

FATigue MOnitoring System-V

KEEP VIBRATIONAL FATIGUE UNDER CONTROL

The high-accuracy vibrational fatigue monitoring system **FATigue MOnitoring System-V** provides the basis for extending the operational lifetime of components and equipment

Challenge

Industrial structures are subjected to VIBRATIONS and the material fatigue induced by these phenomena CAN BE THE LIMITING FACTOR OF THEIR LIFETIME. Today, there is a lack of control of the plant operator over the plant ageing process and a lack of knowledge about its actual remaining life duration. In contrast to existing structural health monitoring system which aim to detect the appearance of an unexpected fatigue damage a system is needed which is able to predict fatigue damage before it occurs.

Solution

FATigue MOnitoring System-V, developed by Framatome, gives a real time assessment of the remaining life duration of structures submitted to vibration induced fatigue. Framatome disposes of the systems's software for the detailed vibrational fatigue monitoring of vibrations of components. It calculates actual fatigue usage factors and implements a trending function. **FATigue MOnitoring System-V** constitutes the best/most realistic solution for the vibrational fatigue assessment of components thanks to the direct processing of the measuring signals. Additionally, the remaining lifetime is displayed based on the calculated fatigue usage factors. Based on these information the operator is in the position of operating the component in a fatigue friendly manner. In case of already existing fatigue cracks **FATigue MOnitoring System-V** is extensible in the sense of a fatigue crack propagation prognosis. The system is customized to each customer's specific needs.



FATigue MOnitoring System-V Software

Customer benefits

- Real time assessment of the remaining life duration of structures submitted to vibration induced fatigue
- More realistic computation of cumulative usage factors (CUF's) thanks to sensoric vibrational load measurements with qualified instrumentation and data acquisition methods
- Optimization of maintenance and inspection costs
- Prediction of fatigue failures before they occur
- Cost savings through plant lifetime extension and through the increase of plant availability

Your performance
is **our** everyday **commitment**

Technical information

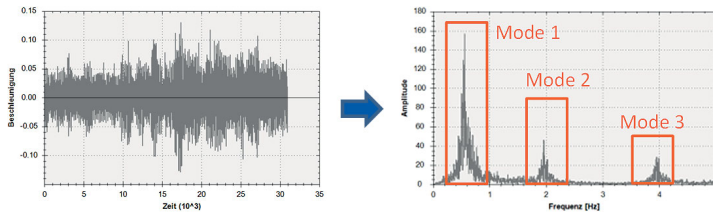
Fatigue **M**onitoring **S**ystem-V is composed of a hardware part and a software part:

The hardware consists of simple and robust accelerometers or displacement sensors that measure the vibration at a few key selected points of the structure.

The software is a program that identifies the contribution of each dynamic vibration mode in the measured vibrations and transforms this information into an estimation of remaining lifetime at each weld or other locations of interest. This transformation is customized by Framatome experts for each particular structure.

An accompanying service package is proposed to the customer on a case by case basis, including technical support for the hardware and/or software, additional expertise or big data analysis.

For structures submitted to both thermal and vibration induced fatigue, a coupling of **F**atigue **M**onitoring **S**ystem-V with the thermomechanical **F**atigue **M**onitoring **S**ystem-i system is easily possible.



Acceleration function and Eigenmodes of a tower structure



Vibrations in technical structures

Key figures

5 systems Successfully operating on a chemical plant structure.

> 35 years of experience in fatigue monitoring

General **F**atigue **M**onitoring **S**ystem-i References

Nuclear Power Plants

> 45 systems sold
> 12 non OEM plants

South America

- Brazil (PWR)
- Argentina (PHWR)

Western Europe

- Finland (PWR)
- France (PWR)
- Belgium (PWR)
- Netherlands (PWR)
- Spain (PWR)
- Switzerland (PWR)
- Germany (PWR)

Eastern Europe and Russia

- Ukraine (VVER)
- Russia (VVER)
- Bulgaria (VVER)
- Slovakia (VVER)

Asia

- China (PWR)

PWR: pressurized water reactor

PHWR: pressurized heavy water reactor

VVER: water-water power reactor

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