BRITISH STANDARD

BS 5502 : Part 52 : 1991
Implementing Amendment No. 1, not published separately

Buildings and structures for agriculture

Part 52. Code of practice for design of alarm systems, emergency ventilation and smoke ventilation for livestock housing

Confirmed December 2009

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Farm and Horticultural Buildings Standards Policy Committee (FHB/-) to Technical Committee FHB/1, upon which the following bodies were represented:

AFRC Institute of Engineering Research
Aggregate Concrete Block Association
Brick Development Association
British Cement Association
British Commercial Glasshouse Manufacturers' Association
British Constructional Steelwork Association Ltd.
British Poultry Federation Limited
British Precast Concrete Federation Ltd.
British Veterinary Association
British Wood Preserving and Damp-proofing Association
Cold Rolled Sections Association
Department of Agriculture Northern Ireland
Electricity Supply Industry in United Kingdom
Farm and Rural Buildings Centre
Farm Buildings Association
Fibre Cement Manufacturers' Association Limited
Health and Safety Executive
Institution of Civil Engineers
Local Authority Organizations
Ministry of Agriculture, Fisheries and Food
National Farmers' Union
Royal Institute of British Architects
Royal Institution of Chartered Surveyors
Scottish Office (Agriculture and Fisheries Department)
Steel Construction Institute

This British Standard, having been prepared under the direction of the Farm and Horticultural Buildings Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 30 August 1991

The following BSI references relate to the work on this standard:
Committee reference FHB/1
Draft for comment 89/13137 DC

ISBN 0 580 19735 2

Amendments issued since publication

Amd. No.	Date	Text affected
10014	June 1998	Indicated by a sideline

Contents

Foreword

This Part of BS 5502 has been prepared under the direction of the Farm and Horticultural Buildings Standards Policy Committee and comprises a new Part of BS 5502.

While BS 5502 is being revised and added to, the opportunity is being taken to restructure it into the following broad subject areas:

Part 0	Introduction and consolidated index
Parts 10 to 19	Reference information and legislation
Parts 20 to 39	General design
Parts 40 to 59	Livestock buildings
Parts 60 to 79	Crop buildings
Parts 80 to 99	Ancillary buildings

More specifically, the livestock building series will comprise:

Part 40	Code of practice for design and construction of cattle buildings
Part 41	Code of practice for design and construction of sheep buildings and pens
Part 42	Code of practice for design and construction of pig buildings
Part 43	Code of practice for design and construction of poultry buildings
Part 49	Code of practice for design and construction of milking premises
Part 50	Code of practice for design, construction and use of storage tanks and reception pits for livestock slurry
Part 51	Code of practice for design and construction of slatted, perforated and mesh floors for livestock
Part 52	Code of practice for design of alarm systems, and emergency ventilation and smoke ventilation for livestock housing

A more detailed description of the new structure of BS 5502 is given in Part 0.

The object of introducing the new structure is to allow subject areas to be broadly characterized, and related subject matter, whether in the form of recommendations, guidance or supporting data, to be rationalized and brought together. It will also allow sufficient flexibility to enable BS 5502 to be expanded and developed in a logical way in the future.

It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people, for whose guidance it has been prepared.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Code of practice

1 Scope

This Part of BS 5502 gives recommendations on the design and selection of alarm systems, emergency ventilation and smoke ventilation equipment for the housing of livestock, especially poultry, pigs, calves and rabbits when housed under intensive conditions. These recommendations are an important factor in ensuring the welfare of livestock in the event of fire or failure of the ventilation system.

Methods of detection and alarm, and the provision of alternative ventilation are recommended for systems which have the ability to:

a) detect failure of the electricity supply;

b) detect unacceptably high or low temperatures; and

c) provide a warning for the stockperson.

The main types of ventilation systems considered are those which provide fan powered and automatically controlled natural ventilation. For manually operated natural ventilation systems, only the warning that temperature is outside pre-set limits is considered.

The provision and display of operating instructions and procedures for testing and maintaining the alarm system and the emergency ventilation equipment are also covered.

The fitting of intruder and gas alarms, and the provision of subsequent escape routes is not included.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

NOTE. Work has commenced on a further Part of BS 5502 (Part 10) which will be a glossary of terms used in BS 5502 for buildings and structures for agriculture.

For the purposes of this standard the definitions given in BS 6100 apply, together with the following:

2.1 alarm system

A combination of components connected so that an audible or visible alarm is activated when the temperature within the house departs by defined amounts from the desired value and/or the electrical supply to the ventilation system fails.

2.2 emergency ventilation

Ventilation provided from emergency openings designed to be operated in the event of detection of high temperature and/or failure of the electricity supply to the ventilation system.

2.3 pre-set temperature limits

The pre-set levels of temperature (high or low) at which the alarm system is actuated.

NOTE. In this case temperature is the dry-bulb temperature which is indicated by any standard measuring device shielded from direct radiation.

2.4 stand-by generator

Electrical plant installed to provide power for fans, lights, heaters, controls etc. in the event of electrical mains failure.

2.5 stockperson

The person with the duty of caring for the well-being and welfare of the livestock housed.

2.6 smoke ventilation

Ventilation provided from emergency openings designed to be operated in the event of detection of fire.

3 Welfare considerations

Attention is drawn to the provisions of the current Code of Recommendations for the Welfare of Livestock.

Special consideration should be given to all classes of intensively housed livestock and, in particular, consideration should be given to the following.

a) All automatic and mechanical equipment essential for the health and welfare of the stock should be inspected at least once daily.

b) Alternative ways of feeding and of maintaining a satisfactory environment should be available for use in the event of a breakdown.

c) There should be an alarm system to warn the stockperson of failure of any automated ventilation equipment.

NOTE. Similar provisions are laid down in the Welfare of Battery Hens Regulations, 1987.

In addition, attention is drawn to the need to provide adequate heating and to avoid overcooling for susceptible stock in cases of an emergency.

The implications for animal welfare of intruders, gas hazards and means of escape are not covered in this standard, but should nevertheless be considered.

4 Selection of system

4.1 General

The selection of an alarm system should depend upon the class of stock housed, the type of housing and the type of ventilation system.

NOTE. Great care should be taken when selecting controllers which automatically increase the temperature at which the alarm operates to compensate for an increase in outside temperature.

4.2 Basic criteria

4.2.1 An alarm system to warn of fire or failure of any essential automatic ventilation equipment should be fitted in all situations where livestock are housed. To monitor such a failure an alarm system should respond to:

a) temperatures which are above and, in the case of young stock, below pre-set limits; and

b) a loss of electrical power.

4.2.2 The alarm system should comprise the following:

a) sensing devices;

b) a means of warning the stockperson of the fault;

c) a back-up power supply from batteries to operate in the case of mains failure;

d) facilities for regularly checking that the system is operational; and

e) instructions for operating, testing and maintaining the system.

4.3 Additional criteria

All alarm and control units should have indicator lights to show that they are operational and should be checked daily.

NOTE.1. Some units may also have facilities to check their various functions.

To reduce the risk of nuisance alarms due to short power supply interruptions a built-up delay should be incorporated.

NOTE.2. A basic alarm system may form part of a more complex system that can automatically initiate emergency procedures such as releasing vents, opening back-draught shutters and/or controlling battery powered motors.

Other facilities which could be included are fire, intruder, water and feed supply alarms.

4.4 Modes of operation

The automatic action in the event of an emergency for different typical systems is shown in figure 1. The modes of operation of the different systems are as follows:

a) an audible or visible alarm occurs, normally a short time after the emergency;

NOTE 1. The stockperson will need to take any emergency action required.

b) an alarm and emergency action occurs after a pre-set delay;

NOTE 2. The stockperson will need to attend to check functioning of the emergency vents and stand-by generator (if installed).

c) similar to item (b) except that the system may be part of, but operationally independent of, a more complex controller which may also control other factors.

NOTE 3. The stockperson will need to attend to check functioning of all emergency equipment.

5 Components of alarm systems

5.1 Temperature sensors

The temperature sensors may be electromechanical thermostats or electronic detectors such as thermistors.

Both temperature sensors to detect ventilation failure and temperature sensors to detect fire are required.

Sensors that can be locked at sea levels are preferred. Sensors and wiring should be robust and protected from damage by livestock and vermin. Some protection of the sensors against excessive accumulation of dust should be provided.

Great care should be taken to site the ventilation failure temperature sensors where they are exposed to representative samples of the air temperature in the building and are inaccessible to unauthorized persons.

Great care should also be taken to site the fire temperature sensors where they would be exposed to any high temperature products of combustion, i.e. not more than 500 mm below the ceiling or roof inner lining. In buildings with pitched roofs without ceilings they should be fitted vertically below the ridge.

Neither type of sensor should be situated where they could be affected by radiation from extraneous sources such as heating elements or the sun. They should not be enclosed in such a way that their response time is raised to an unacceptable level, i.e. greater than 5 min.

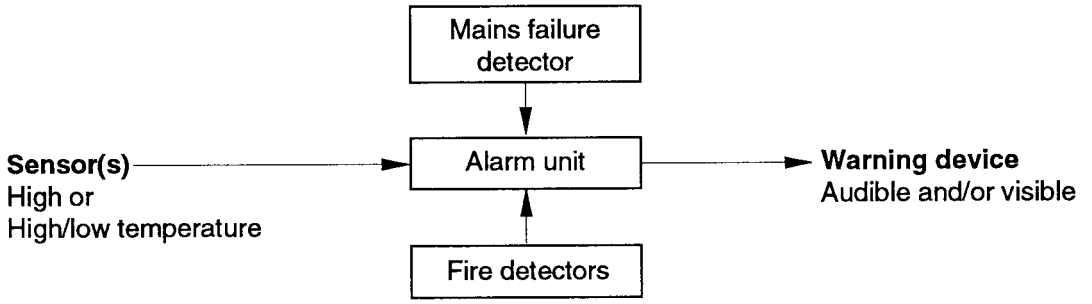
There should be at least one ventilation failure temperature sensor and one fire temperature sensor for every 500 m^2 of floor area. Both types should be uniformly spaced such that the horizontal spacing between each sensor does not exceed 25 m and the horizontal distance between any point on the periphery of the building and a sensor does not exceed 15 m.

Where types of fire detector other than temperature sensors are also installed (e.g. flame detectors) these should also be connected to the alarm system.

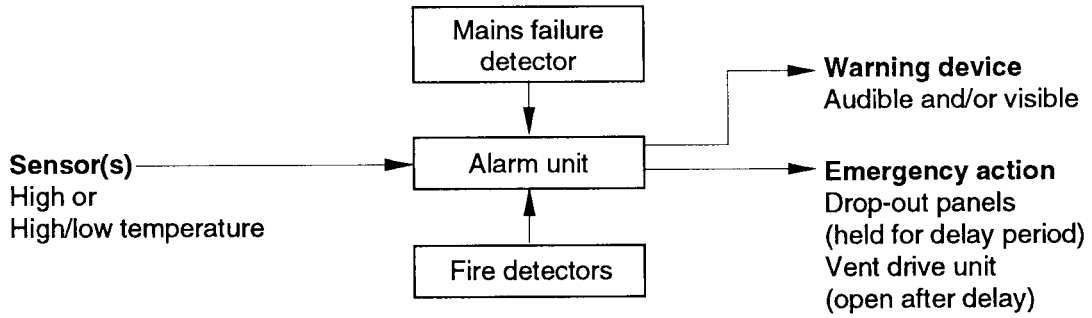
5.2 Electrical mains failure detector

On livestock farms with several houses it is important that mains power failure detection is fitted to each house.

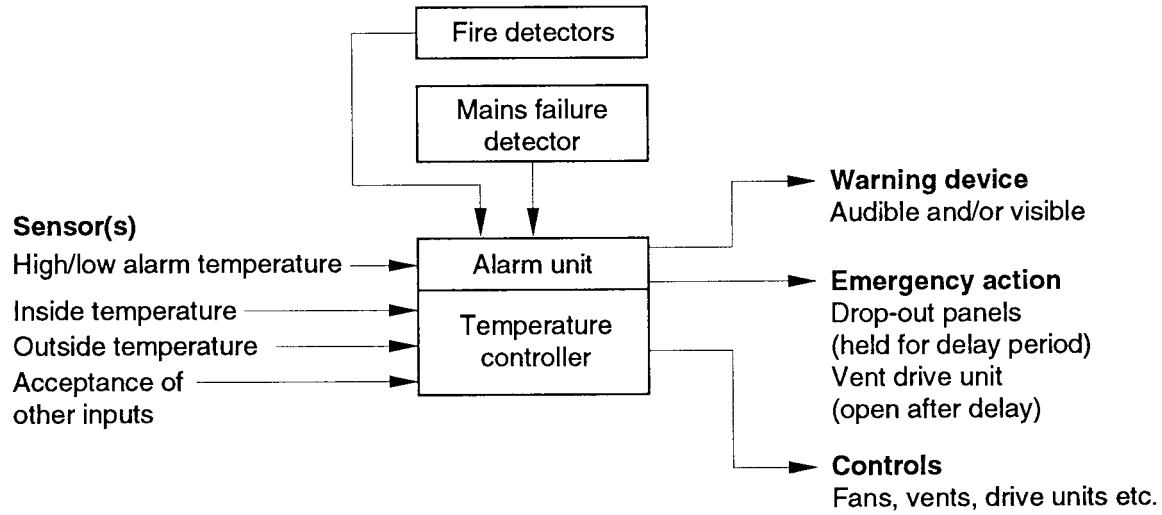
Since short interruptions to the electricity supply have little effect on temperature stability within a building all power failure detectors should incorporate a delay to prevent nuisance alarms. This period should be at least 1 min and not more than 5 min. It is recommended that the delay should be set at the minimum level for very young stock or other conditions where a quick response from the stockperson could be vital.



a) Basic alarm system



b) Alarm system with extended facilities to provide emergency ventilation



c) Alarm system with emergency ventilation and a controller

Figure 1. Examples of alarm and emergency ventilation systems

In the case of three-phase supply the monitor should be capable of detecting the loss of any single phase or neutral as well as complete failure of the supply.

Where a stand-by generator is arranged to start automatically as a result of mains failure an alarm should also be given so that the stockperson can check the functioning of the equipment.

5.3 Alarm warning device

An alarm warning device should consist of a buzzer, bell, siren or flashing light situated on the site and may be associated with a personal radio pager or telephone autodial system. A warning device should be situated where it gives the maximum opportunity for immediate response.

To simplify location of the fault on a farm where there are several houses it is recommended that a flashing light, which is wired to flash in the event of an emergency, is fitted to each house. A normally lit indicator light which is extinguished during a fault condition is also acceptable. Information on the type of warning given should be made available to the stockperson.

Telephone autodial systems may be programmed to contact sequentially a number of different receivers and give either a taped or electronically generated speech message. An alternative arrangement is for the autodial system to contact a 24 h manned station e.g. security or other suitable specialist organization, so that the message can be relayed to the appropriate person. Where the electrical supply and telephone lines are both overhead it is recommended that consideration be given to routing the telephone line so that the risk of fracture to both lines from the same incident (e.g. a falling tree) is unlikely to occur.

6 Emergency ventilation

6.1 Range of application

The installed ventilation system, whether powered or automatically controlled natural ventilation (ACNV), should be adequate for the stock housed but provision should also be made to ensure that the animals receive sufficient fresh air in an emergency. This provision can only be by natural ventilation during a failure of powered ventilation and may require additional openings in the building. All buildings with a powered ventilation system should have extra emergency openings which can be operated if the powered ventilation system fails.

The emergency ventilation system should also be designed such that it can provide sufficient ventilation to support a fire of 0.2 MW at any point on the floor of the building without the temperature at the roof inner lining or ceiling (if fitted) exceeding 200 °C and without the smoke layer descending below a height of 2 m above floor level.

6.2 Calculation of natural ventilation openings

6.2.1 Natural ventilation is driven by pressure differences across the building structure which are caused by the effects of wind and indoor/outdoor temperature differences. In the absence of wind, natural ventilation is driven only by the buoyancy of warm air, which is commonly called the stack effect. If the internal air is warmer than that outside then cold air enters the building at the lower level openings whilst warmer indoor air leaves at the higher level openings. In addition to the difference (ΔT) between the inlet and outlet temperatures (T_i and T_o respectively), the main factors affecting the ventilating air flow rate are the area of inlets (A_i) and outlets (A_o), the difference in height (H) between the inlet and outlet openings, and the number (N) and heat output (q) of the stock housed. The approximate heat output (q) for common classes of stock is shown in table 1.

The temperature at which the high limit sensor is set will depend upon factors such as:

a) class and weight of stock;

b) stocking density;

c) group size;

d) feed level;

e) floor type and bedding;

f) availability of water.

In many situations a high temperature limit (T_o) of 30 °C will be satisfactory although for young stock (e.g. day old chicks) the limit may be higher.

Table 1. Approximate heat output for livestock

Class of stock	Animal weight	Heat output (q) per animal
	kg	W
Weaners, 8 weeks old	23.0	55.0
Finishing pigs	64.0	100.0
Finishing pigs	90.0	125.0
Layers in cages	1.8	8.5
Broilers, 7 weeks old	1.8	8.5
Turkeys, fattening	4.5	20.0
Calves, newborn	45.0	120.0
Calves, 12 weeks old	136.0	250.0
Rabbits, broiler	2.5	9.0
breeding	5.0	18.0

6.2.2 Design formulae which enable the various parameters of natural ventilation to be calculated are already well established. The following formulae are derived from *Natural convection through openings and its application to cattle building ventilation* by Dr. J. M. Bruce.

The formula to calculate the vent areas required for emergency ventilation in a building with open ridge and side wall ventilation is as follows:

$$\frac{1}{A_i^2} + \frac{1}{A_o^2} = \frac{2\,c^2 g H \Delta T}{T_i V^2}$$

The formula for the determination of air exchange rate is as follows:

$$Nq = \left\{ \rho C_p V + \sum_{s=1}^{n} A_s U_s \right\} \Delta T$$

where

A_i is the inlet area of vents (in m^2);

A_o is the outlet area of vents (in m^2);

c is the discharge coefficient of vents (normally 0.6 to 0.65);

g is the acceleration due to gravity, 9.81 $m \cdot s^{-2}$;

H is the difference in height between inlet and outlet (in m);

T_i is the inlet temperature (in K);

T_o is the outlet temperature (in K);

ΔT is the $T_o - T_i$ (in K);

V is the air exchange rate (in $m^3 \cdot s^{-1}$);

N is the number of animals;

q is the heat output per animal (see table 1) (in W);

ρ is the density of air, 1.2 $kg \cdot m^{-3}$;

C_p is the specific heat of air, 1010 J $kg^{-1} \cdot K^{-1}$;

A_s is the surface area of building element (in m^2);

U_s is the thermal transmittance of building element (in $W/(m^{-2} \cdot K^{-1})$);

s is the particular building element (e.g. floor, roof).

The value of ΔT adopted will determine the risk taken in the design of the emergency ventilation system by the choice of the acceptable internal air temperature rise. Obviously the value of ΔT chosen should be based on an appraisal of local climatic conditions throughout the year and the tolerance of the animals being housed to departures from the normal environment.

It is recommended that, for the purposes of emergency ventilation, the value of ΔT adopted should not be greater than 5 K.

6.2.3 To ensure that sufficient air is supplied to the building the inlet area (A_i) should never be smaller than the outlet area (A_o) as this could have serious effects on the performance of the system in an emergency.

6.2.4 The number and size of each emergency opening depends upon the total area required and the existing layout of fans and vents. In general, emergency inlets should be distributed as uniformly as possible along the building in order to avoid areas of stagnation occurring in the house, particularly near the ends.

NOTE. Hoods, baffles and weather protection should be designed so that they do not reduce the effective area of inlets or openings.

6.3 Failure of powered systems

6.3.1 Emergency inlet and outlet openings based on the guidance given in **6.2** should be fitted in all cases, even where an alternative power supply is available. Such openings would usually be closed by hinged, pivoted or suspended flaps under normal conditions.

6.3.2 The action to be taken during an emergency depends upon the design of the ventilation system. In general, with power failure there should be an alarm and the normal vents should stay at the position they were when the failure occurred. Some systems fitted with battery operated motors or electromagnetic clutches are designed so that the normal vents are opened in the event of power failure and return to automatic control when it is restored. In the majority of situations this is advantageous but there should be provision to prevent this if overcooling of susceptible stock is likely to occur.

High temperature may be a consequence of power failure and should result in emergency flaps being activated.

6.3.3 Where there is no power failure but a high temperature alarm is given, emergency flaps should be opened (see exception in **6.3.4**). The emergency flaps may be held closed by an electromagnet and opened by gravity, weights or springs. When a low temperature alarm is given there need be no automatic emergency action but it may be necessary for the stockperson to provide an alternative source of heating.

6.3.4 Where roof-mounted extractor fans are fitted it is necessary to take into account the existing vent area when calculating the amount of emergency opening required. The restricting area is likely to be through the fan itself rather than the chimney cowl outside the buildings. In this situation extra emergency openings should be provided in the side of the chimney between the fan and the exterior of the building. These and any other roof emergency flaps should be arranged to open in the event of high temperature caused by power failure but not in the case of high temperature alone and where the fan continues to run. Extra side-wall emergency openings will also be necessary; the flaps on these should open in the case of high temperature only.

6.3.5 With ridge inlet, side-wall extractor systems the ridge inlet vents should be fully opened, either by battery-operated motor or magnetic release, only in cases of high temperature. The vents may be of sufficient size to act as emergency outlets for natural ventilation but the side-wall extractor fan openings (with back draught shutters open) will not be adequate as an emergency inlet and extra side-wall emergency openings will be required. In hot weather when the ventilation system is running at its maximum capacity and if the temperature control cannot be achieved then it may be advantageous to have the ability to reverse the fans so as to blow air over the stock with the ridge ventilators fully open.

6.3.6 Where the space above a permeable ceiling is pressurized it is necessary to provide chimneys running through the loft space with the bottom of the chimney opening into the body of the building to act as emergency outlets. The flaps at the base of these chimneys should only be opened in the event of high temperature. The gravity-operated side and end-wall flaps fitted over the normal outlets to provide wind protection should also be lifted to a near horizontal position so that the normal outlets can act as emergency inlets.

6.3.7 If both the inlets and fan outlets are in the side or end walls of a building they should be sufficient to act as emergency inlets for natural ventilation. However, emergency outlets should be fitted in the roof and provision made for any fan back-draught shutters to be opened in an emergency. These emergency openings should be preferably distributed along the length of the building to reduce the risk of stagnant areas forming.

6.4 Automatically controlled natural ventilation (ACNV)

ACNV systems are usually designed on the basis of outside wind speed and have vents which are automatically opened and closed on the basis of measured inside temperature. Just like fan ventilation systems, ACNV systems can fail and provision should be made for emergency ventilation in the event of excessive temperatures in the building. This is usually due to breakdown or power failure but in ACNV systems may also be due to insufficient wind speed.

In the event of power failure some provision should be made either to keep the vent actuating mechanism powered, e.g. by battery back up for low voltage actuators, or to open the vents manually, in which case it should be easy to do, or automatically by some inherent design feature of the actuating mechanism, e.g. the use of gravity or springs to open the vents.

The problem of excessive temperatures which can arise in the building during an emergency means that vents should be provided to ensure adequate ventilation due to natural convection. These should be designed according to the guidance given in **6.2**. Providing that it can be ensured that the ACNV vents will also be open during an emergency then they can be combined and form part of openings as recommended in **6.2**.

6.5 Openings for smoke ventilation

The high temperature limit of the fire temperature sensors should also usually be set to 60 °C and under no circumstances should the setting be greater than 80 °C.

In order for smoke ventilation to operate satisfactorily the lowest point of the outlet openings should be as high as possible and should not be lower than 2.5 m above floor level.

The ventilation openings required for emergency ventilation described above will usually also be suitable for smoke ventilation and therefore it is not normally necessary to carry out separate calculations. If in doubt the calculation procedure described in Fire Research Technical Paper No. 7 should be used.

7 Permanent stand-by generation plant for emergency supply

The installation of privately owned generating plant should be in accordance with recommendations in BS 5502 : Part 25. With automatic starting there should be a delay of not less than 1 min and not more than 5 min after mains failure before the generator starts.

8 Commissioning, testing and maintenance

8.1 General

All alarm systems, emergency ventilation equipment and stand-by plant should be commissioned when installed and tested regularly.

NOTE. To ensure safety and efficient operation, all material and electrical wiring should be carried out in accordance with the recommendations in BS 5502 : Part 25 and the current IEE Regulations.

8.2 Alarm systems

If an alarm occurs and the alarm device is allowed to operate for a long time, the internal batteries, whether dry-cell or rechargeable, may discharge to a low state and be ineffective in the event of another alarm occurring soon after. Batteries should be tested after an alarm situation and replaced at regular intervals. Regular cleaning of sensors may be necessary to ensure that response times are not unduly affected.

NOTE.1. The cleaning of sensors should only be carried out as recommended by the manufacturer of the sensor/system.

All alarm systems should be inspected daily and tested frequently, with intervals between testing not longer than one week. A record should be kept of all tests and maintenance.

NOTE.2. Regular testing with reasonable proof of testing may be necessary to satisfy the requirements of insurance and other bodies.

8.3 Emergency ventilation equipment

8.3.1 Emergency ventilation equipment which is designed to operate automatically in the event of an alarm state should be regularly inspected. All hinges, pivots, pulleys, etc., which might cause emergency flaps to stick or jam, should be inspected at weekly intervals. A lubricant should be applied where appropriate. Where a wire rope system is installed which connects a series of emergency flaps the cable route should be inspected to ensure that its operation is not restricted in any way. There should be adequate space around the emergency flaps for them to operate and the access to them for re-setting should not be impeded.

8.3.2 Full scale testing, in accordance with operating instructions, of all emergency flaps, back-draught shutter mechanisms and other openings used in an emergency should take place as frequently as is compatible with the husbandry regime with intervals between testing being not longer than two months.

8.4 Stand-by generator

8.4.1 The equipment should be regularly maintained and the following should be checked:

a) the general cleanliness of the equipment and its surrounds;

b) fuel level;

c) lubricating oil level;

d) radiator/coolant level;

e) starting battery condition;

NOTE. Most batteries used for stand-by plant are equipped with constant voltage chargers. With this system the battery controls the amount of charge it receives and is therefore automatically maintained in a fully charged condition without attention.

f) the openings, vents or grilles for the air supply to ensure adequate flow for combustion and cooling;

g) the integrity of the exhaust and its outlet to ensure that it is not blocked;

h) that the safety guards are in good order and correctly set.

8.4.2 Particular attention should be paid to the maintenance of automatic start and changeover plant when installed.

NOTE. Its maintenance should be entrusted to an approved electrical contractor, e.g. a member of the National Inspection Council for Electrical Installation Contracting (NICEIC).

8.4.3 The routine checks listed in **8.4.1** should be made at least once a week and the generator started on the same occasion. A clear and accurate record should be kept of the date and person carrying out the checks together with any relevant comments.

9 Safety aspects and warning signs

9.1 Where there is a significant risk to health and safety that has not been avoided or controlled by the methods required under relevant health and safety legislation, employers must use a safety sign if that could help reduce the risk. Attention is drawn to the Health and Safety (Safety Signs and Signals) Regulations 1996. Safety signs are not a substitute for other methods of controlling risks such as engineering controls and safe systems of work.

9.2 The following provisions should also be made.

a) An effective portable battery powered light should be available even if stand-by plant with automatic changeover is installed.

b) If automatic changeover plant is installed a notice warning that the plant could start at any time should be displayed and securely fixed.

c) Automatic start apparatus should be isolated and locked when the stand-by plant is being maintained or serviced.

d) In cases of doubt about the capacity of the generator to supply the total power requirement, a listing of the equipment which may be run together and, if necessary, the order of starting electric motors should be provided.

NOTE 1. The starting current of a motor (e.g. fans) can be three times the running current.

e) Engine exhaust fumes should be directed so as not to cause a hazard to persons or stock and should be well away from air inlets to the buildings.

f) A readily accessible emergency stopping device should be provided near the generating plant.

g) Where a generator is driven from the power take-off shaft of a tractor, the shaft should be guarded.

NOTE 2. Attention is drawn to the Agriculture (Power Take-Off) Regulations 1957.

h) Opening flaps which may open unexpectedly and counter-weights which may drop and injure workers should be adequately guarded.

10 Information

Information on the following should be made available by the supplier to allow the proper functioning of the system:

a) the operating principles for the component or unit and/or the system with instructions for its siting, installation and use;

b) full details for the commissioning and initial testing of the installed component, unit and/or system, and for the subsequent routine testing procedures;

c) the frequency for routine testing and maintenance of the component, unit and/or system.

The following information should be made readily available on site and formally communicated to staff:

(1) frequency of and procedure for the routine maintenance and testing of the system;

(2) method of operation of the emergency opening panels together with information on their manual operation and whether the direction of airflow can be reversed;

(3) the frequency of checking fuel supplies, i.e. to local electrical generation plant, and for the recharging/replacement of batteries;

(4) instruction with regard to response to alarms and what action should be taken in the event of an emergency;

(5) the locations of the emergency stopping devices;

(6) contact points in case of injury or other emergencies.

Index

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Publication(s) referred to

BS 5502 Buildings and structures for agriculture
Part 20 Code of practice for general design considerations
Part 25 Code of practice for the design and installation of services and facilities

BS 6100 Glossary of building and civil engineering terms

[1] Code of Recommendations for the Welfare of Livestock, MAFF, the Department of Agriculture and Fisheries for Scotland and the Department of Agriculture for Northern Ireland

[2] IEE Regulations for Electrical Installations, 15th Edition 1981 (IEE Wiring Regulations)

[3] Health and Safety (Safety Signs and Signals) Regulations 1996

[4] THOMAS P.H., HINKLEY P.L., THEOBOLD C.R. and SIMMS D.L. Investigations into the flow of hot gases in roof venting. Fire Research Technical Paper No. 7

BRUCE, J.M. Natural convection through openings and its application to cattle building ventilation. Journal of Agricultural Engineering Research **23**, 151-167, 1978

[1] Available from MAFF Publications, London, SE99 TTP.

[2] Available from the Institution of Electrical Engineers, Savoy Place, London WC1.

[3] Available from The Stationery Office, London.

[4] Available from The Stationery Office, London.

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