

Focus on IFA's work

Edition 9/2014

617.0-IFA:638.21

Noise reduction by decoupled mounting of machines

Problem

In a test laboratory of a chemical company, the employees were exposed to extreme noise levels. The noise was caused by numerous fans for screening units on the storey above which were installed directly on the floor consisting of steel plates. This yielded sound pressure levels of about 85 dB(A) in the room beneath and of 75 to 80 dB(A) in the immediately adjacent laboratory.

Activities

Since the fans and their electric drives were the only conceivable source of the noise and the noise emission was obviously caused by the excitement of vibration in the steel plates, it was decided to prevent the transmission of vibration from the fans to the floor. The ventilation pipes connected to the fans were also identified as additional noise sources. These pipes passed through openings into the room below and were routed there beneath the ceiling.

It proved to be possible to completely detach the fans and drives from the steel bearing plates and support them with a load-bearing structure on walls beneath and on existing concrete girders, as shown in the illustration. The ventilation pipes were also re-routed entirely on the upper storey. One can see the now implemented elastic mounting of the fans on insulating elements as well as the original fastening points on the steel plates. One can also notice a hole in a steel plate through which the ventilation pipe used to pass.



Fans installed so that vibration is not transmitted to the bearing plate

To improve sound insulation, this hole can now be sealed.

Results and Application

The noise measurements carried out after the re-installation of about 50% of the fans and the re-routing of the associated ventilation pipes revealed a significant drop in noise. On the basis of comparative measurements in the areas with and without insulated mounting of machines, noise level reductions of about 8 to 10 dB(A) can be expected after complete re-installation. A noise pressure level of less than 70 dB(A) should now be achieved in the laboratory area.

Area of Application

Firms with noise problems due to the transmission of structure-borne noise to building structures.

Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors