



pennsylvania
DEPARTMENT OF TRANSPORTATION



**Pennsylvania ASphalt Improvement Network
2008 Construction Pilots' Implementation Update Report
(Phase 2)**

**A. FOLINO
CONSTRUCTION
INC.**



**Submitted to:
PennDOT Deputy Secretary for Highway Administration
and
Pa Asphalt Pavement Association**

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Date: February, 2009**

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EXECUTIVE SUMMARY

Overview

Pennsylvania ASphalt Improvement Network (PASIN) is an initiative to *develop, pilot, and implement an ISO 9000-2000 based Quality Management System (QMS) from pavement design through qualification, procurement, manufacture, delivery of materials, installation, acceptance testing, and maintenance of asphalt pavement.* **This 2008 PASIN Pilot Update Report is an addendum to the 2007 PASIN Pilot Report.**

The Phase 2 PASIN initiative was piloted in 2008, by the following contractors, in the following two construction projects:

1. District 3-0, ECMS 79105-Lycoming Co., SR 15-A20/A30 NB, constructed by **Glenn O. Hawbaker Inc.**
2. District 12-0 ECMS 80092-Fayette Co. SR 21-Betterment Project, constructed by **A. Folino Construction, Inc.** with asphalt material provided by **Hanson Aggregates, Inc.**

Results

Implementing PASIN in the 2008 Pilot Projects was easier in 2008 than in 2007, as the PASIN Specification and deliverables were more clearly defined. The 2008 Orientation provided clearer guidance to enable Quality Managers to facilitate implementation, as a result of lessons learned from 2007 pilot projects. PASIN Implementation Team developed specific contractor templates for the expected deliverables, for *Management Review, Customer Complaints, Corrective and Preventive Actions, Control of Non-Conformances, etc.* Use of these templates resulted in faster resolution of issues, while involving company senior management through Management Reviews.

The District 12-0 project involved a paving contracting company with an external material supplier. Each company implemented PASIN requirements, both individually, and collaboratively to ensure project success.

Metrics were collected by the pilot contractors to help manage the plant and laydown processes. The metrics allowed the contractors to compare printed ticket to lab tests for asphalt content, field samples and CAMMS results for mat density from the PennDOT Materials Testing Division.

At times, implementing PASIN in the Pilot Projects for the contractors was difficult, particularly since the effort was still new to the asphalt industry and to PennDOT. However, District Inspection staff and the contractors worked closely together with the support from the PASIN Implementation Team to facilitate implementation. Overall, implementation of the PASIN requirements in Districts 3-0 and 12-0 in 2008 was considered successful in piloting the PASIN effort. The PASIN Core Team determined that implementation is possible on future projects and can result in improvements to asphalt production and paving operations. (Refer to [Results](#) Section, in this Report, for specific information.)

Recommendations

The PASIN Core Team, upon completion of Phase 2 PASIN pilot projects, determined the following recommendations for PASIN implementation.

Phase 3 Pilots in Calendar Year 2009

1. Conduct two (2) pilots with the following requirements:
 - ✓ *QC Based Acceptance Specification* that focuses on the contractor QC results, with Department verification (Compliant with FHWA 23 Code of Federal Regulations).
 - ✓ Linking the requirements of PASIN and a Warranty Specification.
2. Assist asphalt production and paving companies that wish to voluntarily:
 - ✓ Develop ***HMA PASIN Implementation Plan*** to include deployment of Quality Management System and Best Practices throughout their company.
 - ✓ Develop options to deploy use of the *QC Based Acceptance Specification* listed above.
3. Train PennDOT staff on the PASIN implementation process.

2010 and Beyond

Incorporate PASIN requirements for all paving projects by completing the following:

1. Developing PASIN Quality Management System *Compliance* requirements.
2. Allowing use of the *QC Based Acceptance Specification* when the contractor meets *Compliance* requirements.
3. Investigating development of a compliance tracking link to prequalification.
4. Establishing a joint PennDOT and industry management review process.

[Barriers and Action Plan](#) for overcoming the barriers for implementing *Recommendations*, are listed in the ***Phase 2 Update Section***.

PASIN PHASE 2 UPDATE

Overview

Pennsylvania ASphalt Improvement Network (PASIN) is an initiative to *develop, pilot, and implement an ISO 9000-2000 based Quality Management System (QMS) from pavement design through qualification, procurement, manufacture, delivery of materials, installation, acceptance testing, and maintenance of asphalt pavement.* **This 2008 PASIN Pilot Update Report is an addendum to the [2007 PASIN Pilot Report](#) to communicate:**

- Differences in Phase 1 pilots, completed in 2007, and Phase 2 pilots in 2008.
- Results of Phase 2 pilots.
- Provide recommendations for Phase 3 to occur in 2009.

The objective of the PASIN Phase 2 Pilot Projects was *to pilot the construction portion of the overall Asphalt Pavement Delivery Process during the 2008 construction season, with additional requirements than for 2007 projects.* PASIN initiative for 2008 was piloted in two construction projects, noted below, by including the requirements in an Item and Special Provision for *Item 9409-9999 Pilot Asphalt Quality Systems Implementation*, which required the contractors to provide a **Hot Mix Asphalt Production PASIN Implementation Plan (HMA Plan)**, including implementation of Best Practices.

Pilot Projects

The Phase 2 PASIN initiative was piloted in 2008, by the following contractors, in the following two construction projects:

3. District 3-0, ECMS 79105-Lycoming Co., SR 15-A20/A30 NB, constructed by **Glenn O. Hawbaker Inc.**,
4. District 12-0 ECMS 80092-Fayette Co. SR 21-Betterment Project, constructed by **A. Folino Construction, Inc.** with asphalt material provided by **Hanson Aggregates, Inc.**

Features of the 2008 Pilots

Phase 2 pilots contained several new features that were different from the Phase 1 pilots:

1. The PASIN Implementation Team (I-Team) developed specific forms to enable contractors to document, log, follow-up, resolve and close-out *customer complaints, corrective actions, and non-conformances.* Additionally, the I-Team provided templates for *Management Review Agendas, Minutes, Training Records, and Control of Documents and Records.* These were considered to be beneficial in implementation of Quality Management System.

2. The contractors and production facilities were asked to collect the following *Metrics*, as shown on *Chart 1-Metrics*:

CHART 1-METRICS			
Process	Metric	Data	Frequency
Production	Gradation (% variation for each aggregate)	Straight line diagram	Every 1,000 tons
	HMA temperature	Straight line diagram	Every 5th truck
	Plant shut downs	Record reason for shut down; time shut down	Each plant shut down
	Asphalt content	Compare printed tickets to plant sample	Each ticket (5 minute print for drum plant)
Paving	Mat temperature behind the paver	Straight line diagram	Contractor to define
	Stoppage of paver greater than 10 minutes	Time paver stopped and reason	Each time paver stops greater than 10 minutes
	Percent improvement of pavement ride	Calculate IRI from ride profile from existing condition to after paving	Perform ride quality IRI after concrete patching, after binder, and after wearing course.
	Tack Sample	Document test results	
	Mat Density	Impedance meter or Nuclear Gauge	Each core sent to MTD

Results

Implementing PASIN in the 2008 Pilot Projects was easier in 2008 than in 2007, as the PASIN Specification and deliverables were more clearly defined. The 2008 Orientation provided clearer guidance to enable Quality Managers to facilitate implementation, as a result of lessons learned from 2007 pilot projects. PASIN Implementation Team developed specific contractor templates, for *Management Review*, *Customer Complaints*, *Corrective and Preventive Actions*, *Control of Non-Conformances*, etc. Use of these contractor templates resulted in faster resolution of issues, while involving company senior management through Management Reviews. District 12-0 project involved a paving contracting company, with an external material supplier. This meant that each company implemented PASIN requirements, both individually, and collaboratively to ensure project success.

At times, implementing PASIN in the Pilot Projects for the contractors was difficult, particularly due to the fact that the effort was still new to the asphalt industry, and PennDOT. However, District Inspection staff, and the contractors worked closely together, with the support of PASIN Implementation Team, to facilitate implementation. The contractors developed a plan for implementing Quality Management System, and Best Practices for production and paving processes. Contractors implemented the HMA Plan, during the paving itself, and will continue to implement additional improvements, in the coming months, to benefit their companies.

Metrics were collected by the pilot contractors to help manage the plant and laydown processes. The metrics were chosen to be key process indicators that would allow the contractors to make adjustments, as necessary, during production and laydown of the HMA material. The metrics allowed the contractors to compare printed ticket, field samples and CAMMS results for asphalt content from the PennDOT Materials Testing Division. Internal and External Audits were also completed. Both contractors, more specifically, completed the following:

District 3-0 PASIN Pilot Project

1. The Quality Manager approached the development of the HMA Implementation so that it could be applied on future PASIN projects and could be implemented by any of the company's plants and paving crews. The company had an existing customer satisfaction system that was incorporated into their HMA Implementation Plan.
2. The contractor's computer system allowed the Quality Manager to manage the PASIN pilot project documents and provide access to project personnel connected to the computer network.
3. The paving crew submitted a customer complaint to address a compaction issue in the field. They developed a corrective action plan, identified the root cause, and logged the resolution and closure. The Quality Manager directed the plant to treat any QC results requiring action as a non-conformance. As a result, the plant recorded corrective actions, recorded the resolution, and provided verification of closure of the issue. These corrective actions were also discussed at the Management Review Team meetings.
4. The Quality Manager created data collection forms and charts to diagram metrics containing numerical data. The metrics showed that the HMA material was within allowable tolerances during the production and laydown processes. The HMA temperatures taken at the plant and in the field were within allowable tolerances. The density between the nuclear gauge, contractor samples, and the acceptance samples tested by PennDOT were also within allowable tolerances. The IRI metric showed consistent improvement in ride quality over each course of paving, as well as the level of improvement with respect to the initial pavement condition.

District 12-0 Pilot Project

1. District 12-0 project included two companies working collaboratively to implement PASIN, with *A. Folino Construction* as the contractor and *Hanson Aggregates, Inc.* as the supplier of the asphalt material. Essentially, both companies developed and implemented an **HMA Implementation Plan** for their respective companies and also in collaboration with each other to serve PennDOT as the customer.
2. Both companies appointed a Quality Manager for the project; however, A. Folino Construction's Quality Manager (QM) served as the main QM for the project, which the District Construction staff stated was a benefit to have one point-of-contact.
3. Both companies completed the Quality Management System requirements of conducting Management Review Meetings, documenting and resolving customer complaints, corrective actions, etc. Management Review Team discussed issues that arose, to ensure resolution, in a timely manner. District Construction staff indicated that this portion of the PASIN implementation process was particularly effective.

4. A. Folino Construction documented the *Laydown Metrics* and Hanson Aggregates, Inc. documented the *Production Metrics*. Opportunities for improving the process, based on metrics' results, are being analyzed.
5. A. Folino Construction streamlined reports to remove redundancy of reporting corrective actions, customer complaints, etc.
6. A. Folino Construction stated that the increased focus on customer service was helpful.
7. District Construction Staff worked closely with the Contractor, and the PASIN Implementation Team to ensure that PASIN requirements were satisfactorily completed.
8. District Construction Staff stated that it would have been beneficial to apply the PASIN Special Provision to the entire project.

Both Projects

The District 3-0 and District 12-0 projects both accomplished the following:

1. Developed HMA Production and Paving Plan (HMA Plan), and submitted for review and approval, prior to commencing paving operations. PASIN Steering Team reviewed and approved HMA Plan.
2. Assigned *responsibility* for ensuring that the [Plant Best Practices](#) (74, in total) and [Field Best Practices](#) (42, in total) were implemented, as appropriate. Also provided timeframe for completion of these Plant and Field Best Practices.
3. The contractors conducted an internal implementation training session which provided an overview of the internal audit team responsibilities, the responsibilities that members of the paving crew and plant operation will have during the pilot with respect to recording best practices, metrics, and non-conformances during the paving operation, and the logistics for collecting the quality records from the field and at the plant.
4. Developed Internal Audit Plan and identified internal auditors with plant, paving, and management expertise. Conducted internal audits, upon receiving internal audit training from PASIN Implementation Resource Team and may continue, in some cases.
5. PASIN External Auditors completed external audits of both projects and have concluded that PASIN requirements were implemented effectively, in most cases, and have identified both *points of pride* and *areas of improvement*.

Overall, implementation of the PASIN requirements in Districts 3-0 and 12-0, in 2008, was considered successful in piloting the PASIN effort. The PASIN Core Team determined that implementation is possible on future projects and can result in improvements to asphalt production and paving operations.

Recommendations

The PASIN Core Team, upon completion of Phase 2 PASIN pilot projects in 2008, determined the following recommendations for PASIN implementation, as shown on *Chart 2- PASIN Implementation Recommendations*.

CHART 2-PASIN IMPLEMENTATION RECOMMENDATIONS		
Calendar Year	Recommendation	Requirements
2009	<p><u>Phase 3 Pilots</u></p> <p>1. Conduct two (2) pilots with the following requirements:</p> <ul style="list-style-type: none"> ✓ <i>QC Based Acceptance Specification</i> ✓ <i>Linking the requirements of PASIN and a Warranty Specification</i> 	<ul style="list-style-type: none"> ➤ Obtain <i>QC Based Acceptance Specification</i>, approved by FHWA. ➤ Obtain approved <i>Warranty Specification</i>. ➤ Continue to provide support to contractors by the PASIN Implementation Resource Team.
	<p>2. Assist asphalt production and paving companies to voluntarily:</p> <ul style="list-style-type: none"> ✓ Develop <i>HMA PASIN Implementation Plan</i> to include deployment of Quality Management System and Best Practices, throughout the company. ✓ Develop options to deploy use of the <i>QC Based Acceptance Specification</i> listed above, which is, <i>acceptance based on contractor quality control testing</i>. This means adopting an acceptance plan that conforms to the 23 Code of Federal Regulations and allows for using the contractor QC data in the acceptance decision. 	<ul style="list-style-type: none"> ➤ Develop, facilitate and support development of <i>HMA Plan</i>.
	<p>3. Train PennDOT staff on the PASIN implementation process.</p>	<ul style="list-style-type: none"> ➤ Develop roles and responsibilities for PennDOT staff. ➤ Develop training to enable District staff to ensure successful PASIN implementation.

CHART 2-PASIN IMPLEMENTATION RECOMMENDATIONS

Calendar Year	Recommendation	Requirements
	4. Provide additional information and description for all items listed in the HMA PASIN Implementation Plan.	<ul style="list-style-type: none"> ➤ Revise HMA PASIN Implementation Plan to include complete description of all items.
2010 and Beyond	1. Incorporate PASIN requirements for all paving projects.	<ul style="list-style-type: none"> ➤ Develop PASIN Quality Management System <i>Compliance</i> requirements. ➤ Allow use of the <i>QC Based Acceptance Specification</i> when the contractor meets <i>Compliance</i> requirements. ➤ Investigate developing a compliance tracking link to prequalification. ➤ Establish a joint PennDOT and industry management review process.

Barriers and Action Plan

The following are barriers to implementing the Recommendations previously stated and action plan to overcome these barriers. The PASIN core Team, which meets approximately every six weeks, will continue to identify barriers and accomplish action plans to overcome barriers.

1. Lack of obtaining *QC Based Acceptance Specification*, in a timely manner. *Action Plan:* PASIN Core Implementation Team will work closely with Bureau of Construction and Materials to obtain the *QC Based Acceptance Specification* approval and incorporate the specification in a pilot project for 2009.
2. PASIN roles for department staff not fully defined and will require a culture shift from present practices. *Action Plan:* PASIN Core Implementation Team will provide information and work closely with district inspection staff and BOCM, throughout the pilot projects, to build support and ensure success.