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Designing Wire Rope
Design Data collected from test results und field experience. Designing high quality steel wire ropes

By: Paul-Gerd Voigt (Wire Rope Consultant)

Summary:
First program for the wire rope industry worldwide to design wire rope with the computer was developed in 1975 [4]. With the possibility to design a rope within seconds big improvement have been achieved in rope quality.

To day standard calculation programs are available but the output result is only as good as the input. The input values are the important part; design rope diameter, wire clearance (qW) Strand clearance (qS), strand lay length and angle, rope lay length and angle, relation core-/ rope lay length and core diameter to stand diameter. Influence of clearance, core diameter and fibre core density factor (elevator ropes), crossing angles of wires etc. These values are influencing the service life of the rope, resulting in test result differences of 1:30. Examples of values will be presented.

Differences in using percentage clearance (factor calculation method) against an optimum clearance related to rope diameter and other mistakes in rope calculation are explained.

With the presentation at the OIPEEC Conference 2004 [1] it was tried to explain why design and manufacturing details lead to large different fatigue life results up to 1 : 30 (excluding the 10 % rule with these the difference would still be much larger).
This report shows which design and calculating criteria are optimizing the rope geometry to achieve better bending fatigue results and longer service life..

Consistency and Repeatability of the rope; it starts with rope design.

Literature

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8 **Shitkow/Pospechow, Drahtseile, VEB Verlag Technik Berlin.**

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