

Mechanical vibration - Torsional vibration of rotating machinery - Part 1: Evaluation of steam and gas turbine generator sets due to electrical excitation

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms and symbols	4
4.1 Abbreviated terms	4
4.2 Symbols	4
5 Shaft train modelling and uncertainties	5
5.1 General	5
5.2 Modelling of the shaft train and the electrical system	5
5.2.1 General	5
5.2.2 Elastic blade modelling	6
5.2.3 Modelling generator rotor windings	6
5.2.4 Grid/excitation modelling	6
5.2.5 Damping modelling	7
5.2.6 Gear box modelling	7
5.2.7 Flexible coupling modelling	7
5.3 Design element uncertainties	7
5.4 Determination of calculation uncertainties	8
6 Shaft train evaluation	9
6.1 General	9
6.2 Natural frequency assessment	11
6.2.1 General	11
6.2.2 Torsional frequency margins	13
6.2.3 Natural frequency criteria	14
6.3 Stress assessments	16
6.3.1 General	16
6.3.2 Expertise criterion	17
6.3.3 Stress/fatigue criterion	17
7 Calculation of shaft train torsional vibration	17
7.1 General	17
7.2 Calculation data	17
7.3 Calculation results	18
7.4 Calculation report	18
8 Measurement of shaft train torsional vibration	18
8.1 General	18
8.2 Method of measurement	18
8.3 Measurement report	19
9 General requirements	19
9.1 Supplier and customer responsibilities	19
9.2 Acceptance criterion	20
Annex A (informative) Torsional vibration measurement techniques	21
Annex B (informative) Frequency margin examples relative to grid and twice grid frequencies for shaft train modes	32
Annex C (informative) Commonly experienced electrical faults	34
Bibliography	38