KE REFERENCE: THIALF HEERENVEEN ICE RINK

The heavily increased television coverage of indoor top sports is drawing spectators to the sports centres. That makes high demands on the ventilation which is often only dimensioned for the recommended 3-4 l/s/m² floor area. KE Fibertec has been involved in a very exciting project of renovating the Thialf Heerenveen Ice Rink in the Netherlands which is primarily used for ice hockey and speed skating.

Ventilation of sports centres with large crowds is a very complex matter if the solution is to work both during the week when the load is limited to the athletes that use the centre for practise and during weekends when the centre holds large crowds. Especially speed skating requires a very smooth and uniform ice surface as the criteria of success are world records in order to attract sponsors and TV networks. If the ice is "slow" the best skaters will stay away, and the seating capacity of 20,000 seats will not be used.

In the demand analysis, thermographic measurements (heat measurements) were carried out to estimate thermal conditions and the risk of fogginess and condensation and not least the radiation from a hot roof against the ice surface both with and without a crowd. The conclusion gave an inadequate existing air distribution system, and the contractor wanted to separate the systems. Of financial reasons it was decided to keep one of the existing ventilation systems (the outer ring on the picture to the right consisting of a spiro tube and nozzles) with the purpose of using it at public events. Further, new ventilation units of totally 100,000 m³/h were installed to ensure correct temperature conditions and good air quality around the rink.

Thialf chose a KE-DireJet® ventilation system with nozzles from KE Fibertec. As shown in the picture, the yellow ducts are placed so that they follow the ice rink in an oval shape and with nozzles on the outside slanting downwards to the rink

Thialf Heerenveen Ice Rink in the Netherlands fitted with yellow ventilation ducts

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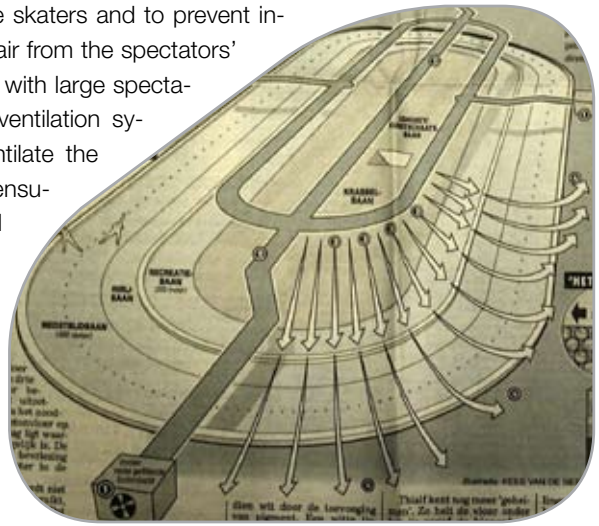
to ensure fresh air for the skaters and to prevent infiltration of warm, humid air from the spectators' seats. For skating events with large spectator crowds the existing ventilation system is operating to ventilate the spectators' seats and to ensure that the heat is forced up below the ceiling. It is very important to prevent heavy, humid CO_2-bearing air from reaching the ice surface as this process will slowly melt the microscopcal top layer of ice thus changing the skating conditions.



The solving of this problem gave rise to another problem since the heat accumulation below the ceiling was going to cause heat radiation towards the skating rink. As the exhaust ventilation alone could not break this pattern it was necessary to render the textile ducts more inductive in order to entrain and break the the "cushion of air". The problem was solved by punching groups of small highly inductive lasercut Ø4.5 mm orifice holes in the textile ducts and direct them towards the centre of the rink. Further, an "auxiliary textile duct" was placed all the way down the centre to blow the induced warm air back towards the floor, naturally outside the ice rink itself, so as to compensate for the vertical temperature difference and by that the heat radiation.

The solution was soon put to the test when the European Speed Skating Championship was held shortly after completion. During that event Thialf Ice Rink obtained their first world record since 1989.

Operational costs of this solution have not increased, on the contrary. During the week, the new energy-reducing ventilation system with textile ducts is used only for cooling whereas the existing CAV plant is only operational at events with spectators present. This philosophy could easily be transferred to other display centres for top sports or with occasionally large crowds.

SPECIFICATIONS OF AIR DISTRIBUTION:

- Ideal temperature for skaters is 17°C at 60% RH
- No mixing of "fresh air" and polluted CO_2-bearing air from spectators' area
- Flexibility and focus on energy

FACTS:

- 3 in 1 air distribution system
- 4 units of each 25,000 m^3/h
- Centre system: Max. 25,000 m^3/h
- Oval system: Max. 100,000 m^3/h
- Existing unit (spectators' seats):
  < 5,000 spectators = 65,000 m^3/h
  > 5,000 spectators = 130,000 m^3/h