Katsumi YOSHIDA

Kyoto Industrial Health Association
67 Kitatsuboi-cho, Nishinokyo, Nakagyo-ku,
Kyoto, 604 Japan

Abstract....Conceptual methods of setting national ambient air quality standards in Japan are discussed in comparison with case of occupational exposure limits in industrial health.

The air quality standards are set by the national government, based on recommendations of the Central Council on Countermeasures for Environmental Pollution, in conformity with the Fundamental Act on Countermeasures for Environmental Pollution. In setting the standard values, thresholds and the existence of specific groups in the people with high susceptibility to a certain pollutant are taken into account.

The standards are set following minimum effect reports in three branches of health effect studies on air pollution: animal experiments, human exposure, and epidemiology. Safe levels take into account the absence of effects, suspicion of irreversible effects, dwellings of the elderly/infant/sick, epidemiologic growth of nonspecific diseases such as asthma, and so on. Under these conditions, air quality standards become far severer than in the case of industrial health limits.

Key words threshold, air quality standards, occupational health limits, safety rate

INTRODUCTION

The history of setting ambient air quality standard in Japan is relatively short. With the episode of Yokkaichi-asthma as a turning point, the importance of standards was

realized and their setting was begun.

Ambient air is the largest in quantity among matters taken into the body. Air is taken in for 24 hours per day. Its quantity reaches about 12 cubic meters of volume, about 13 kg in weight. And it exceeds water intake (about 2 kg including water contained in foods) and food intake (dry weight about 0.5 kg).

The intake-rate of air pollutants (absorption rate or deposition rate) usually reaches about 90%, so setting standards is very important for the nation's health.

SETTING STANDARDS

Conceptual methods of setting standards are similar to the methods of setting industrial health limits, but in some important points fundamentally different.

1. Existing ambient air quality standards are fewer than the occupational health limits.

The number of air pollutants which have national standards is far smaller than the number of threshold limits in industrial health. At the present, five pollutants, SO_2 , SPM (suspended particulate matter), CO, NO_2 , and photochemical oxidants, have standard values.

2. Air quality standards are governmentally determined. As ambient air quality standards have important effects on the nation's health, the standards are governmentally set under the Fundamental Act on Countermeasures for Environmental Pollution. In practice, the Central Council on Countermeasures for Environmental Pollution recommends actual values for the standard.

3. Actual procedure of setting the value

Initially, research papers on three branches of the pertinent pollutant's health effects (animal experiments reports, human exposure reports, and epidemiologic findings) are collected, and thus the dose-effect/dose-response relationship is investigated. Generally, the most important and affective data are those of epidemiologic findings on the pertinent pollutant.

4. The safety rate, as we called it, is not considered as a general rule. In the case of standards, findings from the three research fields are investigated, but the epidemiologic effects which are actually observed in the residents show the lowest value in practice. It can be told that the safety rate is not necessary because standards are based on data which are actually observed in humans including those with high susceptibility.

5. Reasons for difference between the air quality standards and occupational health limits

- 1) In the case of the standard, the sick, the infant, the elderly and the pregnant are contained in the applied subjects.
- 2) Exposure to the pollutant is continuous through 24 hours and its interruption can not be assumed.
- 3) Usually, epidemiologic growth of nonspecific diseases such as asthma or chronic bronchitis becomes a problem. On the other hand, in the case of occupational limit, usually specific disease such as intoxication from pertinent chemicals is the problem.
- 4) In the case of air pollution, in general, specific legal liability does not always exist between the polluter and the dwellers. In the occupational case, the employer's responsibility is well established.
- 5) In the occupational case, health monitoring systems are the legal obligation of the employer. In contrast, such an obligation does not exist in most cases of air pollution.