



MAXIMIZE YOUR PRODUCTIVITY FOR THE COILS SEQUENCING ON COLD-ROLLING PRODUCTION LINES



THE CHALLENGE

Typically, coil sequencing on cold-rolling mills only considers the main transition obstacle (the width of coils) and then more or less adapts to the other constraints. What makes the rules even more complex is the inter-dependency of those parameters. Transition from one coil to another sometimes requires the use of intermediate coils and this

adds cost to the process. N-SIDE, a leader in Steel Industry optimization models design, has developed a solution that optimizes the sequencing of the work orders. It integrates all influencing parameters, in order to minimize the number of unwanted transitions and thus maximizes the productivity of the cold-rolling production lines.



www.n-side.eu

THE APPROACH

Cold-rolling activities such as coating, galvanization, painting or profiling are usually managed from a Planning system that creates work orders for the different finished goods sold to customers. Resulting coils can have multiple shapes (length, width and height) but also have different surface treatments to give them different mechanical or aspect properties. This gives a large amount of possible finished products combinations. However, the order of steel coils used to produce those finished products on the

continuous production lines is very important for many different reasons. It is not straightforward to schedule subsequent coils in cold-rolling machines if they have different shape factors for instance. Setup of machines, frequency and aspect of welded joints - influenced by subsequent coils widths and thicknesses-, temperature differences for the different treatment, speed of coils in the line and nature of galvanization or coating bath also impact the transition between two coils.

→ *Considering all the constraints*

COSPRO (Coils Sequencing Productivity Optimization) is a solution based on the latest Operational Research techniques, making it possible to solve the complex problem of work order sequencing for cold-rolling activities. COSPRO innovative solving approach

differentiates from solutions available on the market by its capability to take into account inter-dependency of constraints and not only to sort those constraints.

→ *Optimizing cold-rolling campaign plans*

Typically, there is a main factor that defines what a campaign is made of. In the case of galvanized steel, it is the galvanization bath composition that defines the content of a campaign. Inside the campaign, based on the available raw material coils, we create campaign plans, which are collections of work orders for end-products coils. COSPRO computes the numerous parameters for the available coils (width and thickness), the speed and load of the line, the temperature and the specific treatments to apply (surface treatment requiring specific tooling etc...) and proposes a sequencing for orders that

minimizes continuous line disruptions. An elaborated system of rules, points and weights is attributed to each influencing factor on the sort. All parameters can be changed at any point in time, in a flexible, user-friendly application, and not requiring any extra programming. Transition rules can be defined in both directions from one type of coil to the other, for each parameter. Computation results can be changed manually if required. COSPRO will then recalculate the sequence based on the manual changes.

→ *On-line recalculation when planning changes occur*

COSPRO interfaces on-line and seamlessly with planning systems, refreshes itself as soon as an order is changed in the planning system and re-computes the data to provide a new optimization based on fresh data input. COSPRO also re-computes data if we force an

order due date for commercial reasons and it will minimize the impact of this planning disruption. Furthermore, all changes in parameters are tracked and saved in the system, with reason codes, for instance, when there is no other choice than using an intermediate

THE BENEFITS

→ *Reduce your planning time for coil sequencing campaigns*

As opposed to hours or even a day for a manual sequencing taking into account only some of the parameters, COSPRO will compute the entirety of the weighed parameters to provide the best sequencing list in seconds.

→ *Increase your cold-rolling mills production quality*

By reaching the smoothest transitions from one coil to another, COSPRO ensures a very high quality level that will be reflected in higher customer satisfaction. COSPRO also minimizes penalties in case of quality issues caused by those transitions.

→ *Reduce costs of intermediate coils causing line disruptions*

By optimizing cold-rolling coil sequencing, COSPRO reduces the usage of intermediate coils used for transitions between some production conditions.

→ *Reduce your cold-rolling production lead time*

By reducing the number of intermediate coils and adapting to manually inserted orders, less setup time is required to adapt the tools to the new pattern.

Others N-SIDE optimization tools dedicated to the steel industry

