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**Optimisation of Reciprocating Compressor Plants
by using Flexible Couplings
supported by Advanced Engineering Methods**

by

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An important aspect of reciprocating compressor plant engineering is the torsional vibration calculation in order to identify sources of critical vibrations, which may lead to damage of the rotating elements. Besides geometrical boundary conditions, the operating parameters and load conditions of the compressor influence the unit behaviour with respect to the occurrence of vibrations. The paper presents advanced computer-based engineering methods helping to predict critical vibrations, taking into account the whole range of the possible operating parameters of the plant. With a view to maximum energy efficiency, this is important for both, full load and especially partial load conditions. It was found that the use of flexible couplings with natural rubber elements, which are state-of-the-art in a wide industrial field, often gives advantages over stiff steel couplings when considering variable operating speed ranges. With flexible couplings the torsional system can be easily tuned, i.e., the natural frequencies can be shifted so that the required operating speed range is no longer critical. Thus, the compressor can be operated without restrictions within the whole operating speed range.

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