

# OEE Studio Tool Tip

## Analyzing Performance Metric

This Tool Tip Assumes that the reader knows how to navigate and use OEE Studio.  
(<https://oeestudio.com/navigation.html> )

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# Calculating Performance Metric

- Using the **Job Data – Job Comparison** menu in OEE Studio, you can get a better insight as to how your products (parts) are running.
- Performance is the Actual Count (good + reject) during Run Time, verses the expected count for that Run Time, based in Ideal Cycle Time.
- The Vorne XLv1 boards use the following calculation for Performance:  
 **$ICT * (Standard\ Cycle\ Count + Slow\ Cycle\ Count + Small\ Stop\ Cycle\ Count) / Run\ Time$**
- OR if you have a Scale Factor >1, then it would be:  
 **$(ICT/SF1) * (Standard\ Cycle\ Count + Slow\ Cycle\ Count + Small\ Stop\ Cycle\ Count) / Run\ Time$**

*Ideal Cycle Time (ICT) = time between pulses*

*SF1 = Scale Factor 1 if you are counting more than one part per cycle.*

# Cycle Times Module in Vorne XLv1

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Cycle Thresholds

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The Cycle Times module tracks how long it takes to manufacture each piece, and categorizes each manufacturing cycle as standard, slow, a small stop, or a full stop. The thresholds between these categories are configurable. In addition, the Pace Timer, which can be used to pace production, has a configurable reload value.

Slow Cycle Threshold	Small Stop Threshold	Full Stop Threshold	Pace Timer Reload
105%	125%	200%	Slow Cycle Threshold

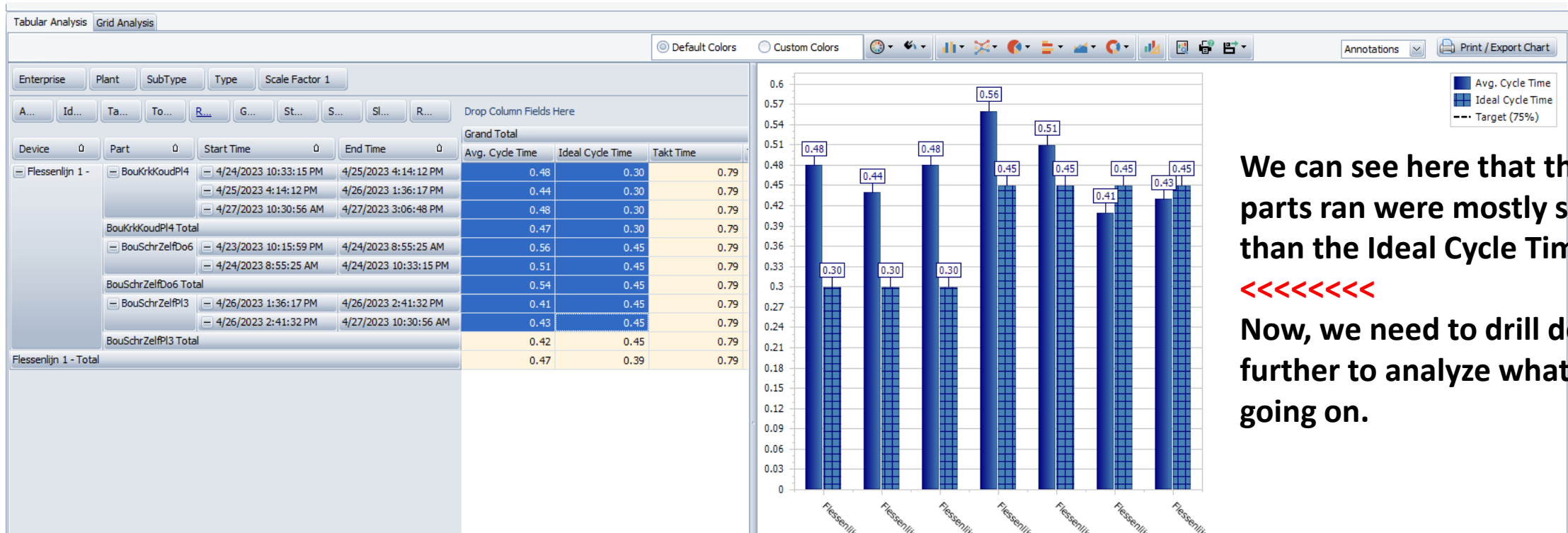
C2 :  $\times$   $\checkmark$   $fx$  =B1\*B2

	A	B	C
1	Ideal Cycle Time	0.14	seconds
2	Standard Cycle	100.00%	0.14
3	Slow Cycle	105.00%	0.147
4	Small Stop	125.00%	0.175
5	Down	200.00%	0.28
6			

You can create a little spreadsheet to determine the proper Cycle Thresholds for your products. You cannot do this on a per product basis.

This shows the factory defaults in the device.

# Analyze Performance



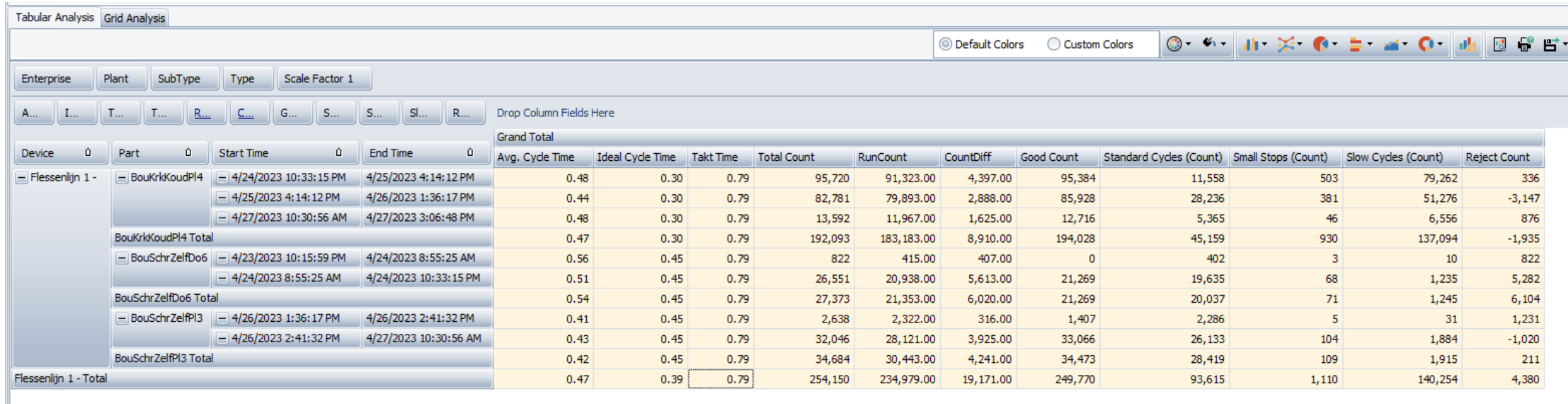
We can see here that the parts ran were mostly slower than the Ideal Cycle Time.

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Now, we need to drill down further to analyze what is going on.

- **Menu – Job Data – Job Comparison**
- Choose your date range
- **Show & Hide Fields** – remove the default OEE metrics and add
  - Average Cycle Time, Ideal Cycle Time and Takt Time
- Highlight the Avg Cycle Time and Ideal Cycle Time columns to graphically display the results.

# Additional Fields are added



The screenshot shows the OEE Studio software interface. At the top, there are tabs for 'Tabular Analysis' and 'Grid Analysis'. Below these are buttons for 'Enterprise', 'Plant', 'SubType', 'Type', and 'Scale Factor 1'. A toolbar with various icons is visible. The main area displays a PivotGrid table with the following data:

Device	Part	Start Time	End Time	Avg. Cycle Time	Ideal Cycle Time	Takt Time	Total Count	RunCount	CountDiff	Good Count	Standard Cycles (Count)	Small Stops (Count)	Slow Cycles (Count)	Reject Count
Flessenlijn 1 -	BouKrkKoudPI4	4/24/2023 10:33:15 PM	4/25/2023 4:14:12 PM	0.48	0.30	0.79	95,720	91,323.00	4,397.00	95,384	11,558	503	79,262	336
		4/25/2023 4:14:12 PM	4/26/2023 1:36:17 PM	0.44	0.30	0.79	82,781	79,893.00	2,888.00	85,928	28,236	381	51,276	-3,147
		4/27/2023 10:30:56 AM	4/27/2023 3:06:48 PM	0.48	0.30	0.79	13,592	11,967.00	1,625.00	12,716	5,365	46	6,556	876
	BouKrkKoudPI4 Total			0.47	0.30	0.79	192,093	183,183.00	8,910.00	194,028	45,159	930	137,094	-1,935
	BouSchrZelfDo6	4/23/2023 10:15:59 PM	4/24/2023 8:55:25 AM	0.56	0.45	0.79	822	415.00	407.00	0	402	3	10	822
		4/24/2023 8:55:25 AM	4/24/2023 10:33:15 PM	0.51	0.45	0.79	26,551	20,938.00	5,613.00	21,269	19,635	68	1,235	5,282
	BouSchrZelfDo6 Total			0.54	0.45	0.79	27,373	21,353.00	6,020.00	21,269	20,037	71	1,245	6,104
	BouSchrZelfPI3	4/26/2023 1:36:17 PM	4/26/2023 2:41:32 PM	0.41	0.45	0.79	2,638	2,322.00	316.00	1,407	2,286	5	31	1,231
		4/26/2023 2:41:32 PM	4/27/2023 10:30:56 AM	0.43	0.45	0.79	32,046	28,121.00	3,925.00	33,066	26,133	104	1,884	-1,020
	BouSchrZelfPI3 Total			0.42	0.45	0.79	34,684	30,443.00	4,241.00	34,473	28,419	109	1,915	211
Flessenlijn 1 - Total				0.47	0.39	0.79	254,150	234,979.00	19,171.00	249,770	93,615	1,110	140,254	4,380

Next, we add the following fields to the display:

Total Count, Good Count, Standard Cycles (Count), Small Stops (Count), Slow Cycles (Count) and Reject Count  
(<https://oeestudio.com/images/tooltips/PivotGrid-ShowHideFields.png> )

Then we create 2 Custom Fields called **RunCount** that sums the three cycle counts above and another that calculates the difference (**CountDiff**) between Total Count and RunCount. (<https://www.youtube.com/watch?v=SK6LxaVkj7M> )

# Create Custom Field - RunCount

1. Create a custom field called **RunCount**
2. Result Type = **Decimal**
3. Summary Type = **Sum**
4. Click Proceed to Expression Editor
5. This field makes it easier to analyze the numbers

**New Custom Expression**

Options

Field Description: **RunCount**

Result Type:

- ☐ Boolean
- ☐ Date and Time
- ☐ Date Only
- ☒ Decimal
- ☐ Integer
- ☐ String
- ☐ Currency
- ☐ Custom Date Interval
- ☐ Duration

Summary Type:

- ☐ Count
- ☐ Std Dev
- ☒ Sum
- ☐ Min
- ☐ Max
- ☐ Average
- ☐ Std Dev P
- ☐ Var
- ☐ Var P

The sum of the values.

Field Calculation:

☒ Actual Values

**Actual Values**

This is the default behaviour.  
In this mode expressions will be calculated using the **actual underlying data**.

☐ Summary Values

Field Area:

☒ Data Area

☐ Row Area

☐ Column Area

☐ Filter Area

Enterprise Location Plant Line

Availability OEE

Device 0

Area	Shift	Device 2	Device 3	Grand Total			
		Availability	OEE	Availability	OEE	Availability	OEE
Packaging	Shift 1	47.3	33.9	46.7	35.2	47.0	34.5
	Shift 2	0.0	0.0	0.0	0.0	0.0	0.0
	Shift 3	58.1	41.0	65.1	47.5	61.6	44.3
	Shift 4	3.9	3.1	10.9	8.8	5.8	4.7
Packaging Total		37.7	26.9	45.3	33.6	41.2	30.0

Cancel Proceed to Expression Editor >>

**f= Expression editor**

[Standard Cycles (Count)] + [Small Stops (Count)] + [Slow Cycles (Count)]

Functions

Operators

Fields

Constants

[Availability Loss Percent]

[Availability Loss Time]

[Availability]

[Avg. Cycle Time]

[Avg. Rate Total]

[Device]

[Down Loss Percent]

[Down Loss Time]

[Down Time]

[Efficiency]

[End Time]

[Enterprise]

[Goal Count]

OK Cancel

New Custom Expression

Options

Field Description: **CountDiff**

Result Type:

- ☐ Boolean
- ☐ Date and Time
- ☐ Date Only
- ☒ Decimal
- ☐ Integer
- ☐ String
- ☐ Currency
- ☐ Custom Date Interval
- ☐ Duration

Summary Type:

- ☐ Count
- ☒ Sum
- ☐ Min
- ☐ Max
- ☐ Average
- ☐ Std Dev
- ☐ Std Dev P
- ☐ Var
- ☐ Var P

The sum of the values.

Field Calculation

☐ Actual Values

☒ Summary Values

Summary Values

This option will cause the formula to work on the displayed data. It is important that **Summary Value calculations will only work on fields that are visible in the grid.** For example if you want to perform a calculation on the Availability summary value, the Availability field must be visible on the grid.

Field Area

☒ Data Area

☐ Row Area

☐ Column Area

☐ Filter Area

Enterprise Location Plant Line

Availability OEE

Device 0

Area	Shift	Device 2	Device 3	Grand Total
		Availability	OEE	Availability
Packaging	Shift 1	47.3	33.9	47.0
	Shift 2	0.0	0.0	0.0
	Shift 3	58.1	41.0	61.6
	Shift 4	3.9	3.1	5.8
Packaging Total		37.7	26.9	41.2

Cancel Proceed to Expression Editor >>

# Create Custom Field - CountDiff

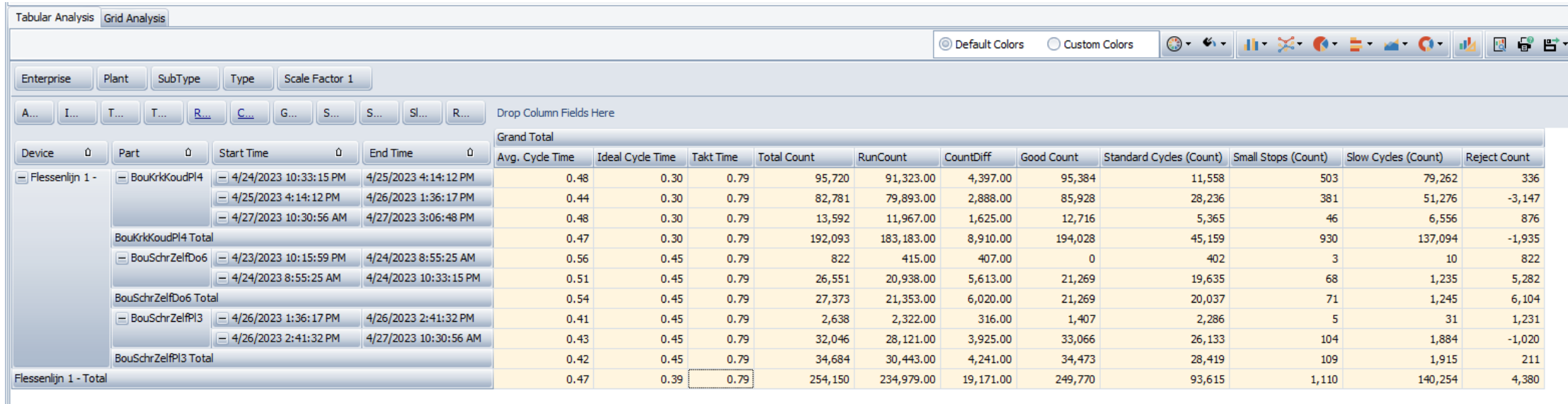
1. Create a custom field called **CountDiff**
2. Result Type = **Decimal**
3. Summary Type = **Sum**
4. Field Calculation = **Summary Values**
5. Click Proceed to Expression Editor
6. We want to see the difference between Total Count and the number of Cycles to running.

Expression editor

[Total Count] - [RunCount]

+ - × ÷ % (...)= ≠ < ≤ ≥ > ( )

# Why are the Cycle Counts different than the Total Count?



Device	Part	Start Time	End Time	Avg. Cycle Time	Ideal Cycle Time	Takt Time	Total Count	RunCount	CountDiff	Good Count	Standard Cycles (Count)	Small Stops (Count)	Slow Cycles (Count)	Reject Count
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While I don't have the answer to this as it is specific to the factory and the products being manufactured.

You now have information that you can take to the teams to find out what is causing the cycles to be different than what is counted, is the Ideal Cycle Time correct for those products, and if they are, then they are not being run properly. If they aren't correct, then what needs to happen to fix that issue?

We also see negative reject counts. Are the inspected products being put back on the line before the count sensor?