

## Dust Control for Livestock Buildings

The exposure to dust and other harmful gases in confined livestock buildings is at a high level among livestock producers. Air pollutants have been implicated in causing respiratory diseases for livestock producers and in making them worse. Swine and poultry workers have a high prevalence of wheezing and chronic bronchitis.

### Dust sources

In livestock buildings, dust consists of animal hair, skin, dry manure and feed. Organic dust contains feather particles, pollen, insect parts, molds, fungi, viruses and bacteria.

### Dust measurement

Dust is mostly measured as mg (airborne dust) per cubic metre of airspace ( $\text{mg}/\text{m}^3$ ). The size of the dust particles varies from less than 0.1 micron ( $\mu\text{m}$ ) to over 100  $\mu\text{m}$ .

The important fractions are inhalable dust (less than 10  $\mu\text{m}$ ) and respirable dust (less than 5.0  $\mu\text{m}$ ). About 80 to 90 per cent of the dust inside swine and poultry buildings is smaller than 5  $\mu\text{m}$  and can be inhaled deeply into the lungs.

### Factors affecting dust concentration

The concentration of dust in the air is affected by temperature, relative humidity, ventilation systems, feeding practices, stocking density, cleanliness of the buildings, bedding materials and animal activities.

### Dust is an occupational hazard

The majority of agricultural safety groups consider working in livestock facilities as a high-risk occupation.

A worker may experience high risk because of work area (location) or work procedure (task).

The following are important considerations when assigning tasks for workers in livestock or poultry units:

- proximity to contaminant sources
- frequency of proximity to contaminant
- worker complaints and illness

### Livestock producers and workers are at risk for respiratory diseases

#### Bronchitis

Symptoms include cough, phlegm, tightness of chest, shortness of breath, wheezing.

#### Chronic Farmer Lung Disease

May occur with repeated dust exposures although it is possible to develop it after only one attack. Symptoms include chronic coughing, increasing and severe shortness of breath with slight exertion, weakness and body aches, and occasional fever.

#### Occupational Asthma

Symptoms include tightness of chest, shortness of breath and wheezing.

#### Organic Dust Toxic Syndrome (ODTS)

About one-third of swine producers have had one or more episodes of ODTS. Symptoms include fever episodes, headaches, muscle aches, flu-like illness and shortness of breath.

**Table 1. Ambient levels of dust in swine confinement buildings**

Type of dust	Range (mg/m <sup>3</sup> )	Typical ambient concentrations (mg/m <sup>3</sup> )	Recommended maximum exposure concentrations (mg/m <sup>3</sup> )	Threshold limit values (mg/m <sup>3</sup> )
Total dust	2.0 - 15.0	4.0	2.50	10.0
Respirable dust	0.1 - 1.0	0.4	0.23	3.0

## Dust control methods for livestock buildings

The control of dust in intensive livestock buildings is important to reduce nuisance and dust respiratory hazards, and also to prevent heat recovery or heating and cooling equipment and buildings from being fouled by dust. Dust hazards can be reduced in four ways:

- minimize the occurrence of fine particles
- prevent these particles from forming dust clouds
- remove airborne dust using air cleaning devices
- have workers use dust masks

## Feeding

Proper and timely maintenance of feeders, augers and other feed handling equipment is required for proper dust control. The addition of oil to dry swine rations significantly reduces the amount of dust in a building.

## Ventilation

The major method of controlling dust and air contamination in enclosed livestock facilities is by mechanical ventilation. Air flow by ventilation has capabilities to remove aerosols from livestock buildings, especially during the warm weather when the ventilation rates are very high. During winter, ventilation rates are reduced to conserve heat and avoid chilling. Lowered ventilation rates result in a rise of dust.

## Oil sprinkling

Sprinkling canola oil or mineral oil will reduce the respirable dust emissions in mechanically ventilated grower barns.

## Air misting

Misting of the incoming air wets the litter directly or indirectly as a result of high relative humidity. This method will reduce airborne dust generation from the litter.

## Ionization

Air ionization systems to accelerate and remove dust from livestock buildings have been investigated by a number of researchers.

## How to protect yourself from dust exposure

1. The most practical way to control dust exposure is by wearing air-purifying respirators or dust masks (disposable or reusable).
2. Provide adequate ventilation if you have to work in a dusty environment.
3. Keep the livestock building as clean as possible.
4. Do your chores inside the barn when the animals are resting (no animal activities).

## Summary

Producers and livestock workers need to be aware and informed of the dangers of being exposed to dusty environments. All the measures to protect against dust exposure should be taken, and medical help should be sought if producers or workers experience any illness related to their exposure to a dust.

Livestock producers or workers should also have a yearly physical examination to check their respiratory condition and compare any changes in lung function from year to year.

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