



EDITOR-IN-CHIEF'S WORD

In the 26 years of its existence, the Croatian Academy of Engineering Sciences has always endeavoured to publish the results of its outstanding members in the professional and scientific research fields, whereby an insight into the relevant achievements of engineering sciences in Croatia is given. The guest editor of this issue is Željko Domazet, PhD, a full member of the Croatian Academy of Engineering and Professor at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split.

I believe you will read with great interest in this issue about research into fatigue, cracks and failures that affect our professional and personal lives. Ž. Domazet and his colleagues present analyses of failure types and the possibility of repairing cracks and defects, which have been successfully carried out and are presented here.

Editor-in-Chief

Vladimir Androćec, President of the Croatian Academy of Engineering



EDITOR'S WORD

Dear readers,

In this edition of HATZ bulletin Engineering Power we continue to present activities of the research groups on diverse topics, conducted by members of the Academy from different Croatian universities.

The Guest-Editor of this issue is Željko Domazet, PhD, Professor at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, and full member of the Academy in the Department of Mechanical Engineering and Naval Architecture.

Editor

Zdravko Terze, Vice-President of the Croatian Academy of Engineering



FOREWORD

In spite of numerous and expensive research in the field of fatigue, cracks and failures caused by fatigue occur every day in all fields of human activity. Such failures typically cause high expenses and danger for human lives.

Perhaps the best definition of fatigue is one of the *ASME Boiler and Pressure Vessel Code* (ASME 2010) which defines fatigue as "... conditions leading to fracture under repeated or fluctuating stresses having a maximum value less than the tensile strength of the material." Fatigue damage in a metal is a progressive, localized, permanent structural change. A fortunate circumstance with many fatigue failures is a relatively

long crack propagation period from its origin to the final failure. Due to it a crack can easily be discovered and the corresponding reparation action can be undertaken.

The following papers present some typical fatigue damages in our industry and transport. The complete damage analysis (numerical and/or experimental stress distribution evaluation, fractography, assessment of remaining service life, etc.) showed two facts:

- the design errors caused all of these, as well as many other fatigue cracks and failures,
- the analysis confirmed the possibility of crack and failure repairs, which has been successfully done and presented here.

Guest-Editor

Željko Domazet, University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture