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A guide to choosing a wire drawing die reconditioning workshop

Worn-out drawing dies are unused treasures, and, as such, should be regularly reconditioned. Only die tools which are in perfect condition are capable of producing good, high quality wires and it has therefore become clear, in nearly all wire drawing and cable plants, that good maintenance of drawing die tools represents one of the keys to success.

Experience has shown that when it comes to investing in a modern die tool workshop, few companies have sufficient knowledge of the proper composition of installations suitable for the processing of tungsten carbide and diamond/PCD dies. Neither do they have the experience to compare and evaluate the range of equipment available. This has often led to wrong decisions being made.

In addition, the purchasing departments of many companies seem mainly concerned with the initial sales price of equipment and simply compare the prices offered by suppliers. In doing so they neglect the fact that, although many machines have the same designation, this does not correspond to the same technical level and its associated advantages.

In fact, the purchasing price represents just one criterion on which to base a decision. Many other factors should be taken into account when comparing die tool working equipment and deciding whether and what to buy.

Comparing technology

In order to establish a suitable basis for how best to compare the various die tool processing machinery available, and to evaluate each machine's potential, prior to any investment being made, the checklist given below should prove useful.

Apart from the necessary overall technical suitability and compatibility, one should carefully check and compare whether or not each piece of equipment offers the following:
- An inherent ability to meet the planned die working requirements in terms of efficiency, size range and throughput.
- Is easy to operate, has the required degree of automation and creates perfect results, requiring few personnel and little intervention.
- Is simple to install and that startup is guaranteed - in other words, a "Plug and Play" system.
- Universal flexibility of application, having a suitable crossover potential - it is suitable for use with many die materials, has extended work ranges, etc., thus saving on the otherwise necessary purchase of additional machines.
- Reliability and longevity, plus proper after-sales service.
- Up-to-date technical assistance, such as training and refresher courses, which are an important investment.
- Good value for money and that complete packages are available - frequently only "bare machines" are offered, at initially favourable prices. However, many optional accessories must be selected in order to make these machines comparable to others.
- A reasonable return on investment.

When comparing die working equipment from different suppliers, despite often apparently similar specifications, considerable price differences appear to exist. However, careful inspection of the technical literature often reveals important differences in conception - i.e. standard, semi-automatic or fully automatic, real-life potential - such as power, work stations, work range and throughput, and in the options supplied with the products concerned.

Cheap pricing levels are usually valid for very basic equipment and consequently many expensive options must be purchased in order to reach a comparable operational efficiency to that supplied as standard by more sophisticated machines.

Cheap machinery also frequently shows deficits as regards its service life. The presumed budgetary advantages of purchasing such equipment are quickly lost, as service and spare parts costs, for example, mount up.

Die reconditioning workshop requirements

There is frequently no clear idea on the general basic composition of a die reconditioning workshop. However, those hoping to set one up would do well to use the following set of guidelines.
1. Tungsten carbide dies
For the processing of tungsten carbide wire drawing dies, the basic workshop should usually consist of:
- A suitable ultrasonic die tool cleaning tank unit – e.g. the Sonomatic 475, 575 or larger – for cleaning all dies prior to inspection and/or during reconditioning.
- Some efficient magnifying lenses (10x/20x) for the optical inspection of the die bores, wear and surface condition.
- High-speed grinding and polishing machines: a semi-automatic version – such as the ETC-1/HF (Figure 1) or the KPM-2/LS if the bore size is often being changed and various tungsten carbide die wear conditions are to be treated; or a fully automatic version, such as the KPM-3/CNC or KPM-4 AC, if a series of dies with largely identical bore sizes and wear conditions are to be worked on.
- Suitable measuring devices, such as precision micrometers, measuring pins, profilometers, etc.
- Spare parts kit(s), if required.
- Working material packages/consumables, e.g. grinding/polishing pins, diamond suspension and/or pastes/compounds.
- Technical assistance/software. This is usually offered upon special request, if needed; training in order to operate the equipment, which is not always required, depending on the equipment purchased, and the transfer of tungsten carbide die working knowhow, which is sometimes required, if no suitable experience exists within the company concerned.

2. Natural diamond/PCD dies
For the processing of precision natural diamond and PCD drawing dies, the basic reconditioning workshop should contain:
- A suitable ultrasonic die tool cleaning tank unit, such as the Sonomatic 375 or 475, for cleaning all dies prior to inspection and/or during reconditioning.
- One efficient die inspection microscope, e.g. the DigiZoom 160, to inspect the dies prior to and during reconditioning, in order to make a suitable diagnosis/identification of the damage’s location and the extent of wear in the die tools.
- An ultrasonic die processing machine, e.g. the USP-115 or USP-200D (Figure 2), with a suitable power/die size work range and with the required level of automation incorporated, to meet the company’s expected throughput and to handle the right kind of dies – i.e. for the working of all die cones, reprofiling, derusting, enlargements, polishing, etc.
- A wire type sizing/polishing machine, e.g. the HGM-21 (Figure 3), HGM-22, or UFW-1 (Figure 4), with a suitable number of work spindles, a suitable die size work range and stroke-speed. It should also meet the expected throughput requirements and be able to handle the right kind of dies, i.e. capable of working cylindrical die bearings, blending/rounding off the profile, etc.
- Suitable measuring devices, e.g. precision micrometers, such as the EM-X Profilometer, EM 02-3 elongation measuring devices, etc., for checking the individual diametrical dimensions of the dies prior to, during and after reconditioning.
- Spare parts kit(s).
- Working material packages and consumables.
- Technical assistance and software, which is sometimes available upon special request; training to operate the equipment efficiently – usually not required, depending on the ease of use of the equipment purchased – and die working knowhow, which is sometimes required, if no suitable experience exists within the company concerned.

About Eder Engineering
Austria-based Eder Engineering, which has over 55 years of experience and currently exports 99% of its products, is a specialist in the field of both advanced drawing die tools as well as die processing technology and equipment. The company is a global supplier and advisor to the international wire and cable industry in over 67 countries. The company also offers single pieces of equipment, based on the latest technology, for upgrading existing installations, complete die tool reconditioning workshops and turnkey die tool production lines, with all the hardware and software required.
Conclusion

It is a fact that only well maintained drawing die tools, that are not allowed to deteriorate, can guarantee an improved die life and a high wire quality and quantity, thus saving considerable money in wire mills and cable plants.

The installation of advanced and largely automatic die processing machinery, such as that from Eder Engineering, compensates a great deal for the current lack and expense of human skills in most die tool working operations.

Such machinery can also handle all kinds of dies most efficiently, thereby boosting productivity and providing a quick return on investment.

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Storage system for die-tool data

At wire 2002, Eder Engineering introduced a new concept for the wire industry: implanting die tools with chips.

The Eder Die-tool Data System (EDDS) has been designed to offer easy storage with immediate access for important drawing die-tool property and performance data.

It is not only suitable for dies, but also for any form of costly tooling, such as diamond cutting tools.

The EDDs data storage and reading system will allow direct, instant readouts of existing data or the storage of new data by simply "connecting" a chip implanted into the die-tool’s casing, using a procedure developed by the Austria-based company.

Eder Engineering plans to supply the entire system of software and hardware, although it can also provide implantation of the data storage chip into existing die-tool casings, plus licenses for die-tool manufacturers who wish to provide their tools with the EDDS data chip.

The hardware consists of a die-tool takeup for each type of casing, a special data storage/reading device and the data storage chips, which can be implanted into casings without damaging the die-tool.

Once set up, the system can be easily tuned to store the required amount of information, and provides immediate access for wire drawing and die-reconditioning workshop departments.

The EDDS software can be used with any PC and will enable extensive tool data to be displayed via a standard PC monitor. In the near future, Eder Engineering is planning to develop a crossover extension for the software in order to provide support for existing quality management systems.

The company claims that the EDDS system can reduce time-consuming data collection work. This would, says Eder, reduce costs for those working with expensive die-tools, while ensuring that the tools are of a sufficient standard to produce good quality wire.

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