

Calculation of Reliability Data using Two-Stage Bayesian Models T-Book/ZEDB-Benchmark

Preface

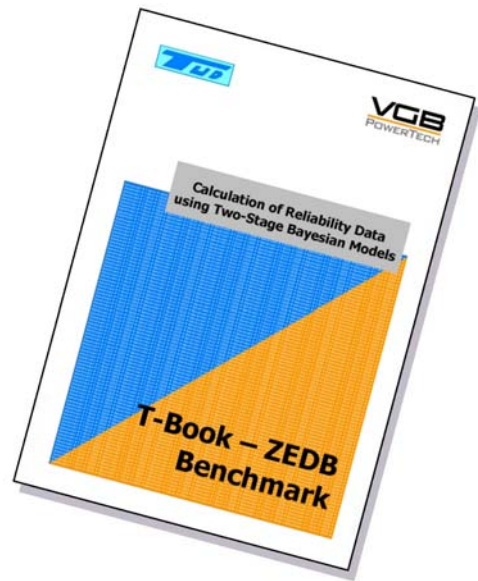
Both the Swedish PSA database T-Book [1] and the German PSA database ZEDB [2] use two-stage Bayesian models which have been reviewed in [3] and [4] to calculate plant specific and generic reliability data from operational experience (component event data and operating times) of nuclear power plants.

Generally speaking, different assumptions can be made for the hyper distribution and hyper priors for the parameters of the hyper distribution, and these may influence the calculated reliability data. Evaluating the same data sets using the T-Book and the ZEDB approaches provides the opportunity to compare the methodologies.

Therefore TUD (responsible for the T-Book) and VGB (responsible for the ZEDB) agreed on a benchmark, the subject of which was to apply the T-Book/ZEDB statistical tools to real data to observe the consequences for the estimated failure rates. For this purpose T-Book-data sets are evaluated using the ZEDB approach and ZEDB-data sets using the T-Book approach.

Pörn Consulting performed the evaluation of the ZEDB event-data on behalf of TUD and Framatome ANP evaluated the T-Book-data sets on behalf of VGB.

The report presents the results of the benchmark; Appendix 1 contains the T-Book evaluation, Appendix 2 the ZEDB evaluation, Appendix 3 a comparison of T-Book calculation of ZEDB data sets with original ZEDB results, and Appendix 4 the exchanged T-Book/ZEDB data sets.



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- [1] "T-Book, 5th edition, Reliability Data of Components in Nordic Nuclear Power Plants", TUD Office, SwedPower AB, Pörn Consulting, Stockholm 2000
 - [2] "Zuverlässigkeitskenngrößen für Kernkraftwerkskomponenten – Auswertung 2000", VGB PowerTech e.V., VGB-TW 801, 2001
 - [3] Cooke, R., Dorrepal, J., Bedford, T., Review of SKI Data Processing Methodology, SKI Report 95:2, 1995
 - [4] Cooke, R., Bunea, C., Charitos, T., Mazzuchi, T.: "Mathematical Review of ZEDB Two-Stage Bayesian Model", VGB PowerTech e.V., VGB-TW 802e, 2002

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Contents

1. Introduction	2
2. TUD and ZEDB databank	3
2.1 TUD	3
2.2 ZEDB	4
3. Basic assumptions used in T-Book and ZEDB	5
4. Benchmark definitions	6
5. Benchmark performance and results	8
6. Conclusion	12
7. References	13
Appendix 1: T-Book calculations performed by Pörn Consulting	14
Appendix 2: ZEDB calculations performed by Framatome ANP	53
Appendix 3: Comparison T-Book calculations of ZEDB data sets with original ZEDB results	98
Appendix 4: Input Data	107
ZEDB component data: tables 1 – 3	107
ZEDB plant specific data: tables 4 – 6	112
T-Book component data: tables 7 – 9	113

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Contact:	André Seidel VGB PowerTech e. V. Kernkraftwerke Klinkestr. 27 – 31 45136 Essen Germany Phone: +49 (0) 2 01 81 28-291 Fax: +49 (0) 2 01 81 28-345 Mail: andre.seidel@vgb.org	Jürgen Zimander VGB PowerTech Service GmbH Verlag technisch-wissenschaftlicher Schriften P.O. Box 10 39 32 45039 Essen Germany Phone: +49 (0) 2 01 81 28-200 Fax: +49 (0) 2 01 81 28-329 Mail: mark@vgb.org
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