

Study of the enwrapping of the front profiles of the active elements of a three-screw compressor

Nicușor Baroiu, Virgil Gabriel Teodor, Viorel Păunoiu,
Georgiana Alexandra Moroșanu, Răzvan Sebastian Crăciun

„Dunărea de Jos” University of Galați, Galați, România
virgil.teodor@ugal.ro

Abstract. Fluid transport requires specific equipment, such as pumps and compressors. Currently, the emphasis is on the ease of transport of liquids and gases so that their handling can be done with the highest possible efficiency and safety. One way to increase efficiency is to change the front profile of the active elements of compressors and pumps. But, a side effect of this change is the difficulty of securing the necessary spare parts in case one of these items is damaged. The usual solution, to completely change the pump or compressor, is not always possible or effective. The paper proposes a method for identifying the front profile of a snail-type active element, consisting of a three-screw compressor. The purpose of this identification is to study the frontal enwrapping between the profiles of the driver and the driven element, in order to produce a possible replacement element. As is well known, the two profiles are mutually enwrapping profiles, which means that the problem can be treated as a plane enwrapping problem. The identification of the profiles was performed by specific reverse engineering methods, the parts being scanned on an ATHOS 500 scanning system. Subsequently, the analytical shape of the driven screw was identified and, applying the “virtual pole” method, the corresponding shape of the guide screw profile was deduced. The obtained profile was compared with the real profile, obtained by 3D scanning. The obtained results demonstrated not only the good match between the theoretical and the real profile but also the simplicity and robustness of the method applied for the study of the enwrapping, namely the “virtual pole” method.

Keywords: reverse engineering, enwrapping profiles, „virtual pole” method

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