Committee of European
Environmental Engineering Societies

CEEES WG Transportation Stresses

A Bibliography on Transportation Environment

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COMMITTEE OF EUROPEAN ENVIRONMENTAL ENGINEERING SOCIETIES

Technical products are, during their entire life-cycle, subjected to a multitude of influences from their environment, thus affecting their functional ability, their durability and their quality and reliability with the aim to realise missions assigned by the user.

Methods of environmental engineering examine the interactions between object and its environment. With a view to possible synergisms, system-technological considerations and comprehensive assessments are indispensable.

It is this field which is covered by the members of the national societies. These national societies form the Committee of European Environmental Societies (CEEES).

The Committee of European Environmental Engineering Societies (CEEES) is an independent organisation which aims to participating in the advancement of science and technology in the field of environmental engineering and related branches of science. The exchange of information and experience concerning environmental engineering and related fields, participating wherever possible in national symposia and arranging international symposia on environmental engineering techniques and their application belongs also to its objectives. Within CEEES currently working groups of interesting items, e.g. on transportations stresses, reliability and ESS, atmospheric pollution effects on materials, are in operation.

CEEES consists to day of the following members:

AITPA	Associazione Italiana Technici Prove Ambiantali, Italy
ASTE	Association pour le Dévelopement des Sciences et Techniques de l'Environnement, France
GUS	Gesellschaft für Umweltsimulation e.V., Germany
NACEI	National Association of Czech Environmental Engineers
SEE	Society of Environmental Engineering, United Kingdom
SEEF	Finnish Society of Environmental Engineering
SEES	Swedish Environmental Engineering Society
SSEE	Swiss Society of Environmental Engineering

CEEES organisation includes a committee of delegates, a committee chairman, a secretariat and technical working groups. A liaison committee maintains the relation to the EU where CEEES is a registered organisation. The chairmanship and the secretariat is held for a period of two years by one of the member societies.

Markus B. Dumelin
CEEES - President

FOREWORD

The transportation environment may be the most severe conditions a piece of equipment will encounter during its entire lifetime. Failures as a result of mechanical, climatic, chemical or other stresses are usually costly to rectify and they affect the company's reputation adversely.

It is therefore often advisable to have the product to be transported tested with regard to the transportation environment. Such testing will reveal how sensitive the product itself is to transportation loadings, and how effectively the intended packaging, shock-absorbing material etc. will prevent damage. One problem here is to design an adequate test programme.

This is where it is advantageous to utilize the vast experience gathered from the several measurements, experiments, theoretical considerations and standardization work which can be found in literature.

This bibliography is intended to assist in the search for relevant references. It covers measurements and analyses made for several products under different environmental and geographical conditions, as well as methods for such measurements, analysis and testing. Damage prevention is one important topic which is also covered.

The bibliography has been compiled by the joint efforts of the members of the Working Group for Transportation Stresses, within the Committee of European Environmental Engineering Societies (CEEES). The editorial work was carried out at the Swedish National Testing and Research Institute (SP), and the printing organized by the Swedish Packaging Research Institute (Packforsk). CEEES wishes to gratefully acknowledge all members having contributed to the publication.

CEEES welcomes suggestions for additions and improvements for future editions of this bibliography.

Borås in May 1994

Håkan Torstensson

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3. PREVENTION OF DAMAGE ON GOODS

3.1 General

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