

Application Note

YIELD VARIANCE MONITORING WITH HIOKI WIRELESS LOGGERS



What Is Yield Variance?

Yield variance is defined as the difference between the actual amount of finished products and the expected amount of units produced from a given amount of raw materials used [1]. Yield variance is normally calculated in terms of the cost of the difference as below:

(Actual output in units - Expected output in units) x Standard Cost per unit of raw materials

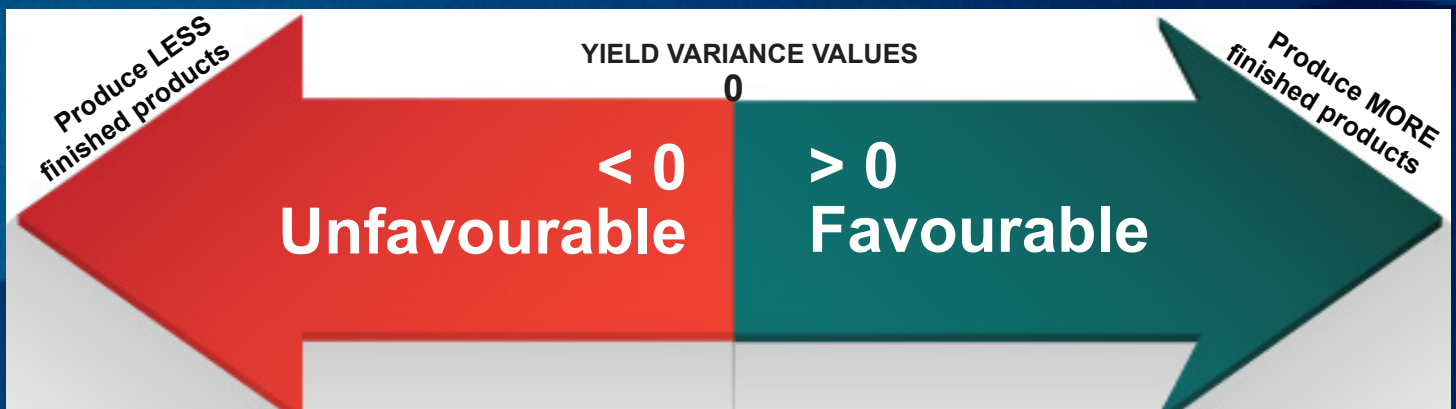


Figure 1.0 Yield Variance Values & Interpretation

Figure 1.0 shows the relationship of yield variance value to the amount of finished products. In brief, yield variance measures the efficiency of turning inputs into outputs [2]. A negative yield variance could be due to labor inefficiencies, faulty equipment, improper production methods, high wastage, inferior materials or use of cheaper mix with a lower yield.

Methods To Track Number Of Produced Units

There are a few methods to track quantities produced [3]

- 1) Manual count and recording
- 2) Automatically using direct connection of counter on production equipment
- 3) Automatically using external add-on attachment to tap to related production equipment signals (for equipment without built-in counter)
- 4) Dual mode – Combine manual and automated data collection for flexibility

Hioki LR8512 For Wireless Pulse Output Signal Measurement

The conventional press machine output tracking is by manual count and recording. But this can be automated with the use of Hioki LR8512. A press machine produces one pulse signal output with each press. Hioki LR8512 can tap and record the pulse output signals to represent the output number. The pulse counts displayed are on an instantaneous and cumulative basis. The automated data collection and recording minimizes human error in the production output recording.



■ Specifications (Accuracy guaranteed and Post-adjustment accuracy guaranteed for 1 year)

No. of input channels	2 channels (common GND)
Measurement modes	Integrating (cumulative/Instant), Revolution, Logic (Records an 1/0 for each recording interval)
Supported input format	Non-voltage “a” contact (always-open contact point), open collector, or voltage input (DC 0 V to 50 V)
Recording intervals	0.1 to 30 sec, 1 to 60 min, 16 selections
Recording modes	Instantaneous value
Dimensions, Weight	85W×61H×31D mm (3.35W×2.40H×1.22D in), 95 g (Not including the battery)

■ Pulse input

Pulse input cycle	200 μs or higher when the filter is set to OFF (must be 100 μs or higher in H period and L period.) 100 ms or higher when the filter is set to ON (must be 50 ms or higher in H period and L period.)		
Measurement	Range	Max. Resolution	Measurement Range
No. of revolutions	5000/n [r/s] f.s.	1/n [r/s]	0 to 5000/n [r/s]

*n is the number of pulses, 1 to 1000, per revolution.

In addition, Hioki LR8512 is suitable for real time mass production output tracking due to the following key-features:

- Compact size to fit constraint spaces
- Bluetooth wireless data sending for real time monitoring (accessible thru Android devices installed with free 'Wireless Logger Collector' app within 30m line-of-sight)
- 2 channels for 2 locations simultaneous tracking
- 500,000 data points per channel

Hioki LR8410 as Central Logging Station for multiple LR8512 Pulse Data Logger



For production using multiple data logger, Hioki LR8410 provides automatic data integration for all units and speedy yet error-proof reporting with the following features:

- Max 7 units of data logger connection for data integration
- Quick setup and auto detection of data loggers
- Bluetooth wireless auto data transfer within 30 m (line-of-sight) range of data loggers
- Data integration using single time axis for data from multiple data logger
- Remote control and monitoring capability via built in HTTP server function
- Automatic periodic (configurable by user) data sending via FTP
- E-mail notifications for various conditions

Summary

Hioki LR8512 can be easily integrated into any equipment with readily available pulse output signal for production output tracking. The remote monitoring feature enables real time monitoring and automated data retrieval of production output. Multiple data logger information integration enables accurate overview of production tracking with ease and speed.

References

1. <https://www.accountingtools.com/articles/what-is-a-yield-variance.html>
2. <http://kfkknowledgebank.kaplan.co.uk/KFKB/Wiki%20Pages/Mix%20and%20yield%20variances.aspx>
3. <https://www.lighthousesystems.com/mes-software/production-counting>