Reliable Identification of Coils

ibaDatawyzer-ICC

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Inline Coil Tracking Certifier

Areas of application

› Detection of coil mix-ups
› Determination of strip cuts (head/tail)

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Automatic Monitoring of the Coil Tracking

With ibaDatawyzer-ICC coils in the metal producing industry can be identified by characteristic geometrical features.

Reliable Identification of Coils

ibaDatawyzer-ICC (Inline Coil tracking Certifier) is an application for the metal-producing industry that is used for identifying coils by means of characteristic geometrical properties which have been acquired and recorded with ibaPDA. As the identification is made by means of these inherent properties, ibaDatawyzer-ICC can help detecting and rectifying errors and weaknesses of logistical material tracking systems.

The task of ibaDatawyzer-ICC is to verify the identity of a coil after or while going through a manufacturing process, i.e. proving the correctness of the reference of the current Coil Ident compared to the Coil Ident of the previous process.

Background

When producing rolled steel strips or aluminum strips, the material passes through a number of different machines and processes. Between the individual processes, like e.g. hot rolling, pickling, cold rolling etc., the material usually is stored intermediately and transported. Despite the use of logistical coil

tracking systems and warehouse management systems, mismatches or losses can always occur. This can happen due to a wrong assignment or a coil that has been stored at the wrong place. Also an unplanned and not acquired rewinding process is sufficient for generating inconsistent quality data. This results in malfunctions in operation and in further processing.

Fundamentals

ibaDatawyzer-ICC mainly uses for coil identification the thickness measuring value of the rolled strip. As the material thickness usually is measured at the output of one and the input of the following manufacturing process, it „accompanies" as characteristic measured value the coil from hot rolling to the cold rolled and possibly coated sheet.

The length-related thickness measuring value, the thickness length profile, distinguishes itself by its unique signal pattern and by the fact that it is an unchangeable part of a coil, comparable to the human fingerprint. In some cases, the width measuring value can be used for improving the coil search.
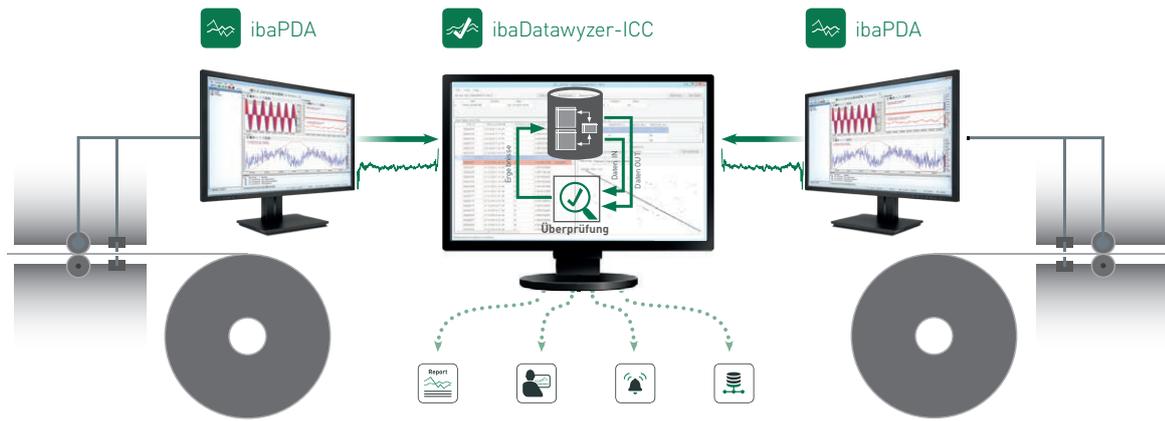
Thickness measurements during the production of a coil, at the exit and entry sections of the machines

Procedure

The high resolution measured values are recorded at all involved machines by different ibaPDA-systems in measurement files. Subsequently, the ibaDatawyzer-ICC relevant measurement data are automatically converted by means of ibaDatCoordinator and ibaAnalyzer into length related data and extracted into separate and compact measurement files. By another extraction with ibaAnalyzer-DB, a central ICC database is filled with the most important characteristic values of the coils and the reference to the compact measurement data files. Each time a coil is completed from a follow-up process („child"), ibaDatawyzer-ICC determines the reference to the „parent"-coil using the information provided by the logistical coil tracking systems. Based on the determined reference, ibaDatawyzer-ICC loads the corresponding measured data files of both coils and starts the analysis.

Matching and Alignment

Using the patented fingerprint technology, ibaDatawyzer-ICC determines the unique characteristic of a thickness length profile and uses it for the coil identification. The result of the analysis essentially is a hit rate (match counter), i.e. the number of congruences of „parent and child coil" on distinctive positions within the signal pattern. In two measurement protocols of the same coil, the hit rate should be significantly above a plant-specific limit. A lower hit rate either indicates bad data quality (measurement error) or a wrong assignment (mix-up). The assignment of data sets with the maximum hit rate as well as all calculated characteristic values are stored in the database.

If the hit rate is below the selectable limit, the entry is marked in color in the visualization and ibaDatawyzer-ICC automatically searches for better matching coils. Moreover, the thickness length profiles are aligned. This way, stretching and compression of the coil and the signal offset on the longitudinal axis - caused by scrap cuts - are taken in consideration.

Thus ibaDatawyzer-ICC can also be used to determine the strip cut at the beginning (head) and end (tail) of the strip with a resolution of about 1 m.
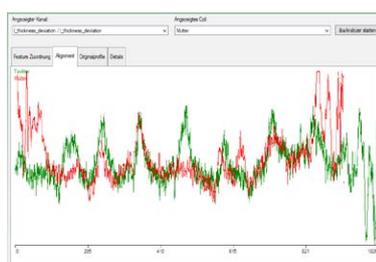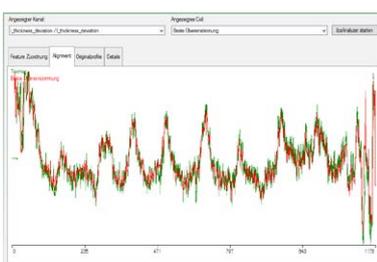
Comparison of the alignments of identical coils (left) and non-identical coils (right)
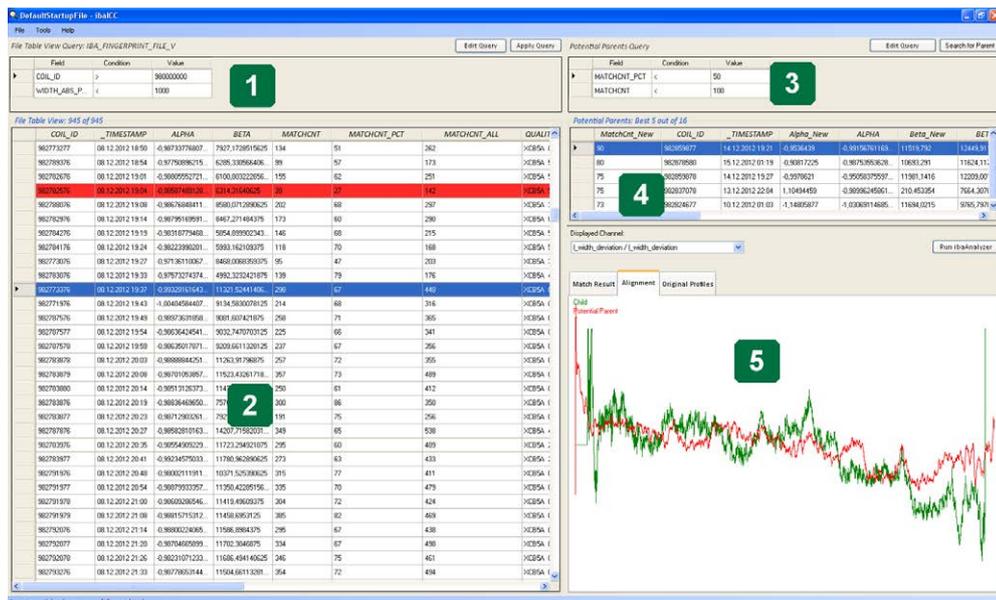
Graphical user interface of ibaDatawyzer-ICC: customized queries (1), matches result table (2), extended query (3), list of potential parent coils (4) and graphs for matches and alignments (5)

Display and Operation

A dataset is displayed for every alignment (parent/child). By means of the query assistant (1), selection criteria can be predefined. The list of results of the query (2) is fully configurable. Usually, the following fields are selected to be displayed:

› Production date of parent-/child-coil
› Coil ID
› Match counter
› Scaling, orientation and offset
› Statistical characteristic values and other information.

If the hit rate is too low or there are doubts about the correct assignment, the user can initiate a targeted search for the parent coil of the marked entry

by means of a further query assistant. The results of this search are also displayed.

In a graphical display (5), the graphs of the thickness length profiles can be displayed with and without alignment. Another graphical representation displays the matches as an approximate straight line through a features cloud. For a more exact analysis, the underlying measured data files can be opened directly with ibaAnalyzer, e.g. for determining scrap lengths.

Integration and Alarming

Based on the open database architecture, the matching results can be used for release systems (automatic locks) and/

or for cross-process information systems (genealogy). Simple alarms can also be configured with corresponding error reports via e-mail.

System Requirements

› Windows 7 (32/64 Bit), Windows Server 2012 R2 (64 Bit), Windows 10 (32/64 Bit), Windows Server 2016 (64 Bit), Windows Server 2019 (64 Bit)
› ibaPDA, ibaDatCoordinator, ibaAnalyzer-DB
› Database (e.g. Oracle, MS SQL-Server)

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