the existing face to be painted with a PG-binder material, typically PG 64-22, prior to placing the second lane. Until 2006 that vertical face was, in most cases, painted with an emulsion. The use of the PG was a compromise between the emulsion and the use of proprietary materials that would have required the contractor to have additional equipment and material just to paint the joint. The move to PG was a step in the right direction; painting the joint does not improve joint density, but it does improve joint performance.

When placing the second pass the overlap onto the first land should be approximately 1-inch. Much less than an inch and it may be difficult for the paver operator to consistently overlap the exist-
ing lane. More than 2-inches is too much material for the lute person to push back. The visit to Maryland found they have a method specification which strives for a 1-inch overlap and no luting prior to compacting the joint.

Opinions again vary regarding the proper rolling sequence for the confined longitudinal joint. One school of thought is to roll the longitudinal joint in the vibratory mode with a 4 to 6-inch overlap on to the cold lane. Another opinion is to stay off the longitudinal joint on the first pass approximately 6 to 8-inches; compacting the joint with the second roller pass. This method confines the joint material between the existing lane and the material compacted on the first pass. A third philosophy is suggested for rolling the wedge joint; that is to start at the outer edge of the pavement working into the joint. This method allows extra time for heat transfer between the freshly placed material and the previously placed wedge joint, resulting in improved bonding of the two lanes and increased wedge density.

Differing viewpoints from nationally recognized experts adds credibility to the statement, “no one method is right all the time”! Aggregate type, PG binder, air temperature, base temperature, sunny, cloudy, windy, existing base condition, etc. all combine to create an ever changing reaction between the roller and the mix.

Unfinished Business

Longitudinal joint construction will continue to be a focus area for the APQTIF in 2007 with the goal of reaching a consensus on how to specify and build a long lasting longitudinal joint. A few of the questions still to be resolved are:
• should there be a density spec or a method spec,
• if the decision is to go with a density spec; what is achievable
• several districts and the Turnpike overband the long-

itudinal joint, does this improve performance

In an effort to answer those remaining questions, two members of the APQTIF’s longitudinal joint sub-committee, Frank Colella and Garth Bridenbaugh, visited two Pennsylvania projects last Fall to evaluate different longitudinal joint construction methods. They will continue that effort in the 2007 construction season. After obtaining approval from the District they will visit projects throughout the Commonwealth asking contractors to try several methods of longitudinal joint construction. Ultimately, they will report their observations to the APQTIF. If Garth and/or Frank visit your project, your cooperation will be greatly appreciated.

Dean Maurer, Pennsylvania’s Bituminous Engineer, is in the very early stages of evaluating longitudinal joint properties as compared to mat properties. Dean is looking at air voids, permeability, and tensile strength ratios of cores taken from the mat versus cores taken from the longitudinal joint. His early results are very interesting; he is hoping to continue that evaluation this construction season.

What can you do?

Evaluate your longitudinal joints this construction season (density, texture, etc). More importantly, go back and look at the longitudinal joints you built over the past 5 to 10 years. Are the longitudinal joints ones that have performed, ones which make your company proud? If they are, continue to do what you have done in the past, but if they are not, consider the discussions earlier in this article. If, after reviewing your previous 5 to 10 years of work, you find a few joints that did not perform they may be demonstrating, “no one method is right all the time”. Be flexible, when a mix deviates from the norm, it may be the time for you to deviate from your normal method of longitudinal joint construction.

PAPA NEEDS YOU!!!

PAPA is actively searching for ideas for upcoming editions of the newsletter. If you would like to write an article or provide PAPA with a company profile, please contact Millie at 717-657-1881.

We look forward to hearing new and interesting ideas!
GOH Paving in the Caribbean Islands

By Patrick Hawbaker

GOH’s reputation for Safety, Quality, and Productivity in our paving operations has earned us a contract with local engineering firm, Orth-Rodgers and Associates. GOH, Inc. has been contracted by the Grand Cayman Government National Road Authority (NRA) to provide operations training on pavers, rollers, and truck driving. The government has recently purchased a fleet of paving equipment and trucks and hired a local workforce to perform asphalt paving previously done by local contractors. The NRA has been provided manufacturers training on the equipment. However, they were looking for specific hands-on training to improve their skills. GOH sent three of our distinguished paving professionals for the job. Mike Dotts, Roller/Density Technician, Troy Franks, Paving Superintendent, and Tom Merryman, Driver Trainer were chosen to execute this challenging task. The training took place during the week of December 4, for five consecutive days. This project is well beyond our typical geographic market area, however it allows us to share our knowledge and experience with others in the paving industry. This project truly defines a “working vacation.”

Asphalt Institute Hosts Bailey Method Training

By Ronald J. Cominsky, P.E., Executive Director, PAPA

On February 22, 2007, the Asphalt Institute sponsored a one-day seminar on “The Introduction to the Bailey Method for Achieving Volumetric and HMA Compactability.” The seminar was held at the Grantville Holiday Inn. Forty-four industry and fifteen PENNDOT personnel attended. The training was conducted by Mark Blow, P.E., of Sioux Falls, SD and Wayne Jones, P.E. of Columbus, OH. Both instructors are Regional Engineers for the Asphalt Institute.

The Bailey Method was originally developed by Mr. Robert Bailey of the Illinois Department of Transportation. Mr. Bailey developed the method as a means to combat the rutting of asphalt mixes while maintaining the proper durability characteristics.

The Bailey Method is a systematic approach to blending aggregates that provides aggregate interlock as the backbone of the structure and a balanced continuous gradation to complete the mixture. The method provides a set of tools that allows the evaluation of aggregate blends. These tools provide a better understanding in the relationship between aggregate gradation and mixture voids.

The Bailey Method gives the practitioner tools to develop and adjust aggregate blends. The procedures help to ensure aggregate interlock (if desired) and good aggregate packing, giving resistance to permanent deformation, while maintaining volumetric properties that provide resistance to environmental distress. The Bailey Method can be applied to both SUPERPAVE and SMA mix designs.
PAPA’s 2007 Regional Technical Meetings

PAPA hosted its Regional Technical meetings on March 6-8, 2007. The Eastern Regional meeting was held at the Lehigh Valley Holiday Inn Convention Center (Briegsville) on March 6; the Central Regional Meeting at the Penn Stater (State College) on March 7; and the Western Regional Meeting at the Holiday Inn (Indiana, PA). There was excellent attendance this year – Eastern 102, Central 74, and Western 123 attendees. The Central Regional attendance was down slightly from that anticipated due to inclement weather.

Key agenda items discussed were the PAPA/PENNDOT “round-robin” testing using the ignition furnace; PAPA’s hot-mix asphalt data collection on plant quality control; local acceptance specification; SMA specification; 37.5mm/25mm sampling and testing; an ISO-9000 asphalt update; paver widening sampling; and other selected topics from the audience. Mr. Dean Maurer from the Materials and Testing Division (MTD) provided presentations on several of the agenda topics. Mrs. Sherry Hartman of MTD provided a presentation on statistical concepts for quality control. PAPA extends a sincere “thank you” to both of these individuals for their contributions.

Additional photos on page 12

Eastern Regional – Left to Right: Ron Cominsky, John Savastio, Dean Maurer
What’s Happening in... Pennsylvania

PAPA’s 2007 Regional Technical Meetings

Eastern Region

Western Region

Central Region
ISO Quality Manager Orientation
Conducted in PENNDOT Districts 5 and 10

By Frank Colella, Technical Support Manager, PAPA

PENNDOT in conjunction with PAPA has completed two sessions of Quality Manager Orientation for the ISO Pilot Projects. Attendance and achieving satisfactory results on the examination is a way of fulfilling a portion of the requirements for the position of Quality Manager as spelled out in the special provision titled Pilot Asphalt Quality Systems Implementation. The portion of the special provision referring to the qualifications of the Quality Manager read as follows:

CONSTRUCTION

a) Perform work under the direct supervision of a quality manager. The manager will be the main contact for all activities under this item and will be responsible for implementation of the relevant sections of the PASON Quality Systems Manual and any related documents. The qualifications of the manager must be submitted to and approved by the Department. The manager must, as a minimum:

1. Provide verification of successful completion of the PASIN Quality Manager Orientation Training offered by the Department.

OR

2. Be certified as a Quality Manager or Quality Engineer by the American Society for Quality (ASQ); and/or certified as a Quality Management Systems Auditor or Lead Auditor by the, Registration Accreditation Board (RAB) and Quality Society of Australasia Limited (QSA) known as RABQSA International: or an acceptable alternative. The intent is for the manager to understand basic ISO quality management principles and understand the relationship of the quality engineering to the quality system.

3. Understand the fundamental concepts of quality control for the design, production, delivery, lay down, testing, and maintenance of asphalt paving in Pennsylvania, and be capable of applying problem-solving tools and basic statistical concepts, establish process control, process capability plans, and acceptance sampling; and attribute controls, as demonstrated by 5 years of supervisory experience in asphalt production or paving.

The Orientation session was attended by 27 PAPA members representing 13 companies. The Department also trained a number of district personnel who will be involved with the pilot projects. The sessions were conducted over a 2 day period at the District 10 office in Indiana PA and the Schuylkill Co. Maintenance Office in Schuylkill Haven PA.

The Quality manager Orientation Course was comprised of 8 sessions followed by a question and answer period, participant course evaluation and an examination which consisted of 24 multiple choice questions.

Session 1, was scheduled for 30 minutes and reviewed the history of ISO at PENNDOT and explained the intent of the ISO Pilot Projects. The session also addressed the PASIN acronym, which stands for Pennsylvania Asphalt Improvement Network, and identified its’ members: PENNDOT, American Council of Engineering Companies, PACA, PAPA, PAAMA, AASHTO Materials Reference Laboratory, PA Turnpike Commission, NECEPT.

This session also addressed the Industry concerns of “What’s in it for Me”: Reduced oversight on projects with Quality Management Systems, A learning tool for new employees, An analysis of your organization as it compares with others in the bituminous community, Tools to document performance, Continual improvement of processes and procedures, Best practices in the bituminous community, Reduced Costs and increased profits.

Session 2, Quality management System Requirements was scheduled for 45 minutes. This session covered, among other things what the ISO Standards address. They address an organizations process, not its’ product. They address how an organization does its’ work, not the end result. They specify what requirements an organization must meet, but not how an organization goes about meeting them. The ISO Mantra, which was discussed in almost every session of: Say What You Do, Do What You Say, Prove It, Improve it was also introduced.

Session 3, which was scheduled for 45 minutes, discussed the State of The Industry. The ISO Baseline Assessments that were conducted on 5 PAPA members, this past construction season, were discussed. The strengths and weaknesses of the Industry as they pertain to ISO were highlighted.

Session 4, which was scheduled for 45 minutes, was a detailed review of the PASIN Manual. This manual which in essence is the bible of the PASIN Projects was a collaborative effort between PENNDOT, PAPA, core group members represented by the engineering community, FHWA and r. bowen and associates (the Departments ISO subcontractor).

Continued on page 14 …
...Continued from page 13

Section 5, which was scheduled for 110 minutes, was a review of the process maps and best practices as developed by industry-wide subcommittees comprised by Industry and Department personnel. It was explained how the subcommittees had gone through a FEMA (Failure and Effects Mode Analysis) which tried to identify areas where failure was prone to occur in the process and what best practices might assure that these failures would not occur.

Section 6, which was scheduled for 30 minutes, discussed the Process Capability Analysis and how to monitor all critical aspects of the paving process. The development of control charts and use of cpk to measure the variability of the process were discussed.

Section 7, was scheduled for 110 minutes and reviewed the roll or the Quality Manager as it relates to the Pilot Projects. This session spanned both days of the orientation.

Section 8, was scheduled for 90 minutes and discussed the bidding requirements, implementation plan and potential risks that were involved with the projects.

A brief review followed by a question and answer period wrapped up the orientation. This was followed by the 24 question multiple choice exam. All Industry personnel who took the exam at both orientation sessions passed.

By the time this article is published the 2 pilot projects will have been let, and, hopefully, well on their way to being awarded. The Department plans to let more Pilot Projects in the future. There could possibly be one let in each District in 2008. This could mean this same orientation program will be offered in the participating districts. ◆

CONTRACTOR VOLUNTEERS WANTED

2007 Longitudinal Joint Performance Reviews

PENNDOT and PAPA are looking for contractor volunteers to participate in its longitudinal joint construction study. The study kicked off in late 2006 with two contractors already participating and new volunteers are needed for 2007.

The purpose of this effort is to evaluate current practices of Pennsylvania contractors and make a comparison to a “recommended best practice method”. Study field views also serve as good opportunities to gather and exchange information on potential improvements to longitudinal joint quality. The end goal is to evaluate the project findings and recommend improvements in the way joints are constructed in our state.

If you are interested or would like more information, please contact Garth Bridenbaugh of PENNDOT at 814-696-7194 or Frank Colella of PAPA at 724-946-9018. ◆
We are in the beginning of a new season. We hope the cold and wet weather has passed so that we may start the new paving work. At this time, we are all checking to see if the paver maintenance, along with the rollers, the transfer equipment, perhaps a new coat of paint, will be complete and the equipment ready for the season’s start.

After this walk-through of the shop, it is now time to stop by the asphalt plant. We check to see if the new bin liners have been completed, if the cold feeds have been repaired and ask if the baghouse has been inspected. Also, are the mix designs ready for the new season? Going through our inspection, we feel that the important items on the maintenance schedule are well underway for completion prior to the paving season.

The important part has not been addressed yet. The most important item – Are the men and women that work with us, not for us, prepared and ready? This includes everyone within a company. Each of us, as employers, works hard to get the best possible health insurance and other benefits for all employees. The next step – Have we done enough training for each job we have in the operation? Have we updated the information at each level where needed? Have we offered the employees enough information to be able to move to a higher position if they desire?

The greatest asset each company has is the men and women working with us. Have we taken time to say “Thank you for the great job you have done”? This display of appreciation goes a long way towards a better working relationship with your fellow workers. Let’s not forget the “Thank you”.

Henry James (1843-1916)  
Writer
By Ralph Duca, Vice President

Clean Water of New York (CWNY) provides the asphalt industry with an economic and environmentally sound fuel alternative. Waste derived liquid fuel or WDLF costs substantially less than #2 oil and can dramatically reduce operating costs.

CWNY has been providing this reliable, recycled product to the industry for over five years. Our clients include national companies as well as local plants. The company operates a fleet of radio dispatched trucks to bring the product to your door. The company services Pennsylvania, New York, Connecticut, and New Jersey.

Each load is accompanied by a certified analysis certifying the load as on spec. Clean Water’s five million gallon storage facility allows for sufficient supply as well as batch testing of the product. Our 300,000 gallon tanks allow for quality control to insure environmental compliance.

The facilities treatment process includes chemical treatment, heat and micro filtration. This product offers a substantial BTU value allowing for superior production. CWNY’s product is blend of virgin fuel oils, used lube oils and other industrial lubricants.

Pricing options for the material vary from spot purchases to term pricing.

Clean Water of New York also provides a complete array of environmental services including:

- Used oil collection
- Oily water disposal
- Tank cleaning
- Oil water separator maintenance
- Drum disposal
- Marine environmental services

In order to combat the rising price of oil, the asphalt industry has tapped into an economic source of fuel. Waste derived liquid fuel or WDLF, has grown in its popularity with the ever increasing price of fuel oils. By utilizing WDLF, a recycled material, the industry is not only cutting operating cost, but also reemphasizing its commitment to keeping asphalt as “green” as possible.

An increasing number of asphalt companies are using WDLF to power their plants. Since WDLF is produced from a discarded product, it costs less than virgin oil, reducing operating cost. In the last three years the use of WDLF has increased tremendously

WDLF is a blend of lubricating, heating and industrial oils. The oils are collected from retail automotive service centers, residential and industrial tank closings and other industrial process. The material is collected by local independent jobbers as well as regional, national and public companies.

Once collected, the WDLF is then shipped to oil recycling facilities. These facilities are required to have a permit authorizing them to collect, receive and treat oils. The permit has specific acceptance parameters that the facility must follow in order to receive these materials. The facility then treats, processes and blends the material to produce an on specification product.

Most states require the asphalt plant receiving the WDLF to have a state issued permit, allowing the plant to receive the WDLF. In Pennsylvania, the Department of Environmental Protection (PADEP) oversees this activity, through its air emission program. The PADEP issues a permit limiting the levels of certain impurities in the material to be burned. This allows the state to limit the amount of pollutants emitted into the air (after burning)

The specifications that this product must meet is initially published by the USEPA and then, depending on the state, carried out and enforced by the state environmental department. If any of these parameters are exceeded the plant can incur serious environmental violations and or fines.

Choosing a reputable WDLF supplier is critical. Price alone can not be the determining factor in the selection process. Product quality, reliability, regulatory compliance and required analytical and shipping documentation are all essential factors in evaluating a supplier. Ensuring that your supplier has a clean compliance history as well as verifying the source of the material and it’s adhering to local, state and federal guidelines is paramount.

In most cases the recycling facility and the asphalt plant permit require the supplier to provide analytical results with each load to the receiving facility. These specification sheets provide the levels of PCB’s, Sulfur, Halogens (Chlorine), Metals and Flash point among other relevant impurities. The receiving facility is also required to perform some type of periodic quality assurance on the incoming material. This testing is to confirm that the material is on specification and meet the asphalt plants permit.

An asphalt plant, burning oil that is found to be off specification can lose its permit to burn WDLF and or incur fines and violations. Responsibility to insure compliance falls solely on the plant burning the material. These liabilities must be managed and monitored very carefully.

The process to obtain a permit, to burn WDLF can be a complicated one, often requiring the services of an engineering firm to help navigate the regulatory requirements. Although this process can take time, the economic benefits of being able to burn WDLF as opposed to #2 oil is significant. Burning WDLF has environmental and economic benefits, cutting operating costs and using an environmentally friendly recycled product. It also requires a comprehensive program to monitor compliance with very stringent regulations.

As this general overview tries to point out, WDLF has many issues with which a plant must contend. There are also factors to detailed to explore in this space, such as natural gas prices, prices being charged for WDLF and the prices being paid for the used material at the retail level. But overall WDLF has found a place in the asphalt industry that will continue to alter how companies procure and use fuel. •
Federal EPA SPCC Deadlines Extended

On December 14, 2006 EPA announced final revisions to the federal Spill Prevention Control and Countermeasure Regulations. The compliance date for facilities was extended until July 1, 2009, for certain new elements of Spill Prevention Control and Countermeasure Regulations.

These final regulations affect the industry in several ways:

- Companies are required to have signs at truck vehicle entrances warning of overhead piping, whenever a facility has overhead piping which could be struck by a vehicle with a raised dump body.
- New aboveground tanks should have secondary containment, and most in the industry are purchasing double wall tanks to meet this requirement.
- The issue of wall thickness testing for tanks was never resolved. Where aboveground tanks are purchased in the future, they should be raised above the ground so that costly emptying of the tank is not needed to check base plate wall thickness.

It is recommended that Members establish compliance schedules for the new regulations in their current SPCC Plans, which can be combined with Pennsylvania Department of Environmental Protection (PADEP) Preparedness Prevention and Contingency (PPC) Plans, into a single document.

Should there be any questions on Contingency Plans, contact either Mr. Walter Hungarter or Mr. Gary Brown at RT Environmental Services, Inc. 800-725-0593.

PAPA Environmental Management System to be featured at PAPA Chamber of Business and Industry Seminar

On April 17 and 18, 2007 the Pennsylvania Chamber of Business and Industry is holding their annual Environmental Law and Regulations Conference in Harrisburg, PA. The PAPA Environmental Guide and system of update seminars, along with articles in Paving the Way will be featured as an effective Pennsylvania Environmental Management System, to hold as an example for other industries to follow.

Through the ongoing system of seminars, Environmental Guide updates and Paving the Way updates, the asphalt pavement industry in Pennsylvania has achieved high levels of environmental compliance using a Pennsylvania-specific regulation based approach. Although implementation of effective environmental management systems has been implemented in a number of other industries, use of ISO systems used in other countries or states is not viewed by many in the Pennsylvania Department of Environmental Protection (PADEP) as appropriate, given the many “Pennsylvania Regulation Specifics” included in waste, air, and water program regulations.

In late fall, the Association was commended by air officials as work continues on a uniform statewide General Operating Permit. When the Association, through member input and request, evaluates specific environmental issues, members are contacted to determine the best and most appropriate course of action or specific needs for regulatory clarifications. By being well prepared for meetings with DEP, and giving senior DEP officials clear information on the issues over the last five years, uniform procedures for managing asphalt environmental issues have been established.

As procedures have become more uniform, General Permits have been used in environmental programs to an increasing degree, compliance problems in the industry have fallen off, as plant operations, supervisors, and field foreman know how to manage asphalt plant production as well as pavement placement operations in accordance with environmental laws, regulations and guidance. The upcoming Air General Permit solves a remaining issue where some companies which owned, for example, five plants had no two air operating permits with the same language or testing requirements, which created confusion. Ms. Joyce Epps, who currently runs the PADEP Air Program has been a champion of using General Permits, which provide uniformity and consistency throughout the industry increasing compliance. A goal of the PAPA Environmental Committee in 2007 is to achieve agreement on a General Operating Permit language, so that uniform air permitting and plant operations can be implemented throughout the Commonwealth.

All members should note that as indicated in the last issue of Paving the Way, an updated Environmental Guide is now available, which covers updated federal Contingency Plan requirements, an updated Asphalt Fact Sheet, which all members should now be using, information on Waste Derived
Out of State Air Emissions Concerns

A number of asphalt plant operators contacted the Association around the first of the year concerned about Midwest state mandates forcing requirements to change fuel at asphalt production facilities. The changes are driven by multi-state panels which are attempting to address ozone in areas where current air quality does not meet federal standards.

The Association has been in touch with NAPA, as well as senior PADEP Air Officials on this issue. Although the northeast region Interstate Ozone Transport Group has asphalt plants on a list of sources for potential emissions source reductions, DEP currently believes that requirements for best available technology or selective use of fuels will only likely apply to new asphalt plants with some potential for future changes in ozone non-attainment areas, such as Pennsylvania’s Southeast Region.

No near term requirements to change asphalt plant production at existing facilities are planned. We will keep you up to date on this issue in the future through environmental update articles in *Paving the Way*.◆
Dates To…
REMEMBER!

Executive Committee Meeting
April 19, 2007
Carnegie House
State College, PA

Board of Directors Meeting
April 20, 2007
Carnegie House
State College, PA

75th Anniversary Celebration
June 16, 2007
Hotel Hershey
Hershey, PA

Executive Committee Meeting
September 20, 2007
Carnegie House
State College, PA

Board of Directors Meeting
September 21, 2007
Carnegie House
State College, PA

2007 PENNDOT LETTING SCHEDULE
Following is the tentative Letting Schedule for Construction Year 2007:

January ..................... 11 and 25
February .................... 8 and 22
March ........................ 8 and 22
April ......................... 12 and 26
May .......................... 10 and 24
June .......................... 7 and 21
July .......................... 12 and 26
August ...................... 2, 16 and 30
September .................. 13 and 27
October ..................... 11 and 25
November ................... 8 and 29
December ................... 13 and 20

Price INDEX
Consolidated Procedure – Pennsylvania Department of Transportation/Department of General Services
(Contract 5610-36)

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(Be sure to check PAPA’s website - www.pahotmix.org - for monthly Price Index)