komax

WIRE Insights

WHITEPAPER

EN

HOW THE WIRE PROCESSING INDUSTRY BENEFITS FROM REAL-TIME DATA ACQUISITION WITH WIRE INSIGHTS

Increasing customer demands for quality, flexibility and availability are forcing manufacturers in the wire processing industry to design lean, flexible and efficient production processes. Increasingly, IIoT services are being used to ensure highly efficient collection and analysis of data in real time. This whitepaper highlights the success that the PKC Group – a solution provider to the global commercial vehicle industry and part of the Motherson Group – has achieved by implementing the WIRE Insights cloud-based digital service and reveals the results.

Abstract

Increasing demands on quality, availability, price pressure, and regular adjustments and changes in production are reshaping the wire processing industry. Processes must be increasingly measurable, automated, and continuously optimized to ensure a lean, efficient, and cost-effective production process. PKC Group is also familiar with these challenges and is investing in the digitization of its production sites.

To this end, PKC and the Komax Group carried out a data analysis project at a total of 4 different PKC production sites with the help of the WIRE Insights digital service over a period of 6 months. Real-time data acquisition from a total of 15 machines and regular discussions within the project team, during which the data was analyzed and operational measures were defined, led to significant improvements. “The wire reject rate as well as the number of error messages per unit of time were significantly reduced.” This not only increases the efficiency of the machines, but also leads to significantly less rejects, resulting in additional financial savings for the customer.

Current Challenges in the Wire Processing Industry

The world is changing. New technologies are changing our daily lives significantly, having a positive impact on our efficiency, improving comfort, and are increasingly taking sustainability into account. Producers are under constant pressure to offer consumers a more pleasant, safer, and better life – they must be able to produce and process their products cost-effectively, in a sustainable manner, with maximum flexibility, and as quickly as possible.

This change is not only leading to tangible changes in our daily lives, but is also forcing all industrial and production sectors to rethink and reshape their approaches. And the same goes for the wire processing industry – increasing customer demands when it comes to quality, a high degree of flexibility in the production process, as well as ongoing price and deadline pressure are the main factors that are forcing manufacturers to design production processes to be as lean, flexible, and efficient as possible. The highest possible production output and maximum profitability are paramount, while observing environmental production standards and fulfilling the demand for the most sustainable production method possible. Customer-specific wire harnesses can now be ordered from specialized wire processing companies basically at the click of a mouse. This requires an extremely high degree of flexibility in the production process, and the increasing electrification and miniaturization of vehicle components also means that production processes must be regularly adapted and continuously optimized in order to remain competitive.

OEMs in the automotive industry are also increasingly demanding traceability and transparency with regard to production processes and quality standards. Intelligent, fully automated, and fully interconnected digital solutions are increasingly being used to meet these requirements. This makes it possible to achieve a high degree of transparency when it comes to production, the production process, and machine performance. In colloquial terms, systems like these are often referred to as the Industrial Internet of Things (IIoT), where IIoT stands for the highly efficient acquisition and analysis of real-time data. This enables important information to be made available and used for faster and more accurate business decisions.

How IIoT Services Proactively Support Customers

IIoT systems consist of plants connected to the internet and advanced analytical platforms that process and evaluate the generated data. IIoT devices can be anything from the tiniest connected sensors to large and highly complex industrial systems. This connectivity and the analysis of real-time machine data enables advanced operational efficiency and production process optimizations. But systems like these offer other significant advantages: IIoT machines can be monitored to predict potential issues, leading to reduced downtime and increased overall efficiency. IIoT technology can also be used to reorder goods via planning data and real-time production data – and do so before the current stock runs out. The advantage of this is that goods that are actually required are in stock, storage costs and waste can be reduced, and employees can concentrate on other tasks.

The universal advantages of IIoT solutions for industrial companies are also increasingly being applied in the wire processing industry. Due to the high proportion of manual process steps, system suppliers and manufacturers in this industry are faced with the challenge of digitalizing the entire production process. In light of this, it may be a good idea to focus on the partially and fully automated work steps of the production chain as the first step. The automated elements of the production chain can generally be digitalized with less effort, but can already provide useful information on upstream or downstream processes.

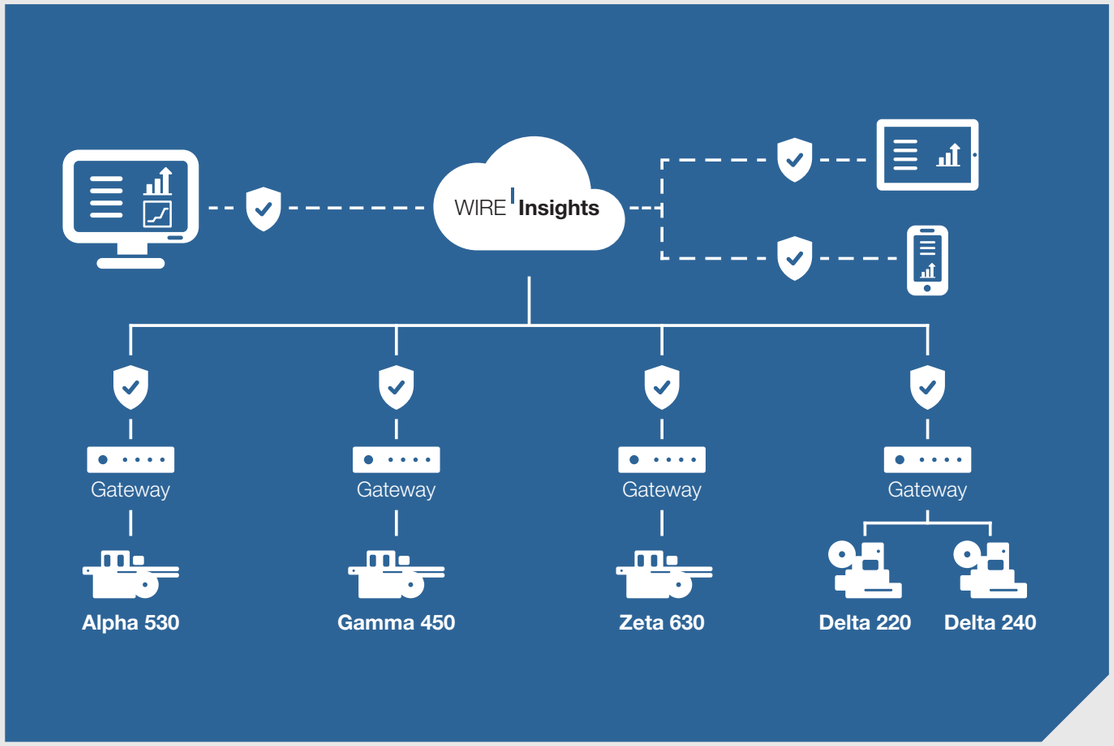
It is now common practice for data sets like these to be collected and evaluated via Manufacturing Execution Systems (MES), especially in larger plants. In the wire processing industry, however, experience has shown that conventional production data is often not sufficient to identify sources of error and optimization potential on the machines themselves. In-depth data records such as real-time status messages are usually required for this purpose. The more detailed the information contained in the data records, the more precise the analysis options are and the more accurately sources of error can be narrowed down. One of the greatest challenges in this regard is the continuous and complete acquisition of machine data, which makes meaningful historization and evaluation possible.

Linking the historized data sets already offers considerable added value compared to the traditional acquisition methods via MES. While a production line is running, information can be obtained about the current performance of the producing machine. This supports manufacturers in the targeted identification of production problems, can help to quantify optimization potential, as well as to exploit it through targeted measures in the production process. Ultimately, this initiates a continuous improvement process.

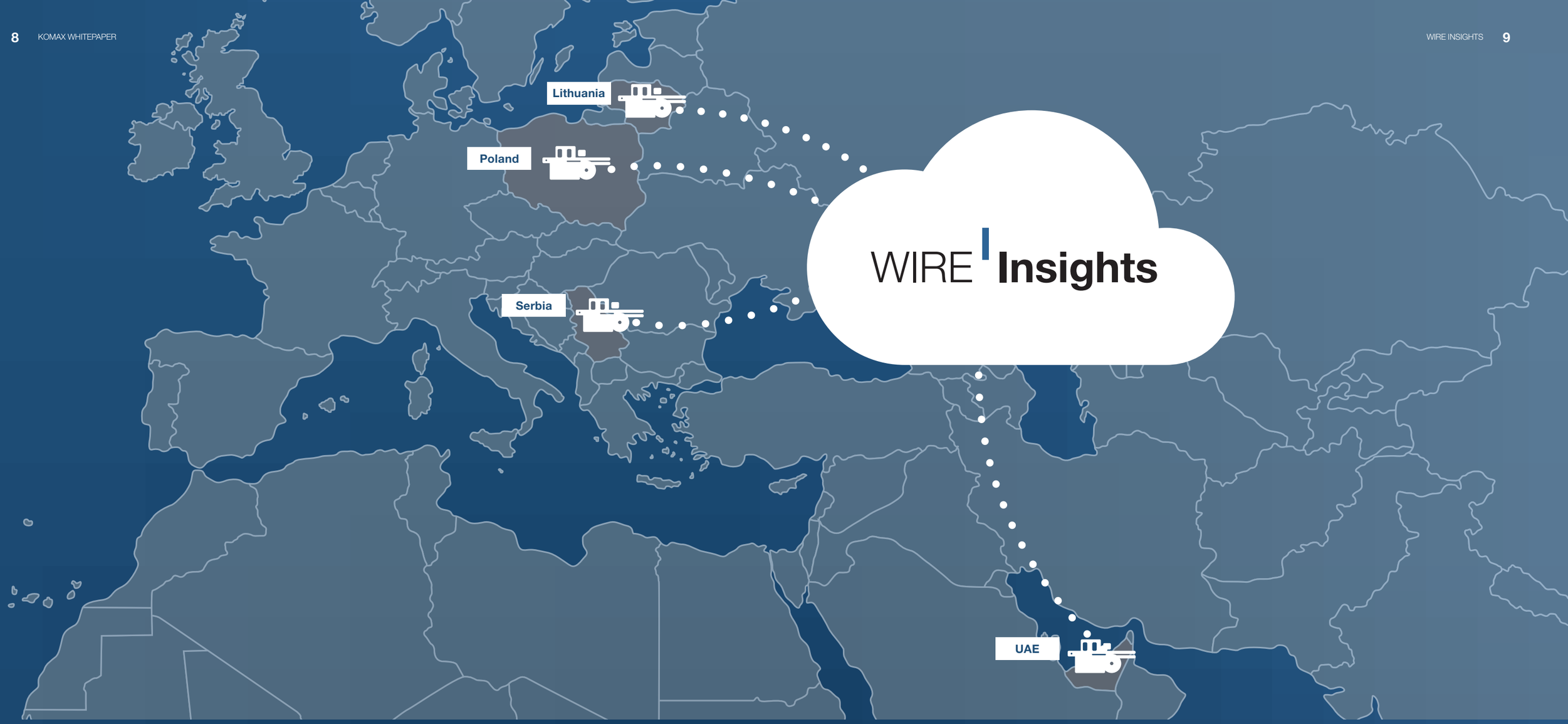
WIRE Insights: Connectivity Solution for the Wire Processing Industry

With WIRE Insights, a cloud-based digital service, the Komax Group offers a solution for real-time production data acquisition for the wire processing industry. The service is primarily designed for capturing and historicizing machine data from ongoing production and making it available to a company's various organizational units from any location. This ensures that all relevant parties share the same data upon which they base decisions.

WIRE Insights is a digital service that transfers data from ongoing production to the WIRE Insights cloud service in real time by way of a "connectivity gateway." On the one hand, this offers the advantage that the service can also be used with existing and already installed machines in the plant. On the other hand, it increases data transfer quality and IT security, as the machines themselves are decoupled from the cloud connection. The gateway acts as a buffer zone for unsuccessfully transmitted data packets, but also applies essential security features. In the event of a network failure, data can be cached on the gateway and transferred to the WIRE Insights server following successful connection to the cloud. From this point on, the data records are continuously transferred from the gateway to the server via a secure channel, via which the entire data history of each machine can then be analyzed in-depth on any device via the WIRE Insights visualization. Integrating machines into the cloud requires no engineering effort at all, as the system automatically recognizes the machines and displays the data fully automatically in the system. This concept is scalable and can be expanded as required over time, meaning that a single system can be used to display data from several production lines or even across plants. Seamless and easy-to-use data analysis is the foundation for process and machine optimization. This ensures that the results of ongoing data acquisition are incorporated into day-to-day business across the various departments and hierarchy levels and implemented operationally.



The data analysis project with our customer, the PKC Group, impressively demonstrates how real-time data acquisition, careful data analysis, and systematic implementation of operational measures can lead to significant improvements in efficiency.



PKC Group and How the Project Went
The Motherson Group is one of the top 15 automotive suppliers in the world and the PKC Group has been part of Motherson since 2017. PKC designs, manufactures, and integrates customized electrical distribution systems and associated architecture components, vehicle electronics, as well as wires and cables. The company particularly focuses on trucks and buses, light and recreational vehicles, construction machinery, and agricultural and forestry equipment. PKC also designs and manufactures control cabinets, power supply units, and electrical distribution systems for leading rail vehicle manufacturers.

The Motherson Group supports its customers with over 400 facilities, operates in 44 countries and counts more than 190 000 employees.

Of these plants, a total of 4 existing PKC Group production sites – in Serbia, Poland, Lithuania, and the United Arab Emirates – were equipped with the WIRE Insights cloud service as part of the data analysis project. The installations were carried out in collaboration with the local IT departments during ongoing operation.

A total of 15 Gamma 450 machines were connected across the four production sites mentioned above during this project. Choosing the same machine type across all plants has improved the comparability of the data captured across the sites.

Following successful installation, the machine log data was collected for a total of four weeks without training or other activities. This was done in order to determine the current status of the machines. Afterwards, machine performance was then recorded over a five-month period. The project team consisting of project management, local production and service managers, as well as Komax experts met at regular intervals to discuss and analyze the data records in detail. At the beginning of the project, the team defined the following cross-plant targets, which were then monitored and optimized over the entire duration of the project:

KPIs
– Machine downtime
– Wire reject rate
– Terminal reject rate
– Seal reject rate

Objectives
– Reduce alarm messages by at least 10 percent
– Achieve wire, terminal, and seal reject rates of below 5 percent
– Keep machine input waiting time to less than 1 hour per day and machine

Results during the First Project Phase

After the first few project meetings, it already became clear that the regular and cross-plant discussions based on the defined target variables and KPIs were very helpful for the PKC Group. This made it easy to compare the performance data of the various plants and define corresponding measures. The packages of measures were defined individually for each site and assigned to the individuals responsible for the local production. Monitoring activities within the the project team, the definition of measures, and the regular evaluation of data via WIRE Insights have led to the following results on average and across all production sites:

18.5%
(from 2.7 to 2.2 %)
Reduction in wire reject rate

84.3 %
Reduction in alarm messages

If we take a closer look at the changes at the individual plant level, the results are even clearer. For example, in one plant where the WIRE Insights service has been in use for a long time and is integrated into the local production processes, the following KPIs were achieved:

36.4%
(from 2.2 to 1.4%)
Reduction in wire reject rate

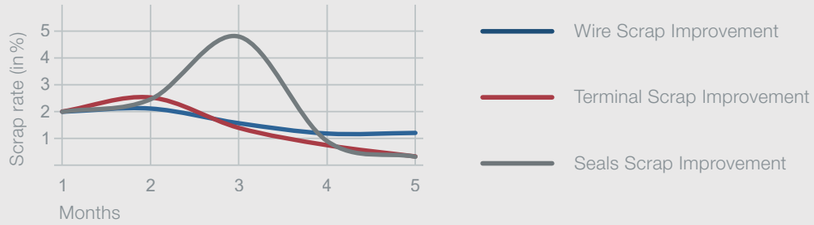
39.5%
(from 4.3 to 2.6%)
Reduction in terminal reject rate

38.6%
(from 4.4 to 2.7%)
Reduction in seal reject rate

37.6 %
Reduction in alarm messages

The following graph shows the documented trend of the measured reject rates. The wire reject rate is shown in blue, the terminal reject rate in red, and the seal reject rate in gray. Looking at the graph, a clear drop in reject rates across the board is visible. The short-term negative trends in the terminal and seal reject rates are particularly noteworthy (shown in the graphic as upward curves). They clearly show that by regularly measuring performance data, long-term success can be achieved and negative trends effectively countered. Machine optimization is a continuous processes that must be firmly enshrined in production, as the project with the PKC Group has shown.

KPI Improvement at PKC Poland



Summary

The project in close collaboration with the PKC Group has impressively demonstrated that WIRE Insights can be put to extremely good use in day-to-day production thanks to the simplicity of machine data analysis. And this applies regardless of whether someone works at the production plant, is in charge of machine maintenance, is responsible for production planning, or is part of a company's management team.

WIRE Insights provides valuable insights into ongoing production and both delivers and analyses data in real time. The cloud-based service creates transparency and makes machine data visible, measurable, and comparable. WIRE Insights therefore forms the basis for revealing and exploiting optimization potential as well as operationally monitoring the entire fleet of machines. And this helps companies make informed decisions and initiate measures that promote the efficiency of ongoing production.

Digital services act as an ideal complementary product to get the most out of every installed machine, especially when combined with the Komax Group's extensive range of services.

Raphael Wespi
raphael.wespi@komaxgroup.com

WELCOME
TO THE KOMAX GROUP

komax
Schleuniger
adaptronic
CIRRIS
DI.IT
TECHNOLOGY HOSVER
WUSTEC

Komax – leading the field now and in the future

As a pioneer and market leader in automated wire processing, Komax provides its customers with innovative solutions. Komax manufactures series and customer-specific machinery, catering to every degree of automation and customization. Its range of quality tools, test systems, and intelligent software and networking solutions complete the portfolio, and ensure safe, flexible, and efficient production.
Komax is a globally active Swiss company with highly qualified employees and development and production facilities on several continents. It provides local support to customers worldwide through its unique sales and service network and offers services that help them get the most out of their investments.

Komax AG
Industriestrasse 6
6036 Dierikon, Switzerland
Phone +41 41 455 04 55
sales.din@komaxgroup.com

komax
komaxgroup.com

WIRE Insights Whitepaper V1 11-2024
Subject to change