

## **STANSTEEL®: THE GREENING OF HOTMIX (AND WARM MIX) ASPHALT PLANTS**

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Over the last few years, there have been some significant changes in the hotmix asphalt plant facilities which have made a major impact on the greening of the asphalt industry as a whole. The beauty of many of these changes is two-fold. Not only do they show the tendency of the industry to become more and more environmentally conscious and earth-friendly, but, also, in many cases, they have proved to be economically smart and with efficiency benefits for the hotmix asphalt facility. Best of both worlds, we might say.

This is truly an arrangement for the individual companies and industry to make significant contributions and often with minimal investment. The industry has long been recognized as the No. 1 recycling industry in North America especially from the standpoint of tonnage. Recent reports show that there are as much as 100 millions tons of recycle asphalt products that are recovered and reused every year.

In looking at evaluating how hotmix asphalt contractors and producers can implement their green and environmental plans, Stansteel® has developed an entire array of products under the broad banner of the Stansteel® Greenline™. These products can generally be broken into three categories. The first category is Add-On Products and Accessories that can improve virtually any facility without major modification of the process or reconstruction of the facility changing it into a more recent design.

The second major category is the Modification/Enhancement of Existing Facilities so that they can process higher percentages of recycle or lower their temperature of processing or modify from a one type process such as batching to a combination of batching and continuous drum processing thereby reaping the benefits of both.

The third major category is Installation of New Facilities or Partial Facilities that significantly change the production process or add a new step in technology development such as going to a

counterflow drying and mixing process or adding a system to process shingles which have a high liquid A.C. content.

Let's examine each of these in more detail.

**Stansteel® specialty products developed to add on to existing facilities or incorporate in new plants.**

One of the products achieving a very significant impact in the industry and garnering a great deal of press coverage is the entire warm mix and/or modified liquid A.C. process. There are basic ways of going to a warm mix process through the use of warm mix foaming that utilizes water in conjunction with the liquid A.C. to foam or expand the asphalt thereby coating the aggregates. Stansteel® has developed items such as their introductory Eco-Blend™ System to address customers and states that are receptive to this type of process.

In a more versatile arrangement, many locations are wanting to utilize both the warm mix foam (utilizing water) as well as liquid chemical additions to the process that have both a foaming and coating action, but also have a chemical reaction to help the liquid A.C. bond to the aggregates. This is especially true when there are marginal aggregates or a lower cost aggregate could be utilized. Stansteel® has developed items such as the Accu-Shear™ and the Accu-Shear™ Advanced Multi-Purpose Inline Blending Systems. With these systems, asphalt producers are choosing to blend inline at the plant with multiple materials, in order to achieve different results, depending upon their pavement performance and the governmental agency they are working with. As an example, one recent producer chose to have a combination of five materials capable of being added to their base liquid A.C. These included a latex additive for creating a polymer modified asphalt, water for making regular foamed warm asphalt, liquid anti-strip, diesel fuel for making certain cutback asphalts and finally a liquid chemical for making specialty cold mix patching material. Watch a video of the results achieved with the Stansteel® Accu-Shear Advanced™ at [www.stansteel.com/advanced.wmv](http://www.stansteel.com/advanced.wmv)

The bottom line of the warm mix, whether chemical liquid or modified asphalts, is the savings. And the dramatic savings come from both a fuel usage, by mixing at lower temperatures, as well

as from an excellent performance on the roadway, by the materials being extremely well coated. In addition, there is a benefit that, in the more technologically advanced warm mix system such as the Accu-Shear™ series, the liquid asphalt temperature does not have to be elevated. A normal 290° or 300° liquid asphalt can be used in conjunction with the system to avoid overheating the liquid and aging it. With these warm mix processes, therefore, it appears that the mix product on the road is darker and blacker because the asphalt has not been oxidized and aged by overheating. In addition, we are also noticing less blue smoke appearing around the transfer points on the hotmix plant, the discharge of mix from silos or the batch tower into a truck and less smoke and odor at the lay down and paving site. A number of contractors have also reported substantially less requirement for roller passes in their lay down process. In fact, some have noted as much as a 50% reduction in the lay down roller passes to achieve desired compaction levels.

Another significant item that would come in this category would be items such as plant flexibility for burning different types of fuel. The plants that seem to get the largest economic benefit are ones that can easily change from burning No. 2 fuel oil to burning waste oil or even natural gas or propane. Items such as the Inline Fuel-Mizer™, hot oil inline preheater, have immediate benefits. They can heat up waste oil or reclaimed oil so that it will combust in a manner similar to diesel fuel. Often, the cost of the reclaimed or recycle oil is much less, but yet possesses equal or even greater BTU value for better heat release. Often, items such as this are combined with the Hotmix Parts® group's Fuel Efficiency Flighting System™. The flighting system not only is designed to allow adequate cubic volume in the process to combust the heavy fuel, but is also designed to handle some of the rigors of the high heat input in the process. Many customers have reported much lower CO levels as well as improved combustion efficiency and lower fuel usage.

Another example of an add on item would be the *Turbo RAP Gator*® Recycling Breaker. As the Rap Gator is specifically designed to go inline process and break up chunks of the recycle millings that have stuck together in the pile, either from age, compaction or heat. As many producers were first getting into the recycling process approximately 20 years ago, the amount of millings was not as high in volume and could be used in the process quite rapidly. As they started to stockpile RAP, the millings stuck together and often would be screened off the

process and wasted or hard to handle. The *Turbo RAP Gator*<sup>®</sup> Recycling Breaker goes inline and road.

**Stansteel<sup>®</sup> plant modifications to facilities increased usage of recyclable materials for improving energy and fuel usage efficiency**

In this category, there are a number of items that can transform even a 50-year old asphalt plant into a unit that is much more technologically advanced and into a true Green facility. Some of these items would be such as converting a parallel flow drum mixer to a counterflow. In doing this, it lowers the fuel usage and dramatically decreases the potential to blue smoke. Since the recycle product is not introduced into the hot gas stream, there is no potential for either the liquid asphalt or the recycle to smoke and get carried into the atmosphere. All of the heating and mixing is performed outside the gas stream and, in fact, in more technologically advanced systems such as Stansteel<sup>®</sup> Asphalt Plant Products' designs, the blue smoke and fumes are actually recycled and incinerated and add to the thermal efficiency.

Some of the other items that improve efficiency would be equipment such as a batch plant Progressive Weighing and Metering System that enters the recycle material into the pugmill mixer and avoids the massive dust and steam explosion that's common with current standard designs.

Something that was pioneered by Stansteel<sup>®</sup> over 18 years ago is the Rotary Recycle Mixer™. This device can be added to either a drum mix plant or, most often, a batch plant to completely transform it into a plant that can run in a continuous mode and introduce recycle again outside the normal gas stream. This can increase both the production rate and the ability to run 25, 35, 40% or even more recycle, depending upon the configuration of the facility.

What's also becoming much more common usage is addition of multiple recycle feed bins. Whereas years ago, a unit might have one or perhaps two recycle bins, now there are two, three and even more. The greatest benefit to existing plant contractors is modifying the facility to add to their existing recycle and just increase the ability to blend aggregates. It's known that one of the limits of recycle from past was its inability to add the proper gradation of ingredients as it

was combined in the process. Now, with proper screening and sizing, recycle might be kept in several sizes or even the same size of aggregates that would match to the cold feed bin. In this way, an inconsistent gradation of material is not caused by the addition of recycle since its sizes are graded and screened as well.

Something that many contactors overlook in their screening process is how much waste material they have in their process. An advanced control system such as the Accu-Track™ Total Plant Control is able to blend material and sequentially time all types of different mix designs so as to minimize the waste as it is going through the process. Each aggregates moves through the process differently and the Accu-Track™ System performs at the ultimate when given the challenge of meeting tough mix specifications. For instance, part of its circuit design is to send out a signal to a device such as a feeder, pump or other unit giving it a signal to operate at a certain ton per hour or flowrate. One of the unique characteristics of the Stansteel® Accu-Track™ is that it features a closed loop system to monitor and make sure the equipment is operating as designated by the control. For instance, if the liquid asphalt calls for 120 gallons per minute, there is actually a separate control phase that monitors and confirms that it is operating within the guidelines and within a certain percent of deviation.

### **New plant additions to enable the utilize of Green technology**

Several of the items covered above also apply for an entire new facility. Items such as the Stansteel® Double Drum, Rotary Recycle Mixer® utilizing counterflow technology, also counterflow retrofit plants/conversions, several new technologies have been developed for low energy asphalt and the proper way to process that. In addition, there are some existing plants that do not have any of the equipment to bring them into 21<sup>st</sup> Century. This would be items such as recycle systems to add to batch plants or drum plants, shingle recovery systems that can process either tear off shingles or tabs from the manufacturing process or other items such as new Green technology burners that control 100% of the combustion air or new hot oil heat exchangers. Even an item as simple as a hot oil heater can have a dramatic impact on energy in the ecology based on the efficiency. For instance, Stansteel® has developed a line of hot oil heat exchangers. These particular units are in the 90% efficient range versus some older units that are only 50% or less. Two of best telltale signs are the actual fuel usage and the exhaust stack

temperature. It's not uncommon for some of the older model heaters to burn 150 or 200 gallons per day of fuel. Whereas many of the new exchanger models might be 50 gallons per day or less. A great monitoring method would be to test the exhaust stack. Again, the new heaters might have 100° or less temperature of exhaust gas stream that is above the temperature of the hot oil circulating in the system. Some of the older models might run 1000, 1100, 1200° F or more in the heat exhaust temperature stack.

One of the most neglected areas is that many existing plants that have a very good infrastructure of items such as cold feed equipment, liquid asphalt tanks, perhaps silo systems and air pollution control. A huge change can be made to these existing facilities by incorporating new technology and utilizing it with existing equipment. The other advantage to this, and many times environmental departments of states welcome this improvement since even though the company may be processing more tonnage or higher percentage of recycle, their carbon footprint and their total emissions may significantly decrease.

***Please contact Stansteel<sup>®</sup> Asphalt Plant Products,  
Louisville, KY, 1-800-826-0223 for questions or  
evaluations of existing plant processes, or visit the  
company's web site at [www.stansteel.com](http://www.stansteel.com)***

