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**VGB – technical committee hydro power plants:  
Guideline for the evaluation of fatigue loaded components in hydropower plants**

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Wolfgang Kofler: Overview and content of the guideline

The application of numerical computations in combination with high-strength materials enables higher utilization of mechanical components. Guidelines for calculation as well as construction and testing of materials must be well balanced. A temporary working group of the VGB - technical committee hydro power plants has prepared recommendations to handle with highly- stressed components of machine units in hydro power plants. It will be given an overview regarding to the above issues as well as recommendations regarding fatigue strength in components for new projects and existing power plants, i.e. recommendations as a tool to prepare tenders and test instructions and recommendations for assessment of existing components regarding safety of operation and residual service life.

Xaver Schuler, Chris Kohler: Requirements for the design and fatigue assessment of new plant components

Material fatigue is one of several degradation mechanisms of hydro power plant components. The increasing demands on the flexible operation demands on the detailed consideration of material fatigue. This affects the design phase and manufacturing process of new plant components as well as the lifetime management of existing plants. The VGB guideline includes information and recommendations for the use of fatigue assessment procedures as well as for the quality assurance and life time assessment acc. to the state of the art for new and existing power plant components. The present paper describes the requirements acc. to the VGB guideline for the design and manufacturing for new hydro power plant components. Its application is demonstrated by representative examples for hydro power components.

Klaus Schneider: Evaluation of existing power plant components

The evaluation of existing power plant components can be carried out analogously to the procedure for new plant components. However, the necessary input data for fatigue strength calculations in particular with respect to the constructive details and material properties could not be available in the required quality and completeness. In these cases the operating experience and proof during the often long-term operation can be respected in the assessment including the findings obtained from inspections and tests. Different possibilities for the assessment are explained in reference to examples. The benefits of time life assessments for operation and maintenance are shown.

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