

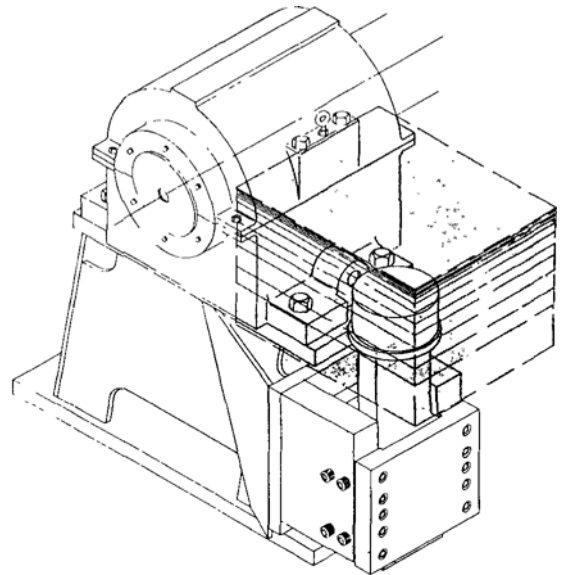
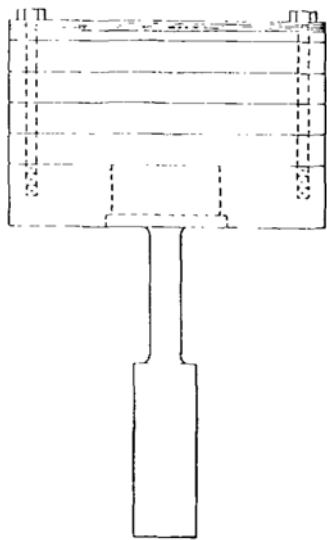
A vibration test leads to an absorber system that produces an opposing force to fan rotor imbalance.

Vibration Absorber System Smooths Operation of Induced-draft Fans

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Public Service Co. of New Hampshire was recently faced with a nagging operating problem at its 420-MW oil-fired cycling station in Newington: severe vibration

the fans operate at considerably lower bearing vibration levels, typically 2-3 mils. Without the absorbers, operating levels were in the range of 10-12 mils and ramping,



of the unit's induced-draft fans limited the plant's loading rate as well as its power output. A vibration test program conducted by an outside consultant, Brewer Engineering Laboratories, Inc., revealed that the natural frequency of the fan/foundation system was very close to the normal operating rotational speed, 14.8 Hz.

To shift the natural frequency beyond the operating range, a special vibration-absorber system was designed. The eight-unit system (four per fan) provides very low damping to suppress the vibration generated by a wandering rotor unbalance due to thermal distortion.

Each absorber consists of a rectangular spring element of high-strength steel, which is rigidly mounted to the bearing pedestal, and a laminated adjustable carbon-steel weight system to provide fine tuning (see sketch). For maximum effectiveness, the absorber mass is centered on a plane through the axis of rotation. The absorbers were fine-tuned at an operating frequency that would produce a restoring force on the system opposite in sense to that generated by the rotor unbalance.

With the use of four absorbers for each fan (two on each bearing), the lateral vibration amplitude was reduced by a factor of three, making it possible to ramp the unit at a higher rate, approximately 5 MW/min. Also,

limited to 1 MW/min, was frequently abandoned because of excessive bearing vibration. The Public Service automatic dispatch system is now set to a maximum of 5 MW/min.

The absorber system has effectively provided a rigid foundation at relatively low cost, and was installed without interrupting the power plant operations.

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