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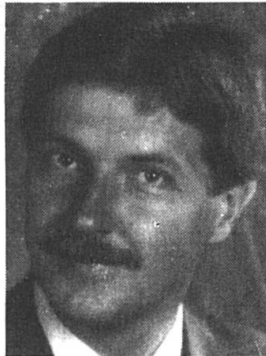
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Health and Safety Monitoring of Composite Structures

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SUMMARY

Structures show a typical dynamic behaviour which may be addressed as „**Vibrational Signature**“. Changes in a structure such as all kinds of damages leading to decrease of load-carrying capacity have effects on the dynamic response. This suggests the use of the dynamic response characteristic for evaluation of structural integrity. Monitoring or measurements of the dynamic response of structures makes it possible to get very fast knowledge of their actual condition.

1. THE BRIDGE MONITORING SYSTEM BRIMOS

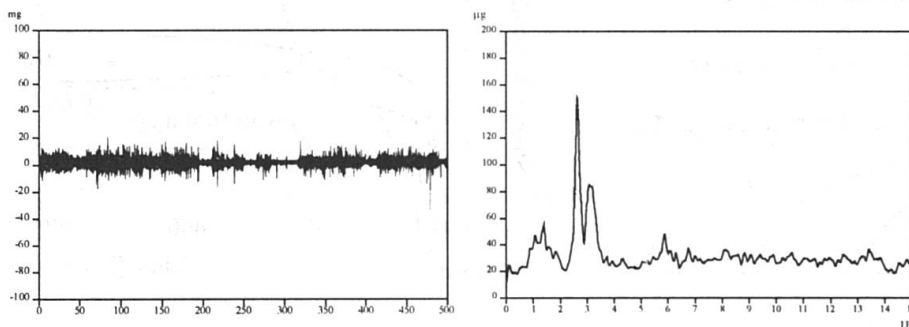


Figure 1 : Typical signal and spectrum of the Nordbrücke in Vienna (composite structure)

For the purpose of „System Identification“ a monitoring set-up was created, that enables quick an efficient recording as well as signal processing and report generation. The basis is the measurement of acceleration in a well determined layout of relevant locations of a structure. This provides data for the FFT analysis to generate the desired spectra. In addition data of the actual displacement of the structure is collected by infrared laser to gather information on the static behaviour and its relation to the dynamic action.

2. DATA PROCESSING

The collected data are processed to provide an informative report, which shall contain information on the signals itself in the desired units, the power spectrum of the readings, raw and smoothened, the drift of the readings and the relevant displacements. In a further step the readings of the various locations are combined to get an averaged spectrum and the related displacements. This is the basis for the animation of the Eigenform of the structure and the visualisation of it.

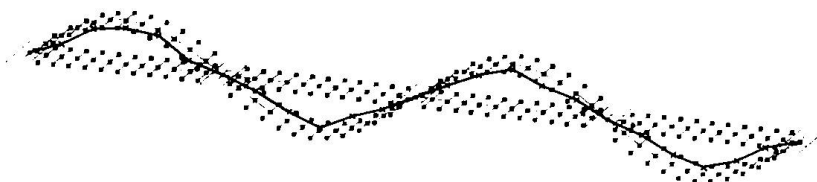


Figure 3 : First Eigenform calculated and measured of the Nordbrücke in Vienna

3. CONCLUSION

Due to the fact, that this bridge was monitored during 3 different stages, before, during and after the rehabilitation, valuable information was gained about the influence of the state of the structure on the response spectrum. From this basis it is tried to develop further tools to assess the quality of structures using data from dynamic monitoring.

