

An approach to implement STEP-NC in the footwear industry

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Abstract

There is a growing need to automate the footwear industry by introducing new methods and tools to improve footwear production. The use of CAD tools for the design of shoes and their components is increasingly common, but it is a sector in permanent adaptation to socio-economic changes where it is therefore complicated to incorporate high-tech machinery. The introduction of improvements in production is a necessity, so the use of technologies that allow the adaptation of old machinery with the latest technologies in the area of CAD/CAM would be an important advantage for the sector.

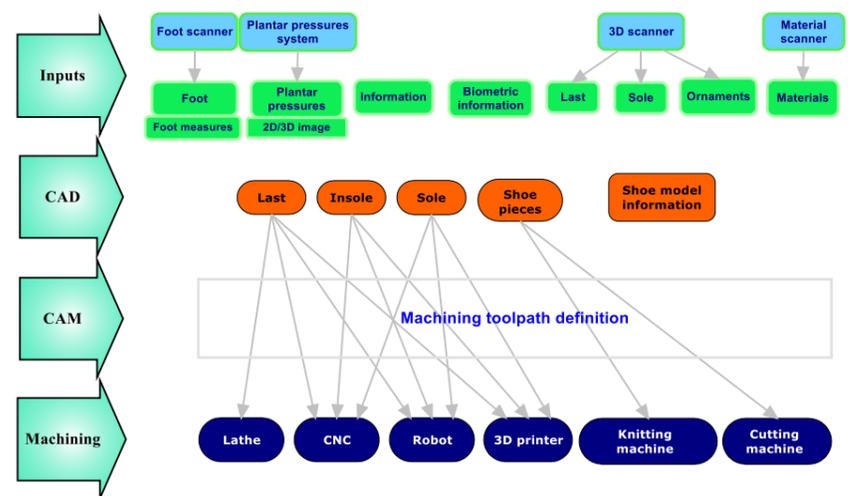
So far, each component is designed and manufactured separately. In this way, the real dependence that exists between the different components required for manufacturing footwear means that a change in any of these elements implies a redesign (CAD level) of the rest of the elements. This fact increases the manufacturing cost. It is also necessary to modify the way of manufacturing the product (CAM level), which is a complex manual process in many cases. The introduction of changes in an industrial environment with limited resources means a very slow implementation.

In this poster, a platform based on STEP-NC is defined to show the advantages that its implementation in footwear sector would imply, by relating all the elements involved in footwear manufacturing: CAD tools that generate the geometries of the components, CAM tools that define the paths for their machining, and the different machines that manufacture these components. Furthermore, additional advantages would be incorporated, such as process control, supervision, inspection, allowing information to flow in all directions.

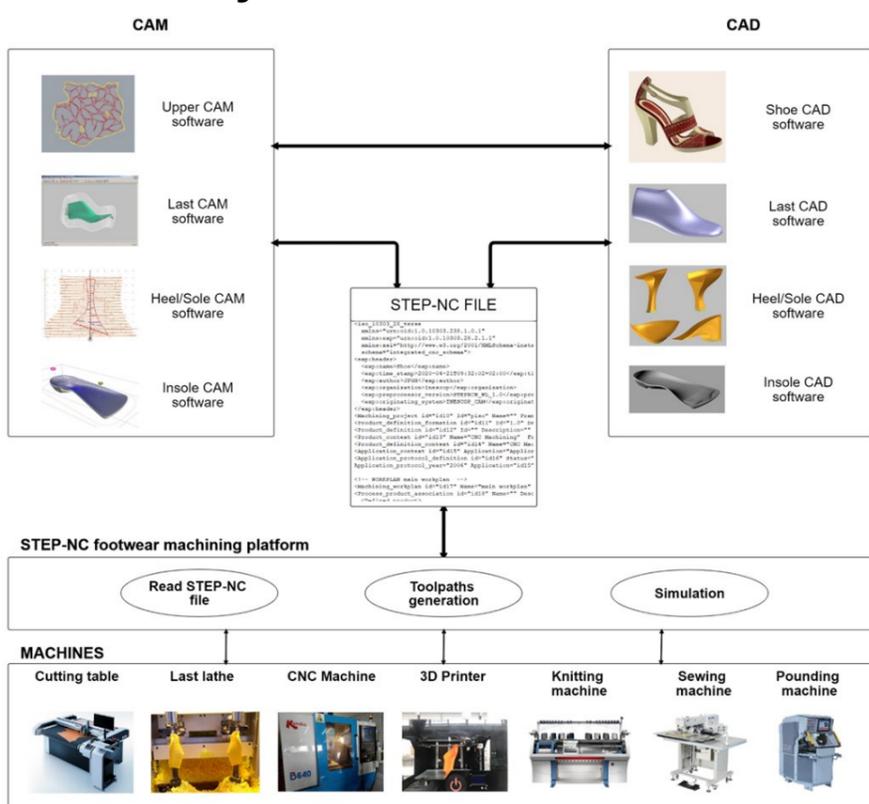
STEP-NC (ISO 10303-238) advantages

- Easily defined tasks.
- Self-documenting, contains CAD and CAM information.
- Safer and adaptable (independent of the machine vendor).
- Complete and structured data model, associated with geometry and technical information
- Changes in the production stage can be stored, providing two-way feedback between design and manufacturing.
- Object-oriented vision.
- XML files can be used, allowing electronic exchange

Footwear manufacturing process



Approach to integrate STEP-NC in the footwear industry



Conclusions

A platform has been proposed as a solution to adopt STEP-NC in the footwear industry for improvement of the shoe manufacturing process. Nowadays, new paradigms in industry, such as Industry 4.0 or smart factories, must also have an impact on traditional sectors, such as footwear, where most companies are SMEs and cannot afford large investments in technology. This approach allows the use of legacy machinery, and additionally, improves the software layer interconnecting different CAD and CAM software applications with the machining level. Therefore, it can be used as a starting point to introduce changes in footwear machinery.

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