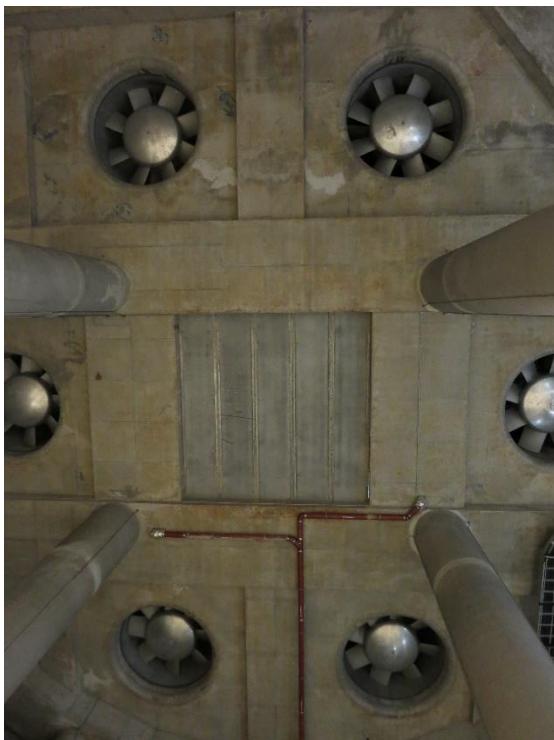
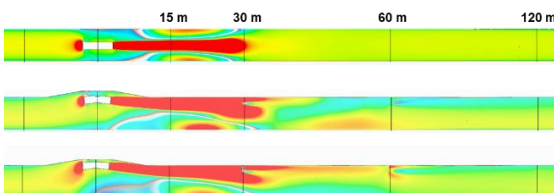




Aerial photo of the construction of a triple ventilation station



Six exhaust fans (view from below)



CFD-calculations: Jet Fan configurations

## Description

The first part of the large WestConnex project in Sydney opened on July 12, 2019. The project cost was 3.8 billion AUD.

The 5.5 km long double-tube tunnel has several entry and exit ramps and is operated with unidirectional traffic. Due to environmental regulations, tunnel air is not allowed to escape from the portals.

The tunnel is equipped with 139 jet fans, 14 exhaust fans and 2 supply fans. This corresponds to a daily energy requirement of up to 55 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, Samsung and John Holland.

## 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.