

## BITUMINOUS PAVING PLANTS.

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properly, and cannot be handled properly on the street. If too hot, the asphalt cement is injured when tossed about in the mixer in thin films upon the overheated aggregate.

In the present plants, change of temperature will occur most frequently through variations in rate of feed or through delays in turning out the material which necessitates shutting off the feed and allows the drum to become overheated. The most common cause of temperature change would be removed by the regular mechanical feed of aggregates as described above.

In any case, it would be comparatively simple to apply to the control of temperature of the dryers, the principle of the electric thermostat which is attached to the draughts of the ordinary house furnace. This thermostat could be so set that when the predetermined upper limits are reached at the boot of the hot elevator, an electric motor would come into operation which would open a trap at the discharge chute from the drum, allowing the mineral aggregate to drop into a screw conveyer, discharging onto the ground.

This conveyer would be interposed between the end of the drum and the hot elevator, so as to remove the overheated material before entering the elevator. Simultaneously, the motor should open the fire doors of the drum, allowing the cold air to enter. When the temperature has dropped sufficiently, and the electric contact is broken, the motor should operate and close the trap, permitting the aggregate again to enter the elevator.

A similar operation could be adjusted for predetermined minimum temperatures.

Present arrangements for control of temperature necessitate taking a sample of aggregate from the boot of the hot elevator and testing it there or at the mixer, and if the temperature is not right, either discharging the aggregate from the top of the hot elevator or from the storage bin. This latter operation is always attended with confusion in shifting teams beneath the mixer or in changing the rate of feed of aggregate. The uniformity of temperature and general satisfactory operation of a plant depends very largely upon the continuity, and anything which interferes to shut down or disturb the mixing operation immediately throws the entire work out of gear, and leads to other disturbances.

**Screen and Bins.**—Generally, in handling complex mineral aggregates, the proportions are approximately determined at the cold elevator, but in order to avoid segregation in bins or drums, the best practice requires the screening of the aggregate into several compartments and sizes, the number of operations depending upon the complexity of the aggregate.

In most plants, this is not accomplished with sufficient accuracy or with sufficient provision against contingencies which arise during plant operation. Frequently, the storage bins upon these plants are small, and when subdivided into compartments, the operating screen is too short to make a clean separation. Sometimes the partitions are light and do not come up sufficiently around the screens, and when one bin becomes filled, while the adjoining one is nearly empty, there is enough deflection in the partitions to move them beyond the line of division of the screen, permitting one bin to catch aggregate which should drop into the other. Frequently, also, if the plant is not taking material as fast as it might, or if the feed has been varied, one bin will fill up and in the absence of an overflow spout from each individual compartment, material from one bin will crowd over into the next.

It follows, in any case, that in weighing out aggregate from different bins, the proportions set are departed from, and variable aggregate discharges into the mixer, for which the amount of asphalt cement may be entirely unsuited. To correct this condition, it is necessary, when this occurs, to stop the work, empty out the bins, thereby interrupting the smooth operation of the plant and causing disturbances in other directions.

This occurrence is a most frequent one at paving plants, and is the cause of much unnecessary trouble and irregular mixture. In fact, it sometimes becomes so troublesome that it is often advisable not to make a screen separation of aggregate, but to regulate it as closely as possible at the cold elevator. Unless this screen device is so constructed as to operate without causing contamination of the various aggregates with each other, it becomes a source of constant danger. It should be a comparatively simple matter to design this separating unit so that it will actually perform the work for which it is intended.

**Mixing.**—After the aggregate has been separated into its components and delivered to the storage bins at the proper temperature, the next and most important step is the combination of the various elements into the final pavement mixture.

Until recently, it was common practice to measure the aggregate by volume, either in a box of constant capacity or by striking off an open measuring box. The writer has frequently observed these boxes of constant capacity operating with upper and lower slides, which would not permit shutting off from the bin without first opening the discharge. As a result, a considerable quantity of material over the theoretical capacity frequently passed into the mixer before the upper slide was shut off.

In one case which resulted in a dispute of binder yardage, it was found that the amount of binder actually turned out was 20 per cent. in excess of the capacity of the measuring device, just on this account.

The use of open boxes for measuring is liable to the objection that it requires striking off by the laborer, and this in the long run is slighted. Measuring devices of this kind, as well as volume measurements of asphalt cement, are fortunately almost a thing of the past. It is now customary upon the most modern plants to weigh these various ingredients. Unfortunately, however, the class of labor available for this purpose cannot generally be depended upon for accuracy, even in so simple a matter as weighing, and the result frequently is in error, owing to overdrawing of weights, changes of tare, and errors in handling weights.

The automatic scales on the asphalt concrete bucket should be of a kind which would operate somewhat differently. This should be devised in such a manner that the given amount of asphalt cement will be discharged from the bucket regardless of its tare. This would eliminate the greatest source of error at the mixer, and would result in uniformity of the product of the plant.

It is believed that the foregoing accounts for a very considerable amount of defective or partially defective work which sometimes results in spite of the best of intentions on the part of the paving contractor and his employees. It is further believed that the manufacture of paving mixtures should be facilitated by applications at least equally effective as those available for processes of similar importance. The plant manufacturer who devotes attention to such details will do much toward forwarding the interests of the asphalt paving industry, and his efforts will be appreciated by all responsible for the success of the product of these paving plants.