

**Robert Żuczek**

AGH University of Science and Technology, Krakow

Faculty of Foundry Engineering

Abstract

### **Shaping the casting of the suspension element with zones with different purpose functions**

The development of modern numerical techniques and manufacturing technologies allow for the implementation of the latest advances in materials and construction. That approach significantly affects the growth of competitiveness of the domestic industry in the aspect of the global economy. The growing market demand for the use of lightweight castings with improved operating parameters, forces the Polish foundries to increase the need to participate in the innovative material solutions and advanced casting technologies. The castings used in modern automotive and machine industry allows for trend the supply of them, especially in times of increased demand for alternative fuel vehicles.

Issues presented in this work are related to the process of the material, structural and technological conversion of the mobile suspension element of the special-purpose transport platform. The use of advance numerical techniques in the process of shaping the swing arm structure allows to develop a casting element with a lower weight compared to the original welded structure, while guaranteeing the possibility of transferring the expected operational loads. The aspect of mass reduction forced the use of an aluminum alloy with improved strength properties.

The swing arm manufacturing process also includes the modeling of the structure taking into account the possibility of transferring the loads caused by the shockwave pressure of small explosive devised IED (Improvised Explosive Device). Appropriate modeling of areas absorbing the energy of an explosion with zones that are the initiators of destruction, wchich allows to implement different utility functions and at the same time.

The final effect, obtained in the process of shaping the numerical structure of the rocker arm, is a prototype of hydroactive suspension with elements manufactured by the casting method, which is successfully used in special purpose commercial vehicles.