



# DAILY PAVING WORKBOOK

Instruction Guide 6.7.18  
6.10.20 3-pages of Supplemental Instructions  
Additional updates will be added.

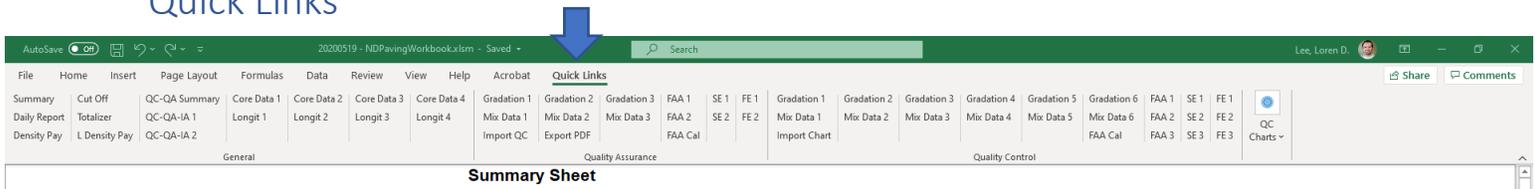
# June 2020 Changes to the Paving Workbook

## Supplemental to Daily Paving Workbook Instruction Guide dated 6.7.18

### Summary

- Quick Links
- Reports: Printing / Exporting PDF
- QC Data - Automated Importing
- QC Control Charts
- Rounding
- Important Things to Note

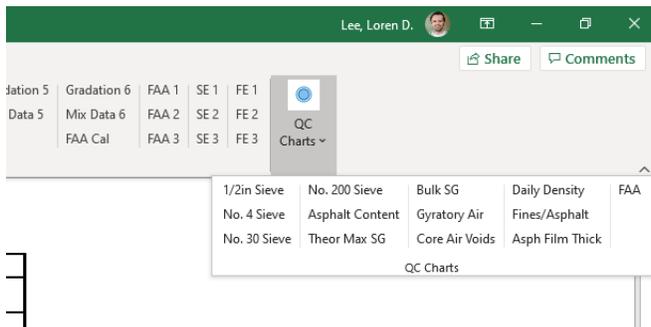
### Quick Links



When you open the paving workbook, you need to enable macros.

The quick links that were located on the right of each spreadsheet (see right) have been moved into a new tab on the Excel ribbon (see above).

Depending on your screen resolution/size, you may have more or less of these buttons collapsed as the “QC Charts” are collapsed in the example image. Click on the collapsed button and the full list will open below it.



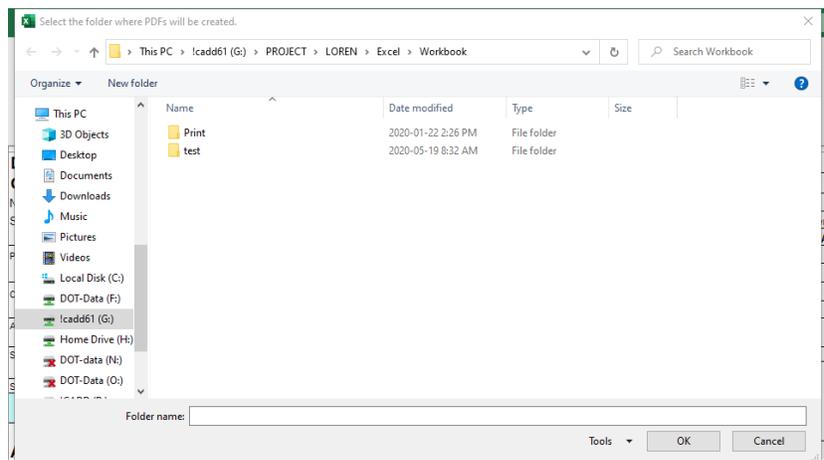
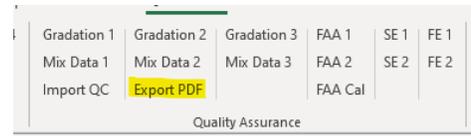
Quick Links		
	Summary	
QC Gradation 1	QA Gradation 1	QC-QA Sum
QC Gradation 2	QA Gradation 2	QC-QA-IA
QC Gradation 3	QA Gradation 3	QC-QA-IA 2
QC Gradation 4	QA SE 1	Cut-Off Report
QC Gradation 5	QA SE 2	Totalizer
QC Gradation 6	QA FAA 1	Density Pay
QC Mix Data 1	QA FAA 2	Core Data 1
QC Mix Data 2	QA FAA Cal	Core Data 2
QC Mix Data 3	QA F&E 1	Core Data 3
QC Mix Data 4	QA F&E 2	Core Data 4
QC Mix Data 5	QA Mix Data 1	Daily Report
QC Mix Data 6	QA Mix Data 2	
QC FAA 1	QA Mix Data 3	
QC FAA 2		
QC FAA 3		
QC FAA Cal		
QC SE 1		
QC SE 2		
QC SE 3		
QC F&E 1		
QC F&E 2		
QC F&E 3		

## Reports: Printing / Exporting PDF

The workbook now can print to PDF all sheets (reports) that have test data In the Quality Assurance section of the quick links by selecting the button “Export PDF”. It will open a file dialog box asking where you want to save the PDFs. Select your folder and click “OK”.

The workbook will make a PDF of all sheets with data; a separate PDF of the Cut-Off sheet for inclusion in the Asphalt PQE; and a separate PDF of the Daily Report for any potential Contract Adjustments.

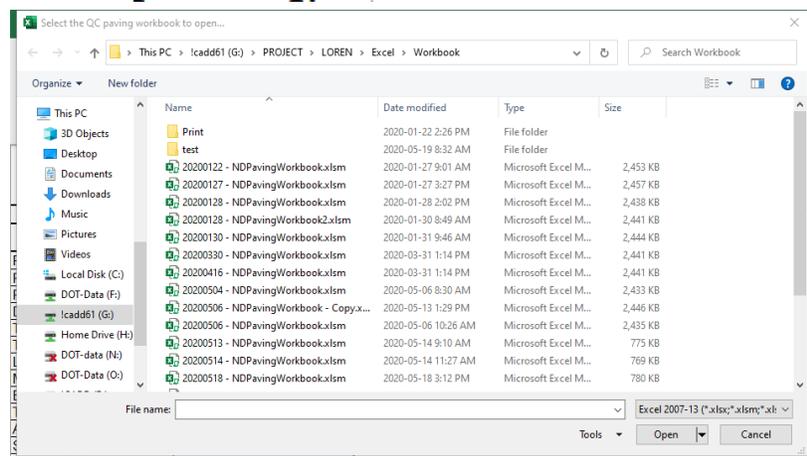
The spec book requires that labs have internet access. We know that is often the case but not always. When you do have internet, the PDFs can be emailed to the Project Engineer and/or added to CARS. (ask your district representative for their preference) When internet is unreliable you could use a flash drive to give the PDFs to the Project Engineer instead of paper copies or upload the documents when you are in an area with internet access.



## QC Data: Automated Importing

When the Contractor agrees to use the NDDOT paving workbook you will not need to reenter their data. You will use the new “Import QC” function under the “Quality Assurance” section.

Instead of giving paper copies of their tests for you to manually enter, the Contractor would either email or use a flash drive to give you a copy of their workbook each day. In the QA workbook, click on the “Import QC” button. It will open a file dialog box where you can select the QC workbook. Click “Open”. Your paving workbook will copy all the QC test data to itself.



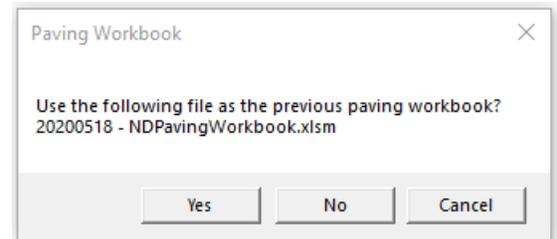
## QC Control Charts

One reason the contractors have not agreed to use the paving workbook is because it did not graph all the things required to by the NDDOT Spec book. These have been added.

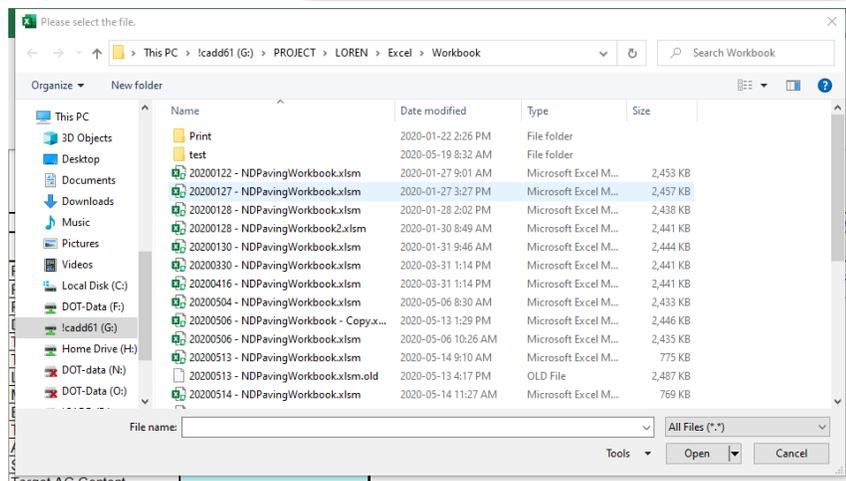
Gradation 1	Gradation 2	Gradation 3	Gradation 4	Gradation 5	Gradation 6	FAA 1	SE 1	FE 1
Mix Data 1	Mix Data 2	Mix Data 3	Mix Data 4	Mix Data 5	Mix Data 6	FAA 2	SE 2	FE 2
<b>Import Chart</b>					FAA Cal	FAA 3	SE 3	FE 3

Quality Control

In the “Quality Control” section, click on “Import Chart”. A dialog box will open that looked for the second most recently used excel file in the same folder (likely yesterday’s paving workbook). If this file is correct, click “yes” and it will store the data necessary to make the Contractor charts in another section of the workbook. If it is not the right file, click “No” and a file dialog box will open for you to select the correct file. Click “Open”.



From the second paving day on, the Contractor (or you), would run the “Import Chart” on the previous day’s workbook. All the previous chart data is copied into today’s workbook so that it can be separated from the previous workbooks, emailed around, and still have full functionality.



## Rounding

Excel’s normal rounding procedure rounds up when the last value is exactly 5. The rounding procedures of the FSTM say to use bankers rounding (to nearest whole number). A new function has been added in the code of the workbook and used by many formulas that performs bankers rounding. There may be some instances where it may still need to be added.

## Important Things to Note

If you are doing a test on a sheet, fill everything out. A cell you might not think is important could be used in something for the charts or other things behind the scenes.

All workbooks need to have a unique name. When using the “Import QC” and “Import Chart” functions, do not try to open a workbook with the same filename. Excel does not allow this. If you try it, and my code to prevent you from doing so fails, you will crash the workbook.

## NDDOT Paving Workbook Instructions

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This instruction guide was created to provide a basic overview of the (Excel) Daily Paving Workbook. Some of the most frequently asked questions and features new to the 2018 version are explained.

The workbook is used by the QA lab tester. The tester enters their test data and also enters the contractor (QC) test results as they are received. When assigning field sample numbers to samples, it is strongly suggested that you will use the same field number for all QA worksheets.

The QC tester will most often use their own software or spreadsheet and will also graph the control charts.

The results from the density cores (SFN 10071) are entered in the workbook from the previous day (to match the day of paving).

The district Materials Coordinator will provide the current version of the workbook when your project begins. This workbook may be updated throughout the year. If you have a copy from an earlier project you will want to verify that you have the current version.

As always, communicate with your local District Materials Coordinator or other district personnel on specific materials questions. And remember it is good practice to thoroughly review all calculations and occasionally verify calculations by comparing to manual calculations.

A separate guide titled *QA Lab Tester Responsibilities* is also available online.

This guide will be updated periodically. Please let us know if you have suggestions to enhance/clarify this document. It is current as of June 7, 2018.

### District Materials Coordinators Contact

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# NDDOT Paving Workbook Instructions

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## Summary Sheet

1. Always leave the original as is (Do not enter data in the original workbook)
2. Always verify that you have the most current version. This workbook will be updated periodically.
3. Use the “Save As” Command and save each “Lot No.” as you need them, (Each lot is a day).
4. Fill out all light-blue-shaded cells with the information from your job. When you enter information in the summary sheet it copies to the appropriate fields in the worksheets. When you enter the JMF Criteria it will calculate your tolerances for the gradation.
5. On the summary sheet you will find a Quick Links table to the right. Clicking each button will take you to that page – avoiding the need to scroll through all the tabs. The Quick Link table is on every sheet to help make navigation easier.
6. In the “General Data” section you will find a place for pit locations. They are divided up based on sand, gravel and aggregate. The sand and gravel locations will only show up in the quality test sheets (i.e. fine aggregate angularity and sand equivalent), but the aggregate location will populate all the gradation sheets in the workbook.
7. After filling in all data within the summary sheet and also the FAA calibration sheet it is acceptable to save the workbook as the master copy for the job.
8. In the quick links table on the summary page there are three print buttons. These print buttons will print the QC, QA and the other sheets respectively. The buttons are setup to print only the pages that have sample numbers or data in a user-controlled cell. An example of this is on the QC-QA-IA comparison sheet if you select a QC test number it will print that page. In the daily report sheet if you have the stationing entered it will print that page. This will reduce the amount of clicking and printing you can just hit the print and all the pages you added data will print. Make sure the print settings are ready to print before you press the print buttons. The button works like the Quick Print function. It will not allow you to make any changes to the print properties before it prints.
  - a. You can print individual sheets if preferred.
  - b. You also can set your print preference to Print PDF but you will then be prompted to name each sheet.
  - c. The QC gradation reports each have a default Field Sample No. (all six copies will print if you select the Print QC)

## NDDOT Paving Workbook Instructions

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### Gradation (SFN 9987)

1. Ensure you select the proper gradation sheet for example if you are running a QA test enter it under the QA gradation sheet. This goes for the QC tests also when you receive their results you will have to enter their data into the correct sheet. This is necessary to allow the test summary and test comparison sheets to work properly.
2. The light blue shaded cells are for entering your data from your test, the sheet will calculate your percent retained and passing. **NOTE:** When you enter your sample numbers on all your workbook pages the gradation and mix properties will be the same. They will autofill to other worksheets. The Aggregate qualities have a drop down list that will display the sample numbers that you have entered in the gradation sheet. Select the one that corresponds with the sample you are running the test on.
3. If you are not using a sieve listed on the worksheet enter a zero "0" as a weight retained. For example if you do not use the No. 10 sieve, you will still need to enter "0" for the calculations to work properly. The No. 10 sieve is placed in the sheet to prevent overloading of the No. 16 sieve even though it does not have a specification itself.
4. The *Lightweight Pieces* section of this page automatically pulls the percentages for each sieve size and the amount in grams that is retained.
5. The *Fractured Faces* part of this page requires the weight of your fractured particles, questionable particles, and the total sample weight that you tested.
6. *Rounding* - The gradation section of the sheet rounds according to the spreadsheet method not the NDDOT method. If you run into a situation that the number is close then you will need to hand calculate that percent passing to apply the NDDOT rounding to see if that makes a difference on that percent passing. It is always good practice to occasionally verify calculations manually.

### Mix Data (SFN 50289)

1. Ensure you select the proper mix data sheet for example if you are running a QA test enter it under the QA mix data sheet. This goes for the QC tests also when you receive their results you will have to enter their data into the correct sheet. This will allow the test summary and test comparison sheets to work properly.
2. The light blue shaded cells are for enter your data from your test the sheet will do all the calculations for you. Note: The test number will be brought in from the gradation sheet so these will be the same.
3. Record as much information as possible this includes the station where the mix sample was obtained the, lane direction, daily tons, and total tons.
4. *Aggregate Blend Proportions*- At the bottom the form is a location to enter the bin splits that were being used when you obtained your sample. This should be filled in and any changes noted as well as how it affected the mix data.

## NDDOT Paving Workbook Instructions

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### **FAA Calibration (SFN 51729)**

1. This sheet must be filled out prior to doing any FAA tests in the workbook. The FAA worksheet requires the volume of the cylinder from this page.
2. When calibrating the cylinder note that the table with temperatures is a condensed version of the full table found in ASTM C29. You can use other temperatures found in ASTM C29 as long as you use the correct density conversion for the temperature.
3. This does not have to be performed every day or every time you run the test. The intent is to help those who do calibrate in the field. This also requires the QA inspector go to the QC lab and verify the calibrations are available and that they are current.

### **FAA (SFN 51701)**

1. The field sample number is a drop down list of all the gradation numbers, please select the correct sample number for which the test represents. The drop down was added to make the test summary and test comparison sheets work properly.
2. The sample number cells below that are just to separate your two tests that you ran on that sample.
3. The dry specific gravity is based on the minus no. 4 virgin specific gravity (ND T 84) not on the total of all the aggregates.
4. When performing this test and using the No. 10 and No. 40 sieve in your sieve set you must remember to include the No. 10 with the No.16 and the No. 40 with the No. 50 sieves for the test to be accurate.

### **Sand Equivalent (SFN 51730)**

1. The field sample number is a drop down list of all the gradation numbers, please select the correct sample number for which the test represents. The drop down was added to make the test summary and test comparison sheets work properly.
2. The sample number cells below that are there to separate your two trials that you run on that sample.

### **Flat or Elongated Particles (SFN 51700)**

1. The field sample number is a drop down list of all the gradation numbers, please select the correct sample number for which the test represents. The drop down was added to make the test summary and test comparison sheets work properly.
2. Total weight of sample is the entire weight of your dry sample before you ran it through the shaker. This is needed so the sheet will calculate the percent retained and the weighted flat and elongated pieces properly.
3. The first column (A) is used for entering the amount retained on each of the sieves from the gradation. The next column (D) is the weight of the approximate 100 pieces from the sieve sizes listed. The last column (E) is the weight of flat or elongated particles.

## NDDOT Paving Workbook Instructions

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### QC-QA Test Summary (SFN 50290)

1. This sheet will pull in all of the QC data without any input from the user. The test number will be pulled from the gradation sheet so it will match what you entered on those sheets.
2. The QA data has a drop down list with all the test numbers entered. You will need to select the QA sample you ran in the appropriate column that represents the time of day/QC sample it compares to. This was done to be able to more accurately compare the test results to the appropriate QC data.

### QC-QA-IA Comparison (SFN 61095)

1. The first test number (IA Test Number) is for a quick reference and does not affect the sheet at all.
2. The QC and QA test numbers are drop down lists and these lists are populated from the sample numbers you entered on the gradation sheet. When you select the desired test number it will pull all the data from that test number. Again, this is why making sure all your sheets have matching test numbers is important. *If the test numbers are not exactly the same this sheet will not pull in all the data.*
3. This sheet will compare all the data and show the results of the comparison on the right side. It will also display if it is in or out of tolerance.
4. The bottom portion contains the IA test results. That will need to be entered manually.
5. Also in that section once you enter the IA data it will populate for both the QC and QA and will show you if you are in or out of the tolerances.

### Cut-Off report (SFN 9988)

1. The *Bitumen in Storage* fields are for entering how much is in the tanks at the start of the job or what was left from the previous day. This is also true about the average specific gravity field to the right. This is the average of the bitumen in the tanks at the start of the project or day.
2. The *Add: Bitumen Delivered This Report* section is where you record each load that is delivered that day. For each load a manifest number, specific gravity and weight in pounds is entered. All information must be entered for the worksheet to calculate correctly. The sheet will calculate the average bitumen for the day based on a weighted average of what was in the tank and all the loads that were brought in throughout the day. This was revised to allow accurate specific gravity and calculations when contractors use multiple bitumen sources or loads with different specific gravities. **Note:** Newly added tool in the right margin is a conversion calculator that will convert from KG to Pounds. You will still need to type the Pounds into to the *Add: Bitumen Delivered This Report* section.
3. The *Less: Bitumen In Storage (end this report)* section is for what is left in the tanks when they measure/stick the tanks at the end of the day.
4. The *Less: Bitumen Used for Items Other Than Mix* field is for the bitumen only (not mix) that is used for something other than going into mix for your project

## NDDOT Paving Workbook Instructions

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5. The *Total: Bitumen Used for All Mix Produced This Report* section is Per Haul Sheet Number is the number of total tons recorded on the haul sheet. This includes mix that did not go to your project. This is included to make ensure the pay quantity and waste equals the amount of mix on the haul sheet.
6. The next lines are used for the tons of mix that is paid and the amount of non-paid mix. They both need to be recorded for the calculation of how much oil is in the mix. If we used only the tons we are paying for, the oil content would not be accurate.
7. In *Remarks* section explain where non-paid mix was used. *Example 2 tons road waste, 25 tons private use.*

### **Totalizer (SFN 18674) referred to as Uniformity or Asphalt Content & Virgin Aggregate Determination**

1. At the top is a field to enter the Target RAP percent that is being used in the mix. This was added to allow accurate calculations for recycle projects. When you enter the information from the totalizer the percent virgin and the target percent virgin will match.
2. The next lines are for entering the random number and the totalizer information. This form is used to ensure that the mix is uniform.
3. The flow meter for the bitumen is in gallons. Some plants do not record in gallons, they record in tons. For those plants you will need to back calculate based the tons of bitumen and the weight of a gallon of bitumen.
4. The totalizer cutoff is the last reading from the totalizer after the plant has been shut down for the day.
5. The Remarks section provides an area to record moisture test results.

### **Density Pay Factor (SFN 59132)**

1. This sheet will bring in all the information needed from the QC mix data and the core data worksheets. The only items you fill in are the *Random Numbers* and the required *Target Density* percent. **NOTE:** The workbook defaults to ordinary compaction so if there is no data in the Core Data Sheet (SFN 10071) it will default to ordinary compaction so nothing is needed on this page.

### **Core Data (SFN 10071)**

1. The workbook will default to ordinary compaction if no data is entered into this sheet.
2. The *Lane* cell is for which lane the cores were taken out of EB, WB, Driving, Passing, etc.
3. The *Stationing Direction* cell is for which direction the station is running - whether you are going up or down. If you are paving with the stationing increasing you would put in a (+) sign if it decreasing then you would put a (-) sign. This is used in calculating the sample station based on your random numbers.
4. *Width of Road* cell is for the width of the road so the sheet will calculate the core location offset from the centerline.

## NDDOT Paving Workbook Instructions

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5. Enter your *Sample Number* information in the far left column. The sheet is formulated to automatically calculate the next beginning station, only if there is information in the Sample Number column and Station Direction cell. **Enter the station as a number only**, it will automatically format for the stationing (if you enter "116483" it will appear as "1164+83" after you click out of the cell).
6. For the last lot of the day, enter an end station if the lot is something other than 2000 feet. Entering the end station allows random numbers to be assigned to the entire segment.
7. Excel has a Random Number Generator. To use it enter the formula, =rand() , then press F9 on the keyboard before exiting the cell. If you "Enter" or "Tab" out of the cell before hitting F9, the random number will change every time the sheet is refreshed. F9 will convert the formula to a number and will not change. You can still use the Random Numbers Table in the Field Sampling and Testing Manual.
8. If the Inspector or Engineer is responsible to assign core locations, he will likely use the PDF mobile version found on the DOT website and that version will generate random numbers automatically. You may then be reentering and completing the worksheet in Excel.

### **Daily Report (SFN 18552)**

1. This worksheet is mainly auto populated from all the other sheets within the workbook.
2. The beginning and ending *Stations Paved* must be entered.
3. Another item to enter is tons of mix that you are paying for but was not used on mainline paving. This is for mix that is not required to meet the compaction requirements of the mainline paving (shoulders, ramps, approaches, etc.). The mainline number is automatically pulled in from the Cutoff report. When you enter a number in the other pay cell it will automatically reduce the mainline number by that amount.
4. The workbook defaults to ordinary compaction so if there is nothing in the Core Data Sheet (SFN 10071) then the workbook will default to 1 for density pay factor.
5. The last item that needs to be entered is whether or not the Aggregate Pay Factor needs to be applied. Under the aggregate section of the sheet it has conditional formatting to show red where there are failures. If there are two tests that fail in a row, no matter what sieve they are on, then the pay factor will need to be applied. In the lower right corner of the sheet, there is a toggle button to select whether or not to apply the deduction. The sheet will apply the largest variation from the target and apply the pay factor accordingly when you select apply. **Note: It is always good practice to double check your numbers any time a penalty appears to apply.**