

## SHOE MAKING TECHNOLOGY

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Footwear production industry is facing a period of change and, in the next few years, will be front a significant process of innovation of systems, machines and equipment. The evolution starts and makes its way through the opinion that new approaches to electronics, software and networking can express a common denominator that allows all the players involved to manage together and organically all phases of design, prototyping and manufacturing of shoes and leather products. The shoe, treated in a scientific way and enriched with technological values, is the result of a series of treatments of data related to the foot, the last and the materials used in its manufacture. The main innovative aspects of the footwear industry are summarized by department.

Keywords: Evolution, Technology, Machinery.

### PATTERN CAD

It represents the possibility to scan the foot, rebuild the complete image virtually through a software, import data from a 3D CAD shoe, from which to carry out the process.

They are connected systems and machines for an accurate construction of the last and its standardization.

Parametrics, modularity, codesing, concurrent engineering are the benefits of great importance that are obtained by 3D footwear CAD designing and by productive CAM systems. The rapid prototyping contracts the "time-to-market" and becomes essential to compete in the world market.

About "software", the ability to import and/or export files of last, upper, shoe and components is required to make them readable by most external interfaces dedicated to the individual interventions.

The CAD approach makes the creation of the shoe easy and quick, exploiting the potential of the "object oriented programming" with friendly and logical operating interface.

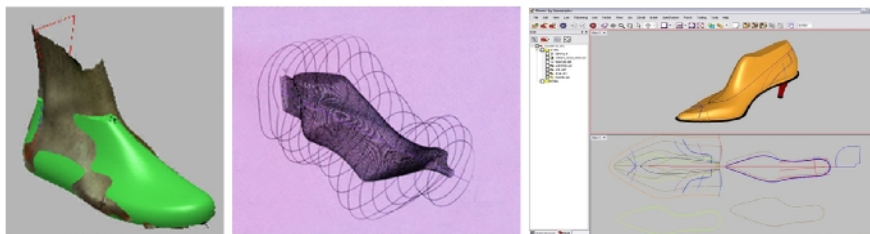


Figure 1. Rapid prototyping, last and shoe CAD

### CUTTING

Significant technological change has occurred in this department through the use of cutting systems in continuous and without the die.

## Shoe Making Technology

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Cutting table equipped with oscillating blade, vision system and model templates projection represents the first building block of the future shoe factory.

The system is characterized by high cutting, punching and scoring speed, and operating costs optimized to energy saving.

The technology suppliers propose and continue to study versions of machine depending on the area of skin machines, on the production requirements and on the area available for installation. There are also present cutting, engraving and leather processing tables with laser technology.

Cutting technological offer is completed by dedicated nesting tables (automatic, semiautomatic, manual) to combine the skill of senior leather expert and the cutting process for large productions.

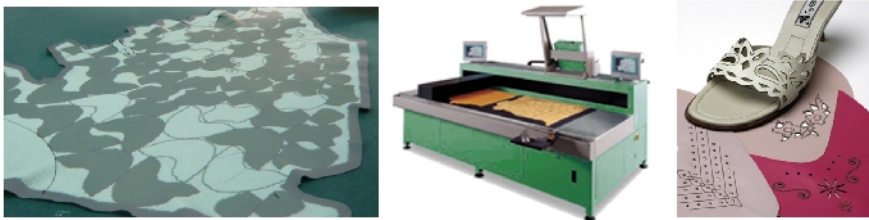


Figure 2. Cutting and nesting

### UPPER PREPARATION AND CLOSING

Upper preparation interventions can relate to the drilling, engraving, plating, printing, edge treatments, cementing and closing. Machines and equipment characterized by operating and configuration parameters that cover every need. Thousands versions realized and sometimes focused to maximize and standardize production and quality sometimes to get a specific fashion effect.

Computerized perforating machine with one equipment is able to realize different ornamental designs based on simple on-screen programmability and allows the personalization of products.

Integrated machine can decorate leather/textile upper with nailheads, rivets, eyelets and laser process.

Automatic gluing plotters permit to automate and speed up the selective gluing operation made on flat patterns.

About automatic edge folding of upper parts, the features present in the machines relate to the programming of operating speed, the high flexibility, the correct deposit of glue along the path to fold up and the precise control of the cuts on the internal curves.

The wide range of sewing machines covers various aspects and needs. Fast machines, accurate in managing the length of the stitch and keeping it constant in time, capable of regular holes remarking and able to switch to a differential transport without interrupting the action of sewing.

Automatic sewing systems have a wide range of uses often strongly dedicated to specific interventions. They give the possibility to program one or more seams, bartacks and to make changes and corrections in a simple and fast way.



Figure 3. Upper pattern template, stitching operation

### COMPONENTS PREPARATION

Systems and machines for producing and manufacturing the components used in the footwear production cycle (shape, die) and the components that are part of the shoe (toe puff, stiffener, insole, heel, sole, welt, strips, small metal parts, etc.)

In this area more and more solutions are present driven by software and operating through multi-axis and multi operating CNC.

It works on molds, soles, heels, insoles and inserts of varying shape and material, always in a precise, rapid and optimal production quality.

Stylists and fashion designers pushing the technological research to the realization of equipment suited to specific tasks and achieved in a short time.

### SHOE LASTING, BOTTOM MAKING

The most important phases of this department are lasting machines: pulling-over, side and heel seat. They have been made flexible by programmable functional modules for the automatic adjustment of the machine to different shoe styles.

Characteristics: mechanical items that incorporate cement tracers and/or helicoidal rollers, controllable hydraulic pressures, perform with precision paths and speeds, for any type of upper and/or softness of leathers, upper fitting to the last during the lasting phase, high versatility in work changes, console touch screen panel control, remote control for assistance.

Programmable and automatic shoe lasted bottom and sole cementing systems, versions with the "vision" or programmable axes. Technical solutions with spray nozzle or rotary brush.

It is available an integrated machine for roughing and cementing the side wall sole shoe, 3/5 axes interpolation functionality.

A particular solution is represented by the "Reverse" shoe assembly seam, useful for a specific type of light footwear or to develop easily the first footwear mechanization in specific geographical areas.

The lasted shoe requires special and differentiated treatment of air conditioning: circulated air oven at high speed, oven-drying glue and reactivation, cooling station.

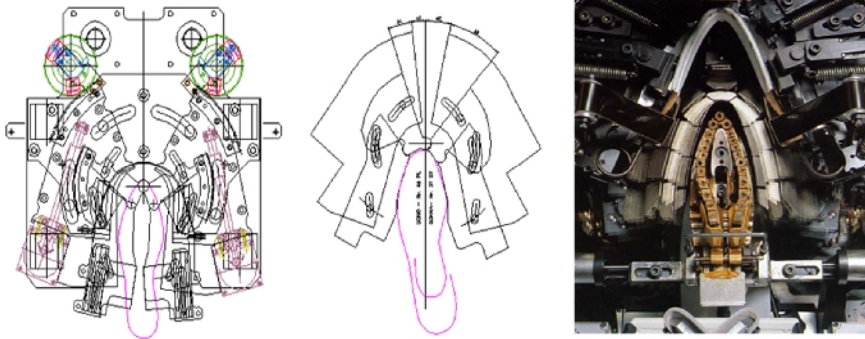


Figure 4. Flexible and programmable lasting

### CONCLUSION

Technological development has accelerated in recent decades, so changes come faster and in more areas. Computers and robots will take on increasingly complex assignments, and Internet will be a breeding ground for completely new, virtual industries. The footwear industry must adapt to this mega-trend and take benefit of it. There are aspects that the footwear industry should align itself with the help of the technology: machines networking, design and implementation of intelligent machines and processes, conception of energy efficient machines and processes, direct communication channels between machines and specialists.

The challenge to the shoe factory of the future is launched. Technology is renewed and offers more and more targeted solutions according flexibility and connectivity. The appointment to stay updated and informed is represented by the international exhibitions (first fair in Milan in February), a meeting place for experts and technologists belonging to leading companies in the industry.

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