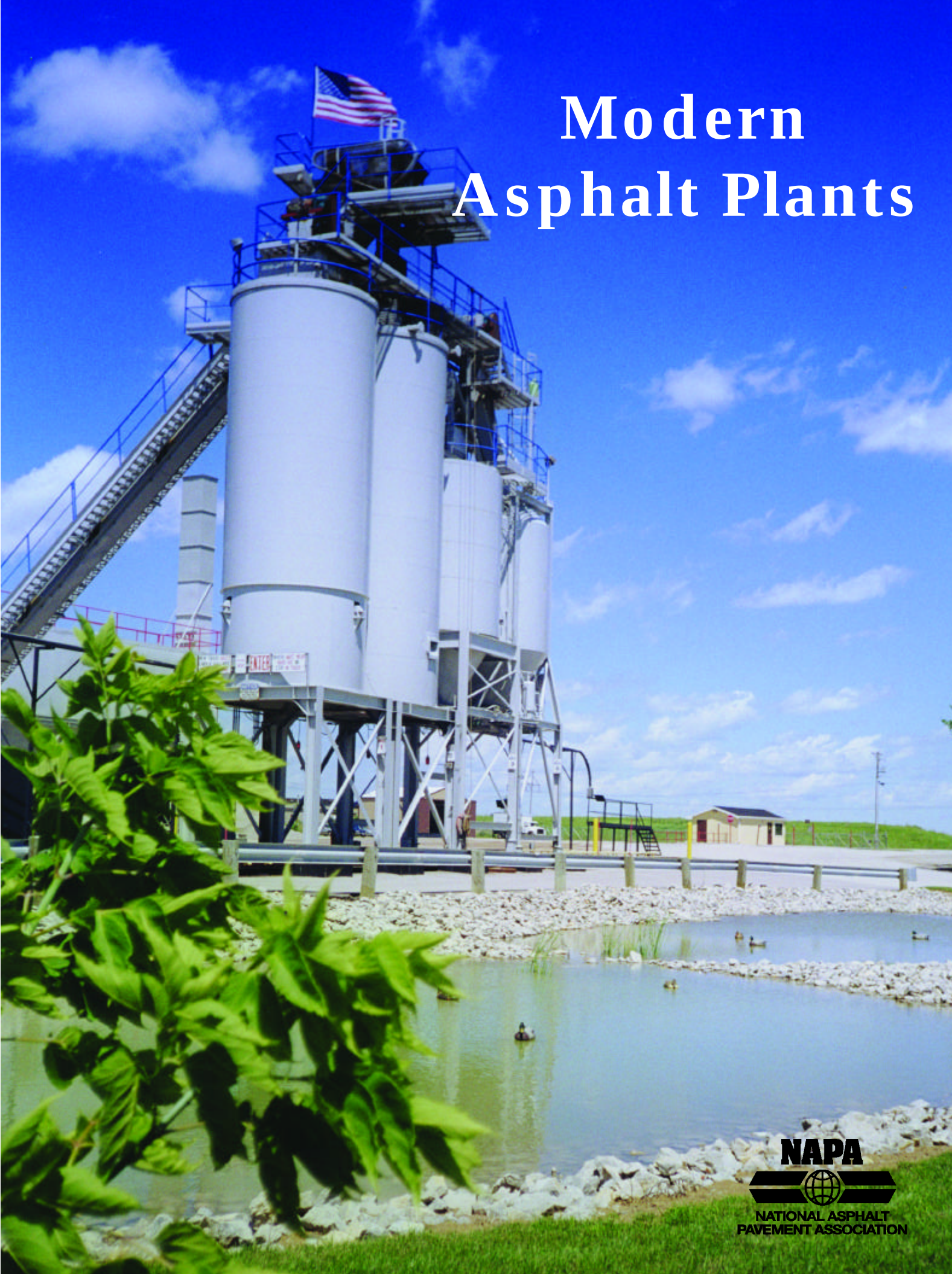
Modern Asphalt Plants



NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

An asphalt plant is where materials are brought together and blended into Hot Mix Asphalt, which is transported to the paving site for construction into a pavement.

We'll explain the "Hot Mix" term in a moment, but first let's correct another misnomer — the use of the word asphalt.

Asphalt is often used loosely to refer to a variety of asphaltic or asphalt-containing products, which often causes confusion in discussions concerning various asphalt products. Hence, the National Asphalt Pavement Association (NAPA) has been encouraging the industry and government to adopt specific terminology to clear up this confusion.

ASPHALT CEMENT (AC) — This is a thick, black petroleum material that acts as the "glue" that holds the pavement together. It is the heaviest part of the petroleum and is usually made by the same refineries that produce other petroleum products. It is liquid at high temperatures and becomes a solid as it cools. Generally, it makes up about 5 percent, by weight, of the total pavement mixture, the rest of the weight being aggregates.

AGGREGATES — These make up the remaining 95 percent, by weight, of the pavement mixture. They include crushed stone, gravel, and sand. Different sizes of aggregates, often from different sources, are combined according to a mix design formula that is determined in a laboratory.

HOT MIX ASPHALT (HMA) — This is the final product of our facilities, which is a mixture of AC and aggregates.

HMA PAVEMENT — This is the final form and use Hot Mix Asphalt generally takes.

Briefly, what happens in our HMA facility is that the aggregates are dried and heated, then mixed and coated with AC. The HMA is often transferred to holding bins (called silos) for short-term storage, then to trucks for transportation to the paving site. It is a mixing process rather than a manufacturing process.

“An asphalt plant in my community? What's going on here?”

More than 94 percent of the nation's two million miles of streets and highways are paved with asphalt. That's because federal, state, and local highway departments have long known that asphalt pavements are smooth, cost-effective to construct and maintain, exceptionally durable, quiet, environmentally friendly, and 100 percent recyclable. The asphalt industry is also proud to be the nation’s number one recycler. More than 70 million tons of reclaimed asphalt pavement is reused or recycled every year.

Around the country, asphalt plants are located near homes, businesses, golf courses, and farms. Chances are good that there has been an asphalt facility not far from you for years, and you didn't even know it was there.

The terms “asphalt plant” and “asphalt facility” are used interchangeably in the pavement industry. These terms may be misleading, in that they may also imply the production of petroleum asphalt itself, which is actually done at an oil refinery. Whichever term is used, however, you can be sure that no refining takes place at asphalt plants or asphalt facilities.

“What exactly is asphalt?”

What most people mean when they say "asphalt" — also known as blacktop, macadam, or tarmac — is actually a particular product, known in our industry as asphalt pavement, or sometimes, Hot Mix Asphalt (HMA) pavement.

“Is it a complicated process?”

It's really pretty simple. There are two basic ingredients in Hot Mix Asphalt. The first is aggregates, a mixture of crushed stone, gravel, and sand. The aggregates used are almost always locally available stone. About 95 percent of the total weight of an asphalt pavement
consists of aggregates.

The remaining 5 percent is Asphalt Cement, which acts as the glue to hold the pavement together. Asphalt Cement (AC) is a petroleum product. It generally comes from the same refineries that
produce gasoline for your car and heating oil for your house. AC is the heaviest part of the petroleum.

Mix the two ingredients together, and you get Hot Mix Asphalt pavement material.

“What else happens at an asphalt facility?”

The paving aggregates are heated and dried, then mixed and coated with Asphalt Cement. The Hot Mix Asphalt is often put in storage silos, then trucked to the paving site.

“Why do we need an asphalt plant in my community?”

Hot Mix Asphalt is usually mixed at about 300 °F — cooler than what you'd use to bake a pie. And it has to be placed hot, no less than about 250 °F. The HMA must be delivered to the paving site hot. Transporting the mix over long distances could allow the mix to cool too much,
ultimately harming the quality of the pavement. Therefore, it is necessary for HMA plants to be near paving sites.

“Are there health risks?”

If you visit an HMA facility, you'll see people wearing typical construction clothes such as hard hats, gloves, and long-sleeved shirts. There is no evidence that the very low levels of emissions from an HMA facility pose health risks to humans.

“But don't you have to keep hazardous chemicals on site?”

Liquids that must be handled with care at a Hot Mix Asphalt facility are: 1) fuel oil for the burner, which is the same kind of fuel oil you may be using to heat your home, 2) fuel for vehicles, which is the same product you buy at the gas station, and 3) at some facilities, solvents for the quality control lab. These solvents are used in small quantities with great care and new lab procedures are quickly making the solvents obsolete.

By federal law, a Hot Mix Asphalt facility must keep and use these products, including the fuel oil, in accordance with strict EPA standards.

“What happens if there's a spill or leak?”

Asphalt Cement starts to harden the moment it cools. Unless it's over 250 °F outside, it simply cannot travel over the ground more than a few feet. It will not penetrate the soil more than an inch or two before solidifying. Asphalt Cement does not mix with, or become soluble, in water.

“How about a tour?”

There are two basic kinds of HMA facilities. We'll take you through a "drum mix" plant since most new facilities are of this type, and then describe the differing components of a "batch mix" operation.

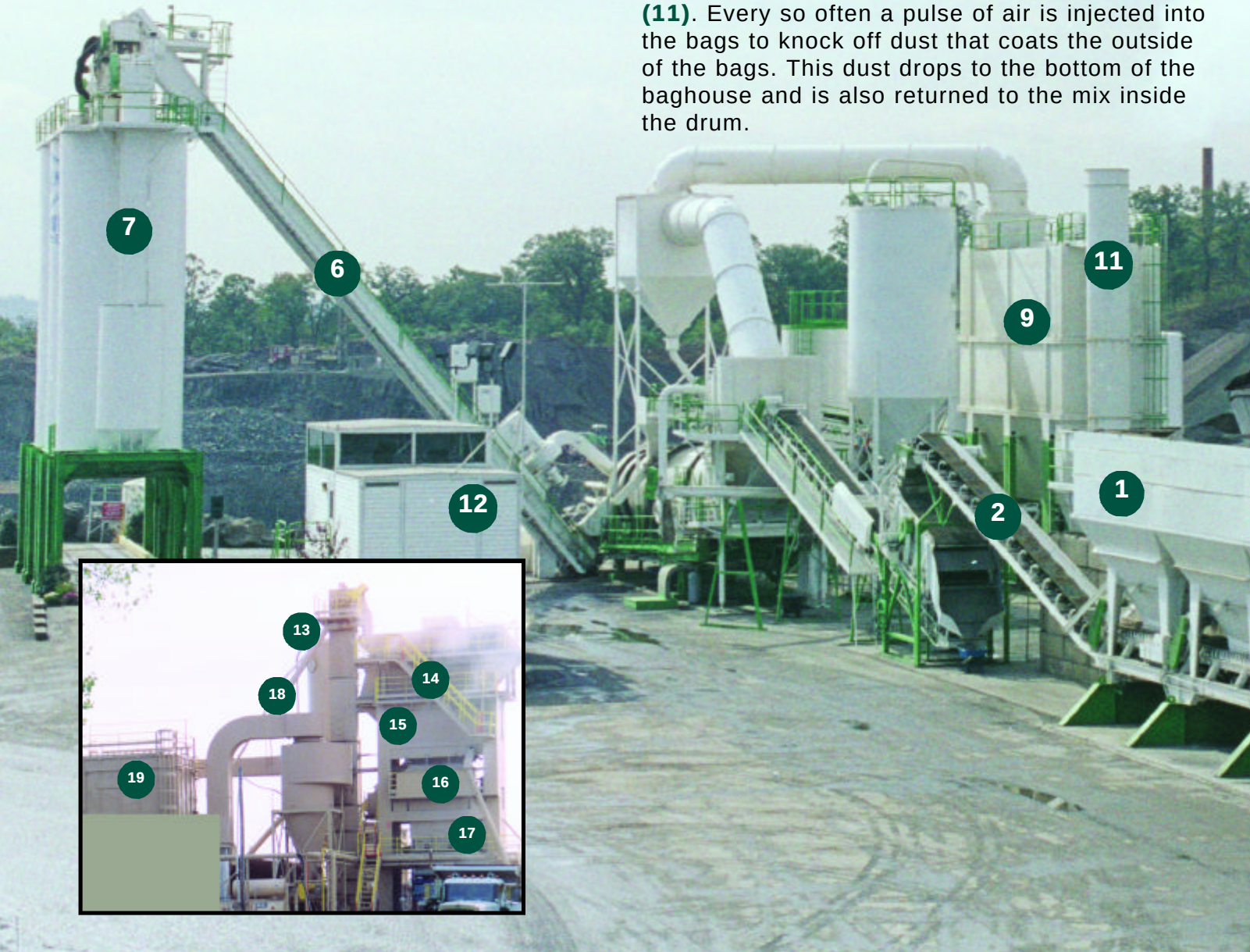
Aggregates in **cold feed bins (1)** are measured into specified portions according to the kind of pavement required and carried by a **conveyor belt (2)** into the **drum (3)** where they are dried and heated by a **burner (4)**. If pavement removed from existing paved surfaces is to be recycled into new pavement, it is usually conveyed to the middle of the **drum (5)**.

Asphalt Cement is pumped from its holding tank in liquid form (heated to about 300°F) and injected into the drum where it mixes with, and, coats the aggregates.

The drum operates very much like a clothes dryer. As it rotates, "flights" along its sides keep the aggregates tumbling and dropping which ensures that they are thoroughly dried, heated, and mixed with Asphalt Cement before being dropped into the discharge chute and carried by a **conveyer (6)** to the top of the **storage silos (7)**.

An **exhaust fan (8)** at the end of the **baghouse (9)** creates an airflow velocity in the drum which pulls uncoated dust through a **knockout box (10)**. This is a large volume structure that allows the exhaust gas to spread out, reducing its velocity so that a large portion of the heavy dust particles drop to the bottom to be returned to the mix in the drum.

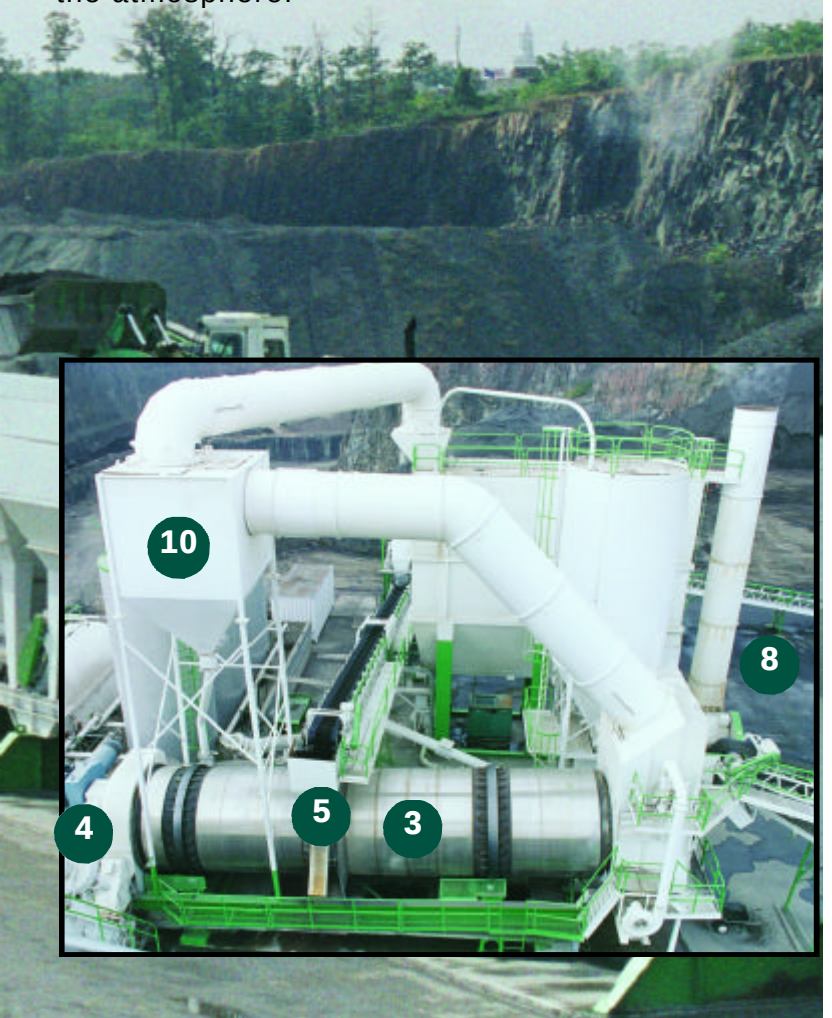
A small amount of lighter particles are carried into the main body of the baghouse which functions like a series of vacuum cleaner bags, except the dust collects on the outside rather than the inside of the bags. The reason for this is that we want only clean air to be exhausted out of the **stack (11)**. Every so often a pulse of air is injected into the bags to knock off dust that coats the outside of the bags. This dust drops to the bottom of the baghouse and is also returned to the mix inside the drum.



The entire operation is controlled and monitored by a computer, or a **programmable controller (12)**, which make sure the system is performing properly and warns the operator of any failure.

The batch mix HMA plant differs from the drum mixer in terms of where the AC coating takes place. The aggregates are dried in the drum, but not coated with AC. Instead, the dried aggregates are conveyed by a **bucket elevator (13)** to a mixing tower where they are separated by **vibrating screens (14)** at the top and dropped into individual **storage bins (15)** by size. They are dropped from the holding bins to a **weigh hopper (16)**, the amount of each size being determined by the type of mix being produced. From the weigh hopper they go to the **pugmill (17)** where they are coated with AC, which has been weighed separately.

The finished product can be transferred directly to a waiting truck, although it is becoming more common to transfer the HMA into storage silos like those at a drum mix plant. Batch facilities manufactured since 1973 must have a **"fugitive dust system" (18)** which connects the tower to the **air pollution control equipment (baghouse) (19)** to prevent the release of fugitive dust into the atmosphere.



"What about the environment?"

Thirty or more years ago, Hot Mix Asphalt facilities often generated noticeable levels of dust, smoke, odors, and noise. But two things have brought big changes. One was the EPA's New Source Performance Standards, which went into effect in 1973. These standards required HMA producers to meet strict emission standards and install control systems to prevent the release of dust and smoke into the air. A plant must also meet stringent "visible emissions" tests in order to comply with regulations. An even stronger incentive for clean operation is economic. It's in the owner's best interest to make sure that all the equipment is operating at peak efficiency — which means producing very little in the way of emissions.

In the past 40 years, production of HMA paving material has increased by more than 250 percent; during that time, total emissions from HMA operations have decreased by 97 percent. Recognizing the improvements in air quality that have been achieved by the asphalt pavement industry, the United States Environmental Protection Agency has declared that no HMA plant has the potential to be a major source of hazardous air pollutants.

Hot Mix Asphalt producers want to be good neighbors. They strive to build clean, quiet operations that are compatible with the rest of the neighborhood.

"It sounds like this would be okay."

You're right. When people get the facts about modern Hot Mix Asphalt facilities, they understand the need for having one in the community. And they appreciate their critical role in building and maintaining the nation's infrastructure.

This informational brochure was produced by the National Asphalt Pavement Association, whose members are dedicated to quality, safety, and environmental protection in every phase of Hot Mix Asphalt production and placement.

For more information, visit www.beyondRoads.com

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NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

5100 Forbes Blvd. ● Lanham, MD 20706-4407

Toll Free: 888-468-6499
Tel: 301-731-4748 ● Fax: 301-731-4621
www.hotmix.org
E-mail: napa@hotmix.org