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Do It Yourself is in Trend

The importance of coating cutting tools is continually increasing. With this, more and more companies are faced with the question: is it worth my while to invest in my own system? A well-founded consideration of costs will help you further.

No small amount of experts believes that the coating of a cutting tool determines up to 50 percent of its performance. Generalized in such a way, this is clearly an exaggeration, but there is also a lot of truth in it. So, it can’t be a coincidence that one of the most major trends on the market consists of integrating coating technology into the production process of the tool manufacturers. The main reason for the decision to invest in your own coating system lies in the technical and operative field: complete manufacturing, faster delivery, higher quality and better coatings, as well as simpler logistics [1]. These varied reasons are enough for a great deal of companies to decide upon in-house coating. The specific tool geometry, the dedicated layer and the production process can be developed collectively, which gives rise to an optimal and thoroughly distinct product (Figure 1) [2].

The costs, the benefit, and the efficiency of coating at large coating companies are known to be excellent. But what is it like at smaller businesses? Or in other words: at what job coating costs should small or medium-sized enterprises (SME) invest in a separate coating system? This specific question will be answered below with reference to concrete practical figures.

An effective periphery is also a must for small systems

First and foremost, the optimal size and capacity of a coating system must be selected with the quantity of tools that need coatings in mind. For example, the 11 series by the coating specialists Platit – Figure 2 shows the different variations according to user need and with this the increments – covers a very wide spectrum of users. It ranges from small regrinders to large forming tool manufacturers [3]. Needless to say, a coating system only functions with the support of the corresponding periphery, which is also evident in Figure 2.

Cooling, cleaning units and quality control systems are absolutely necessary, even at the smallest expansion range. Additionally, tools need edge preparation and post treatment units, but these are already present in 95 percent of German grinders [4]. Furthermore, a decoating system is highly recommended for regrinders [5]. This kind of periphery can serve at least three coating systems. The space requirement of a coating system for

1. This heavy-duty drill MaxFeed from the company Müller Präzisionswerkzeuge GmbH in Sien/Germany was designed specially for cast iron. This award-winning tool concept is an example of how the harmony between geometry, in-house coating and processing technology can yield optimal results (Photo: Müller)
up to three coating installations ranges from 50 to 150 m² [3].

Costs and benefits realistically weighed up
An encouraging fact beforehand: the Return on Investment (ROI) is achievable in around two years depending on the size of the installation [3]. The costs pictured in Figure 3 were calculated for a tool manufacturer that produces drills, end mills, cutting inserts and hobs, with diameters between 3 and 80 mm and lengths from 46 to 180 mm.

The fixed costs such as credits, wages, social affairs, rent and depreciation, as well as the variable costs like energy, target, gas, cleaning and decoating were considered under the following production conditions:
- two shifts of eight hours production time in the day,
- fill rate/charge 80 percent,
- possible coatings for the different systems,
- typical discounts on coatings, depending on the systems and layers and last but not least

- the supposition of half a workload in the first year.

With how many tools, or in other words, at what annual job coating costs is it worth it for a small tool manufacturer to consider investing in a coating system? In order to answer this question pragmatically, we will make another calcula-
The cash situation of the business is analyzed according to today’s usual leasing conditions. The following cash-relevant costs are considered:

- Leasing rates, calculated using the price of the coating system (including cathodes, coating recipes, basic holders, cleaning system and a quality system), with an interest rate of 4 percent,
- Labour costs, including social costs, and
- Variable costs like energy, target, gas and cleaning expenses.

The costs which arise within a coating company from transportation, repeated packaging, handling damages and rejected deliveries are not considered. These costs are cancelled out or at least decrease heavily due to the in-house coating, which improves the cost situation further.

On the other hand, there are the costs which the tool manufacturer has paid to the job coating company. The diagram in Figure 4 shows the negative and positive cash flow (loss and gain) which in-house coating can generate against job coating, depending on the amount of tools being coated (or the original costs for job coating).

150,000 euros for coating companies to get into the black

The table in Figure 4 also illustrates that, according to the calculations for this case, in-house coating is profitable once job coating costs reach 150,000 euros.

But the most important benefits are still the technical and operative advantages: complete in-house manufacturing done independently, being able to deliver quickly, simple logistics, better and consistent quality, and not least the exclusive and dedicated coatings. If you look at the statistics from the global PVD coating industry, you will come to the following conclusions [6]:

- The growing number of cutting materials prompts more and more dedicated coatings, which cannot practically be delivered by job coating centers.

The increase in PVD systems is bigger than that of job coating. Consequently, the systems are more and more frequently used for in-house coatings.

In summary, we can therefore establish that in-house coating is quite rightly in trend, due to both the technical and operative, and the economical advantages.

A deciding question: At what job coating costs is in-house coating profitable? (Photo: Platit)

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