

The Economic Impact of using Modern cutting techniques in the field of metal and iron works

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Summary:

The research came under the title "The Economic Impact of Using Modern Cutting Techniques in the Field of Metal Works", and the aim of the research is to conduct an analytical study of some modern industrial techniques and their effect in reducing the economic cost in the field of metal works industry

.and their effect in reducing the economic cost in the field of metal works industry. And iron works without studying the advantages of these techniques and their impact on reducing the economic cost of products and metal works.

The research followed the descriptive analytical method in studying and describing some modern industry techniques and analyzing their economic impact in the field of manufacturing metal and iron works.

It includes three main axes, and the first axis was economics and its concept in a field Industry, which addressed:

Defining economy as the process of managing resources to achieve human needs at a relative cost for a specific performance and at a specific time. Industrial economics is defined as one of the branches of applied economics which includes the use of various tools and methods of economic analysis in the study of economic phenomena and processes that take place within the industrial sector, as well as including the design relationship Industrial economy, and this relationship is achieved by taking into account a number of factors, the most important of which are

-The degree of simplification or complexity of the product's components and parts and the associated number of industrial processes required for implementation.

-Setting the design that saves time and effort during the manufacturing process.

-Setting designs that achieve the use of minimum raw materials .

-The ability of designs to be standardized and executed by the standard quantitative production method -Possibility of setting designs with the help of Computer aided design (CAD) programs

This saves time and effort in calling those designs, developing, modifying and re-implementing them in line with the requirements and accelerating variables of products, which is consistent with manufacturing and production economics. It also includes the first axis as well.

The relationship of industrial techniques and the realization of the economic factor in the field of industry

-The level of product quality and finishing

-Type and quantity of production: Industrial techniques are employed according to the production method quantitative or individual)(

-The number of industrial processes required to be performed during the process of operation and manufacturing flexibility, which means the ability to operate various raw materials as well as the ability to perform more than one industrial process (abrasion, punching, cutting) in addition to the possibility of changing some parts of equipment and machinery to conform to the production of various shapes.

-Compatibility with the computer-aided manufacturing method in order to achieve accuracy and speed in performance.

- Percentage of wastes from raw materials

The second and third pivots dealt with modern cutting techniques and their most important characteristics and advantages

And its impact on reducing the economic cost in the field of metal works, where plasma cutting technology was addressed and the most important characteristics were:

-Cutting all types of ferrous metals such as stainless steel and nonferrous metals such as copper and aluminum.

Metal cutting with various thicknesses-

-Moving manual cutting with the ability to cut shapes with complex engineering lines using the ability to cut shapes with free flowing lines using the capabilities of automatic control cutting machines.

-Economical operation and maintenance and easy change of the damaged parts.

The most important characteristics of the water jet cutting technology were:

-Easy programming and compatibility with computer-aided design and manufacturing systems as well as compatibility with cutting systems on multiple axes(

-The environmental compatibility of cutting with water jet does not produce dust particles or polluted gases during the cutting process. Water can also be recycled using the closed-loop system.

-The ability to cut without direct interference with the material, as there is no region affected by heat.

-Ability to cut sharp corners and turned shapes, and make holes with a minimum of inner radius with high accuracy.

-The ability to engrave and scrape with variable depth and high accuracy of interlocking and complex shapes, through automatic control programs that control the movement of the head of the waterjet cutter.

-The possibility of adjusting the slit or the width of the parts by replacing the parts in the cutting nozzle, as well as changing the type and size of the abrasive materials, which enables obtaining small details in a range of applications in the field of metallurgical and iron industries.

As for the laser cutting technology, its most important advantages were:

-The ability to produce high-quality and accurate cutting products that do not require secondary operations such as the finishing operations following the cutting process in mechanical cutting methods.

-There is no corrosion or damage to the cutting tool, and consequently, it produces cracks or edges of very fine cutting.

-The possibility of cutting or abrasion on flat two-dimensional surfaces or inclined surfaces.

-Possibility to test the cutting path before the operation process, which reduces errors and faults or restart The research reached a set of results, the most important of which were:

-The economic factor verification in the field of industry is related to a set of determinants:

-The level of product quality

The type of technology and industrial techniques used in the production process.

Quality and style of production (quantitative production or individual production per piece)

-Modern industrial technologies (plasma cutting, waterjet cutting, laser cutting) are characterized by operating flexibility and compatibility with the style and quality of production, whether quantitative production or individual production by piece.

-The employment of modern cutting technologies in the field of industry achieves an abbreviation of industrial processes and the time needed for the operation process, as well as to provide raw materials and stereotypes for the works executed in a quantitative production manner with the same accuracy, standard, quality and without defects, errors or restart during the manufacturing process, which reflects in response to the verification of the economic factor In the field of metal and iron work.

-Modern cutting technologies are characterized by the production of abrasion products or cutting parts or shapes of high finishing accuracy and quality, which raises the aesthetic and economic value of the product and enhances its ability to compete in the markets and the rapid response to the diverse requirements of users.

Connecting modern cutting machines to the computer achieves the ability to test the cutting path (according to the required drawings and designs) before performing the operation, which reduces the percentage of errors and defects, and also achieves the possibility of calling those drawings or designs, modifying, developing, and re-implementing them according to the rapid and varied variables of products. Metal and iron works, which corresponds to the economics of manufacturing and production.

The research recommendations are as follows:

-Researching new developments and their effects on the level of production quality in the field of metallurgical and iron industries.

-Study the environmental impact of the industrial techniques used in the field of metal and iron work.

-Studying the effect of the production planning process and its effect on the economic factor in the field of metal and iron work industry.

-Conducting a comparative study between traditional manufacturing methods and modern industrial techniques and the effect of each on achieving the standards of quality metal works.

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