EZ- Flo Scales- RAS Feeder Scale Control Specs

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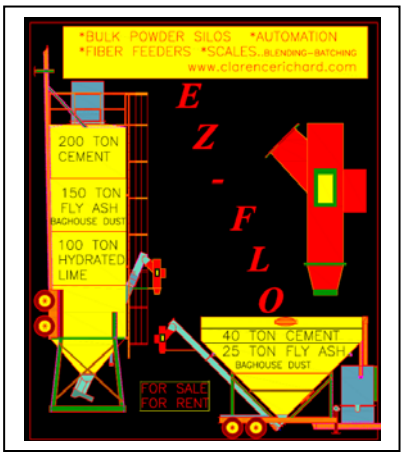

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Scope: Introduction of a 'New Feeder Scale' improves traditional RAP Bin System ***significantly*** without existing Blend Control Software/Hardware modifications. This does not mean the Blend Control should not be modified because of the addition of the second scale. The scale benefits by themselves are reason enough to capture most of the benefits available to fix the obsolete RAP Bin System. It will take time for the Blend Control Industry to write software to a new concept they have not heard of until 2010.

In the existing RAP Bin System(without a Feeder Scale), even when the system is satisfied that the RAP Belt Scale is reporting to the Blend Control the amount being request by the setpoint, the Blend Control can be lied to and more or less oil (at the least.. swings up to ± 15%) is actually being put in the mix.

And when the Control is not receiving the desired amount, the control system is changing the oil content several minutes down the process, hoping the change in the part of the RAP/RAS stream coincides with the change of oil.

Step 1) By installing the Feeder Scale now, these problems (which is the majority of all the problems) can be avoided by adding a Feeder Scale with a signal output that mimics the Feeder Tach. The Feeder Scale frequency signal now replaces the Tach frequency signal sent to the Blend Control. The Blend Control practically knows no difference and Feeder Scale part of the Blend Controls now control a much more accurate amount of RAS (or whatever RAP is in that Bin at the time) into the process. This Feeder Scale will cause the Feeder Belt to increase or decrease depending on the Rate of flow out of the Feeder. The

scale accounts for all changes in RAS Density. The Feeder Scale can be accurately calibrated for very low flow rates.

Step 2) The RAP system can be further enhanced when considering how it has been used now that another continuous weigh scale has been added. The RAP Belt Scale usually weighs material from two bins therefore when the flow changes over the RAP Scale, the Blend Control does not know how much oil to adjust for. The Blend Control does adjust. It is anyone's guess if it was adjusted correctly or not. This problem has become very significant with the high oil contents of RAS or FRAP.

This is not much of a problem unless the Blend Control's Setpoint is not made and the Blend Control has to estimate the new change in asphalt output.

When adding a Feeder Scale, that output can be subtracted from the RAP Belt Scale. The difference is now the Rate of Flow from the bin without the Feeder Scale. That Feeder Speed can now be adjusted immediately without having to adjust the oil or affecting gradation ratios of the aggregate and RAP bins.

This may take time for some Blend control Manufacturer's to provide this kind of control. In the mean time, the mix producer should install a feeder scale as in Step 1 and do all that can be done to keep the other feeders continuously flowing. When that happens, the Mix Producer can be confident producing the Mix Quality he is looking for without any concern to RAS Density and calibrating RAS low flow bins to a over sized RAP Belt Scale.

History: RAP Bin systems were designed decades ago to add multiple RAPs; each RAP being fed at a significant flow rate to a Belt Scale. The bins can be calibrated to the Belt Scale at flow rates in the range of the belt scale. Volumetrically calibrating the significant flow rates to the belt scale is acceptable. The density of RAP remains relatively constant and therefore volumetric flow measurement is acceptable. The percentage of oil from the different RAPS are relatively equal to each other therefore it has been acceptable practice to change either the oil in mix or change the RAP Bin Speeds collectively when setpoint is not being met.

In recent years, Mix Producers have been experimenting with their existing RAP Bin Systems by putting in a product other than what the system was designed for, such as Recycled Asphalt Shingles (RAS). There are two characteristics that makes RAS different from RAP when using RAS in the standard RAP System. These characteristics make the existing RAP systems in their current condition, an unacceptable metering device for RAS 1) RAS has significantly more oil than RAP. Therefore the Bins run slowly which is problem to calibrate to a RAP Scale not accurate at that low rate. Also, when the Belt Scale

reports an oil correction that needs to be made, the system can not make an accurate correction since the combined materials is being weighed by one scale. 2) RAS can be compressed to take up less volume after it has been processed depending on how it is stored and handled. The RAS Density at the top of a pile is less than at the bottom of the pile. The Bin of RAS is now being volumetrically calibrated to an inaccurate reference scale (RAP Belt Scale). Once it is determined the Bin is volumetrically calibrated, the the question needs to be asked, "At what RAS density was the Bin calibrated at?". And since the bin will continuously be fed with varying densities (density change ± 15%), frustration sets in with QC Management.

A scale, Ez-Flo Feeder Scale, has been developed to continuously weigh material as it falls from the feeder to the collector belt below. The initial reaction of many mix producers is to find acceptance from their particular blending control manufacturers to accept a scale input in a system. Many mix producers are now interested in the new RAS Feeder Scale. Most manufacturers do not have the software and hardware to accept this signal and process it and reconfigure the outputs yet. Encouragement from Mix Producers will help the Producers get the upgrades sooner, hopefully.

The following specs illustrate the equipment proposed for Step 1. Clarence Richard Co., Ez-Flo, provides proposed specs for Blend Control Manufacturer's to consider writing their software to. Please contact Clarence Richard about your Blend Control Manufacturer. Chances are, we are in the process of helping the manufacturer of your equipment consider this software change. If not, we would be pleased to give you a proposed spec to send to your manufacturer.

Step 1 Specs: EZ-Electro-Mechanical Retro-Fit No Hardware/Software Changes to existing Blending Controls

A quick fix that probably fixes about 95% of the error (near 100% error correction most of the time and varying amount when the RAP Bin Flow changes). Fixes: 1) Calibrating Low TPH Rate Bin to an oversized RAP Belt Scale and 2) RAS Density can change ± 15% .

Add RAP Bin systems using RAS in one bin is to

Add a Feeder Scale by mounting the scale between the Feeder discharge and the Collector Below. Replace the Tach input for that bin into the Blend Control with a Frequency Signal coming from the RAS Feeder Scale Rate Indicator.

The EZ-Scale Rate Indicator to supply a frequency to the Plant Blending Control assuming the Computer has an input for The RAS Bin: No hardware software changes are required of the blending controls that have tach inputs. *Tach Input Exceptions: Roman's ICE and

CMI's Impulse do not have tach inputs . In these exceptions, the RAS bin speed will either be controlled manually or automatically with a Closed Loop Controller ($4,995).

The Ez-Flo Feeder Scale is provided with Rate Indicator/Totalizer. The following controls are proposed as well.

1) **Auto/ Manual Switch** with **Manual Speed Pot**. The Auto function allows the existing Blend Control's close loop controller to increase and decrease the bin speed based on the Scale Rate and the Blend Control Set Point. The Speed Pot is used for Speed control in the Manual mode and as a Startup Setpoint in the Automatic. In the Automatic Mode, the pot will control the Variable Speed Controller at a set speed until the scale rate (scale rate indication responds slower because of dampening required) for a **programmed time** (about 10 seconds) and then when the Scale Rate settles out, the Scale Rate Signal will be used to control the feeder bin speed via the Blending Control's closed loop control.

2) A **Feeder Speed Rate Indicator** scaled to the approximate Feeder Scale TPH Rate. This Speed Rate should generally match the Feeder TPH Rate with plus minus 15% or less. This helps cross check the Feeder Scale for proper operation during plant production. This also helps to determine the best feeder speed setpoint upon startup.

3) A **Tach/Scale** Control Selector shall be provided to control from either the Tach or Scale.

Feeder Scales for 36" and 30" Feeders $9,950
Custom Sizing $TBD
*Rate Indicator 4-20 ma output Rate signal .. $250
*Rate Indicator Frequency output Rate signal to replace feeder belt tach output..$450
* Auto-Manual Switch with Manual Speed Pot with
Auto Mode Startup Feed Rate Control Timer,
Tach-Scale Control Switch,
Speed Indicator scaled to estimated volumetric flow rate in TPH. $1250
* Set of 4" and 2" Skids.. $295