



SPM-182 PRODUCT MISSION PROFILING

Practical examples of mission profiles and derived tests

Susanne Otto, DELTA
Kim Schmidt, DELTA
Jørn Gaardsvig Nielsen, Terma

SPM

Reliability Management

SPM is an independent organisation consisting of about 60 company members in Scandinavia.

SPM initiates and finances unprejudiced investigations of common interest for its members – mainly in the field of reliability and testing of electronic components and materials.

NOTE: The report must not be reproduced without the written approval of SPM Reliability Management.

Abstract

This report introduces the reader to the basic concept of mission profiling and a general mission profiling process has been developed. The process is demonstrated by practical examples of mission profiling and derived tests.

The practical cases demonstrate mission profiling and derived tests of a typical antenna system from Terma A/S, an electric drive systems to be used on refuse collection vehicles from Banke Accessory Drives ApS, and a detector for severe agricultural environment from an anonymous supplier.

The report is intended for design, test, and reliability engineers familiar with environmental conditions and testing of electronics and electromechanical products.

The report is the result of a survey performed among SPM members, gathering of information from a number of sources, including engineers with many years of experience in the field of environmental conditions and testing.

Preface

Background

The work presented in this report has been initiated and financed by SPM Reliability Management.

Mission profiling is important in order to obtain and verify product robustness and reliability. It serves as basis for the product development process i.e. specification of product requirements. Further, mission profiling together with acceleration models for the relevant failure mechanisms are fundamental in estimation of life time.

A common question is how to describe the use environment for new products in practice i.e. how to determine which parameters are relevant for the actual failure mechanisms, which part of the product life cycle and which parameters can be omitted and how to translate mission profiles into tests.

Different activities were undertaken to aim the focus of this on the areas most relevant for the SPM members:

- Survey among SPM members was performed – 14 high quality responses from 13 companies out of the 53 member companies (at the time of the survey) were received.
- Seminar to present intermediate results and give the SPM members an opportunity to influence the project.
- E-mailing project group established to assist the project.

Readers

The report is intended for design, test, and reliability engineers familiar with environmental conditions and testing of electronics and electromechanical products.

Table of contents	Page
Preface	v
1. General	1
1.1 Defintions of mission profile	1
1.2 Introduction	1
1.3 Project and report.....	2
1.4 Survey.....	2
2. Product mission profiling	5
2.1 Inspiration from standards or handbooks	5
3. Cases	18
3.1 Terma case.....	18
3.2 Banke mission profiling case.....	35
3.3 Månegrís case – Mission profiling for products in severe environments	56
4. Mission profiling process and guidelines	74
4.1 Mission profile process.....	74
4.2 Guidelines.....	77
5. References	80
Annex 1 Questionnaire	81