

SURVEY OF DUST COLLECTION EQUIPMENT - ASTEN-HILL MFG. CO. CARD ROOM

The dust collection system can be divided into three phases for discussion:

1. We can consider air supply
2. Air removal from the machines
3. The dust collector

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The Card Room includes the blenders, pickers, cards, spinning frames and twisters.

The entire system was engineered in 1949 at which time we built an entirely new plant.

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We supply to the Card Room a total of 25,000 cfm of conditioned air. This air is cooled in the summer and heated in the winter and held to a maximum relative humidity of 50%. This air has been filtered by a Westinghouse electrostatic precipitron and an American blower spray type air washer. The Card Room is divided into three separate zones, each of which can be controlled by a thermostat. We supply to the Pickers a total of 2800 cfm of air through two 1400 cfm defusers. The Cards are supplied with 8700 cfm through 16 defusers and the Twisters are supplied with 13,500 cfm through 10 defusers. The defuser installation has been successful with the exception that the ceiling lights are surface mounted and sometimes we have difficulty with the blast of air striking the projecting lighting fixtures and blowing down on the operators.

DUST REMOVAL FROM THE MACHINES:

We remove from the Picker section approximately 6900 cfm which is taken through two Picker condensers. We remove from each of six Cards approximately 1800 cfm each. All of this air is removed from the top of the Card through a wood and sheet metal hood system. The hoods over the main cylinders are fairly successful. However, we are now experimenting with changing the shape of the hoods over the aprons, etc. to get better efficiency.

We now remove from 10 of our 11 Twisters about 1000 cfm each through an 8" pipe under each machine. We are, at present, installing the system originated by John Weber. We are making a few modifications to this system and we are pleased with the results as shown on one spinning frame.

We try to exhaust more air than we supply to this room so that we have a flow into the room from other areas.

DUST COLLECTOR:

Our dust collector consists of three Pagborne #913 CB-1 cyclones arranged in parallel and are fed by a 42" diameter pipe which collects the dust from all of the aforementioned machines. These cyclones

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discharge into a four section CJ-1 Pangborne bag collector. The bag collector discharges into a 30" x 30" square manifold which is exhausted by a #397 American blower. This is a backward curved, bladed fan used for clean air. It is driven by a 75 hp motor and operates at 1530 rpm.

We have had to replace the bearings in this blower every year since its installation. We have tried all kinds of bearings including roller, ball, etc. without any improvement. We have had the rotor balanced and have installed a new shaft.

It is my opinion that the bearing trouble is caused by the fan operating at a static pressure beyond its rating which causes hunting. This is further shown by the fact that we hear an occasional rumble in the fan and a decrease in the amperage load. The 30" square duct has collapsed on several occasions due to high static pressures.

The CJ-1 bag collector operates well from the standpoint of removing the dust from the air but the resistance across the bags is excessively high as can be noted from the table below. These bags are cleaned by periodic shaking at which time the section being rapped is closed off and reverse air is introduced which is supposed to blow the dust from the bags. This was originally supposed to be done by the operators every four hours and was a complete failure because we could never get the operators to conscientiously perform this duty. We have now installed an automatic screen rapping system which operates each section for five minutes on an hour and a half cycle. This bag collector is cleaned every other week but we have had trouble with the cleaning personnel tearing the bags while attempting to blow off the dust with a compressed air hose and pipe.

We are now awaiting the Pangborne Company's recommendation as to how the high resistance across these bags can be reduced. We fully expect that they will recommend replacing the bags at an expense of approximately \$3,000 plus labor.

The CB-1 cyclones operate rather well except when the bag collector's excessive resistance has reduced the velocity through the inlet pipe at which time we have settling of the heavier dust in the inlet pipe. We have made it a policy to clean these pipes once a week.

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SUMMARY OF STATIC READINGS IN INCHES OF WATER

	<u>Min. Design</u>	<u>Present Cond.</u>	<u>Present Aver.</u>	<u>Cond. where</u>
	<u>Conditions</u>	<u>With Clean Bags</u>	<u>Condition</u>	<u>dust will</u>
				<u>be object-</u>
				<u>ionable</u>
At 397 Blower	10.5	12	12	12
Clean Air Side of				
Bag Collector	10	11	11	11
Dirty Air Side of				
Bag Collector	7½	4.5	4	3.5
At Cyclone	6	2.4	2.2	2
Manometer	5.8	2.4	2.1	1-¾

The reading referred to as the manometer reading in this table is a reading where one of the main ducts goes through the floor and gives some idea of the efficiency of the entire system. This manometer, because it is conveniently placed, can be read often and will give an indication of any difficulty before it becomes serious enough to affect the efficiency of the system seriously.

John McCormack
Plant Engineer

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