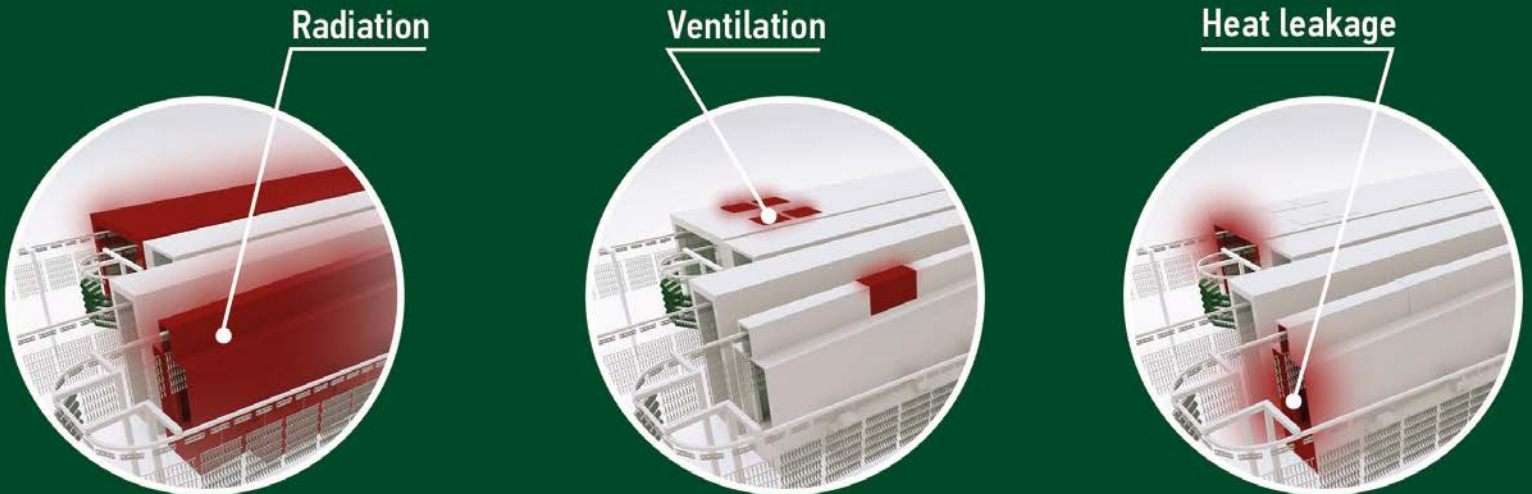


ENERGY LOSSES IN A COATING LINE



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ANALYSIS

The New Financial-Economic Era: Post-Globalisation

Adriano Antonelli

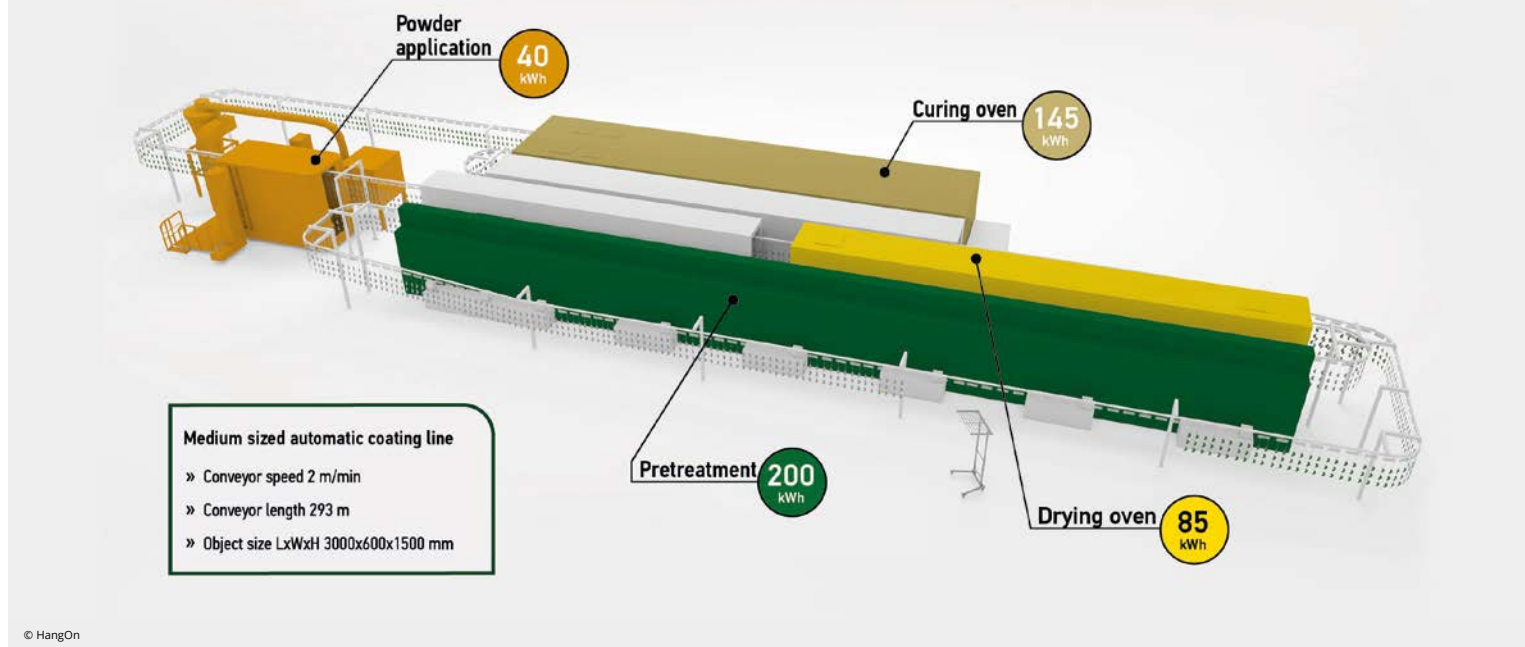
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We lived in the era of globalisation. Underlying this economic and financial concept is the free movement of goods and the maximum openness of markets, which enabled each country (or macro-area) to specialise in what it could produce best, purchasing goods and services that were not within its reach efficiently. This resulted in the relocation of low-added value production and, for developing countries, in a great opportunity to grow stably. It also forced companies to find new forms of organisation to be globally competitive. It was possible to find any product at the best price and in a short time. Warehouses were downsized and some productions that were no longer considered interesting were relocated. We thus witnessed a so-called “win-win” process: the northern part of the world could buy

components and process products with significant added value, whereas the southern part could finally start its industrial and economic-financial development.

More production led to more employment and, in fact, between the 1980s and 2000s, there was an increase in employment of around 800 million people. “Turbo-production” linked with “turbo-finance”, therefore, resulted in a long period of high employment rates and the illusion of lasting global stability. However, some emerging issues were not taken into account, such as the fact that “turbo-finance” was causing disruptions in the banking circuits or that the soft power of certain countries was causing friction at the international level. On the other hand, we had the great advantage of living in a period that can

ENERGY CONSUMPTION IN A COATING LINE



Ibix, distributor of HangOn products, investigated which segments of a coating line are most energy-intensive and what actions can be taken to reduce their impact and footprint.

be described as “deflationary”: just think of the price of some products that would not have been sustainable if production had been carried out entirely in Europe or in Western countries in general.

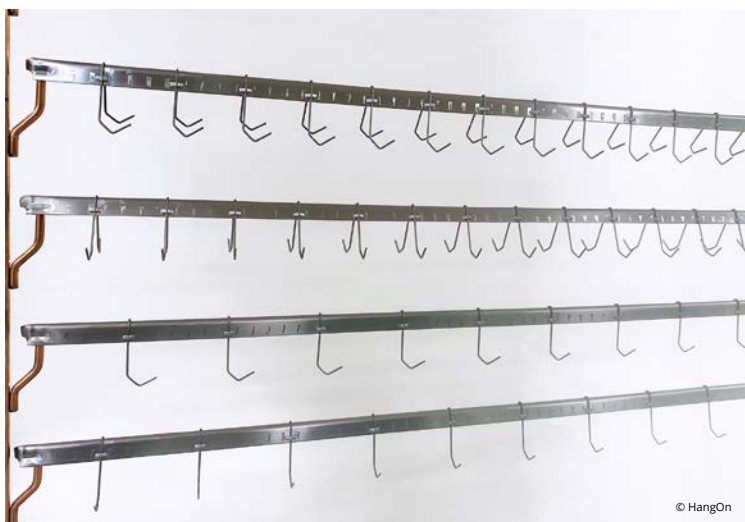
The contraction of markets

Since 2008-2009, however, several issues have been undermining the economic and financial system: in chronological order, recession, Covid, climate change, and even the war in Ukraine. Particularly during the pandemic, problems emerged with company closures and the lack of components that had been taken for granted and readily available for a long time. It was precisely at this time that markets such as China started to become increasingly closed, causing restrictions, limiting trade, and diminishing opportunities for growth and for the specialisation of industrial districts where technological innovation and improvement could take place. Attempts have been made to solve this problem by shortening value chains. Long supply chains with departments located in every corner of the world have shrunk, bringing back “home”, or at least close to the company’s headquarters, the production of essential

components for goods production. Globalisation has transitioned from a worldwide scope to the district and local levels.

Ecological issues and the WLB index

Last but not least, different ecological factors should be considered. We have realised that resources are not infinite. Extreme climate events, supply shortages, and the issues related to rare earths have drawn attention to how we use and manage raw materials. We have started considering new production processes, new but more expensive energy sources, and a new sustainable mobility model. This has clearly affected and will continue to affect the manufacturing fabric and its reorganisation. Another aspect not to be underestimated in this process is the change related to human capital. When comparing how work was and is conceived by Baby Boomers and the Millennials, it is important at least to mention the new WLB (Work-Life Balance) index. All this concretely affects production processes, habits, purchasing choices, and in general the organisation of society, which is experiencing major frictions at the global level that generate both financial and production tensions in the markets.



In the HQL bar, you can hook 1 mm or 1.5 mm on both side (or just one) to increase hanging density.

Effects on the industrial coating sector

On these pages, we would like to analyse how this affects the industrial coating market. We asked our customers, through a survey focussing on the value of sustainability, the reduction of energy costs, and the use of raw materials. We also investigated which segments of a coating line are most energy-intensive and what actions can be taken to reduce their impact and footprint. These values are not only hypothetical but are now actual standards required to work with large groups and multinationals, and they cannot be underestimated for all the reasons described above. Numerous products and production lines are now being reshored to Europe, and many of these include coating operations. Times, quality standards, and costs are changing. All this requires an organisational and production analysis.

How to reduce coating times and costs

Some solutions that can facilitate hanging operations and therefore reduce coating times and costs include frames and systems such as bars produced automatically to reduce both absolute and relative costs, so much so that the price of each hanging point can now be equalised to that of a single hook. The advantage is having stable frames, which increases hanging density and reduces cycle times, especially compared with hook-by-hook hanging.

The HQW system

An example of this is the new HQW system, a 2 mm diameter tree-shaped frame with fixed hanging points. The range is wide, so that every customer can choose its ideal pitch. To have a compact frame, also in terms of packaging, hanging must be done with separate hooks. This frame is designed to be used when a sudden need arises and to avoid hanging hook after hook. The cost is less than one Euro to eliminate any regeneration-related issue.



The HQL bar is also suitable for hanging the pieces in its two holes.

The Flexi Frame system

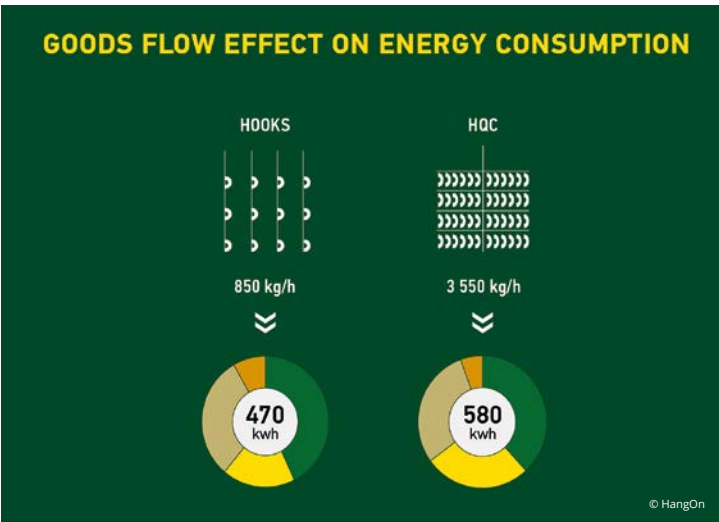
Another new product launched this year is the Flexi Frame (flexible frame) system. It is a frame that can be completely disassembled and stored on shelves, consisting of a T-shaped bar housing two workpiece holders. HQL, HCL BHL, H11B, and HQS bars can be accommodated. The system is designed to be stocked and then used in case of urgent need.

It guarantees the following advantages:

- saving storage space and reducing storage problems;
- lower transport costs, including one-off ones;
- easy handling;
- flexible and compact design;
- self-locking;
- customisable as required;
- reduced cost.



The HQC bar accommodates hooks with a diameter of 1.5 mm, but only on one side.



The advantages of using the HQC bar include increased efficiency, in terms of both speed and hanging density.

The HQL bar

HQL bars are produced fully automatically: this reduces costs and eliminates the need for regeneration. Hooks with a diameter of 1 mm can be inserted into the bar on both sides, in order to hang the workpieces symmetrically. For example, the HQL 800x33 bars accommodate 46 hooks over a length of 800 mm. The bars can be inserted into the universal HCF system. This makes the system modular and enables bars to be inserted according to the length of workpieces. Moreover, the HQL G6 caps guarantee perfect electrostatics.

1.5 mm-hook bars, also made of spring steel, are now also available for small, heavy parts. Different configurations are available in the range, including the triple-bend one, as it provides more secure anchoring in the case of light workpieces that could be lifted into the air during pre-treatment. HQL bars for single-sided hanging are also available, in case it is necessary to hang parts only on one side and



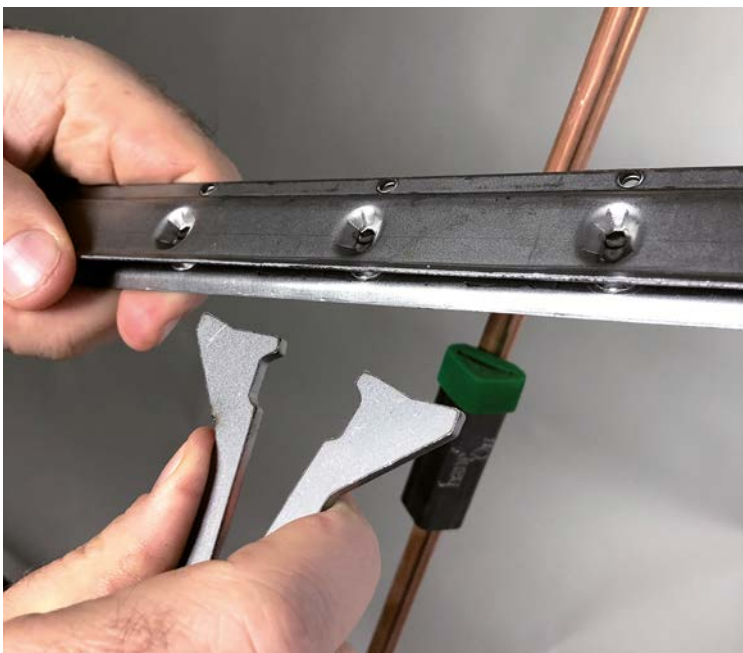
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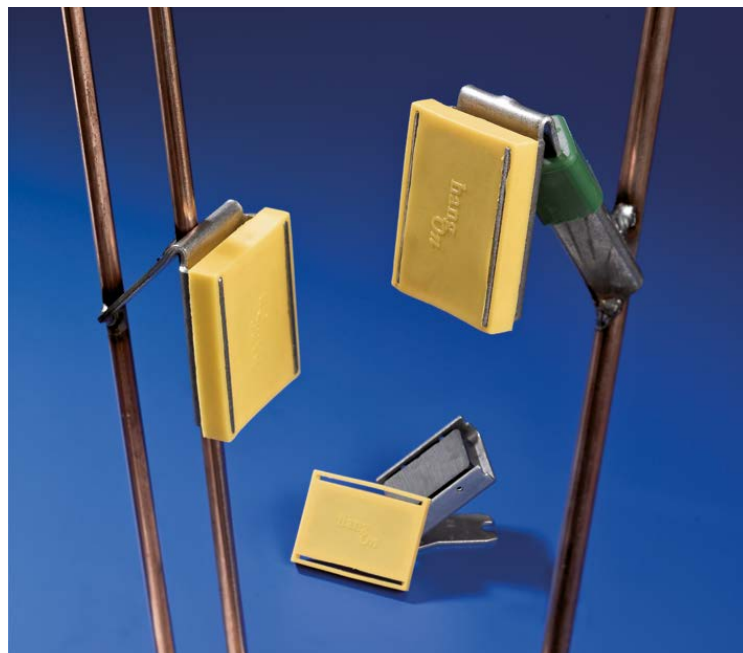
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The new metal adapter also allows inserting H11B bars.



Examples of magnets.

thus avoid any shading effects and other issues.

The advantages of using this bar are numerous:

- time saving: it is possible to achieve a speed that is 30 times higher than with single hooks;
- the hooks leave only a slight mark on the coated parts;
- spring steel hooks;
- possibility to configure the bars with special hooks;
- smart packaging to reduce transport costs.

The HQC bar

A more robust version of the HQL bar is the HQC one. It accommodates hooks with a diameter of 1.5 mm, but only on one side. It has a coupling that allows hooks to be inserted into a central 10 mm-diameter one. The R 58 bar holder allows the bar to be stable and easily removed, also thanks to the BH G 20 caps. The resulting frame is economical and flexible, as it is possible to avoid filling all the levels. The hooks have a pitch of 50, 75, or 100 mm. This type of bar was also designed to avoid using individual hooks, which dramatically reduces the operators' hanging time. Indeed, the availability of a ready-to-use frame eliminates the need to handle single hooks. In addition, it allows for easy offline pre-hanging. Another advantage is that it can be used for multiple hanging configurations. This bar's production technology makes it possible for it to have a similar cost to that of an individual hook. Therefore, there is no extra cost for the purchase of frames compared to standard hooks. Finally, to make this frame even more versatile, a new metal adapter was launched that also allows H11B bars to be inserted. In this way, using the same central hook, a bar can be accommodated allowing hooks up to 4

mm in diameter to be inserted, thus achieving horizontal flexibility.

The H11B bar

These are punched bars inside which hooks are lodged. This ensures clean and protected contact points as well as the flexibility to change the hanging hooks whenever necessary. Standard or twin hooks can be used with the same bar, fitting between the two punches and remaining fixed. As far as twin hooks are concerned, any configuration can be chosen for even greater flexibility. These bars are highly durable (it has been assessed how much they can support depending on their length). Even more robust H2B, H25B, and H3B versions are also available. These bars can accommodate hooks up to 10 mm. Hooks can be welded at their ends to obtain a T-shaped frame. This guarantees part stability, while the system's modularity allows hooks to be inserted where needed without losing conductivity.

The HCL bar

HCL bars have housings for the insertion of springs or hooks made from round rods or sheet metal. Their ends are protected with silicone caps that allow easy removal and ensure conductivity. They can have single or double housings to increase hanging density. They are therefore extremely flexible, eliminating the need to build a different frame for every part to be coated. Special accessories can be created, depending on the workpieces. Two springs can be accommodated inside the hook holder with a 4-end outlet. These bars can also be used for cataphoresis processes, thanks to a cap system that allows their ends to be protected and prevents the

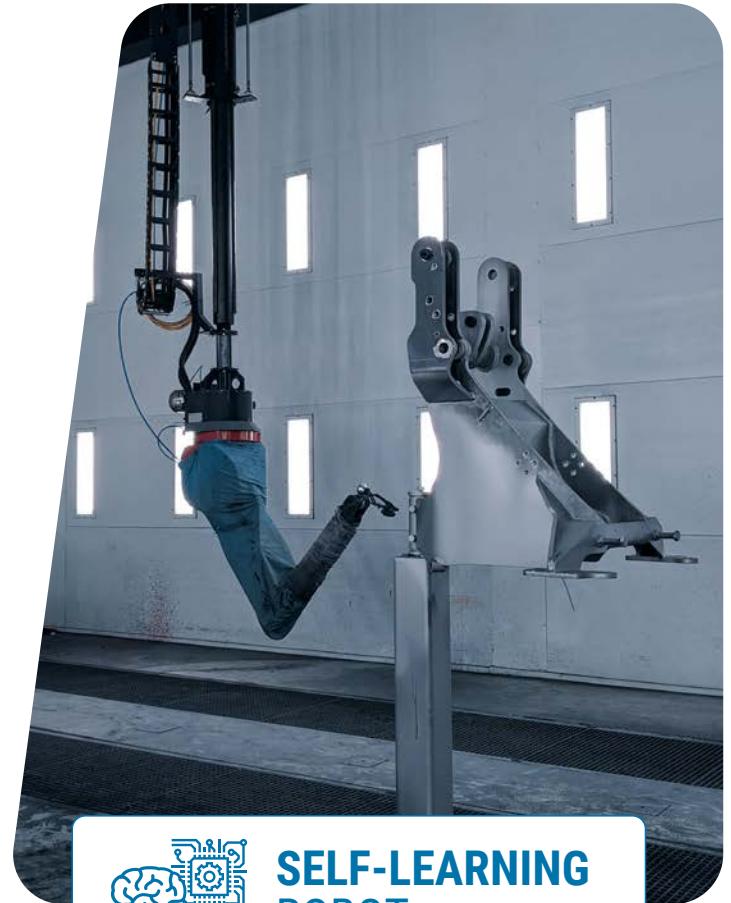
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HQS frames have metal slats for hanging any element from individual parts to profiles.

cataphoresis product from climbing up.

The flexibility of the HCF universal frames allows using bar holders with interchangeable bars, and in some cases, bars with accessories that can be inserted depending on the workpiece to be hung. This leads to a significant reduction in the number of frames required for the different workpieces processed, in the space needed for storage, and in the possible handling problems. The universal frames can also be used for cataphoresis operations: the structure remains the same, but the bars and accessories are changed to guarantee maximum conductivity. Already-welded bars with universal hooks are available in the range, allowing for minimal contact. For greater flexibility, we



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1 OPERATOR REQUIRED

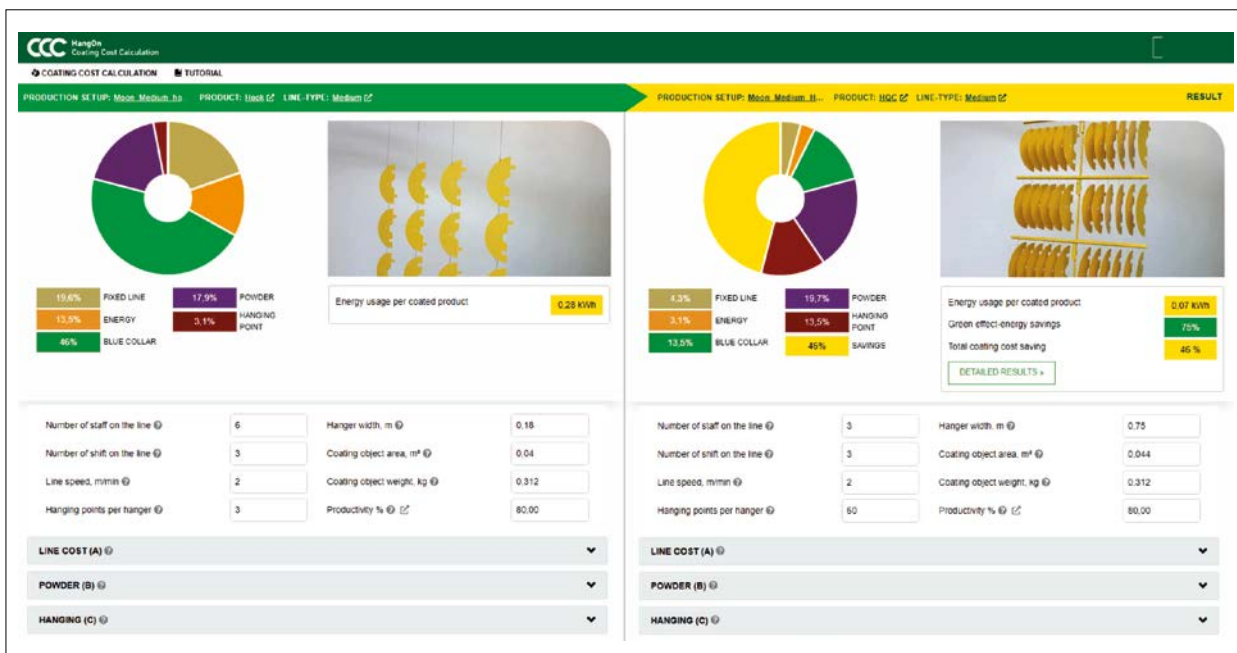


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The new tool developed by HangOn to calculate the cost of coating lines.

also offer hook holders where universal accessories and, at the top, protective caps can be inserted.

Another interesting application is the use of magnets. In cases where no metallic paint is used and where it is acceptable to have an unpainted area on one of the two faces of the metal workpiece, magnets can be employed for hanging. This makes the operation quicker and easier, especially when there are no holes. The range includes different magnets depending on the weight to be supported. The magnets are always covered by silicone masking systems to prevent them from getting dirty.

The HQS frame

HQS frames have metal slats for hanging any element from individual parts to profiles. The central 4 or 5-mm hook guarantees an overall resistance of the frame up to 100 kg. These frames have been recently launched on the market with various types of hooks, thanks to which each customer can find the best configuration for its specific use. The tree can be up to 2,400 mm in length, whereas the slats are 1.0 mm thick and 18 mm high. It is possible to create different slat configurations, e.g. sheared (i.e. on one side only), zigzag-shaped, or bent from 0 to 180°. This type of frame was also designed to avoid using individual hooks. It is manufactured automatically, which guarantees a low cost, equal to that of single hooks. The new configurations made available allow the users to find the appropriate hook shape for every workpiece to be hung. Another new feature launched on the market is the adapter that allows HQS frames to be extended using standard or currently available frames. The HQS frames can be used for hanging small parts, but also workpieces with varying weights, including profiles.

In addition to its automatically produced and standardised range, HangOn can build customised frames, hooks, and systems according to customer requirements. In addition, the implementation of trolleys offers the possibility of managing one's treatment processes even better. Indeed, trolleys have become essential to reduce process times and increase density. In-line hanging may not be efficient in terms of density, when it is not possible to adequately fill the m³ available within the line handling time. Trolleys allow for pre-hanging and handling within the plant. Some HangOn trolleys are designed to be modular and flexible and to be combined depending on the type of frame used. If switching among frames with different coupling devices or different sizes, trolleys adapt to the various requirements to perform two functions: that of allowing pre-hanging and bringing all the frames on the coating line and that of storing unused frames in an orderly manner. Special trolleys can be designed according to the various requirements posed by the components' characteristics.

Managers can and should have the strength to change their company's inefficiencies and get out of the comfort zone in which the most common phrase is: "We have always done it this way". A tool that can be useful for moving from ideas to figures is the new CCC calculation system on HangOn's website¹. It allows comparing two hanging systems: relevant data such as the cost of powder, the number of people employed on the line, machine cost and times, etc. can also be entered. Hanging costs can also be shown and compared. ○

1 <https://ccc.hangon.com/>