



**ASPHALT**  
CONTRACTOR™

# Comprehensive Guide to Asphalt Plant Technology

From increasing efficiencies to lowering carbon footprints, innovations are available to help mix producers meet their goals

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Cover Photo Credit: Ammann Asphalt Plants | Top Photo Credit: ADM

## Retrofits Can:

- ▶ Improve Plant Efficiency
- ▶ Apply New Solutions
- ▶ Modernize Production Capabilities



Photo Credit: Astec

Implementing technology at your asphalt plant is really no longer an option, but a necessity to keep your operations running smoothly and your customers happy. From the demands of producing a quality mix to the ever-growing desire for sustainability, asphalt plants need to have every tool at their disposal to reduce costs and grow profits.

### Retrofits Improve Efficiency & Profitability

Making changes to your asphalt plant can be costly, but producers can ease into improvements with retrofit applications. In short, retrofitting means to add new technology or features to old systems. With this process, you can benefit from new technologies with lower costs, optimize your plants, help recycling and, finally, adapt your plant for new products.

#### Most Demanded Retrofitting

- Hardware and software updating
- New bag filter
- New and exclusive dryer models
- Modern solutions for warm-mix asphalt production
- New fuel types for modern burners
- Renewal of mixing towers

- Increasing the capacity of goods silo
- Applying new solutions (warm, cold, and hot recycling systems mentioned above)

The Astec Versa Jet burner was designed specifically for retrofit applications. The adaptable design is compatible with virtually all drum designs without complicated drum modifications. The versatile platform has the capacity to fire at a range of rates and can be easily configured to meet production needs.

The unique platform of the Astec Versa Jet burner permits quick delivery and setup. Minimizing downtime maximizes profitability and the streamlined design of the Versa Jet burner ensures that these burners are ready to ship to your site quickly and can be installed with minimal modifications needed.

Retrofits come in many shapes and sizes and can immediately help improve operations at your plant. Let's look at plant control upgrades next.

### Automation & Total System Controls

Since plant control systems were introduced nearly two decades ago, their use has evolved drastically. What they were mainly designed for however, to improve plant operations and efficiencies, has remained constant.

Automation controls give producers complete control over their plant. Motor control, flows, temperatures, sensors and all other components of the plant are monitored, controlled, trended and alarmed to individual needs.

For example, the Command Alkon PlantWise system is highly configurable and allows users the ability to design custom software switches, create reports and adapt to the current and future plant control requirements.

As electronics and computers are more and more reliable, the downside effect of more sensors and other systems having an adverse effect on overall reliability is not an issue anymore. This

means automation can help plant owners avoid any unforeseen errors that tend to occur with a complex system like an asphalt plant, preventing downtime and lost production capacity.

make start ups easier. They are also ideal for easily switching between different mixes as the all-electric controls open valves as needed when you switch the mix over.

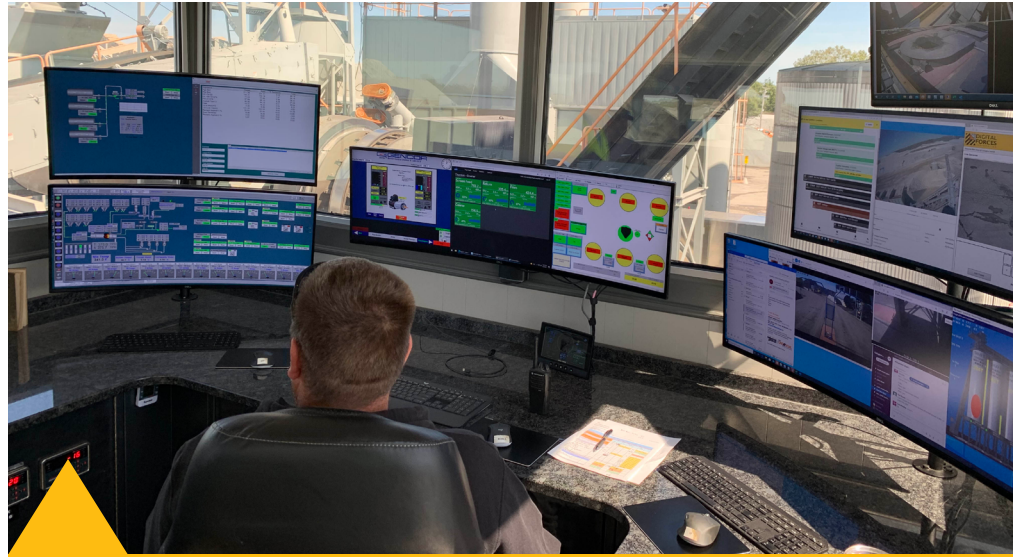
operators. The layout of information allows for a quick understanding of the overall working system. Delays and timing, for example, are displayed over a graphic representation of material flow and plant layout. These types of details help to prevent errors and misinterpretation.

## Data Drives Adoption

The requirements for meeting mix specifications and government benchmarks have become more stringent in the last decade as quality can be measured immediately during the paving process. While automation has already significantly improved plant efficiencies, increased regulatory initiatives are really what will drive the technology adoption as plant owners are being tasked with creating higher quality mixes.

As we get faster feedback on the quality of the mix through technology on the jobsite, the product going out the door needs to be on target and automation is critical to delivering consistent mix quality. Through automation, you can virtually guarantee achieving pay factor bonuses by knowing exactly what is going into your mix and at what rates.

Automation systems monitor and pilot the process of making asphalt to make sure it is as good as expected. If the raw material is good and if the process is good, the result will be good. By qualifying the process rather than waiting for sample analysis, a good automation system can detect faulty conditions and prevent the waste of hundreds



Automation can increase plant performance, control maintenance needs and deliver more consistent mix.

Systems control centers like these are designed specifically for the asphalt industry with an emphasis on rugged construction, operator comfort and logical integration of the plant controls. These systems run and monitor all plant functions from a standard PC, including blending operations, plant motors, motor currents, mix and plant temperatures, material inventory, silo levels, energy usage, alarm status and more.

The WEM Total Systems Control provides advanced yet easy to use systems for batch plants, drum plants, silo loadout, full plant control and data management. WEM also offers complete control houses and motor control centers. These systems are customizable to meet the needs of each plant and can

These automation systems are always “watching” the plant, alarming the operator of potential issues before they become full-scale problems. Automation can track things like the run-time of each piece of equipment and alert the operator when preventative maintenance is due. By proactively maintaining the equipment (rather than waiting for it to fail), plant downtime is greatly minimized. The extensive use of graphics and total controls are also a key component to the success of these systems, as the human brain can process information from a dynamic picture much faster than assimilating numbers.

The MINDS, Inc. DrumTronic interface was thoroughly designed in collaboration with actual

of out of spec tons of asphalt. Systems will even execute a plant shutdown based upon the complexity of the out-of-tolerance condition.

For example, Stansteel's NiteOwl Advantage Plant Alert System allows the plant operator to call and check on the liquid circulating oil temperature and make sure their asphalt cement is still hot. Another advantage is that the alert system also monitors other critical items affecting the plant, such as power outages due to lightning strikes or the need for the unit to be reset.

### Growing Green Capabilities

The latest innovations in asphalt plant automation listed above can be directly attributed to the demand for more mixes using more

types of ingredients that need to be carefully blended together in the process. Not only do producers have the stress of creating a quality mix, they are also being asked to push the envelope on warm mix asphalt (WMA) and recycled asphalt pavement (RAP) mix designs.

The use of WMA reduces paving costs, extends the paving season, improves asphalt compaction, allows asphalt mix to be hauled longer distances at lower transportation costs and improves working conditions by reducing exposure to fuel emissions, fumes and odors. Various technologies are available that allow producers to lower mix temperatures some 30°F to 120°F lower than for traditional HMA. In addition, less energy used during WMA manufacturing typically reduces fuel consumption by 20%. Astec's second generation Double

Barrel Green System provides users several benefits: simpler control—all valves open at the same time; minimal hot oil jacket—one-third the size of the original; and no asphalt cement foaming valves to maintain.

Astec's Green Pak System expands the benefits of the Double Barrel Green warm mix system to any asphalt plant owner or operator. The Green Pak warm mix system can be retrofitted to continuous mix or batch plants from any manufacturer. The Green Pak System allows a plant operator to decrease fuel consumption 14 percent by decreasing the mix temperature by 50 degrees. Green Pak also eliminates smoke and fumes, increases production, and allows the operator to run higher percentages of RAP.

Stansteel produces the Accu-Shear™ Dual Warm Mix Additive System. The Accu-Shear is a warm mix system that has a turbulent shear process to force the liquids together. It offers the advantages of accurately injecting water, other liquid additives or a combination of these. To maintain the integrity of warm mix on batch plants, Stansteel also produces the Accu-ShearB. This unit is custom engineered for each facility and its configuration is based on the ton-per-hour rate and the cycle time. A provision for operating without processing warm mix is included.

Aftermarket WMA solutions have been growing in popularity. Reliable Asphalt produces and installs AquaFoam, a cost effective water injection asphalt foaming system

### New Technology Can:

- ▶ Decrease Fuel Consumption
- ▶ Help Increase WMA & RAP Capabilities
- ▶ Improve Operator Safety



Photo Credit: Stansteel

used in the making of warm mix asphalt. AquaFoam lowers fuel costs, reduces smoke, fumes and emissions and increases the plants ability to run RAP.

At the heart of the AquaFoam system is a hydro-dynamically engineered injection accelerator. The AquaFoam pump skid consists of a positive displacement pump, controlled by a Variable Frequency Drive (VFD). One of the available choices of control systems to fit the need of each plant begins with an on-skid control. This essentially allows the manual setting of the VFD for precise water amounts, to a completely self-contained stand-alone computer-controlled system to allow fingertip control from the plant control-house.

Maxam's AQUABLACK WMA System retrofits any asphalt plant quickly and easily. With AQUABLACK the operator can run more RAP and stay within the temperature limits of the baghouse. AQUABLACK lowers fuel consumption as much as 15 percent.

Lower fuel consumption translates directly into lower emission of greenhouse gasses at the plant and reduces or eliminates fumes and smoke at the plant load-out and at the laydown site.

### Recycle, Reduce, Reuse - with Technology to Help

The asphalt industry remains the country's most diligent recycler with more than 94 percent of asphalt mixture reclaimed from old asphalt pavements being put back into new pavements and the remaining 6 percent being used in other civil



engineering applications, according to a survey by the National Asphalt Pavement Association (NAPA) and Federal Highway Administration (FHWA).

RAP used in asphalt mixtures totaled an estimated 89.2 million tons in 2019, with 97.7% of survey respondents reporting use of RAP. Reclaimed material for future use saved an estimated 58.9 million cubic yards of landfill space and more than \$5.3 billion in landfill disposal gate fees.

Pavement mixes in the U.S. generally use plus or minus 20% RAP, but plants and producers continue to work on methods that make it feasible to go well beyond that level. To that end, some asphalt plants are providing mixes using 65% and higher levels of RAP content for select applications.

Ammann offers both batch and continuous plants to meet the needs of individual asphalt producers and contractors. Among key RAP mix technologies is the ABP 240-400 HRT plant, specifically designed to incorporate large percentages of RAP.

The ABP HRT's entire recycling system is arranged vertically, in

direct line above the mixer. This allows materials to be dropped instead of conveyed, which minimizes wear and optimizes transport of the hot RAP. The HRT approach also means that there is enough room in the plant's tower for additive feed components and for carrying out inspection and maintenance work.

In addition, Ammann's ACP 300 ContiHRT Asphalt-Mixing Plant with a continuous production capacity of 330 tons per hour, is capable of producing mix consisting of more than 60% RAP. The continuous plant, introduced to the market in late 2019, meets stringent emissions guidelines while maximizing RAP utilization.

Other recycling technology designed to incorporate higher amounts of RAP in asphalt mixes include Ammann's RAH100 counter-flow dryer to mix up to 100% RAP, its RAH60 parallel flow dryer to handle up to 60% hot recycled materials and the RAH50 middle-ring dryer incorporating up to 40% recycled materials.

Its continuous-mix plants include portable, relocatable or stationary versions, while some batch plants are offered for the export market

and select domestic applications. The stationary Recycle Batch Plants can process recycle percentages from 0% to 40% and switch from recycle mixes to virgin mixes without emptying the hot bins.

The Asphalt Drum Mixers (ADM) RAP Recycle System allows your operation to produce hot-mix asphalt with as much as 50% recycled material. The company provides customizable capacity options for the system and it's available in various portable and relocatable configurations, designed to tackle the many mix specifications asphalt producers have to handle.

Astec Industries has been on a mission to increase RAP in mix and offers producers and contractors a variety of stationary and relocatable options to meet individual needs.

Its Double Barrel X drum mixer system, capable of achieving high recycling percentages, separates the drying and mixing processes and enables a plant to process warm and hot asphalt mixes up to 50% RAP content.

For even higher RAP quality mixes, Astec markets a Double Barrel XHR system capable of running mix up to 65% RAP, according to the company. With stainless-steel drum and combustion flights, it features an outer chamber on the drum, an external mixer and the company's V-PAC stack temperature control system for lower exhaust temperatures when running high RAP content.

Meanwhile, its BG 1800 batch plant

series introduced in 2019 is capable (with additional drum options) of producing up to 70% RAP and its modular design can accommodate upgrades as plant operations grow. Customizable to meet local requirements, the BG 1800 plant delivers 120 tons per hour when handling feed materials with up to 3% moisture content. The plant's mixer has a capacity of 1,800 kg and can take up to 2/5 of RAP.

Astec says RAP can be incorporated into a mix in the BG Series plant by way of the dryer drum or through the mixer unit. RAP is added to the aggregate in the drum through a RAP collar. Via the mixer, RAP is fed into a surge hopper on the batching tower.

CMI introduced the E3 RAP Star in 2017. The plant's combination of early heating and blending of RAP with pre-heated virgin aggregate in the outer shell and introduction of super-heated aggregate into the final mixing section, provides the ultimate in counterflow drying technology resulting in enhanced fuel efficiency and lower emissions.

This CMI early entry RAP design and unique material flow through the industry's longest mixing and blending zone enables the drum

to produce premium mix quality with high RAP percentages and substantial fuel savings.

Stansteel's RAP Eater Drum is another tool that allows for the use of high recycled material. The RAP Eater allows for both RAP and recycled asphalt shingles (RAS) to be brought to temperature in two ways.

1. The hot aggregate heats RAP and RAS by convection in the outer RAP shell.
2. RAP and RAS are heated in the outer RAP shell by radiant heat from the burner through stainless steel panels mounted on the main drum shell in the combustion zone of the drum mixer.

The demand for mixes with increased RAP content will continue to rise and contractors need to consider purchasing a plant with these capabilities or adapting their current set up to do so.

No matter where you're at with technology adoption at your asphalt plant, it's never too late to start and there's never a step too small to take. Manufacturers are available to help and will work with your plant to make the upgrades you need to compete.

Photo Credit: Astec





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