



5th Atlantic Alliance Symposium

Safe Asphalt Plant Design With Gil Morgan



Overview

- Safety in General
 - Objectives, Obstacles and Opportunities
 - Methods and Mindsets
 - Facing The Challenge
- Safe Asphalt Plant Design
 - Make Safety a Core Value
 - Increase Awareness of Danger
 - Recognize Opportunities to Improve Safety
- Safety Beyond Design
 - Education and Training Are Not Optional
 - Internalize a Safety Mindset and Pass It On
 - Seek Opportunities to Influence Others for Safety





Objectives of Safety

- Safety As an Ideal
 - Has a Cultural Basis
 - Is a Shared Concern
 - Has Many Levels of Implementation





Obstacles to Safety

- Safety Reduced to Perception
 - Decline in Safety Awareness
 - Unspecified Responsibility
 - Lack of Implementation





Opportunities for Safety

- Safety as a Paradigm
 - Building Cultural Adoption
 - Defining Responsibility
 - Programmed Implementation





A Comprehensive Approach

- Embrace The Safety Culture
- Design Safety Into The Product
- Engage Customers and Users
- Exert Influence to Promote
The Safety Culture



Emphasis On Safety



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The Difficulty With Danger

- Danger Can Be Difficult to Recognize
 - Warnings and Labels Inform of Danger
- Danger Can Be Exposed Suddenly
 - Guards Prevent Exposure to Danger
- Danger Can Be Difficult to Eliminate
 - Training and Restricted Access Can Reduce Exposure to Danger



Are Asphalt Plants Safe??



MUTIPLE SILO SYSTEM



Would More
Warning Labels
Make It Safer?



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Imagine a Beautiful Summer Day...
110 Degrees in Houston Texas and
You Have to Wear All of *This* Just to
Look Inside an Electrical Panel.

- PPE Is Necessary to Protect From Specific Known Hazards and Conditions.
- Safety Rules Can Create Real Danger If They Only Address a Hazard and Ignore The Consequences of Implementing.





Options:

- Lighting
- Stair To Drag Head

Standard Features:

- Stair To Silo Top
- Stair To Elevator Head
- Enclosed Stairs In Tower

Enhanced Safety Is Sometimes Optional



Safety Measures

- Guards and Shields
 - Prevent Exposure to Specific Dangers
- Warning Labels and Locks
 - Inform and Warn of Specific Dangers
- Training and Personal Protective Equipment
 - Reduces Injury From Exposure to Specific Dangers
- Designing Out Danger
 - Eliminates or Reduces Exposure to Specific Dangers
- Restricting Access
 - Limits Exposure to Potential Dangers



Enclosed Batcher Safety Features



- Top Gate, Automatic Greasing
- Bottom Gate Enclosed



Mixing Chamber Safety Features



- Large Door for Convenient Access
- Hydraulic Rams and Safety Braces



Portable Design Safety Features



- Pre-mounted Stair Folds for Transport
- Reduced Risk of Damage to Guardrails
- Safety Benefit – No Loose Components to Handle





Portable Erection Safety Features



- Self-erecting Duct and Conveyors
- Eliminate Crane and Rigging Hazards



Portable Equipment Safety Features



- Cable & Harness Safety System
- Eliminates Risk of Lost or Damaged Safety Cages



Self Erection Safety Features



- Hydraulic Self-erecting
- Setup Is Fast and Easy
- Reduces Risk In Frequent Plant Take-down and Setup





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Safety by Innovation

- Apply Existing Technology
 - Electric Heat Blankets Replace Hot Oil
- Acquire Improved Technology
 - Tandem Solenoid Valve Provides Automatic Safety
- Use Emerging Technology
 - Intelligent Controllers Provide Enhanced Safety
- Promote Advanced Designs
 - Reduced Maintenance Brings Reduced Exposure to Injury





Improved Liner Materials

- Increased Wear-life
- Reduced Maintenance
- Reduced Exposure to Danger



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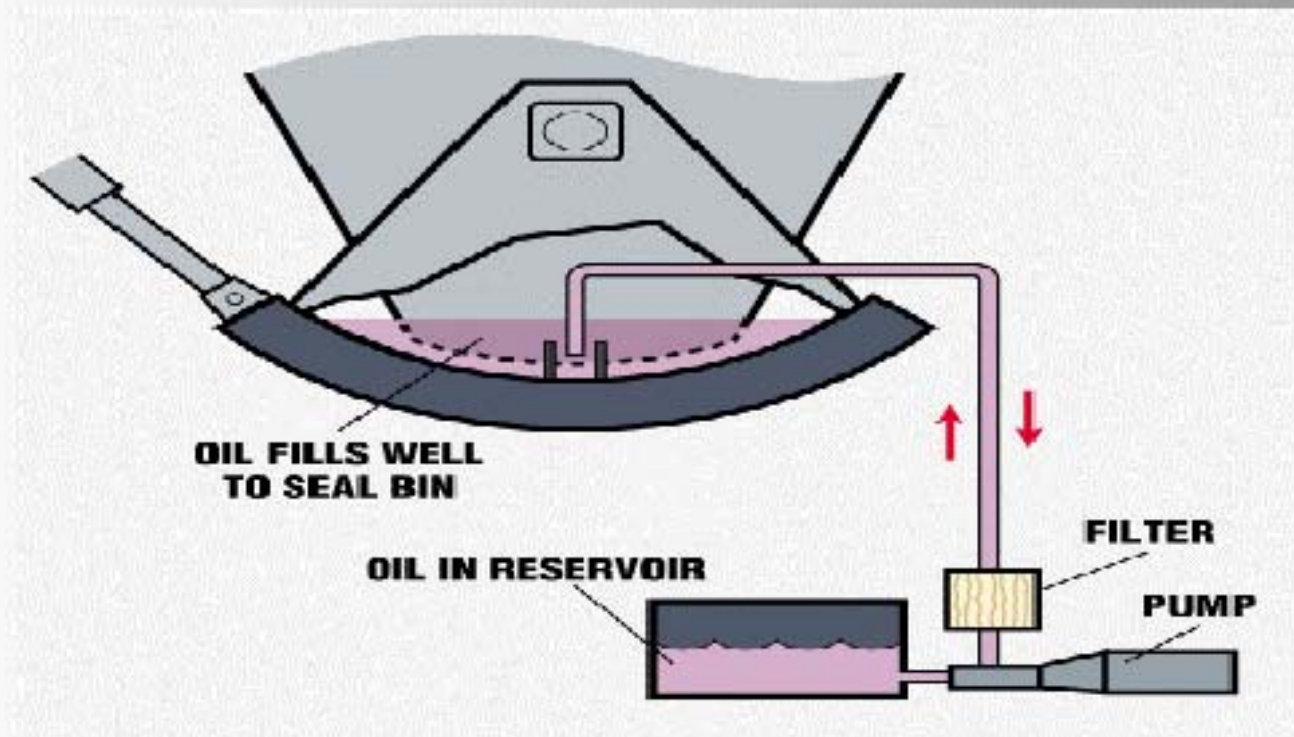


Clearing a Plugged Silo Discharge Gate Opening

- Worker Exposed to Hot Material
- Damage to Ceramic Liner Tiles Is Likely
- Plant Production Delayed



Oil Seal Gate at Storage Silo Bottom Discharge



- Designed to Protect The Product (HMA)
- Reduces Plugging in Discharge
- Reduces Worker Exposure to Danger



Electrical Safety Features



- Warning Labels to Meet Local Codes
- External Controller Mounting for Safe Access



Electrical Safety



- Some Work Cannot Be Made Safe With Today's Technology
- Restricted Access Can Only Protect Unauthorized Persons
- Training and Personal Protective Equipment (PPE) Are Best Option



Electrical Safety Features



- Intelligent Controllers Enhance Plant Safety
- Overload Protection and Event Data Logging
- Monitors Electric Current and Enables Remote Troubleshooting



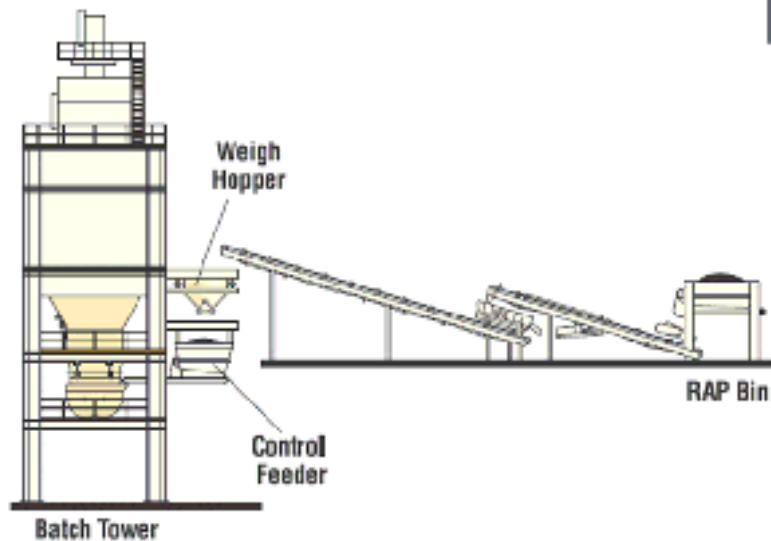
Control Safety Features



- Virtual Controllers Replace Switches, Wires and Relays
- Programmable Circuit Control and Safety Interlocks
- Visual Object Based Indicators and Status Confirmation



Batch Plant Process Safety by Design



RAP Delivery System for Batch Plants



- Early Designs Dumped RAP Suddenly Into Superheated Batch Mixer
- Sudden Release of Steam Was Often Described As An Explosion
- New Design Gradually Introduces RAP Into Mixer to Achieve a Gradual Release of Steam Using a Conventional Scavenge System



Automatic Sample Collection

ACCU-SWIPE™

AUTOMATIC BELT SWEEPER



REST POSITION TO
OPERATING POSITION

OPERATING POSITION TO
SWIPE POSITION

SWIPE POSITION TO
RETRACT POSITION

RETRACT POSITION TO
REST POSITION

The Accu-Swipe by Astec lets you take a full cross-sectional sample of aggregate from the conveyor belt without having to stop the belt. The Accu-Swipe makes it unnecessary to do a test procedure to correct incorrect swirl. It follows the patented procedure for test sampling.

The Accu-Swipe can be installed to virtually any conveyor and is able to sample the cross-sectional portion of the aggregate from the moving conveyor belt in both directions.

In combination with an Astec® Classifier (the ACCU), the sample can be tested directly from the belt. In the ACCU, the cross-sectional sample is the operating size and the material in which samples are taken and tested. This automatic system gives you real time quality control of your aggregate.

The pneumatically operated Accu-Swipe can be run manually or fully automatic. It runs on 110 volt, single phase current.

THE ACCU-SWIPE INCLUDES

- BASE MACHINE
- HOIST / CHUTE SYSTEM
- CONTOUR SUPPORT TOLERS AT POINT OF SWEEP
- OPERATING SENSORS AND JUNCTION BOX (NEMA 4X)



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- Remote Control Option
- Safer For Workers Without The Need To Stop Production



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Pollution Control Systems




- Blue Smoke Emissions Tunnel Capture System
- Highly Effective Collector – Not Popular With Truck Drivers

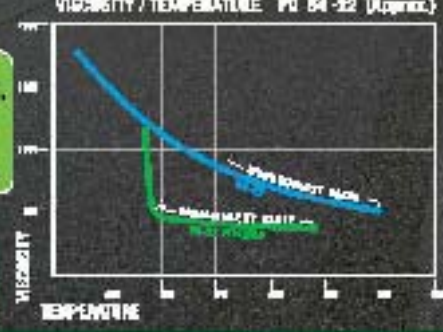


Pollution Control Innovation

Actual mix being Double Barrel® Green system
used for road paving on a job site.
Note: For more information on the Double Barrel®
Green system.



VELOCITY / TEMPERATURE PD 84-32 (Approx.)




At the same time, the Double Barrel® Green system allows for the use of warm mix technology. This is a key benefit of the Double Barrel® Green system.

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WAVE MAINTENANCE
Though the water is used, it is never absorbed into the mix. It is only used to lubricate the rollers and to keep the rollers from getting too hot. The water is also used to keep the rollers from getting too hot. The water is also used to keep the rollers from getting too hot.



A key benefit of the new Astec Double Barrel® Green system is the substantial absence of smoke emissions during paving and loadout.



Standard HMA Mix

Green System Mix

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- Warm Mix Technology – Water Is The Only Additive
- Lower Mix Temperature Improves Worker Safety For Paving Crew



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Safety Encouraged Through Education

ASTEC SCHOOLS



More than 400 HMA professionals attended the five sessions of the 2008 Astec Advanced Customer Schools.

plant manager for Biggs Materials, Inc. in Monroe, North Carolina. "As a guy that has, I'd have to say, Astec schools, I learn so nothing every time. They really do help a lot."

A quick look at the structure of the schools. Each year, Astec usually conducts four different "day-day" schools. Most of the students who attend the schools are employees of HMA producers who own and operate Astec equipment. During the schools, the students have the

opportunity to work directly with instructors from Astec and HMA, getting first-hand knowledge about the latest advances in HMA technology, as well as hands-on experience with the equipment.

William Butler, plant supervisor for H. D. Weaver & Sons, Inc. in Noble, Missouri, was obviously impressed with the school he attended. "The hands-on training was just fabulous," he said. "This was my eighth school at Astec and it was the best one that Astec has put on."

John Carley, superintendent at Biggs Materials, agreed with the value of hands-on training. "It was very educational," Carley said. "I really believe you could actually teach something. This came best just sitting in a hall and listening to lectures all day long."

Melvin Speckel, "I think it's great the way they are handling it in four different sections. It's a lot more one-on-one—and I like that a lot better, believe me."

Although the content of each school varies slightly, the emphasis is on providing the students with actual tips and techniques for troubleshooting HMA plant problems so that they can minimize potential downtime.

In most classes, an emphasis is made on outlining the technology



Left—Lectures and seminars are often conducted in the large auditorium of the Astec Training Center. It is equipped with comfortable student seating and the latest audio-visual equipment.

Below Left—Hands-on experience is provided by actually working with Astec components and equipment. Here, the students are learning some valuable techniques for conveyor alignment.

Below—The quality of the production equipment is evident in the large 300-ton roller shown. Astec has constructed some models of some components built in the training process.



of informative topics. Most of the returning students were in agreement that the 2008 Advanced Customer Schools were the best ever. The specific topics were selected to cover the principal components of an Astec HMA facility. For example,

One class addressed pile, cone, and drag maintenance. Another focused on train-on-adjustment and realignment. Another class provided a step-by-step of how to use and the function of environmental controls. And still another had tips for operating, troubleshooting, and adjusting belts and wedge troughs.

Because everyone has different training needs, Astec also gives students the opportunity to choose which of the areas they would like

"The new training facility was great. It's hard to believe that Astec would spend that amount of money to train guys from the outside..."

to learn more about during the two days of the school. This year, there were more than a 300-ton crusher, taking more snapshots relative to the roller, filling in rolling to radio-frequency indicators to the microscope and more.

Butler had the words from his school about the years ago about

"The training lab you pick up so much more when you're doing it all hands-on. For example, we have a portable plant and I have probably moved it 15 or 20 times. But when it comes to adjusting

the materials, always have this mental block. All I have had in the past is what I read in the book, but believe me, it is a lot easier to understand a procedure when you have someone from Astec standing right beside you saying, "This is how you do it." It worked. After the class this year, I had a very good understanding about roller levels."

Start thinking about attending next year's school. Planning is already underway for Astec's 2009 Advanced Customer Schools. If you want to receive information about the schools, you can check www.astecschools.com from time to time for details. Or you can just contact Linda Sims in the Astec Service Department in Chattanooga, Tennessee. Her contact information is in the box on this page. ▼▲▼

FOR MORE INFORMATION
about Astec's customer service schools, call Linda Sims at Astec:
423-867-3754
Fax: 423-867-6763 • E-mail: astecschools@astec.com





Safety Tips

- Follow Lockout / Tagout Procedures
 - Keep The Key With You
- Stored Energy May Still Be Present
 - Verify That Potential Energy Has Been Neutralized
- Protect Yourself From Burns, Falls, Cuts & Strains
- Avoid Pinch / Crush Points and Entrapment
- Follow Confined Space Procedures
 - Pre-plan Entry and Escape From Dangerous Spaces
 - Don't Perform Dangerous Work Alone
 - Maintain Communication With Coworkers
- Use Common Sense
 - Avoid Rushing and Risky Situations



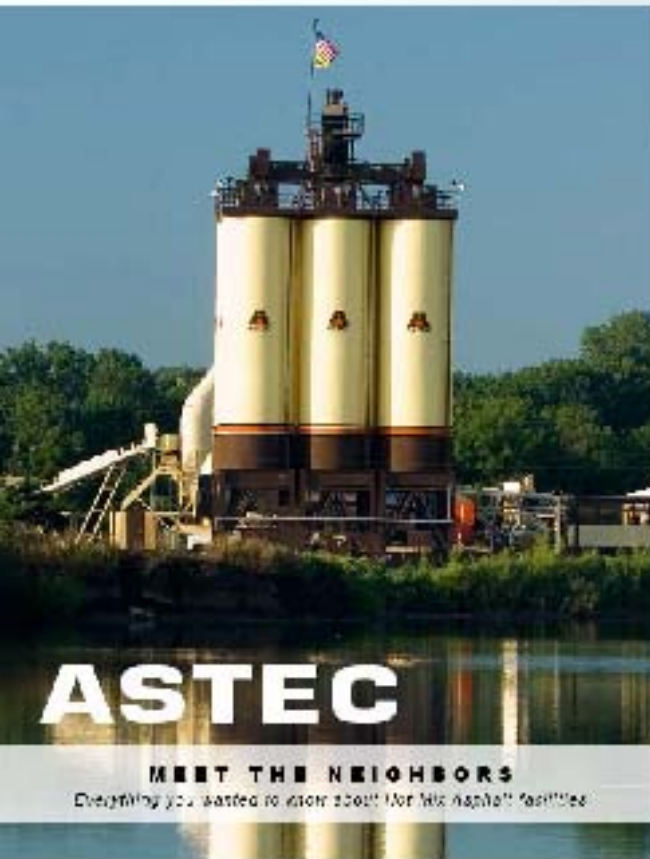


Maintenance Tips

- Oil Seal System Tips
 - Reservoir Filling With Pump Instead of Carrying a 5-gallon Bucket up a Ladder
- Inspection and Repair Tips
 - Fill Silo With Cold Rock to Provide a Stable Work Platform for Batcher Inspection
- Silo Cleaning Tip
 - Run Cold Dry Stone Through Silo to Clean Inside Walls and Cone Before Inspection & Repairs



Public Relations Is Another Opportunity To Develop The Safety Culture



HOW IS HOT MIX ASPHALT (HMA) MADE?

Aggregate is divided and placed into bins according to size. Depending on the mixture of aggregate called for, the bins automatically meter out the right amount of each size needed onto a conveyor belt. The belt deposits the aggregate into a rotary dryer. This machine tumbles the aggregate through hot air to dry it thoroughly. A fuel burner is located at one end of the drum to provide a flame for heat. It is necessary to remove the moisture from the aggregate so the asphalt cement will stick to the rock. Remember, water and asphalt do not mix. After drying, the aggregate is sent to a mixing device where it is coated with heated asphalt cement and thoroughly mixed.

HOW MANY ASPHALT FACILITIES ARE THERE IN THE UNITED STATES?

According to the EPA estimates, there are approximately 3,600 operating Hot Mix facilities throughout the country.

WHY ARE SO MANY FACILITIES NEEDED?

Considering how large the United States is, there really are not a lot of facilities. This amounts to only one facility for every 983 square miles. Approximately ninety four percent of the roads in the U.S. are paved with hot mix asphalt. Road maintenance and construction projects require over 550 million tons of hot mix asphalt each year. Hot mix must be used quickly after being loaded into the haul truck because it hardens as it cools. Cooling occurs during transport from the facility to the paving site. The haul distance needs to be as short as possible to minimize the amount of heat lost during transport because only "hot" hot mix asphalt can be worked (laid down by a paving machine and compacted by rollers). In addition, trucking is a large part of road maintenance and construction costs. Minimizing haul distances will result in lower road paving costs.





Summary

- Safety Can Be a Cooperative Effort Between Manufacturers, Owners and Users
- Buyer Should Consider Safety Benefit As Part of Value in The Cost of Optional Features
- Safety Must Be Implemented On Many Levels To Be Effective
- New Designs Should Incorporate Proven Advances in Safety Technology
- Safety Must Be Deliberately Integrated Into The Design Process





Where to Get More Information

Technical Papers and Product
Information Are Available Online at
Www.Astecinc.Com

Thank You!

