

ODOUR ENCLOSURE

Benbow Environmental has developed an odour control, designed specifically for tunnel ventilated sheds. The design, called an "Odour Enclosure", is an enclosure placed at the tunnel fan bank-end of the shed to treat the odour released from the enclosure. This design was developed based on the following principles:

- Centralised odour control;
- Maximised residence time;
- Maximised surface contact with odour particles in the tunnel ventilated air stream;
- Ability to promote vertical momentum, which would promote dispersion;
- Minimal running costs compared to power-consuming technologies such as electro-static precipitators; and
- Flexibility of the design.

The system consists of the following core items:

- Three walls made out of steel and wood, constructed to surround the main fan bank.
- Shade cloth wrapped on top of three walls to act as a ceiling of the enclosure, engineered to have a capability to open a part of the shade cloth ceiling. The shade cloth is UV protected and is of high quality to provide many years of service.
- Water foggers / fine misters installed below the height of the shade cloth ceiling such that the air flow passes firstly under the sprays and then above the sprays the double passage of the air provides for increased residence time.
- Effective engineering design by Benbow Environmental.

The Odour Enclosure achieves the following aspects in relation to odour control:

- Sufficient residence time maximises contact of fine water droplets with dust and odour particles;
- Shade cloth effectively captures dust particles;
- Enhanced dispersion by inducing a vertical momentum;
- Centralising control of emissions at one location and treated all under the same condition; and
- An odour reducing chemical is able to be added to the fine water droplets to react with the ammonia and other odorous substances in the air released from the shed.

A design is prepared for each farm depending on the location of surrounding receptors and the design mode preferred by the farm operators. Sizing of the enclosures is critical, and location, number and types of foggers are important factors in ensuring the odour is reduced by up to 58%.



What is an Odour Enclosure?

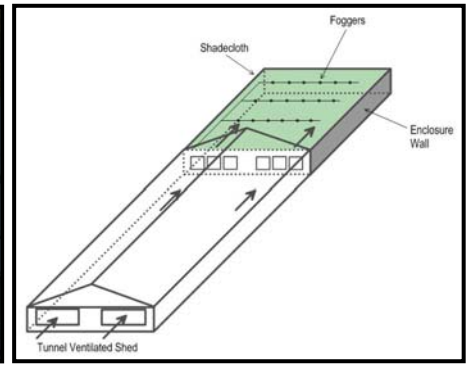
The Odour Enclosure seeks to solve the problem of odour emissions from tunnel ventilated poultry sheds. These sheds are used for intensive raising of poultry for production of chicken meat. Poultry can extend to ducks and turkeys but is mainly for chickens.

Intensive production of poultry for meat production involves housing large number of chickens (also referred to as birds) in litter on sheds that use a mechanical ventilation system to draw air into one end of the long shed through evaporative cooling pads, causing the outside air to be drawn across the width of the shed and be exhausted at the opposite end of the shed through a set of electrically powered ventilation fans, which are usually axial fans.

Odour is generated from the operation of poultry sheds mainly being emitted from the excrement and bird lint/feathers that accumulates on and in a bed of litter. The litter becomes moist from a combination of factors, these mainly being the spillage of water from the water feeders used to water the chickens, from moisture in the excrement, and the humidity of outside air.

The air used to ventilate the sheds and to provide control of the internal shed temperature carries this odour with it as it is expelled from the bank of fans. Lesser volumes of air are expelled during periods of minimum ventilation and provided this air is expelled through the same axial flow fans, the odour enclosure is also able to reduce the level of odour as the air is passed out of the odour enclosure.

The odour from intensive poultry production is offensive and has been seen to recently cause land use conflict in the development of new sheds with the surrounding community, particularly for the extension of existing sheds or conversion of existing naturally ventilated sheds to the tunnel ventilated sheds.



Past Solutions

Past methods have included static electricity inside the sheds to reduce the level of dust being emitted as dust carries a proportion of the odour. Electrostatic precipitation has been used on the inside of the sheds to reduce the amount of dust emitted into the open air.

Scrubbers have been used to wash the ventilation air and reduce the amount of dust and odour from the air being discharged. Bio filters have been used to biologically degrade the substances in the air that cause the odour.

Vegetation barriers are also being used (prominently in the U.S.) and we have used this technique with success. We are also able to use engineered vegetation barriers in combination with our odour enclosures.

The majority of these methods require significant capital costs, hence alternatives are required.

Our Solution

An enclosure is added to the tunnel ventilated end of the poultry shed. This consists of impervious walls, a shade cloth roof and a bank of water atomising nozzles that fog the air within the enclosure.

The odorous air passes through the bottom half of the enclosure, making contact with millions of fine droplets (i.e. a fog) of water. The air is reflected off the end wall of the enclosure and passes back across the top half of the enclosure and the air makes more contact with the fog.

The air is then released through openings which can either be in the roof of the enclosure or through the side walls, hence allowing the air to be dispersed in a direction to favour dispersion of the remaining odour remnants in the air being discharged. The odour enclosures have been proven by dynamic olfactometry testing to be approximately 58% effective in reducing total quantity of odorous air discharged from tunnel ventilated sheds.



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