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# RECOMMENDATIONS for HOUSING & MANAGEMENT of LAYERS

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## HOUSING FOR LAYERS

**Location.** When selecting a poultry house site consider drainage, adequate air movement, expansion possibilities, proximity of road, location of dwelling, and water supply. Also, keep in mind possible housing and industrial developments in the area as well as zoning regulations.

### HOUSE SIZE

**Litter or slatted-floor houses.** A 36- to 40-foot wide house is about optimum for clear-span construction. Greater widths increase construction costs per square foot rather sharply. Optimum widths for metal rigid frame buildings are 40 to 50 feet.

**Cage houses.** A building 32 feet wide is adequate for three rows of back-to-back 16-inch-deep stair-step cages. For other sizes and types of cages adjust the width accordingly, but always allow at least 36 inches for each aisle.

**Roof load and stress.** The following load and stress requirements are adequate for most poultry houses:

$$\text{Dead load}^1 + \text{live load}^2 = 25 \text{ pounds per square foot}$$

Maximum stress in bending = 2,000 pounds per square inch

For cage-layer houses, obtain a plan designed or approved by an agricultural engineer.

### WALL CONSTRUCTION

**Stud frame.** Use a concrete or concrete block foundation with stud-frame wall construction. A one-story building with clear-span roof trusses is recommended. Studs should not be farther apart than 2 feet on center.

**Pole frame.** Pole-frame construction is acceptable if rodent protection is included. Use either 4" x 6" rectangular poles or circular poles with a minimum top diameter of 6 inches. Be sure all poles are pressure treated. Space at a maximum distance of 12 feet on center.

**Masonry.** Masonry construction is satisfactory provided

<sup>1</sup> Dead load is the weight of building materials.

<sup>2</sup> Live load is the weight of snow, rain, equipment, etc.

the walls have adequate insulation (see the section on "Materials"). A standard cinder aggregate block (8" x 8" x 16") has an R value of 1.73. (The R value is the numerically represented ability of a material or combination of materials to resist the flow of heat from the warm side to the cold side.)

**Metal rigid frame.** Metal frame buildings are adequate and may be used if they are in a competitive price range with other types of construction.

### MATERIALS

**Insulation.** Use a minimum of 2 inches of insulation in the walls and 3 inches in the ceiling, or equivalent wall value of R = 10 and ceiling value of R = 15. Such materials as rock wool and fiberglass are satisfactory. Be sure all insulation is vermin treated. Fill-type insulation can be used on flat surfaces, such as ceilings; for other areas use batt-type.

**Vapor barrier.** A vapor barrier, such as 4-mil polyethylene or aluminum foil-backed paper, must be used in all building construction. Place vapor barrier on warm side of insulation, that is, toward the inside of the house.

**Roofing.** Either sheet steel, aluminum, or asphalt shingles are satisfactory. Use 1.25- or 2-ounce zinc-coated corrugated sheet steel, or embossed aluminum with non-siphoning drain. Use asphalt shingles with a minimum weight of 210 pounds per square (a square equals 100 square feet).

**Exterior siding.** Either sheet steel, aluminum, or wood can be used. Use 1.25- or 2-ounce zinc-coated corrugated sheet steel, or embossed aluminum with non-siphoning drain. Tongue-and-groove siding, exterior plywood, and redwood siding are also satisfactory. All these materials must be painted or stained periodically to maintain appearance and assure long life.

**Interior sheathing.** A durable type of board is preferred, but a soft fiber board can be used if protected from picking and bumping. Metal is not recommended.

**Floor.** A 4-inch concrete floor is recommended for ease in cleaning, sanitation, and pest control.

## VENTILATION

**Rate.** All poultry houses need mechanical ventilation if maximum performance is to be achieved. Provide 3 c.f.m. (cubic feet per minute) per bird for optimum winter ventilation, and up to 7 c.f.m. per bird for proper summer ventilation. Fan ratings should be based on a  $\frac{1}{8}$ -inch static pressure difference (static pressure is specified by the manufacturer).

**Exhaust system.** In an exhaust system air is removed from the house by means of fans. This creates a negative pressure and causes additional air to enter. The inlet area should be  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times larger (in square inches or feet) than the exhaust area. Inlets need to be evenly distributed the entire length of the house. Individual slot openings should not be more than 8 feet apart. Space fans so that each will ventilate an equal area. Locate all fans so they will exhaust air with the generally prevailing winds. If fans are placed on both sides of a building, do not place one directly opposite another.

**Pressure system.** In a pressure system air is blown into the house by means of fans and creates a positive pressure which forces out the air presently in the building. Placement of fans in a pressure system is more critical than in an exhaust system. Inlet fans cannot discharge air effectively over a distance greater than 30 feet. Inlet velocity should not exceed 1,000 f.p.m. (feet per minute). The outlet area should be approximately  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times larger (in square inches or feet) than the inlet area.

**Thermostats.** Locate thermostat controls at least 10 feet from a fan or inlet. Place controls at eye level.

**Fan speeds.** Two-speed fans are better than one-speed because they permit flexibility in air movement.

## MISCELLANEOUS

**Window versus windowless housing.** Windowless houses are increasing in popularity. But additional research is needed regarding their use. When windows are used, window space should not exceed 5 percent of the floor area. Include knock-out panels in the walls of windowless houses or install a stand-by generator to operate the fans and lights when power failures occur.

**Rodent protection.** All entrances and other openings into the buildings should be rigidly constructed and sealed. Prevent rodent infestations by regular cleaning of the premises. Use bait stations when needed.

**Peck boards.** Install peck boards (hard-surfaced building material or wood) in all buildings where interior sheathing or insulation can be damaged by the birds.

## EQUIPMENT

### FLOOR BIRDS

**Floor space.** Allow  $1\frac{1}{4}$  to  $1\frac{1}{2}$  square feet per bird in mechanically ventilated houses.

**Waterers.** Provide a minimum of 1 inch of the trough-type waterer per bird, or one round waterer per 100 birds. Suspension-type waterers are recommended because they prevent deterioration of equipment by manure. Do not force layers to travel more than 15 feet to drink.

**Drainage and surplus.** Install some type of easily cleaned cut-off between the waterer and drain tile to prevent the tile from becoming clogged with feed or feathers.

**Feeder space.** Allow 3 inches of feeder space per bird, or one hanging feeder for each 30 layers. All feeders should have an anti-roost system on top. Automatic feeders should have a feed cleaner and automatic level control.

**Mechanical versus hand feeding.** Mechanical feeders can be justified with flocks of 1,000 hens or more. They become a more profitable investment, though, with larger flocks.

**Feed depth.** Do not fill feeders more than one-third to one-half full. When chain-type feeders are used, give special attention to debeaked birds for about a week after debeaking to see that they are able to eat properly and without injury to their beaks.

**Distance to feeders.** Layers should not have to travel more than 15 feet to feeders.

**Bulk feed bins.** Consider using a bulk bin for flocks of 1,000 hens or more. A bulk bin should be large enough to hold a ten-day feed supply. Empty each bin completely after every third delivery of feed.

**Pit cleaners.** Pit cleaners are not recommended at the present time because of their high maintenance cost, and because it is not always possible or desirable to remove manure during certain times of the year.

**Nests.** Provide one individual nest or one square foot of community nest space for each four hens. Mechanical egg-collecting equipment is not economical for flocks of less than 1,000 birds, and may only be justified for flocks considerably larger than this. Nesting material should be clean, dry, economical, and readily available. Nests should be a minimum of 2 feet from the floor or litter when eggs are gathered by hand. If floor eggs are a problem, it is advisable to place the nests on the floor and gradually raise them.

**Roost space.** Provide a minimum of 7 to 8 inches of perch space per bird.

### CAGED BIRDS

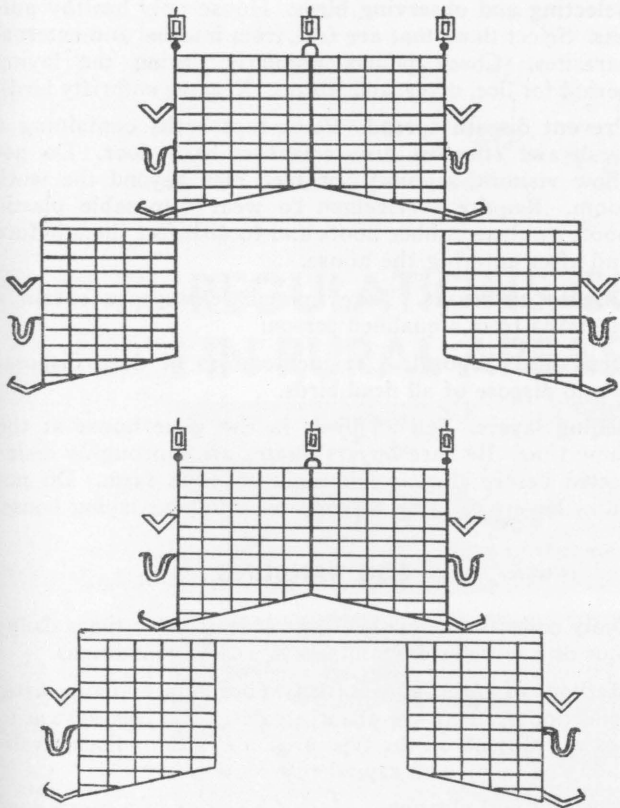
**Types and arrangements of cages.** The various types of cages are: stair-step, double deck with dropping boards, colony, and single deck. Stair-step cages are available in two arrangements, either full or modified.

**Size of cages.** Some common sizes and recommended number of birds for each are: 8" x 16" — two birds; 10" x 16" — two birds; 12" x 16" — three birds; and 16" x 16" or 18" — four birds.

**Waterers.** Use continuous-flow waterers or cups when cages are suspended from the ceiling. Intermittent-flow waterers can be used when cages are fastened to the floor. Provide a water depth of  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in continuous-flow troughs.

**Drainage and surplus.** Same as for floor birds.

**Feeding.** Electric- or gasoline-powered feed carts add greatly to labor efficiency, except for operations of less than 2,000 layers. Do not fill feeders more than one-third to one-half full.



Full (top), and modified (bottom) stair-step cage arrangements.

**Manure removal.** A manure removal or holding system should be planned before the operation is started.

**Fly control.** Consult your county farm adviser about the best methods for fly control. Do not use DDT or other hydrocarbon compounds inside the laying house.

## MANAGEMENT AND ENVIRONMENT

**Temperature.** In a properly insulated house, the inside winter temperature should not fall below 45° F. During extremely hot weather, the house can be kept more comfortable by increasing the movement of air, cleaning the fan blades and screens, and by painting the roof white.

**All-in, all-out program.** An all-in, all-out program is one in which both the started-pullet grower and egg producer keep each brood separate and apart from any other brood. Such a program is strongly recommended for each house and preferably for each farm.

**Time of housing.** Place pullets in the laying house at 20 weeks of age.

**Cannibalism.** Debeak all birds at or prior to housing, or use another recognized method to prevent cannibalism.

**Birds per pen.** House 1,000 to 2,000 birds in each pen. The exact number will depend upon bird concentration, amount of automation, availability of labor, type of operation, and arrangement of the equipment.

**Litter.** Provide 6 to 8 inches of clean, dry litter. Stir

regularly and remove wet spots when necessary. Availability and cost will determine the type of litter to be used.

**Floor eggs.** Reduce the number of floor eggs (2 to 5 percent is not unusual) by blocking off corners and other dark areas. Also, provide an adequate number of nests that can be easily reached by the pullets. Follow the manufacturer's directions when automatic nests are used. Gather all floor eggs daily.

**Culling.** Routine culling is not recommended with today's well-bred strains of layers. Remove only the obviously unthrifty birds.

**Housekeeping.** Good husbandry and housekeeping are essential for optimum production and high egg quality. It is also necessary to minimize the spread of diseases. Include these practices in your regular list of chores: (a) inspect birds daily; (b) clean waterers daily; (c) keep nests clean; (d) keep light bulbs clean; (e) clean windows regularly; (f) control flies and rodents; (g) inspect all equipment routinely.

**Record keeping.** Accurate records of egg production, feed consumption, death losses, costs, and income are essential for efficient day-to-day operations and as a guide for future plans.

## LIGHTS AND LIGHTING

### LIGHT INTENSITY AND LOCATION

**Spacing.** Lights should be located a minimum of 7 feet above the floor. Provide one bulb for each 200 square feet of floor area, or space sockets 14 feet apart on center.

**Intensity.** One footcandle of light at bird level is sufficient for both cage and floor layers. Normally 40-watt bulbs provide adequate lighting in houses where reflectivity is low. Highly reflective houses may need only 25-watt bulbs. A light meter is needed to determine the exact footcandle reading.

**Reflectors.** Generally reflectors are highly desirable and economical, depending upon degree of reflection from interior surfaces.

**Incandescent versus fluorescent lighting.** Either incandescent or fluorescent lights are satisfactory if equal wattage is provided. Warm-type fluorescent tubes should be used rather than the cool-type.

### GROWING PULLETS

**Why control lights?** Restricting light on pullets until they are 20 to 22 weeks old delays sexual maturity, but increases total egg production following the onset of production. Delayed sexual maturity reduces the number of small eggs from pullets, results in a more uniform peak in production throughout the flock, and slightly increases egg weight throughout the production period. An increasing amount of light during the growing period will hasten the onset of lay.

**Amount of light.** Restriction of light is not necessary during the first ten weeks, but it can be done. It is necessary from about the 10th to the 20th or 22nd weeks. The ideal amount is not known, but equally good results have been obtained from pullets restricted to 6, 8, and 10 hours of constant light daily.

**Methods of restricting light.** Lights for growing pullets can be controlled in two ways. One is to restrict the daily light to a constant amount of not more than 10 hours from about the 10th to the 20th weeks. Windowless housing is necessary or the windows must be covered in some way. Mechanical ventilation is also necessary. Another method is to start the day-old chicks on a large amount of light (up to 24 hours daily) and reduce it weekly until the pullets are 20 to 22 weeks old. Existing buildings can be used because blacked-out conditions are not necessary.

### LAYING HENS

**Light stimulation.** Light affects egg production because it stimulates the pituitary gland and not because it stimulates feed intake. The pituitary gland releases an ovary-stimulating hormone into the bloodstream. The exact amount depends in part on the degree of stimulation received by light striking the bird's eyes.

**Constant amount of light.** Provide 13 to 15 hours of light daily. Either morning or evening lights—if compensation is made for changes in day length—or a combination of both, are satisfactory.

**Increasing amount of light.** An increasing amount of light during the laying period appears to have certain advantages over a constant amount. One such program increases the light 15 to 20 minutes weekly after the birds are 20 to 22 weeks old. This continues until a total of 18 to 20 hours of light is reached. Normally pullets should not be changed from a restricted to a stimulating lighting program before they reach 20 weeks of age. Additional evidence is needed to clarify and refine this program.

*Caution:* Avoid sudden or sharp decreases in day length at or near the age of maturity (15 weeks or older) and anytime thereafter. When the pullets are switched to increasing amounts of light, gradual increases will continue the stimulus longer than sharp increases.

### DISEASE AND PARASITE CONTROL

**Cleaning and disinfecting the house.** At the end of the laying period sweep down all cobwebs, dust, and manure from the ceiling, walls, and ledges. Clean out all the litter and scrape the manure loose from surfaces to which it adheres. Scrub and disinfect the ceiling, walls, and floor. Clean and disinfect all movable equipment before it is moved back into the house. Let the building remain vacant and open at least two weeks after cleaning.

**Rodent control.** Make all buildings rodent and wild bird tight. If they are not, provide permanent bait stations. Use rat baits of the anti-coagulant type.

**Selecting and observing birds.** House only healthy pullets. Select those that are free from internal and external parasites. Check pullets regularly during the laying period for lice, mites, and worms. Remove unthrifty birds.

**Prevent disease spread.** Place foot baths containing a fresh and effective disinfectant at each door. Do not allow visitors, salesmen, or feed men beyond the work room. Require servicemen to wear disposable plastic boots or clean rubber boots and to disinfect them before and after entering the house.

**Disease outbreaks.** Take immediate steps to obtain a diagnosis from a qualified person.

**Dead bird disposal.** Use incinerators or deep disposal pits to dispose of all dead birds.

**Selling layers.** Sell all birds in the same house at the same time. Be sure buyers' crates are thoroughly disinfected before they are brought to your farm. Do not allow buyers to bring their crates into your laying house.

### EGG HANDLING

**Daily collections.** Gather eggs at least three times daily; four or five times daily in severe weather conditions.

**Methods of gathering.** Baskets, filler flats, and automatic collection systems are all acceptable. The best system to use will depend on the type of house, size of flock, availability of labor, and capital restrictions.

**Washing and cleaning.** Market all eggs in a clean condition. If eggs are washed, do so before cooling. Use a detergent-sanitizer compounded for egg washing, and follow manufacturer's directions.

**Oiling.** Oiling of eggs is recommended when marketing time is expected to be lengthy or when the marketing agency requires it. Poultrymen should consider oiling if they sell direct to consumers or supermarkets where eggs may remain under refrigeration longer than two weeks before being used. Spray or dip eggs with a mineral oil that is colorless, odorless, and tasteless.

**Holding temperature and humidity.** Hold eggs at approximately 55° F. A relative humidity of 75 percent is most desirable.

**Processing room.** Keep the processing room clean and free from odors and congestion. Locate and arrange equipment to achieve maximum efficiency.

**Holding room.** Use holding room exclusively for eggs. Always keep it clean and free of odors. Provide enough area to hold twice the amount of the flock's total weekly egg production. The cooling unit should be adequate in size to keep the space at the proper temperature.

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