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## ANALYSIS

SPECIAL ISSUE ON ACE & OFF ROAD VEHICLES



# In Search for Competitiveness

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**Masking as a strategic operation to reduce handling times and eliminate the need for touch-ups after coating; once again, Adriano Antonelli's analysis starts from the general economic situation to get to the heart of the paint shop and suggest effective solutions to optimise processes.**

We find ourselves in a phase of change where instability is a variable that is difficult to manage. Although some factors such as falling inflation and lower energy costs are positive, some issues remain unresolved, such as rising interest rates, sustainability-related problems, climate change, and a globalisation paradigm that no longer equals the free market as conceived in the

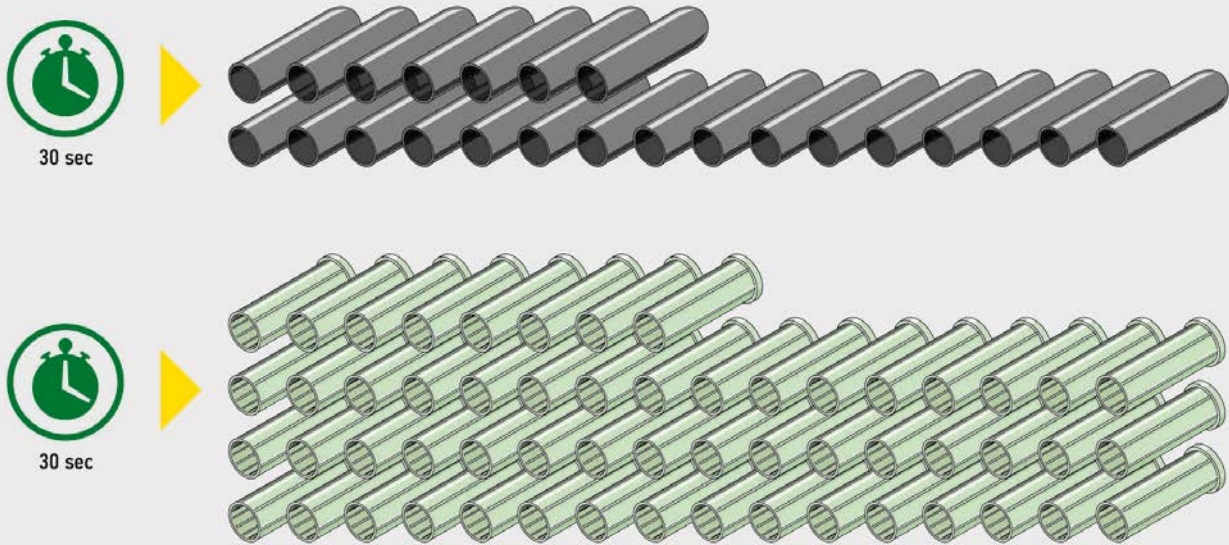
past. More in detail, the reduction in inflation, so far not as significant as had been hoped for, has certainly helped households partially regain their purchasing power. The reduction in energy costs, which weighed heavily on inflation, has been a relief for many families and even more so for energy-intensive companies. On the other hand, the rising cost of money and the consequent falling stock markets, as well as a weather

situation that has caused severe damage, at least in Italy, especially in the Emilia Romagna and Friuli Venezia Giulia region, make the outlook less than positive. New European regulations will have to address these issues.

What is the state of the art of SMEs in this framework?  
At the macroeconomic level, compared to a positive first quarter thanks to the GDP growth that occurred in 2022, the second quarter of 2023 saw a not-so-worrying contraction, closer to a cooling of the economy. Growth has certainly lost momentum. It remains to be seen whether this is a slowdown or a real stop that could lead to recession, at least from a technical point of view. The large European countries, including Germany, are coming to a standstill. What can we expect? Definitely not a cut in interest rates, a drastic decrease in energy costs, or state aid. Italy, in particular, will have to take full advantage of the Next Generation

EU instrument to boost infrastructure and modernisation. The green revolution will have to be considered an opportunity. Private companies will have to search for renewed competitiveness as a focal point for staying in the market and expanding their shares against emerging countries (which perhaps we should no longer call emerging: countries such as India are going to overtake their former colonisers, such as the United Kingdom, in terms of GDP). To do so in the surface coating sector, what can be implemented in the immediate future to increase process efficiency? A key aspect is surely hanging density, which can contribute to reducing a number of costs such as, first and foremost, energy costs. A useful tool available at <https://www.hangon.com> is the CCC spreadsheet, which allows comparing the consumption degrees and savings achievable with different hanging systems. Another key factor is masking, which Ibox addresses with the support of HangOn, for which it

**SMART COST REDUCTION / STANDARD GA vs GAQ**



**2 TIMES FASTER = 50% TIME SAVING**

To mount and dismount a GA masking from an axle can be a relatively difficult task and takes time. The ribs inside GAQ solves that problem.



**Technical comparison between GA caps and GAQ caps: time saving is significant.**

is a distributor. Reducing handling times and avoiding post-finishing are the objectives on which the company focuses.

Below are some ideas for protecting the parts that do not need to be coated, which of course can be explored further according to each customer's production complexity.

### Masking as a strategic step

Masking is an important production step to avoid transferring inefficiencies to downstream departments, particularly the assembly one, whose line cannot be stopped because of a pin that does not screw in smoothly. The parts must therefore leave the coating phase in optimum condition. For this to be possible, if any components need to be protected, it is essential to do so carefully. Crucial to this is masking speed, the certainty that the treatment product will not seep into the protected surfaces, the ease of insertion of the masking devices, and the possibility of removing and reclassifying them for later use. Sometimes, a single part might call for 50 or 60 masking devices to be used, some of them very similar to each other. The ability to distinguish and select them at a glance is therefore of paramount importance.

Another aspect to consider is pre-treatment. Indeed, masking devices must sometimes be inserted before the pre-treatment phase. In the case of a shot blasting operation, they also must be abrasion-resistant

and prevent grit from entering holes and cavities to prevent the workpiece from being rejected for this non-conformity. In the case of phosphodegreasing or similar processes, they must be watertight; otherwise, functional parts of the machine could be damaged. Finally, if cathodolysis coating is performed for corrosion protection, sealing masking devices are of the essence.

### HangOn's masking tools

Many of the ready-to-use products in the HangOn portfolio have already successfully enabled production targets to be met in terms of time and methods, easy pre- and post-use masking management to be implemented, and hence the required results to be achieved. The silicone range certainly falls into the group of these high-performance products. All the devices in this range are coloured and tint consistency is guaranteed for each batch. For example, the M4 size is white in all its various configurations, so that operators can recognise and classify it easily and quickly. In any case, colours can be changed and customised to match each product to a specific colour.

Here are a few examples of products included. The GDM caps allow hermetically sealing through holes. The cylinder terminal part enables to tighten the nut's flaring. This series currently includes caps up to 83 mm in size. These caps are hollow for easier insertion.



**A DSG special assembled masking device in solid silicone.**

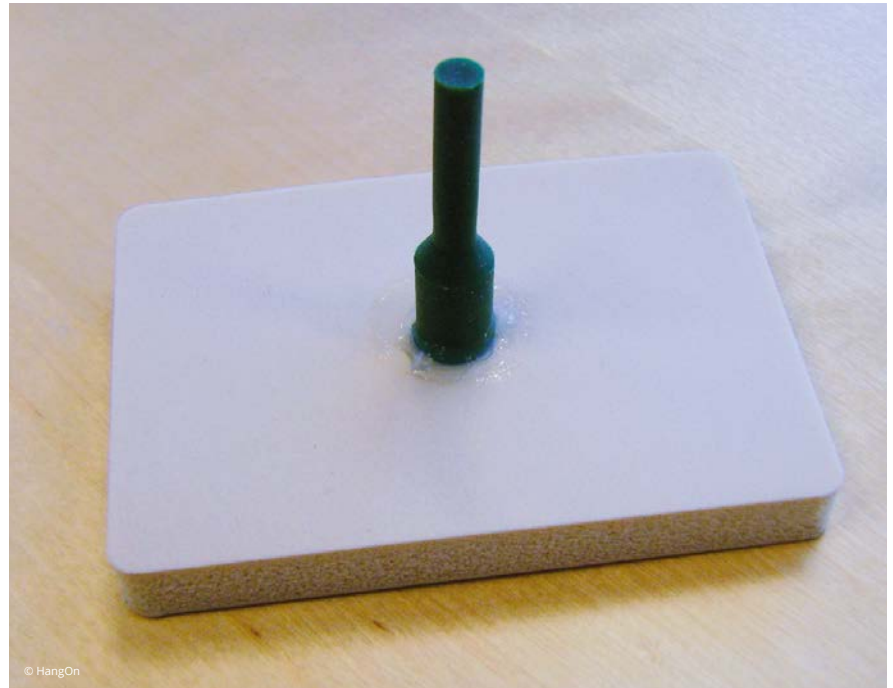


The QB caps are screw caps for blind holes, i.e. parts where depth is minimal and it is necessary to close a hole hermetically and guarantee the masking device stays still even during handling.

In the case of bushings with large through holes, good results have been obtained with expanded silicone. The SP expanded silicone tubes, which can be cut to measure, expand into the hole, thus preventing any shading and build-up effects. Their maximum diameter is 60 mm.

The GBH caps also allow masking large holes, up to 110 mm. The GDM H cylindrical caps can also mask large-sized through holes up to 83 mm. These allow for proper masking and, more importantly, protection of the holes during shot blasting.

For pins, HangOn has designed some non-standard caps, such as the GAP and GAQ ones, which allow protecting pins up to 50 mm and with variable lengths. The GAP caps feature a ventilation valve to insert and remove the masking device without air resistance. The GAQ caps, on the other hand, allow significantly reducing masking times



**A DSS special assembled masking device in silicone foam with a pull handle.**



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thanks to their particular configuration.

For all non-standard products, HangOn (distributed by Ibix) can produce specially moulded products. Indeed, it can design and manufacture products meeting any special needs by taking into consideration production issues, tolerances, friction degrees, treatment processes, and so on.

### Effective masking in the ACE sector

In the agricultural and construction machinery sector, components often feature many surface areas to be masked that have completely different characteristics, so that several different masking devices are required, each one in minimum quantities. Producing a mould for each of them would become too costly. An immediate, flexible solution with short lead times and no minimum required quantities is the use of assembled masking devices. With this type of product, it is also possible to mix various materials and thus make the masking rigid on the outside and soft on the inside.

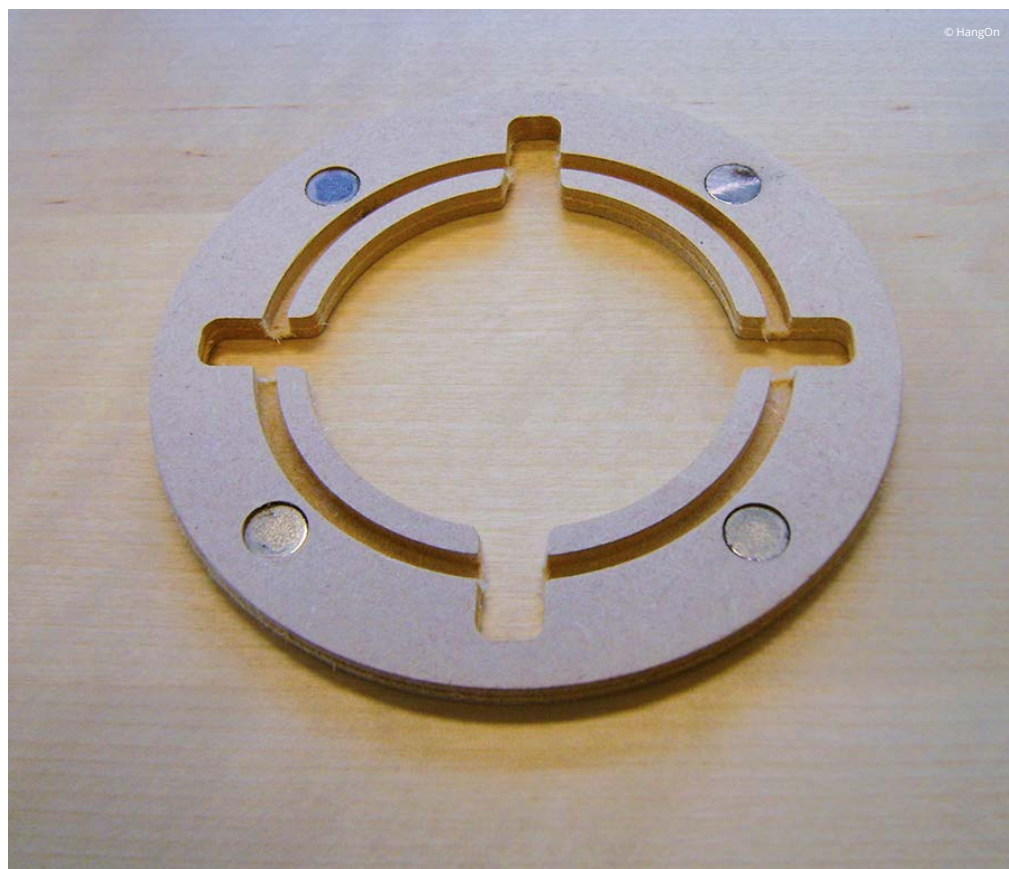
The materials that can be used include as follows:

- Solid silicone from 1 to 6 mm: it has the same characteristics as the silicone used in plugs and caps for coating plants. It comes in sheets

that can be die-cut to measure. These can be glued on top of each other to increase thickness and pull handles can be applied to them. The masking devices obtained can be cleaned like conical caps;

- Silicone foam from 2 to 20 mm: it looks like a sponge. Thanks to its silicone nature, it can withstand high temperatures and it is also cleanable. Its softness allows inserting the caps easily and provides an efficient grip. It can be glued to solid silicone when required;
- EPDM from 1 to 6 mm: it is rigid and resistant to the abrasive action of mechanical pre-treatment processes. It has a maximum heat resistance of 170 °C;
- Magnetic silicone from 1 to 2 mm: it has a magnetic power that enables it to stick to ferrous material, thus eliminating the need for disposable taping systems. It withstands temperatures up to 250 °C and it can be easily cleaned and glued to the above materials;
- MDF: it has a few limits compared with the previous materials. It can be applied before mechanical pre-treatment, but not before chemical pre-treatment because it would soak up water. It is less flexible and therefore more difficult to clean. On the other hand, however, it is more economical and it withstands temperatures up to 200 °C, which makes it also suitable for powder applications;





- Cork from 2 to 25 mm: compressed cork is an inexpensive material designed for liquid applications. It withstands temperatures up to 150 °C and it can be glued to other materials. Magnets can be added to this type of device to provide more stability and a better grip on parts. It is also possible to add caps to improve grip.

Such a wide variety of materials and options enables every company to select the best masking system according to its production times and methods. Masking devices must be chosen by considering the characteristics of the workpieces to be protected, the acceptable tolerance rates, the hanging system used, the level of simplicity required in the masking operation, the product type, the durability performance required, the budget, and so on. Based on this assessment, HangOn/Ibix's technical department can design the most suitable products and afterwards supply the prototypes to verify their coverage and performance degree.

### Conclusions

Proper positioning of masking devices means that there are no errors or uncovered surfaces. The higher initial investment compared with the

low cost of polyester tape for powder coating or crepe paper for liquid coating is fully recovered, if one also considers the ease of removal at the end of the process. This also minimises potential errors of interpretation by the operator who might mask the wrong surface areas. The flexibility of these masking devices, however, lies mainly in quantity. Since there are no minimum required amounts, we can produce exactly the number of items needed by each customer. Furthermore, if the technical department changes the dimensions of the part to be masked, a new device can be produced without fixed costs being incurred, whereas if some products are damaged or worn, they can be replaced at no extra cost. ○

### From the left:

**Examples of magnetic masking devices: a DSM 10 special magnetic silicone mask and, bottom left, a standard silicone mask with an embedded magnet.**

**Special MDF masking devices with embedded magnets.**