Visual Airflow Performance Test of the Indoor Air Quality for the Operator of Shale Shakers at an Oil Platform

Olesen K P
Olesen Consult HVAC AS, Stavanger, Norway

Shale Shaker Ventilation

A video tape showing the displacement of air from the supply roof through the room to the exhaust hoods.

Technical Problem

When drilling with oil based mud (70–80°C) one often have oil vapour concentrations of at least 300% above acceptable level and oil fog of at least 3000% above acceptable level in the worker breathing zone in the working area in front of and between the shakers.

Practical Problem

To convince to operators and the owner of the capability of the HVAC system, that this will fulfil the requirements for an acceptable indoor air quality in the operators breathing zone.

Visual Airflow Performance Test

We use a theatre smoke generator to illustrate the air pattern in order to convince the operator that there are no polluted air being mixed into the clean air by which the operator working area are being flushed.

Technical Solution

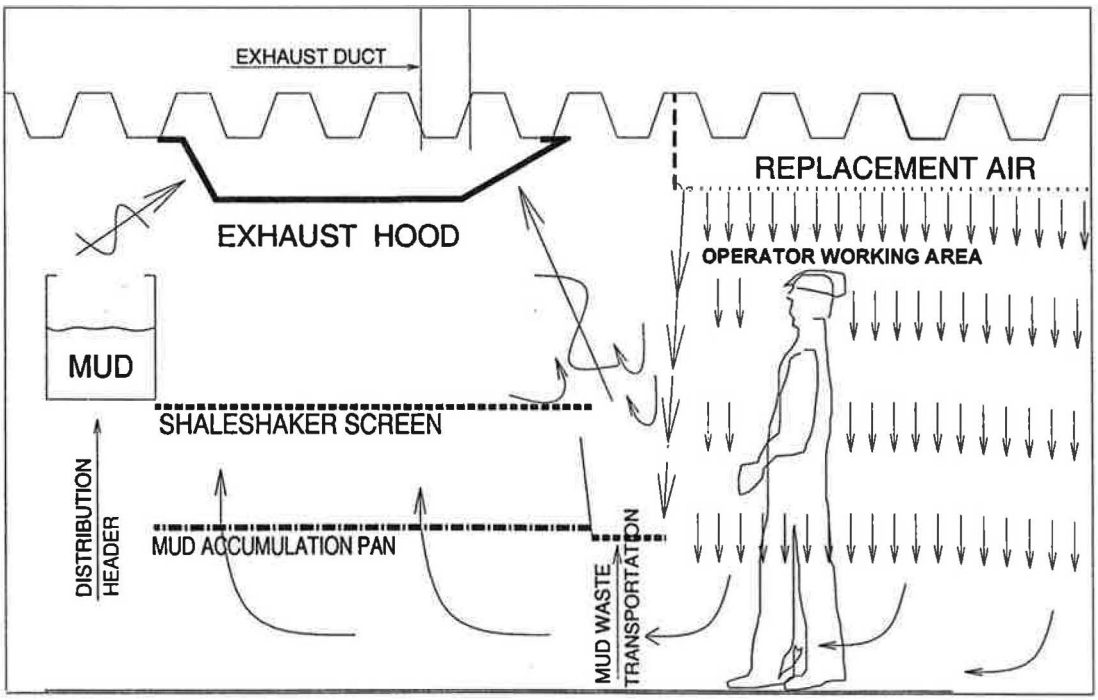
An advanced exhaust hood (Patent pending) which keeps the emissions within the border of the shale shaker screen, together with a well designed replacement air system with continuous flushing of the operators working area. The combined effort results in an excellent working environment well within the authority's requirements.

We have developed and till now installed and tested this type of system at platforms at Statfjord 'A' 1995. Sleipner 'A' 1996. Maersk Jutlander 1997. Maersk Gaurdian 1997. Gullfaks A 1999 and Valhall DP 1999.

Statfjord A - Conditions	Before mg/m^3 air	After mg/m^3 air	NPD req. mg/m^3 /8 hours (12 hours)
Oil fog	1,4 - 21,1	< 0,1	1,0 (0,66)
Oil vapour hydrocarbons	1 - 122	0,1 - 0,4	50,0 (33,3)

The important issue in a push & pull system is the interaction between the properly designed supply system which continually flush the operators working area with clean air and the innovative exhaust hood (which prevent polluted air from entering the working area) with a dynamic separator draining the liquid back to the shaker screen, before the air is blown out through a high velocity stack (high velocity to have minimum settling in the ducts).

The HVAC system have an inlet water separator removing 95% of water particles above 30 my, silencer, steam/electrical) heater, supply fan, silencer and duct system connected to the inlets supplying the air at velocities in the comfort range. The exhaust system have AISI316L exhaust hoods, (here at the smoke test) duct system, silencer, exhaust fan, silencer and a vertical non return outlet.



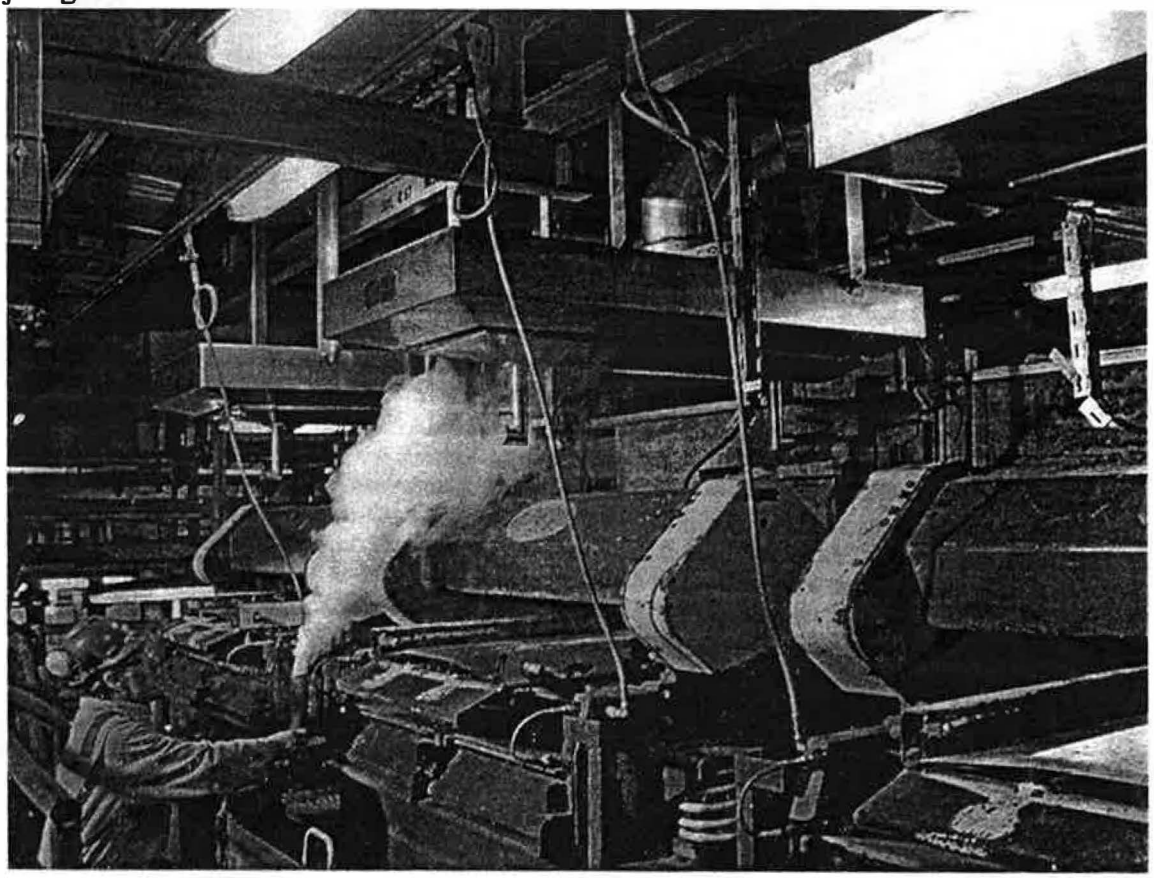
At existing plants with 4 shakers the motor at the supply fan are in the range of 20–30 kW and the exhaust fan motor 40–50 kW. The heater raise the temperature to 5–10°C with an outdoor temperature of -8°C, which is sufficient.

When this method is applied to all areas with open handling of the drilling mud, there will be no conflicts with the requirements of the working environment. This apply to all types of mud.

This is the only known documented ventilation solution which fulfil the functional requirements for the working environment in the shale shaker areas from the Norwegian Petroleum Directorate.

This system can too be used in other areas with large pollution's like the Hopper-mixing table.

You can see our videos from the smoke tests at any of the above mentioned projects, just give us a call.



The video of the visual performance test is a part of the 'As-built' documentation.