AP42 Section: 11.1

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P. A. Kenline,

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ASPHALTIC CONCRETE BATCHING PLANT
(Black Top Plant)

An asphaltic concrete batching plant normally employs an aggregate and sand dryer, belt and bucket conveyors, a shaker screen for separating the dried aggregate into various sizes, an asphaltic batcher, and some means of dust control.

The raw (sand and aggregate) materials are either stored in bins or in piles on the ground. From here the aggregate is transfered by belt conveyor and bucket elevator (cold stone elevator) to the dryer. The rotary drier is oil heated, and heats the aggregate to a temperature of 250 - 450 F. The hot, dry aggregate falls from the drier into a hot stone elevator and is carried to a shaker screen for sizing. From there it passes to a pug mill where heated asphalt, rock dust and aggregate are thoroughly mixed for about two minutes. The asphaltic concrete is dumped into waiting trucks and carried to the point of application.

The major air pollutants are aggregate and asphaltic concrete dusts. The dust sources are:

- rotary drier (this is the worst source and consists of combustion products plus aggregate fines picked up)
- transfer points
- bucket elevating
- screening
- mixing

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To a lesser extent, some report has been made of odor problems connected with the asphalt. These sources of asphalt are the mixer and the open trucks into which the hot asphaltic concrete is dropped.

Rotary drier: Rotary driers have a heavy dust loading. Data from 5 plants indicate an emission of 1500 to 5000 lbs. per hour, (average 3500 lbs./hr.). This dust laden air is put through a cyclone in all instances. Typical installations lead to the following generalizations.

A single cyclone will remove in the range of 70-80 percent of the dust. If well designed this may reach 90 percent removal. An analysis of the dust collected and escaping a cyclone gave the following values:

Size (Microns)	Collected Dust (Pct.)	Escape Dust (Pct.)
45	84.0	1.1
45-25	8.0	1.9
25-10	6.2	8.1
10-5	1.4	12.9
-5	0.5	76.0

Other work has indicated that the medium size of the escape dust is 1 micron and that 90 percent are less than 2 microns in size.

Air-flow from these driers runs around 26,000 to 31,000 cfm. at temperatures of 250-450F. Dust concentrations have been reported as high as 30 gr. per cu.ft., but 5-16 seems commoner. Thus loading from a cyclone still runs perhpas 4 gr. per cu.ft.

The cyclone is therefore often followed by a secondary collector. The following data have been reported (in all cases a primary cyclone was used):

Secondary Collector	Overall (Total) Collective Efficiency	Final Stack Loadings
Cyclone (2 cases)	84.5	1.03 gr./cu.ft.
Dense wool felt	99	-
Wet scrubbers	-	0.5-1.0 gr./cu.ft.
Multiclones	80-91	1.4-1.8 gr./cu.ft.
Wet scrubbers	90-95	-
Bag filter	99	-
Wet wall cyclone	Ca99	.12 gr./cu.ft. max.

As indicated in this table, secondary collectors include: dry cyclones, wet-wall cyclones, spray-type cyclones (wet scrubbers), multiclones, and bag filter. Dry-collected dust can be used in the blacktop mix.

The "fanciest" control system reported in the literature is given below for a plant processing 230 tons of crushed material per hour:

> Dust gases from drier (30,000 cfm. at 350-400 F) pass to primary cyclone. After cyclone the dust loading runs 8-16 gr. per cu.ft. The gases are then cooled by air bleeding to 180 F; this temperature is maintained by automatic control. The gas stream flows through a multiclone where the concentration is reduced to 1.5 gr./cu.ft. At this point the temperature of the gas is sensed. If less than 180 F the dusty stream is filtered through a reverse-jet, dense wool felt dust collector; if greater than 180 F, the stream passes to a wet scrubber. The pressure drop through the system runs perhaps 10 inches of water. Total dust collection averages 3030 lbs./hr., practically 100 percent.

Other dusts: One plant collects emissions from transfer points, bucket elevating, screening and mixing operations and filters these through a fabric collector. Their system handles 6500 cfm. at 13 gr./cu.ft. and reduces this to 0.04 gr./cu.ft. (97.8 percent efficiency). These dust sources amount (in this case) to 725 lbs./hr.

Asphalt: One plant also had a problem with an asphalt mist. This "mist" was of the order of 10-400 microns in particle size. A spray chamber was installed at an initial cost of $0.35 to 1.50 per cfm. (cfm. not given) and an efficiency of 70-80 percent was claimed.

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