

## ANALYSIS OF MODERN METHODS OF PRODUCT PROCESSING IN THE LEATHER-SHOE INDUSTRY

**Raxmonova Malohat Mirkomilovna**

Fergana davlat texnika universiteti, assistant

+998902730731malohatraxmonova@mail.ru

**Abstract:** This article analyzes the leather footwear industry, leather footwear production processes, processing stages, their importance in improving product quality, and types of modern processing technologies.

**Key words:** leather, natural, artificial, cutting, sewing, laser, 3D technology, quality, smart, green technology.

Leather processing: new technologies in the production of natural and artificial leather, improving their quality. Materials used in product processing: high-quality leather, artificial leather, and new technological materials, for example, thermosetting plastics, elastomers, etc.

Product processing steps: Cutting: laser technologies and CNC (Computer Numerical Control) machines for accurate and efficient cutting of material.

Sewing: sewing works using automatic sewing machines and robots.

Laser processing of leather and other materials: using laser technologies to ensure the aesthetics and durability of shoes.

Basic Design and Shaping: Creating precise and perfect shoe shapes through 3D modeling and digital technologies.

### Modern Processing Technologies

#### 1. 3D Technologies and Digital Design:

3D modeling and printing: the use of digital technologies in the creation of leather shoes, the precise consideration of every detail and its creation with the help of a computer. 3D printing: quick and accurate preparation of shoe parts or decorative elements.

2. Laser and CNC Technologies: Ceramic laser engraving is the process of using a laser marking machine to engrave a ceramic product. Because ceramics can



break easily, a single crack can quickly destroy the entire material, laser marking ceramic materials is often a safe option. Unlike older ceramic engraving choices, the laser does not strongly interact with the ceramic. Laser machines remove the ceramic material with high heat absorption and leave a noticeable design. Laser cutting: high-precision cutting and modification of shoe parts. This technology allows the material to be processed with minimal waste. CNC machines: automated machines for high precision machining of complex shapes of shoe parts.

### 3. Robotics and Automation:

Automation processes: automation of every stage of shoe production, making production processes efficient.

Robotic sewing and processing: robots are used for high-quality and fast processing.

### 4. Biotechnologies:

Ecological processing of natural leather: processing of leather and other natural materials in ecologically clean ways. Reducing the ecological footprint by using natural materials with the help of new biotechnological methods

#### Methods of Product Quality Improvement

1. Quality control: Optical scanning and lighting technologies: inspecting the surface of materials, identifying any defects and eliminating them.

Thermal inspection: measurement of thermal conductivity and quality of shoes.

2. High quality workmanship: Shoe strengthening: special chemicals and layers are used to increase the strength of the treated materials.

High elasticity and durability: new elastic materials and technologies are used to ensure long-term performance of the shoe.

#### New Innovations and Future Industry Development

1. Green Technologies: Eco-friendly materials: use of recycled materials, bio-based and eco-friendly models.

Water conservation and waste reduction: technologies aimed at saving environmental resources in the production process.

2. Smart Shoes: Sensors and IOT technologies: monitoring the performance of the shoe depending on the user's condition with the help of sensors integrated into the shoe.

Smart materials: by adapting the materials of the shoe, for example, to change the shoe according to the weather conditions or the user's needs.

In conclusion, modern technologies are significantly changing the processes of product processing in the leather-shoe industry. With the help of 3D modeling, laser cutting, robotics and ecological technologies, it is possible to improve the quality and efficiency of shoe production.

In the future, the leather-shoe industry will be more innovative and environmentally friendly, and it is expected that high-tech and sustainable development methods will be used in the production of shoes.

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