

MACHINE DYNAMICS

Vibration isolation of centrifugal pumps

SASOL Germany GmbH in Moers as operator of various centrifugal pumps and compressors planned the installation of two centrifugal pumps. KCE was instructed to design the vibration isolation for these two centrifugal pumps.

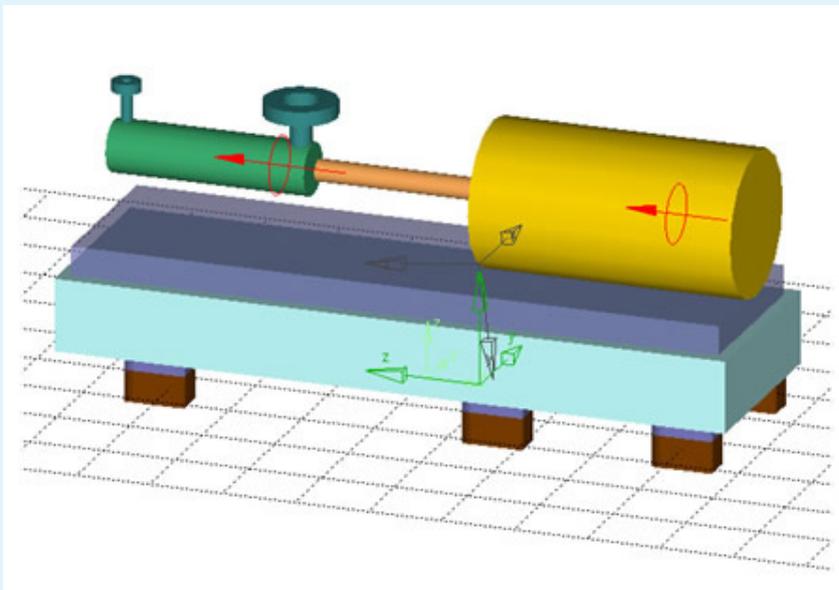
In a first step, the existing vibration situation at the planned installation location of the pumps was measured. Additionally, it was analysed which vibrations were caused by the plant's rail infrastructure. The main vibrations resulted from a compressor located around 15 m away, in a low frequency range of about 7.5 Hz.

The vibration isolation of the pumps was planned on the basis of calculations. Target was the elimination of vibration excitations resulting from the compressor on the one hand and the minimisation of mutual influence of the vibrations of the nearby pumps on the other hand. Therefore, different versions were designed and presented to the customer. Finally, a construction with elastomer-strips and individual foundation in a common outer tub construction of sound absorption mats was realised for both pumps (figure 1). Additionally, the natural frequencies of the elastic pump steel frame, which had to be fixed on the foundation, were checked for possible resonances by means of the finite element method (figure 2).

Finally, the concrete foundation consisting of prefabricated parts produced outside of the site were put on the designed elastomer-stripe with a crane.

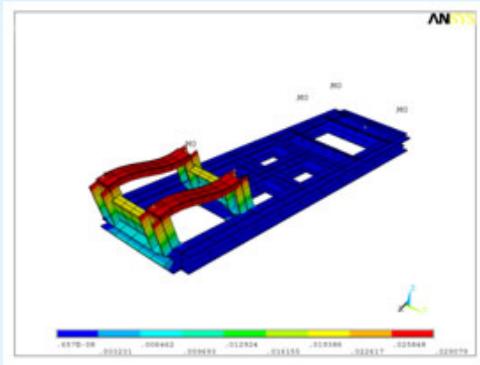
The construction of the foundation pit with strip foundation in parallel to the external production of the concrete foundation saved a lot of time (figure 3).

By this proceeding all risks caused by vibrations could be excluded from the beginning. The commissioning of the pumps proceeded as planned. The pumps could be taken into operation without any problems.



Rigid body model of pump-foundation

MACHINE DYNAMICS



FE-model of elastic pump frames



Foundation on elastomer stripes



Contact:

Dr.-Ing. Johann Lenz
Telephone: +49 5971 9710-47
j.lenz@koetter-consulting.com