

30 Years of Industrial Research and Development in Light Metals and Composites

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This contribution provides an overview of the key milestones from more than 30 years of research on light metals and composites, carried out across both academia and industry. The initial focus was on fundamental research into aluminium alloy composites reinforced with ceramic particles, conducted in collaboration with the Institute of Metals and Technology and the Jožef Stefan Institute. Later, the research continued at the Impol Group, with an emphasis on applied and industrial development. Among various projects, two major “greenfield” initiatives stood out: the establishment of an aluminium alloy forging facility and a continuous strip casting plant. The forging facility marked a significant step toward the production of high value-added products, while the strip casting project culminated in a patented technology for producing blister foil from continuously cast strips—an achievement regarded as a significant competitive advantage. A recurring theme in many other applied projects was the recycling of wrought aluminium alloys. The main challenge involved achieving the desired chemical composition in melts primarily based on post-consumer scrap. This led to the development of advanced techniques for collecting and sorting scrap, as well as industrial methods for determining alloy composition. In parallel, we also developed several non-standard alloys with broader tolerance ranges for certain alloying and trace elements. Although the concept—explored in more depth with the aid of artificial intelligence—ultimately had limited market viability, it provided valuable insights. Metrology, the cornerstone of all production processes and quality assurance, also played a critical role in our research and development. Through a series of innovative solutions successfully implemented in industrial environments, we contributed to improved process stability and enhanced product quality. Many of our research outcomes have been published, fostering opportunities for pre-competitive collaboration with other research groups. This brief overview concludes with a forward-looking perspective, highlighting areas and topics I consider most promising for future development in the field of light metals and composites.