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**KEEP THE AIR INDOORS HEALTHY**  
Regular Cleaning of Air Conditioning is a Necessity

"Problems with air within buildings resulting from inefficient operation of air conditioning systems can be laid at the door of bad design in 20% of all cases and lack of maintenance in 80% of all cases", state Emilienne Clement and Ray De Koster of De Kobra, a company that specialises in hygiene audits and maintenance of air-conditioning systems.

"Bad design results from failing to adapt the system to alterations within the office, incorrect installation, a filter system whose performance is inadequate and an inappropriate supply of fresh air, by for example obtaining such so-called 'fresh air' from underground car-parks."

Picture Caption:

A correctly cleaned ventilation duct.

A bad interior climate can usually be blamed on the air conditioning system. The first part of the system consists of a filtering system which is intended to remove dust particles from freshly supplied air and recycled air, in as far as this is possible. This filtering can never be 100% effective with the result that there are always dust particles which penetrate to the inside. When the filters are contaminated there is an increase in the difference in pressure across the filter which can result in bursting and the distribution of high concentration of micro-organisms throughout the system and the premises. Periodic replacement of the filter is a solution. A damp filter adjacent to the grill which sucks in air from the outside then proves an ideal source of food which permit micro-organisms to grow. The temperatures in the heating and cooling pipework provide good conditions for the development of heat-loving and spore-forming micro-organisms. Checking and cleaning of pipework as and when required reduces these risks.

A third harmful area is the humidification section, because water and humidifiers are excellent habitats for algae and bacteria. The water within the tank is rich in oxygen and is the same as the ambient temperature of the nearby rooms. When this water is sprayed onto the air which is being driven along, such micro organisms present are transferred to the air. Any additional pollution can be prevented by regularly treating the humidification water with disinfectants or by the use of steam humidifiers.

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#### DUCTWORK SYSTEM

A fourth source of emission is the ductwork system, where as a result of poor maintenance dirt and dust can gather. Problems affecting the interior air may be significantly reduced by means of preventive maintenance of the system. Emilienne Clement has a loathing for systems that can only be reached with difficulty, "To ensure good maintenance it is important to take easy access to the various elements of the system into account during the design stage. Most frequently, maintenance is only considered when problems arise. Designers, managers, employers and doctors need to be better informed about the problems and preventative measures. As regards this it is important to distinguish between checking the technical aspects of the system and maintenance for the purpose of interior airway hygiene."

When examining complaints regarding a building, Ray De Koster advises a systematic analysis of the various symptoms.

"During the first phase we gather together as much data as possible about the complaints on health and comfort submitted by the workforce or residents, taking into account their activities out of the workplace, their motivation and psychological factors etc. The questionnaire provides useful information and permits one to plot out the critical areas within the building." Simultaneously, information is gathered about the situation of the system and its working, the construction materials used for the building, the quality of the illumination and the noise levels. The third phase consists of the measurement and analysis of various air hygiene and comfort figures: carbon monoxide, carbon dioxide, micro-organisms, temperature and humidity. After assessing the various factors an action plan is drawn up. The possible solutions include adapting the ventilation system or a programme of cleansing and a disinfection or maintenance programme."

#### NEW PROCEDURE

At the end of June Ray De Koster introduced a new procedure for cleaning air conditioning systems. As cleaning ductwork was until recently a highly labour intensive and therefore expensive exercise, a license in an American system was purchased, enabling more rapid and efficient working.

"In the past cleaning required a great deal of preparatory work", Emilienne Clement explains. "Frequently the false ceiling has to be broken open. Every 4 metres there is a cleaning aperture measuring 300mm by 300mm (1 foot x 1 foot). Revolving brushes loosen the dirt and dust which is sucked up by a vacuum cleaner. The area in which our staff are working must be separated by means of a plastic cover from the surrounding area because when the brushes are removed from the ducting a large quantity of the contamination is introduced into the rooms. By this method 30 metres per day may be cleansed and this was very difficult to justify in financial terms. To check for contamination in the ductwork after the passage of time the false ceiling and cleaning apertures must be reopened."

With the new cleaning system, small round 25mm (1 inch) diameter holes are drilled into the ductwork every 8 to 10 metres. These

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holes are hermetically sealed when work is concluded and connect directly to the false ceiling. Before cleaning commences the ventilation ductwork is visually inspected by means of endoscopic techniques. This checking permits an estimation of the quantity of accumulated dirt and if required dust samples may be analysed by micro-biological methods.

**Picture Caption:**

The new American cleansing system uses equipment which makes the danger of contamination of surrounding areas almost impossible.

**PHASES**

Following this the ventilation plant; ductwork system, plenums batteries and convectors are cleansed. The ductwork is cleaned in phases. After a length of ductwork of between 30 and 50 metres is shut off, the vacuum equipment is connected to a grill. A piece of equipment driven by compressed air is introduced into the ductwork by way of the access opening and this blows and sweeps the dirt away, the dirt is collected and filtered out in the vacuum equipment. The extraction air is returned to the atmosphere following filtration (99.47% return on filtration). During cleaning the ductwork is under negative pressure and as a result, Emilienne Clement states, there is no danger of contaminating the surrounding areas. Where heating and cooling batteries are involved a choice is made between various concentrations of grease removing and disinfecting products, according to the degree of contamination. After permitting the chemicals to work in the batteries are cleaned with a high pressure cleaner.

"This new cleansing method was developed in the United States after many years of research, and when compared to previous methods it could be called a revolutionary method. When work is in progress the building does not have to be taken out of service. The cleansing equipment works by itself and reaches all valves, ductwork surfaces and sides, irrespective of size or type. Insulated or fibreglass ductwork is just as easily cleaned as non-insulated ductwork. The most important factor is the elimination of the danger of contamination from the environment."

Ventilation systems are usually easily accessible so that cleaning does not pose any problems. With regular checking, cleaning and disinfecting contamination and pollution of ductwork avoided.

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