

Fatigue Strength Check

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Overall assessment: OK - the damage sum $D = 0.15473$ stays below $D_{\text{allow}} = 1$.

S-N curve and method

Fatigue strength amplitude σ_D	200 N/mm ²
Knee-point cycle number N_D	1,000,000
Slope exponent k	5
Miner variant	Miner elementary (slope k below σ_D)
Allowable damage sum D_{allow}	1

Load spectrum and partial damage

Step	σ_a in N/mm ²	n_i	N_i	$d_i = n_i/N_i$	Share of D
1	400	1,000	31,250	0.032	20.7 %
2	300	5,000	131,687	0.037969	24.5 %
3	250	20,000	327,680	0.061035	39.4 %
4	150	100,000	4,213,992	0.02373	15.3 %

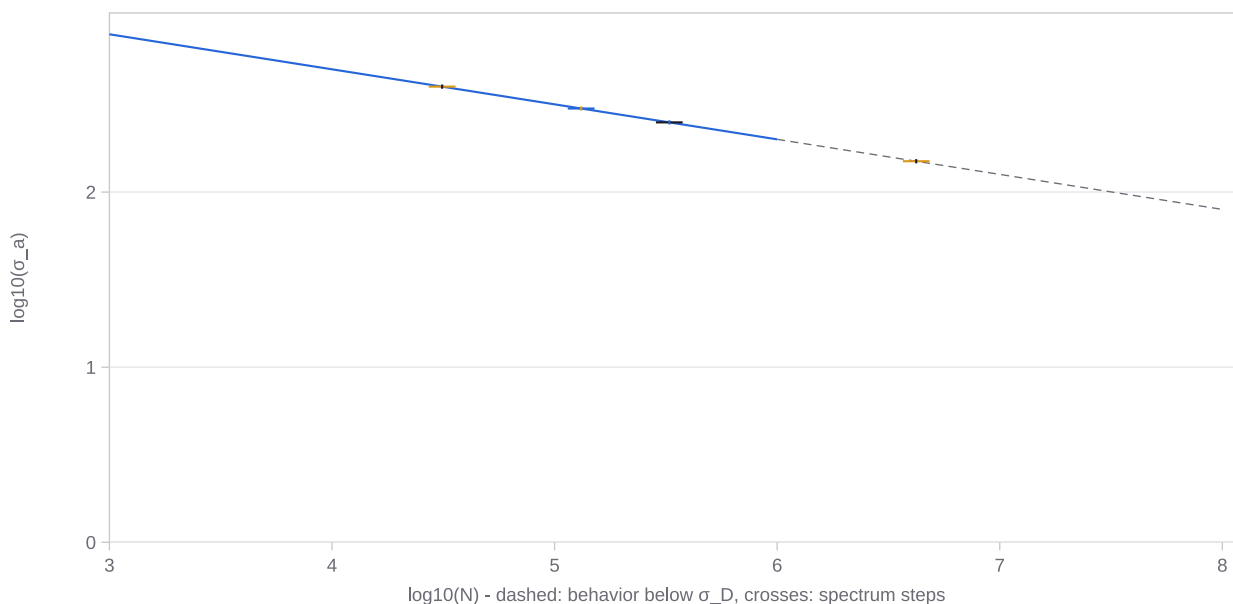
Damage sum

Criterion	Value	Limit	Status
Damage sum D per spectrum pass	0.15473	1	● OK

Life extrapolation

Utilization $a = D/D_{\text{allow}}$	0.15473
Cycles per spectrum pass	126,000
Sustainable spectrum repetitions H	6.4627
Total cycles to D_{allow}	814,299

S-N diagram (log-log)



Calculation basis

Linear damage accumulation per Palmgren-Miner: the component S-N curve $N(\sigma_a) = N_D \cdot (\sigma_D / \sigma_a)^k$ gives the sustainable number of cycles N_i for each spectrum step, from which the partial damage $d_i = n_i / N_i$ and the damage sum $D = \sum d_i$ follow. Below the fatigue strength σ_D , the original variant assumes infinite life, the elementary variant keeps the slope k unchanged, and Haibach uses the modified slope $2k-1$. The check is satisfied if D does not exceed the allowable damage sum D_{allow} ; the extrapolation $H = D_{allow} / D$ gives the sustainable number of spectrum repetitions.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing

Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.