FreePoint™ Technologies Inc.

Wire Harness Manufacturers

Application Notes

by FreePoint Technologies Inc.

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About Wire Harness Shops

INDUSTRY OVERVIEW

Wire harness manufacturers operate a variety of machines that produce electrical harness assemblies to transmit either electrical power or signals. There are a few ways to measure efficiency in this industry, depending on the machine being used.

Many processes are automated but several processes are still largely operator influenced or manually controlled. There are far more people involved "hands on" in production in this industry than in other Tier 1 industries.

The primary manufacturing processes for wire harness manufacturers include:

- Automatic Cutting, Stripping & Terminating
- Molding
- Braiding & Winding
- Electro-Sonic Welding
- Assembly
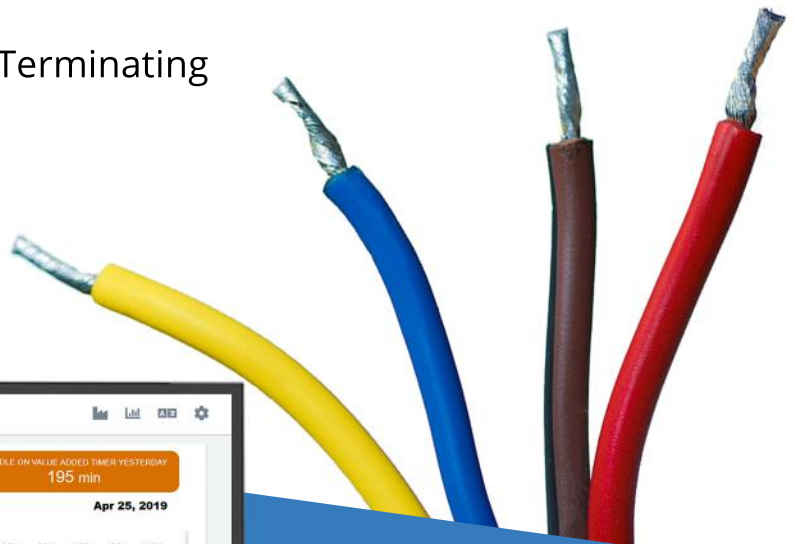
The Challenge

Automatic Cutting, Stripping & Terminating Machines

Automatic cutting, stripping and terminating machines are one of the more costly machine types wire harness manufacturers will buy. They are also the one they are often most concerned about as it is usually the first step in the process. Cutting, stripping or terminating a circuit wrong may mean wasting a tremendous amount of time, material and energy if the mistake goes undetected.

Unexpected machine down time has a major downstream ripple effect. In the past, a machine may have been set up to run one specific circuit for days or even weeks, but in today's manufacturing environment, smaller batch sizes and frequent set ups are the norm, *making set up times as important to track as machine performance time.*
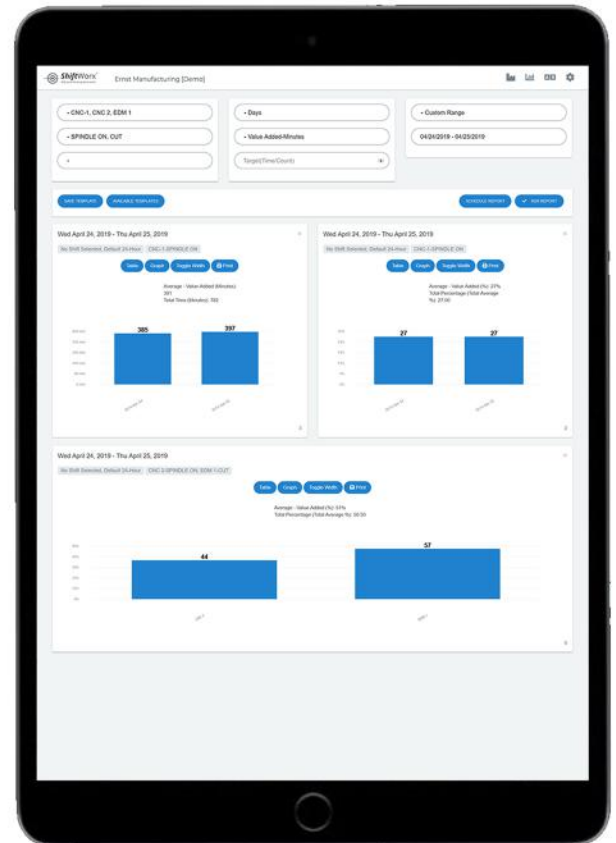
Machine-Specific KPI's

• **Production Rate**
The rate at which circuits are produced *(hour/shift/day/period)*

• **Production Volume**
The number of circuits produced *(hour/shift/day/period)*

• **Value-Added Time**
The time the machine spent producing circuits

• **Set-Up Time**
How long it takes to set up a job

The Challenge

Electro-Sonic Welders

Electro-sonic welders are usually manually operated. Because of this, the rate and yield of the machine is largely operator dependent. There are quite a number of types of machines in operation on the plant floor, most of which do not support traditional connection technologies.

Machine-Specific KPI's

• Production Rate
The rate at which circuits are produced *(hour/shift/day/period)*
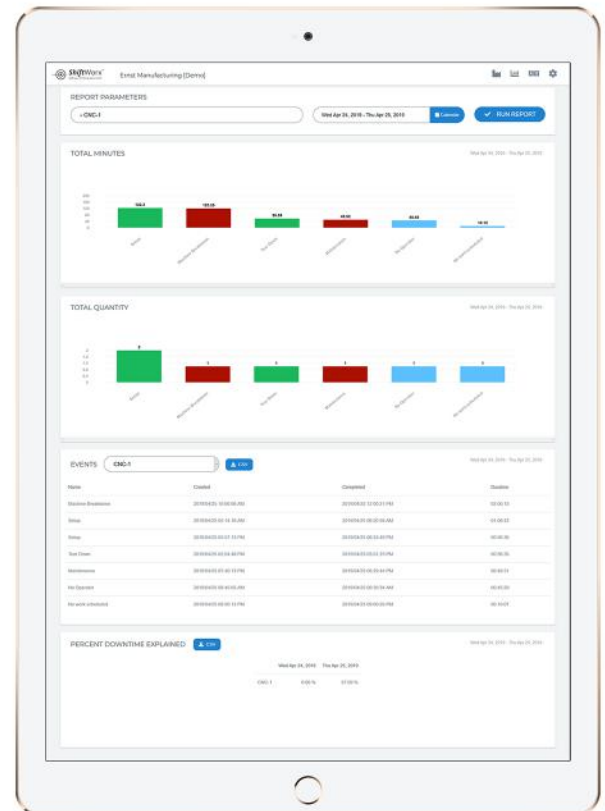
• Production Volume
The number of parts produced *(hour/shift/day/period)*

• Process 'Yield'
Total "good" (or "bad") cycles

• Value-Adding Time
Time the machine spends producing parts

The Challenge

Molding Machines

A growing number of harnesses are being over-molded for environmental protection for weather proofing and reliability. Each connector is often unique, requiring specific tooling for each connector type. Molding machines are often the bottleneck in wire production processes. To optimize throughput, the manufacturer often has to choose between performing more set ups on a machine, or letting machines sit idle to avoid extra set ups, or, buying additional machines.

The cost and complexity of operating these machines makes the process challenging to many manufacturers. Whereas most machines just need floor space, an electrical connection and an temperature, raw material, a recipe, and a more complex tooling set up than most machines, meaning these machines are often the constraint. Because of the wide range of brand age, they often have no built in means to connect to productivity measurement systems.

Machine-Specific KPI's

• **Production Rate**
The rate at which parts are produced *(hour/shift/day/period)*
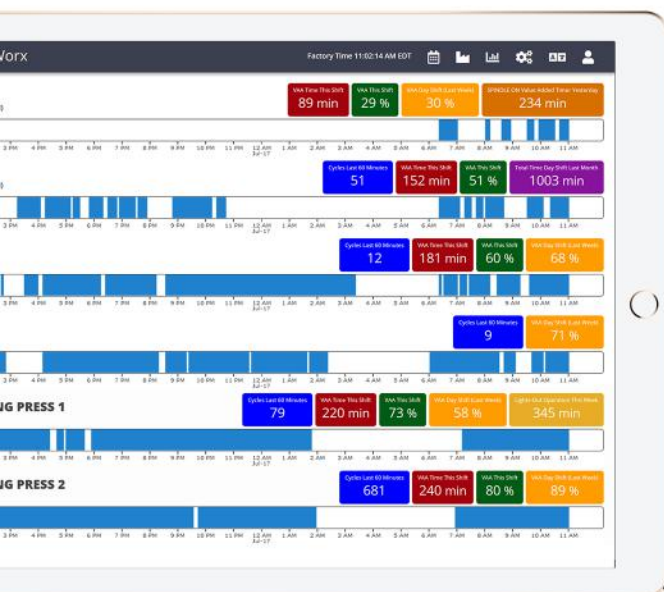
• **Total Production Volume**
The total number of parts produced *(hour/shift/day/period)*

• **Proces 'Yield'**
Total "good" (or "bad") cycles

• **Value-Adding Time**
Time the machine spends producing parts

The Challenge

Braiding & Winding Machines

These are usually continuous processes. The value adding activity of braiding and winding machines comes down to what % of the day (or shift or hour) it is winding or braiding, how long the machine is not winding (or braiding), and the reasons why.

Machine-Specific KPI's

• **Machine Uptime**
By percentage or in minutes
(hour/shift/period)

• **Total Run Time**
(By hour or period)

• **Downtime**
Unplanned causes of machine downtime
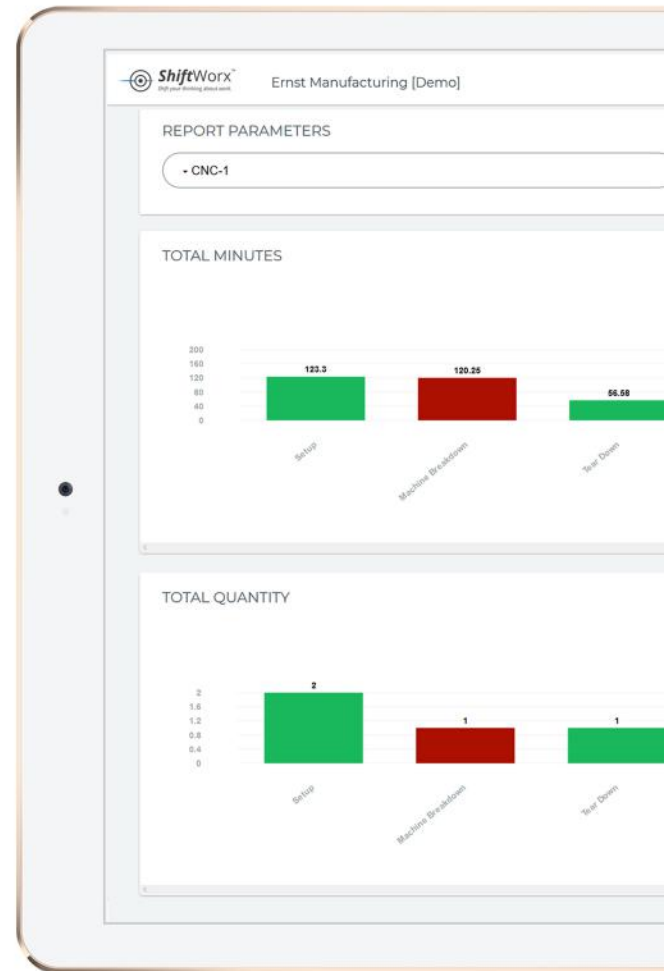
The Challenge

Assembly Stations

This is usually still an entirely manual process. In some applications, operators can assemble and test hundreds of small harnesses in a single day. In others, it can take multiple people up to 8 hours to make a single harness.

Because it is such an operator influenced process, the actual production efficiency can vary extremely, and is not easily measurable (empirically).

Machine-Specific KPI's

• Production Rate
The rate at which harnesses are produced *(hour/shift/day/period)*

• Build Time
Elapsed time to build each harness

• Production Volume
The number of harnesses produced *(hour/shift/day/period)*

• Value-Added Time
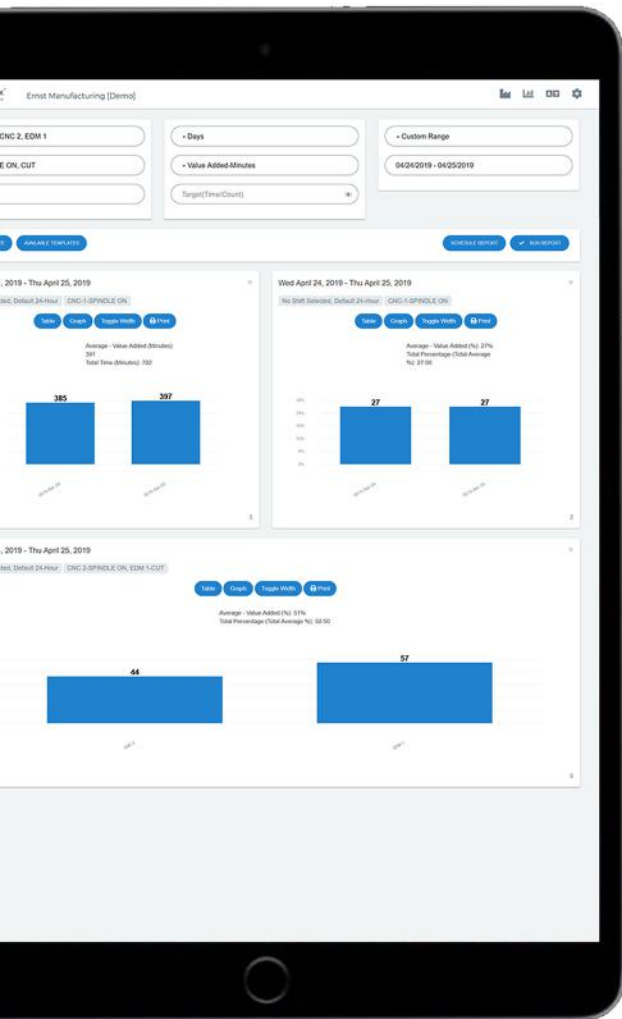The time the operstor spends producing value

• Set-Up Time
How long it takes to set up a job

• Process 'Yield'
Total "good" (or "bad") test cycles

The Solution

FreePoint's proprietary and "non-invasive" machine connection technology can connect to any machine on the plant floor. On some machines such as cutters, welders and molders, value measurement will be based on cycles (counts) produced, and on others such as braiders and winders, it will be based on running time.

On all the machines and assembly stations, FreePoint's patent pending "value added activity" algorithm can be applied to determine what part of the day, shift, or period the machine is actually adding value, and which periods it is not.

By making the value adding activity time and non-value adding time clearly visible in real time, it is then possible to measure, analyze and gain insights on all non-value adding periods, for the purpose of continually improving performance, efficiency and profitability.

Narrative

Using our "Narrative" module, Operators are engaged in the data collection process by empirically identifying all the non-value adding periods (down time causes), giving management the information they need to make better decisions.

Notifications

Using our "Notifications" module, supervisors, managers and maintenance staff can be alerted via text or email whenever a critical machine has stopped for a defined period of time, minimizing or eliminating unnecessary down time.

The Outcome

Wire harness manufacturers obtain much clearer insight into their process by connecting all the various machines on the shop floor on one platform.

Machines old and new can be connected to, visualized on a single dashboard. By improving process transparency, management can more easily identify bottlenecks in their process and address them to mitigate unplanned machine downtime. In turn, **production capacity can be increased without adding new machines or personnel** on the shop floor—saving time and money.

> **Visualizing producion data empowers manufacturers to continually improve performance, efficiency and profitability.**

Interested in an IIoT Solution?

Reach out to us today to speak with an Account Manager.

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Factory Time

WatchLive Menu

Factory Time 11:02:14 AM EDT

Cycles Last 60 Minutes	VAA Time This Shift	VAA This Shift	Total Time Day Shift Last Month
51	152 min	51 %	1003 min

Key Performance Indicator (KPI) Section

Timeline Bar

WatchLive Bar

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