

# Preface

Heavy machines are the main equipment in surface mines around the world. With the development of new technologies, surface mining has also been evolving. Among the leading drivers for change and development in this area are the increasing requirements to improve safety, to reduce the environmental impact and to reduce operating costs. The current and future challenge involves modernizing and maintaining old, worn-out machines and designing new structures.

The construction and operation costs of these machines are counted in hundreds and even millions of euros. These machines are designed for operation 24/7, so when they are out of operation due to failure, they generate huge losses. Occasionally, catastrophic failures happen, which can have negative economic consequences, but which, nevertheless, cannot be compared to the damage to human health and life.

In addition to rock processing, mega machines are mainly used in lignite surface mining. Despite the global trend to obtain energy from renewable sources, a significant percentage of energy production will still come from conventional sources of fuels for many decades. This is dictated by the need to ensure a cheap and stable source of energy. In many countries, the amount of energy consumed from brown coal is significant (e.g., Germany, Poland, Serbia, Greece). In emerging markets (Brazil, India, China), the lignite mining industry is rapidly developing. The most common problem, however, is the age and thus overuse of mining and processing machines (European market). Many of them are over 35 years old, and hence their operational life is close to wearing out. This is a considerable challenge for the users. However, users have gained unique experience over the years, which is an excellent base for developing further operational guidelines and an invaluable source of knowledge that can be used in designing new structures. The research and methods presented in this book have been developed and reviewed in cooperation with the users of such machines. Therefore, the presented content is not a collection of theoretical considerations, but rather of practical guidelines that can be applied in reality. The developed solutions use both the already known research tools and the most modern scientific methods. What is most important, however, is that they are practical and modern.

The examples of applications and methods presented in this book have contributed to the increase in the competitiveness and innovation capacity of the mining and rock processing industry. They are an important contribution to the development of knowledge of the construction and operation of heavy machinery. Above all, however, they have a wide practical application, which provides a more economical, efficient and safe operation.

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