Wall-to-Wall Carpeting is Better

A new DAAB (German Allergy and Asthma Society) study proves that indoor levels of airborne fine dust are reduced, in places dramatically, by the use of wall-to-wall carpeting. Is a revolution in the making - as the first results, exclusively for our readers, suggest?

Better living quality from wall-to-wall carpeting because of less fine dust

While politicians and consumers are currently focusing their attention on airborne fine and very fine particulate in cities, levels of the same occurring indoors have not been a subject of concern. But that may soon change. It has been found that in many homes the level is above the international limits for outdoor air. Given the present standards for the outdoor environment, such a reading would warrant an immediate driving ban in affected areas. The first results of a study on "Indoor Fine Particulate Load" are presented here.

It has been known for centuries that dust, although a part of life on earth, can be harmful to health.

Dust-measuring technology, the medical assessment of the effects of dust exposure, and protective measures have existed for 200 years, with ongoing improvement.

The effects of dust levels have become especially obvious with the experience of coal miners. When much dust was present in the tunnels, visibility was so poor that efficient mining was not possible. As well, the miners were getting sick from inhaling coal dust and could no longer work. This motivated the invention and installation of the first dust control equipment, improving yields as well as working conditions.

As industrialization advanced, the dust levels of outdoor air increased as well until, in the middle of the last century, because of advances in scientific knowledge, more and more dust-avoidance strategies were applied.

The first medical study of dust fractions that are small enough to be inhaled occurred in 1959 in Johannesburg, at the Pneumoconiosis Conference.

Since 1973, the MAK (maximum workplace concentration) lists have set limits on inhalable total dust and alveo-accessible fine particulate.

Fine dust is an especially bad problem for people with allergies. Regardless of the type of dust inhaled, its particles are irritating because of their mechanical effect on the airways. On previously-damaged bronchial systems, their effect is even stronger.

In addition, other harmful materials, such as allergens, bind to these particles and can thus penetrate deep into the lungs and cause subsequent reactions. For example, cat allergens, which become airborne as cats lick their fur, attach themselves to dust particles. Also, the excrement of house mites with its allergens decom-

poses into dust-like components and becomes suspended in the air.

Furthermore, certain types of dust are responsible for a whole series of diseases. Coal dust, for example, attacks the connective tissue of the lungs and destroys the alveoli, while pure airborne dust activates blood platelets, making the blood thicker and increasing the risk of heart attacks. The dust of some materials, like asbestos or beech wood, can cause cancer. An EU study says that fine particulate can reduce life expectancy by nine months. The WHO has reached similar conclusions.

The quality of outdoor air has been continuously improving. This is the result of legislation and regulations that have been developed due to scientific findings, for the protection of people. A similar outcome is also the goal of the current discussion of fine particulate.

In the opinion of the DAAB and GUI (Society for Environmental and Indoor Analysis), indoor air, in which we spend nearly 90% of our lifetime, is not getting enough attention.

Obviously, in naturally-ventilated buildings, dust can enter through the windows. But what happens to the air in the room? Is it directly breathed in by the occupants? Do the elements

This high-tech instrument is used to measure the number of fine dust particles

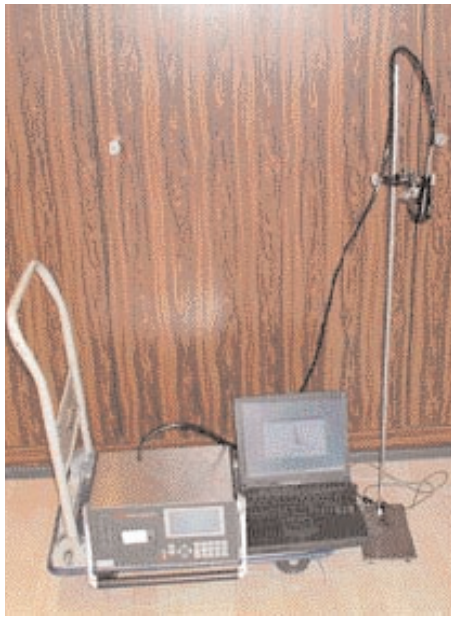
in the air bind themselves to furnishings in the home? When are they released? What is the concentration of fine dust indoors when there are indoor sources such as smoking, open fire-places, pets, and so forth present? How can I best furnish my home for better hygiene and health?

These are just a few of the unanswered questions that are so frequently asked and which we would like to help answer.

More than 100 homes

As already mentioned in the last issue of "ALLERGIE konkret", together with the DAAB we conducted a study of fine particulate levels indoors, paying special attention to furnishings and use and especially the type of floor covering used.

The study involved more than 100 homes selected at random in North Rhine-Westphalia. In these homes we tested bedrooms, living rooms, and children's rooms, where present.



Test set-up for an indoor air measurement

Below we describe an initial but very clear correlation between floor coverings and the fine particulate load in the rooms.

A detailed scientific publication that will examine the essential framework parameters of the sites measured and their influence on the fine particulate load is currently being prepared. It will be published sometime this year and will, of course, be presented to readers of "ALLERGIE konkret."

We would like to acknowledge the support of the DAAB in preparing and designing the study, since without their help this complex undertaking would not have been possible.

The dust measurements were made with internationally recognized scientific instruments. We used 16-channel laser particle counters to detect and count all fine particulate fractions that are equal to or smaller than 10 µm-diameter particles in the air.

At each location we determined the number of particles in the 0.3 µm, 0.5, µm, 0.7 µm, 1.0 µm, 1.5 µm, 2.0 µm, 2.5µm, 3.0 µm, 3.5 µm, 4.0 µm, 5.0 µm,6.0 µm, 7.0 µm, 8.0 µm, 9.0 µm and10 µm fractions. 1 µm corresponds to a thousandth of a millimeter.

Furthermore, the dust was measured gravimetrically. This meant that a pump was used to suck the indoor air in through a filter. Then, using a preset exhaust outlet, only dust particles that were equal to or smaller than 10 µm were left on the filter. By weighing the filter before and after the measurement, we could calculate the quantity of dust and its ratio to the volume of pumped air. This was used to calculate the concentration of fine particulate of less than 10 µm per m^3.

This is the procedure regularly used in measuring workplace concentrations and fine particulate concentrations in the outdoor air, like those currently being much published and discussed.

The graphs present the fine particulate concentrations of the fractions smaller than 10 µm in the air of the tested rooms. 64% of the rooms had bare floors and 36% had wall-to-wall carpeting. This ratio corresponds to what is currently found in Germany. Thus, our study covers a representative distribution.

Limits Exceeded

In testing the individual rooms, the limits were exceeded in some cases, depending on other framework parameters such as smoking, pets, type and frequency of cleaning, etc. We discuss this in greater detail in our scientific publication.

The core result of the study is, however, clear:

In a room with a bare floor, the risk of more airborne fine particulate rises, while the use of wall-to-wall carpeting minimizes this risk.

This means that for especially sensitive people whose airways are already damaged, it is an essential preventive measure to select a floor covering that binds dust and does not release it into the air.

Encouraged by the great success of our joint study, we are now starting a new study of 50 households, where we will examine the occurrence of mite allergens in rooms in connection with their furnishings.

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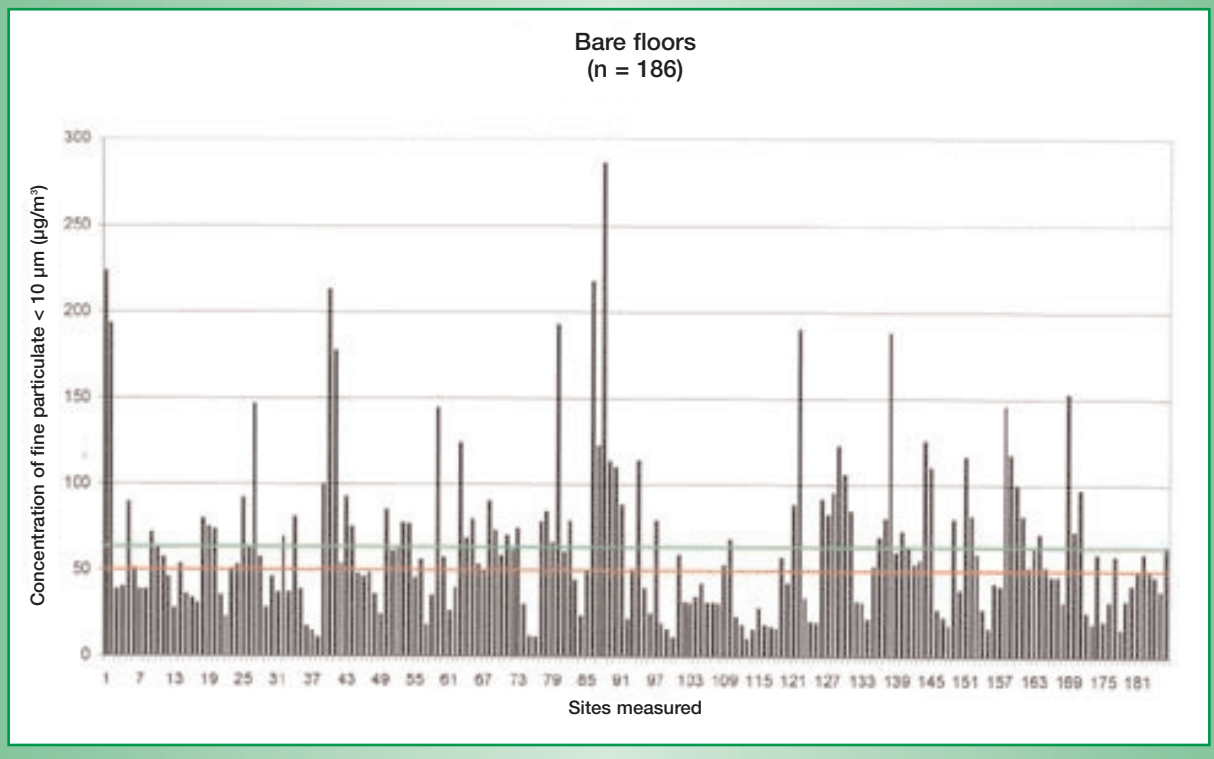

The red line in the graphs shows the limit for fine particulate of 50 µg/m³ in the outdoor air in Germany, based on the application of EU Directive 1999/30/EG on January 1, 2005.

All households above this red line exceeded the limit at the time of the measurement.

The green line shows the average fine particle concentration for all measured rooms, shown separately for bare floors and rooms with wall-to-wall carpeting.

Ideally, this average should be under the red line.

As can be seen from these graphs, the average fine particulate concentration in the rooms with bare floors is 62.9µm/m3, which is well above the limit of 50µm/m³.

In households with wall-to-wall carpeting, the average is 30.4µm/m³ and thus well below the limit.