

Whistling Perforated Panels (1-Page Abstract)

Gordon Breeze, Principal Consultant Building research Establishment (BRE), Garston, Watford, UK

Although there are specialist monographs, papers and books, there is little information in wind engineering literature that gives guidance about aero-acoustics. Indeed, despite increasing anecdotal and published evidence over the years, it has been argued that wind-induced noise is not a significant problem within the built environment. At BRE we recently became involved with a project that has highlighted this subject in a dramatic way.

Perforated standing seam mesh panels are being used around the external perimeters of plant rooms and multi storey car parks for safety and for aesthetic visual purposes. The perforations in the panels allow the plant rooms and multi storey car parks to be naturally ventilated. It has been reported that two particular mesh designs that have been installed on a Headquarters Building in the UK whistle in the wind, and this whistling is both loud and annoying.

Two perforated aluminium mesh test products (5mm holes, 5mm hole pitch, 1mm thick) were attached to a wooden turntable located immediately downstream of the high speed jet. Figure 1 shows the first mesh mounted at the end of the tunnel (the size of the square turntable is 2mx2m). Two diagonal bracing struts were necessary to maintain the mesh in an upright position.



Figure 1. View Looking From Wind Tunnel Outlet Towards Mesh

Acoustic measurements were taken with an acoustic camera, and vibration measurements taken with the BRE laser system. It was found that for a range of wind angles the panels whistled at increasing discrete single octave tones as the wind speed was increased and decreased. Video clips were taken during the testing, which I would like to present at the conference. These clips show testing the raw panel (which whistles), and two potential solutions which stop the whistling. These solutions appear to indicate that the whistling is caused by the perforated holes being coupled with mechanical feedback of the panel vibration.