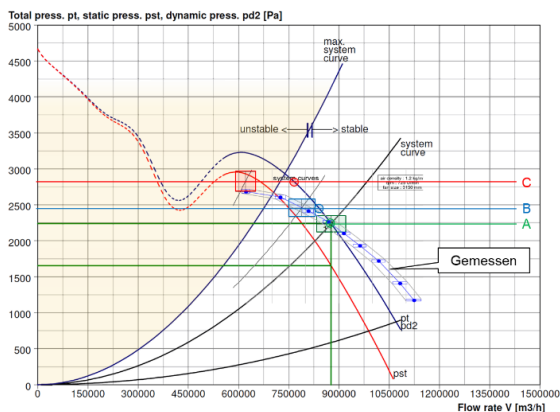




Factory acceptance test of an axial fan



One of the five vertically arranged axial fans



Analysis of parallel operation: theory and practice

## Description

Part two of the large WestConnex project in Sydney opened on July 5, 2020. The project cost was 4.3 billion AUD.

The 9 km long double-tube tunnel is operated with unidirectional traffic and will be expanded with several entry and exit ramps. Due to environmental regulations, tunnel air is not allowed to escape from the portals.

The tunnel is equipped with 177 jet fans, 17 exhaust fans and 9 supply fans. This corresponds to a daily energy requirement of up to 70 MWh with a maximum power consumption of 12 MW.

A balanced design was created with a similar need for ventilation equipment for both normal and fire operation.

HBI Haerter was hired to design the tunnel ventilation by a general contractor consortium consisting of CPB, Dragados and Samsung.

## Services

HBI Haerter has planned the tunnel ventilation during all phases and has accompanied the commissioning. I.e.: *Tender Design, Developed Concept Design, Substantial Detailed Design, Final Design and Issued for Construction Design*. In addition, services relating to the tendering of the ventilation system, award recommendations and factory acceptance tests were provided.

At the same time as the dimensioning, the ventilation control was defined and included in the dimensioning calculations. The control parameters were optimized using 1D simulations prior to commissioning.

Challenges were the parallel operation of the great number of axial fans and ensuring the correct overpressure between the fire tube and the escape tube. In this regard, new ventilation concepts and control principles have been developed.

For special installation situations, CFD studies have been carried out in order to ensure correct dimensioning without having to provide unnecessary safety in dimensioning.