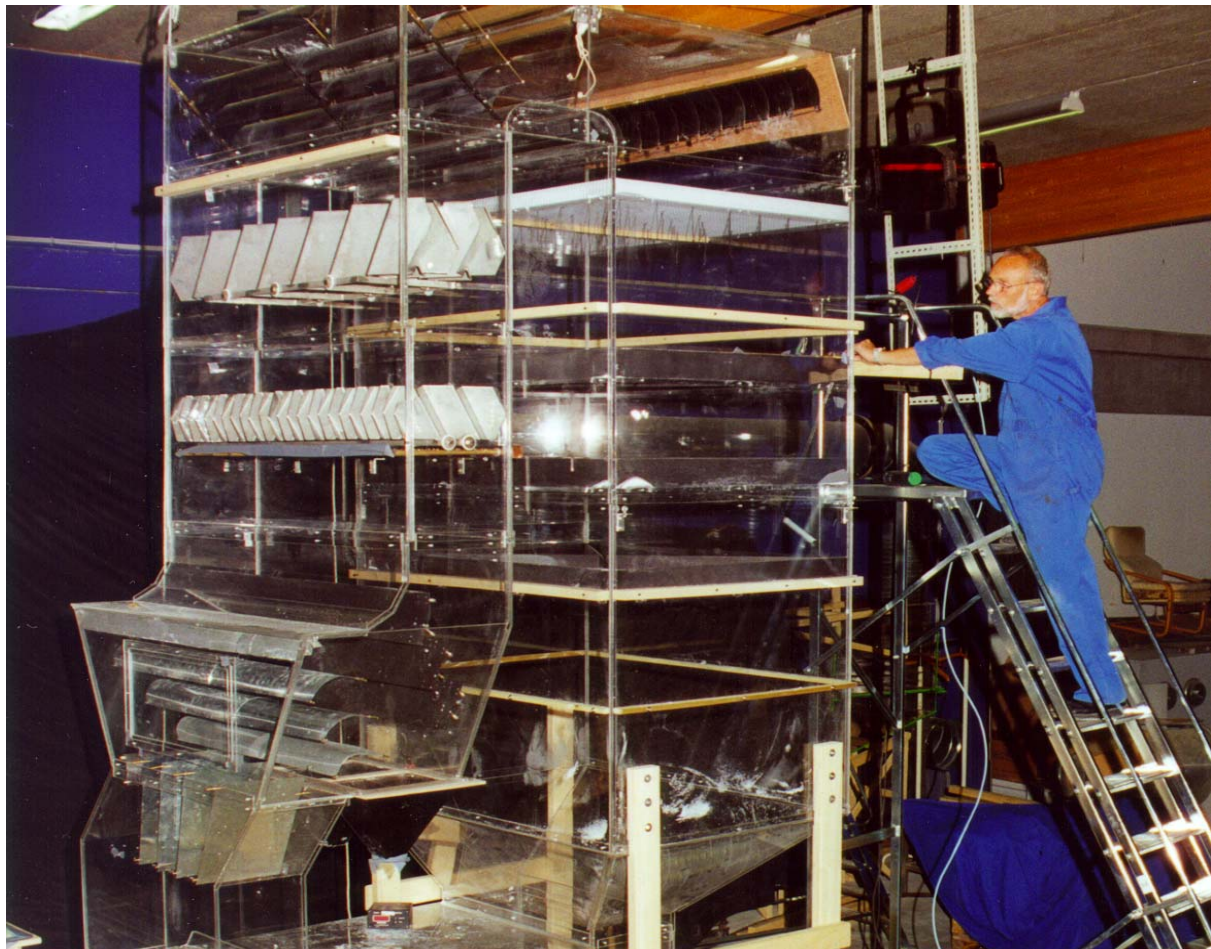


Utilization of CFD cuts down the time between order and finalizing the investigations



Flow Optimization Studies of Selective Catalytic Reactors Plants



Dust precipitation investigations in a DeNOx unit

For several years the Industrial Fluid Dynamics Section at FORCE Technology has been extensively involved in flow optimization studies of Selective Catalytic Reactors (SCR) plants that are used in NO_x removal from flue-gases.

Typically, the experimental scale models are constructed in scale 1:12 resulting in more than 5 metres high transparent acrylic models.

The well-equipped industrial fluid flow laboratory has high capacity enabling simultaneous model investigations of up to 4 SCR-plants.

Guide Vanes

Efficiency of the SCR-plant depends heavily on the uniformity of velocity distribution at the static mixer inlet and upstream of the catalytic converter. Therefore, design and testing of guide vanes are one of the primary tasks of FORCE Technology.

FORCE Technology successfully meets the requirement of no more than 10-15% deviation from the nominal mean flow velocity at the critical cross sections – even in cases involving highly complicated ductwork.

Mixing

Mixing of flue gas and ammonia is documented experimentally by injection of a tracer gas into the flow through a model ammonia injection grid just upstream the first static mixer element.

Mixing is critical to the efficiency of the catalytic process and inadequate mixing will not only cause emission of NOX but also emission of ammonia to the atmosphere.

Dust Precipitation

Another important task is investigation of dust fall-out. Dust may block ductwork passages or dust dunes may be suddenly moved downstream with the flow. The latter could possibly cause structural damage to the plant.

Dust precipitation is studied by FORCE Technology using a special model dust that exhibits the same flow behaviour as the full-scale dust. Critical design features are efficiently identified and remedied by FORCE Technology.

Pressure Drop

The full-scale pressure drop is predicted by FORCE Technology using scale-model measurements.

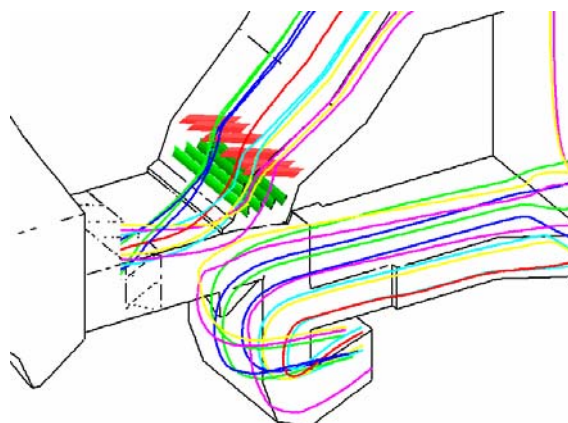
Minimization of the total pressure drop has high priority at FORCE Technology when duct-work design changes are suggested or guide vanes are designed. The final layout most often exhibits a lower pressure drop than the base-line design.

CFD - Analysis

As a supplement or alternative to experimental investigations FORCE Technology has been developing a CFD-methodology for plant design and optimization.

Guide vane design, mixing, dust precipitation and pressure drop may all be included in the CFD-investigations. Access to wide-ranging experimental data has enabled extensive validation and fine-tuning of the CFD-technique.

Utilization of CFD has extended the capacity of simultaneous flow optimization studies and may cut down the time between order and finalizing the investigations.



*CFD-modelling of process plant.
Particles visualizing flow behaviour.*



Further information:
Henrik Hassing, tel. (direct) +45 72 15 77 72, e-mail hnh@force.dk

Subject to changes without notice

FORCE Technology, Kgs. Lyngby
Hjortekærvej 99
2800 Kgs. Lyngby, Denmark
Tel. +45 72 15 77 00
Fax +45 72 15 77 01

FORCE Technology Norway AS
Claude Monets allé 5
1338 Sandvika, Norway
Tel. +47 67 55 38 25
Fax +47 67 55 38 10
e-mail info@forcetechnology.no
www.forcetechnology.no

FORCE Technology Sweden AB
Tallmätargatan 7
721 34 Västerås, Sweden
Tel. +46 21 490 3000
Fax +46 21 490 3001
e-mail info@forcetechnology.se
www.forcetechnology.se

FORCE Technology, Main office
Park Allé 345
2605 Brøndby, Denmark
Tel. +45 43 26 70 00
Fax +45 43 26 70 11
e-mail force@force.dk
www.force.dk