

# Preface

The present book is not simply a new addition of the book *Dynamic Plasticity*, initially published in 1967, a long time ago. Certainly this edition is not only a new version, containing the essential of the old book and what has been done meantime. Why again *Dynamic Plasticity*? Well because very many books published meantime on the subject are not mentioning the waves which are to be considered in *Dynamic Plasticity*. Also, generally, the plastic waves are slower than the elastic one. Thus, when considering a simple problem of propagation of waves in thin bars, for any loading at the end, the plastic waves are reached by the elastic ones, and will not propagate any more. Only a part of the bar is deforming plastically. Examples of this kind are very few.

I thought that this new version is too restrictive for the today students which know little of static plasticity, differential equations, dynamic elastic–plastic properties, etc. Therefore, I thought to write a simpler book, containing the main concepts of dynamic plasticity, but also something else. Thus I thought that this new version would contain the elementary concepts of static plasticity, etc., which would be useful to give. Also it would be good to give other problems, not directly related to dynamic plasticity. Thus I started with some classical problems on static plasticity, but only the simplest things, so that the readers would afterwards understand also the dynamic problems. Also, since in dynamic problems the soils and rocks played a fundamental role, I thought to write a chapter on rocks and soils. Then were expressed several chapters about dynamic plasticity, as propagation of elastic–plastic waves in thin bars, the rate influence and the propagation of waves in flexible strings. It is good to remember here that all problems related to dynamic problems, are to be considered using the mechanics of the wave propagation; without the wave propagation mechanics all results concerning constitutive equations, rate effect, etc. are only informative. Such problems are mentioned however in the book. We have presented mainly the different aspects on constitutive equations of materials, as resulting from dynamic problems. Rate effects are considered in this way. They have been used by a variety of authors. The same with the mechanics of flexible strings, presented afterwards. Not very many authors have considered till now the mechanics of deformable cables.

Therefore I thought to write a very simple book, which can be read by the students themselves, without any additional help. They can understand what “plasticity” is after all. Then several other problems have been presented. Not trying to remove the fundamentals, I have thought also to add some additional problems, which are in fact dynamic, though the inertia effect is disregarded. They are the stationary problems, quite often met in many applications. It is question obviously, about problems involving Bingham bodies, as wire drawing, floating with working plug, extrusion, stability of natural inclined plane, etc.

Further I have considered various problems of plastic waves, using various theories. Also the perforation problems, was presented, using various symmetry assumptions, or any other assumption made.

The last chapter is on hypervelocity impact. To keep it simple, I have given only very few information about. Thus I wished to show what hypervelocity is and how is it considered now.

Though the book is a very simple one, I wished to ask any author to disregard possible missing of some papers. All literature is certainly incomplete. One has done today much more than given here. It was impossible for me to mention “all” authors in this field.

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