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BC and Alberta

Check Scaling

The good, the bad and the non confrontational.

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Why Check Scale?

**Government
compliance**

**Industry
compliance**

**Verification
of log value**

**Train novice
scalers**

**Maintain
scaling
standards**

**Uniform
scaling
practices**

The Good

Log Haul and Scaling Standards

The Bad

1) Everything involved in the log haul and scaling of logs always goes according to the plan.

2) There is an infinite amount of time to carry out these plans.

3) The weather will always completely cooperate to ensuring the completion of the plans.

The common denominator in all these scenarios is THE PLAN.

Traditionally a check scale is an unannounced visit from a scale authority where a sample load, or 8 loads in some regions, are rescaled by a check scaler. The gross and net volume results are compared and if either of the volumes differ by an amount greater than the allotted percent, corrective actions are prescribed. The traditional corrective measures taken are:

- Review the load with the scaler
- Replace the original scale volume with the corrected volume
- Repeat check scales are conducted
- A demerit system is used by the government in Western Canada: BC, Alberta, and Saskatchewan

The reality is that this system, well cumbersome, does eventually work. However, there are many factors that slow down the effectiveness of check scaling.

It is no secret that our industries experienced scalers, generally the ones who are sought out as check scalers, are retiring at a rate that is higher than new scaler's entering the industry.

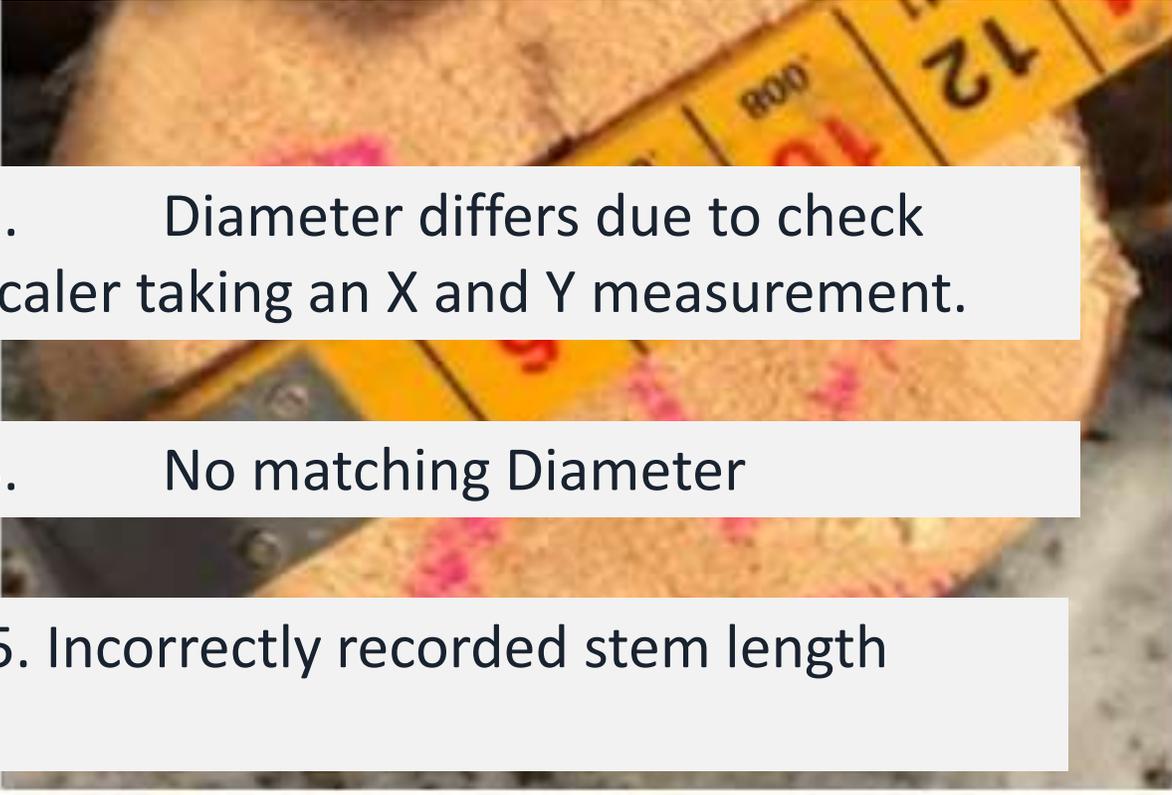
Leaving the quadrium of how to train novice scalers to be check scalers that are both informed and effective.

How can companies and government agencies ensure that their investment in the check scale is going to produce a productive and better informed scalers and check scalers.

The challenge

Regardless of region

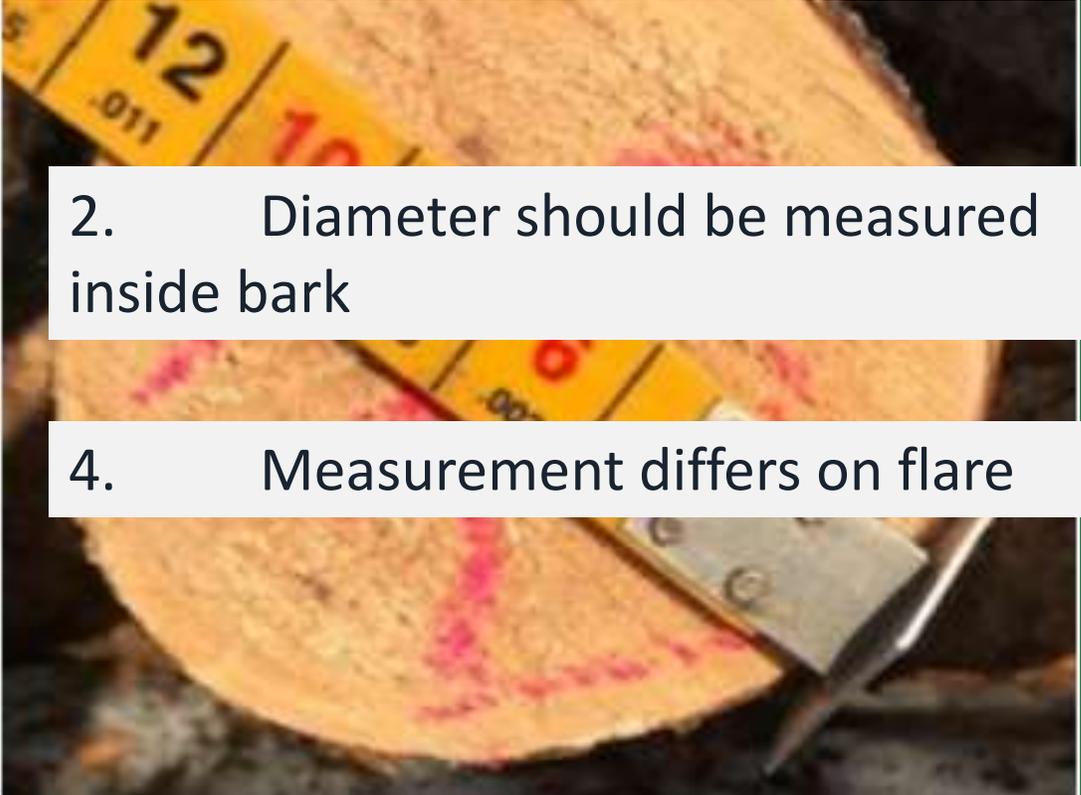
The idea came to me when I was conducting a check scale in yard where review is NOT an option. The sample yard only has room for 6 to 8 loads to be spread at a time and the scaler completes 6 to 8 samples in a day. So how could I convey the issues in the load when review was not an option? I decided to class the gross volume discrepancies into categories.



1. Diameter differs due to check scaler taking an X and Y measurement.

3. No matching Diameter

5. Incorrectly recorded stem length



2. Diameter should be measured inside bark

4. Measurement differs on flare

Finding my way



The difference between a scale and a check scale

Most of the data was already there

A notebook and pen

Check Scale 15

Sample Load: MW00412450 Pop: 813 Species: SP Condition: GR Product: 01
 Location: Fox Creek Source: FMA9700034 Sub: TOH Block: 341
 Sample Date: 2019/01/17 Check Scale Date: 2019/01/27
 Scaler: Colleen Thompson Check Scaler: Dallas Garcia

Volume Summary:

	Scaler Gross	Check Scaler Gross	Scaler Cull Volume	Check Scaler Cull Volume	Scaler Net Volume	Check Scaler Net Volume
Product Code 01	15838	16025	413	310	15425	15715
Product Code 06	16710	16272	611	553	16099	15719
Product Code 99	1734	2181	78	93	1656	2088
Volume Totals	34282	34478	1102	956	33180	33522
True Percent Difference		0.57%		-14.19%		1.03%
Percent Differences from Check Scaler		0.57%		-15.27%		1.02%

- Load is within tolerance of 5%.
- Load is 100% check scale on CTL conifer.

Variation in measurements:

Difference	Number of Stems			% Stems	
	Butt Diameter	Top Diameter	Length Class	Totals Points	Percent of total points
<i>*As Compared to Check Scaler</i>					
Check scaler 1 class smaller then scaler	11	4	3	18	1.2%
Check scaler same class as scaler	446	462	437	1345	90.8%
Check scaler 1 class larger then scaler	21	12	4	37	2.5%
Incorrect length on product code	0	0	34	34	2.3%
Missed product code 99	16	16	16	48	3.2%
Total stems	* 494 stems or 1482 total points				

- The check scale was conducted as 100% check scale on a CTL conifer load.
- The check scale load is well within the allotted 5% tolerance.

Check Scale Discrepancies:

Regarding Volume:

Check Scaler Comments on Volume Discrepancies	Number of stems
Diameter differs due to check scaler taking an X and Y measurement	25
Measurement differs due to the stem not being a butt cut log, adjustment for flare should not be applied	5
Measurement differs due to the stem being a butt cut log, it should be adjusted for flare	11
Grand Total	41

This check scale load was conducted as a 100% check scale. The method the check scaler used to record difference in volume was a classification system using the following four comments:

1. Diameter differs due to check scaler taking an X and Y measurement
2. Measurement differs due to the stem not being a butt cut log, adjustment for flare should not be applied
3. Measurement differs due to the stem being a butt cut log, it should be adjusted for flare

These classifications of volume discrepancies are recorded with the intent to help identify the reasons behind the differences, and to furthermore, aid the scaler in any necessary recalibrations.

There were 16 incidents of the measurement differing due to flare calibration, it is important to note that when adjusting for flare the scaler needs to determine if it is indeed a butt cut log. If the roller marks continue to the end of the stem, and calibration is required due to large branch knot swelling, the calibration should be taken above the knots, not as far up the stem as a butt cut calibration.

Regarding Product Code 99 Identification:

Check Scaler Comments on Product Code 99 Identification	Number of stems
Missed Scale Butt	7
Agreed scale butt	-10
Incorrect length on Product Code 99 portion	10
Excellent identification of top product code 99 portion	-3
Missed portion of product code 99	16
Grand Total	20

The check scaler used a ten-centimeter gage to identify the Product Code 99 portions in this check scale load. The scaler identified 86 portions of Product Code 99 in the load and the check scaler identified 102 portions of Product Code 99. Two stems that the scaler identified as butt cut stems, had additional portions of Product Code 99 identified as separate pencil bucket pieces; this was redundant. The identification of product code 99 is difficult and time consuming. By combining a scale identified butt cut stem with a top diameter that is under the utilization top size, when such a top size is present, it eliminates the need for the stem to be altered in the text file format. Nine of the seventeen stems that were identified as butt cut Product Code 99 stems had their feller buncher marks removed.

The picture below is an excellent example of a properly identified butt cut Product code 99 stem.



Regarding Defect:

The check scaler applied the same concept to defect discrepancies as was applied to volume discrepancies. The defect calculations were carried out in accordance with the instructions and recommended methods in the scaling manual.

The check scaler found that a large amount of the cull discrepancies was regarding cull calculated due to crook and sweep. For this reason, the check scaler decided to present a table just regarding crook and sweep; the points system elaborates how much of the difference in cull volume relates to each defect. As explained in the table's foot note, the difference in cubes associated with the cull, are calculated by deducting the scaler's cull volume from the check scaler's cull volume. Thus, a negative number represents the scaler taking a greater defect volume than the check scaler. Regarding the classification "Crook deduction is the same by fraction" the check scaler considered all the instances where the difference was 2 cubes in either a positive or negative direction.

Check Scaler Comments on Crook/Sweep Defect Discrepancies	Number of Stems	Total Cubes Associated with Discrepancies
Crook deduction greater by fraction	5	20
Crook deduction less by fraction	5	-128
Crook deduction is the same by fraction (+/-2 cubes)	49	10
Sweep -2 so no deduction	14	-71
Missed crook	4	18
Grand Total	77	-151
* 'Total Cubes Associated with Discrepancies' are calculated by deducting the scaler's cull volume from the check scaler's cull volume. I.E. 20 cubes is the scaler calling 20 cubes less of defect than the check scaler.		

Check Scaler Comments on Defect Discrepancies	Number of Stems	Total Cubes Associated with Discrepancies
Stain not rot	1	-10
Missed scars	2	2
Grand Total	3	-8
* 'Total Cubes Associated with Discrepancies' are calculated by deducting the scaler's cull volume from the check scaler's cull volume. I.E. A total of -10 cubes is the scaler calling 10 cubes more in defect than the check scaler.		

The same concept was applied to rest of the discrepancies regarding cull. Not every instance where there is a difference in cull can be classified, the tables represent the defects that were most prominent throughout the load. As noted in the table, there were very few differences in this check scale load. Overall the 14% true difference in cull was the scaler culling 0.146m3 more cull than the check scaler

Sweep Formula:

The following formula is used to determine the percent loss for sweep:

$$\% \text{ loss} = \left(\frac{\text{max deflection} - 2}{\text{top diameter}} \right) \times 100$$

Crook Formula:

CROOK – To calculate the defect volume for an abrupt curvature in the log (crook) the following formula is used:

$$\% \text{ loss} = \left(\frac{\text{deflection}}{\text{diameter at end affected}} \right) \times \left(\frac{\text{length affected}}{\text{total length}} \right) \times 100$$

The final product consists of four sections:

- A volume summary shown in two different formats
- A detailed listing of where the discrepancies occurred
- Pictures taken of the load that correspond to the discrepancies
- A reference section

Difference	Number of Stems			% Stems	
	Butt Diameter	Top Diameter	Length Class	Totals Points	Percent of total points
<i>*As Compared to Check Scaler</i>					
Check scaler 1 class smaller then scaler	51	48	1	100	8%
Check scaler same class as scaler	332	337	405	1074	88%
Check scaler 1 class larger then scaler	23	21	0	44	4%
Total stems	<i>* 406 stems or 1218 total points</i>				

*This table represents the amount of measurements that varied from the check scaler. A perfect check scale would have a hundred percent in the Same Class but the probability of that is unlikely,

a more likely within tolerance check scale would have close to equal percent in 1 Class Smaller and 1 Class Larger. This table is more in line with a Alberta Government check scale.

Check Scale Discrepancies:

Regarding Volume:

Check Scaler Comments on Volume Discrepancies	Number of stems
Diameter differs due to check scaler taking an X and Y measurement	14
Diameter should be inside bark	0
No matching diameter	1
Measurement differs on flare	23
Grand Total	38

This check scale load was conducted as a 100% check scale. The method the check scaler used to record difference in volume was a classification system using the following four comments:

1. Diameter differs due to check scaler taking an X and Y measurement
2. Diameter should be inside bark
3. No matching Diameter
4. Measurement differs on flare

These classifications of volume discrepancies are recorded with the intent to help identify the reasons behind the differences, and to furthermore, aid the scaler in any necessary recalibrations.

There were 23 incidents of the measurement differing due to flare calibration, it is important to note that when adjusting for flare the scaler needs to take a measurement where the natural taper ends and then adjust the diameter according to how far up the stem the scaler took the calibration. See references.

Picture review



Log 164 (Left) – Diameter differs due to the check scaler taking an X and Y measurement. The scaler recorded a diameter of 30cm but by measuring perpendicular on the narrow axis the check scaler recorded a diameter of 28cm.

Gross Volume Summary

The confrontational

Volume Summary:

	Scaler Gross	Check Scaler Gross	Scaler Cull Volume	Check Scaler Cull Volume	Scaler Net Volume	Check Scaler Net Volume
Volume Totals	45724	47030	529	570	45195	46460
True Percent Difference		2.82%		7.46%		2.76%
Percent Differences from Check Scaler		2.78%		7.19%		2.72%

- Load is within tolerance of 5%.
- Load is 100% check scale on TL aspen.



Defect and Deductions

Cubic scale allows for multiple ways to apply deductions. However there are similarities in all the scaling systems I reviewed when it comes to the application of deduction methods.

Multiple defects are commonly recorded under one deduction method.

Different tables for deduction methods were categorized based on the impact the defect had on the load.

Check Scaler Comments on Defect Discrepancies	Number of Stems	Total Cubes Associated with Discrepancies
Missed rot	3	74
Missed scars	4	8
Multiple defects	4	56
Grand Total	11	138

* 'Total Cubes Associated with Discrepancies' are calculated by deducting the scaler's cull volume from the check scaler's cull volume. IE 56 cubes is the scaler calling 56 less cubes of defect than the check scaler.



The results

A learning document that can be used to help educate and train the scaler as well as the any others who review it.



Questions?