Vibration Analyses
Structural-dynamic analysis

Due to the use of the latest measurement and analysis methods and the longstanding experience in the assessment of vibrations the experts from the MAN PrimeServ Field Diagnostic Team provide you with reliable support in the analysis and assessment of the vibration behavior of your machinery.

Our compressors and turbines are typically installed with all ancillary systems as fully functional units on base frames. As all the steel constructions, piping, apparatus and ancillary systems may by excited to vibrations due to design changes or new operating requirements, high vibration amplitudes may result in fatigue damage on the vibrating components as well as in negative impact on adjacent components.

Structural-dynamic analyses pursue the objective to determine the natural frequencies of a certain component and to measure and analyze its vibration behavior under specific operation conditions. These data allow the experts of the MAN PrimeServ Field Diagnostic Team to determine the condition of the equipment and to recommend appropriate maintenance measures. Thereby, the operator can adjust the maintenance plan at an early stage to ensure a high availability of his equipment.

Analysis Tools
By means of the experimental modal analysis the natural frequencies and the therefrom resulting vibration patterns of a structure are determined. Additionally, operational vibration analyses provide valuable quantitative data allowing an evaluation of the actual vibration condition. Prior and concurrent numerical analyses (FEM) provide fundamental information for
Procedure
During the structural-dynamic analysis the vibration signals are recorded in a multi-channel setup. The recording can be performed either simultaneously with a fixed arrangement of the acceleration sensors or within several passages with different sensor positions. The recording of the vibration signals can be performed as well during operation or during standstill.

If the vibration signals are taken on the running machine, the vibration amplitudes and patterns are recorded at start up, normal operation and running down. During standstill, deliberate excitations using a modal hammer or shaker allow the precise analysis of the structural resonances.

Assessment
Using a specialized analysis software the measuring data can be animated so that even complex vibration patterns can be strikingly visualized. To obtain a differentiated evaluation of the structural-dynamic behavior intimate knowledge of the design of the equipment is required. The direct access to the design and layout data enables the Field Diagnostic Team to estimate the condition of the equipment precisely and identify specific optimization measures.

Benefits
Structural-dynamic analyses allow the identification and analysis of vibration effects which are difficult or impossible to be detected in the machine protection system. Thereby, reliable conclusions can be drawn on the equipment condition and suitable maintenance measures can be initiated at an early stage.