

# Layer Coop Design & Construction

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## I. Design Considerations

- A. What you need:
  1. easy access to eggs
  2. easy access to hens (human ingress/egress)
  3. easy access to feeders & waterers
  4. easy to clean/disinfect
  5. moveable? (human vs. truck/tractor, how often will moves occur, how sturdy is required)
- B. What chickens need (Note: organic will have its own set of regulations – google the National Organic Program))
  1. able to exhibit natural behaviors
    - a) *floor space – minimums dictated by Prop 2/12*
      - (1) now: 116 sq in/bird floor space (floor space includes to elevated platforms in multi-tiered systems but \*not\* perches)
      - (2) 2020: 144 sq in/bird floor space (1 sq ft)
      - (3) 2022: cage free + useable floor space as dictated by United Egg Producers Animal Husbandry Guidelines 2017 ed
    - b) *enrichment (Prop 12 2022): scratch areas, perches, nest boxes, dust bathing areas*
  2. protection from elements & environment (includes temperature extremes)
  3. protection from predators & pests (also think about infectious disease)
  4. access to food & water
  5. clean air (ventilation – not just a temperature consideration!)
  6. lighting? (if you wish greater control over production during short days)
- C. flock size + breed considerations
- D. grass vs. dirt pasture: grass provides natural feed source but needs to be maintained, and flocks/coops must be rotated to different areas of pasture
- E. rotational vs fixed-in-place systems
  1. rotational allows grass to regrow if present + soil nutrients to replenish, animals can be symbiotic (Joel Salatin method), but requires increased coop mobility, secondary fencing around coop (if present) can't be permanent (needs to be easily moveable)
  2. fixed: easier to maintain, usually on dirt (because grass would be chewed down in short order)

## II. Design Requirements

- A. strength/weight
  1. PVC: + lightweight, relatively cheap, easily available, easy to work with using limited tools; – not particularly strong, degrades with sun exposure

2. Wood: + still relatively affordable, strong, somewhat easy to work with using limited tools ; – heavy, not weather resistant (and if using pressure treated to improve weather resistance, issues of leaching copper and other substances into soil – unknown if this affects flock/eggs), not as easily cleaned/disinfected since porous
  3. Aluminum: + strong (structural tubing is stronger than conduit, but conduit easier to work with), readily available, weather resistant, lightweight; – more expensive, more tools required to work with unless precut lengths and connectors used
  4. Steel: + very strong, if galvanized good weather resistance; – heavy, more expensive, more tools required to work with unless precut lengths and connectors used
- B. feed & water
1. feeders and waterers integral to coop adds design complexity and expense but (can) ease daily maintenance
  2. standalone feeders and waterers used have less initial design complexity and expense, but more daily maintenance
  3. regardless, birds need 24x7 access to water
- C. chicken access (ingress/egress)
1. automatic door can add functionality but at expense (\$150-\$250, at higher end kit includes solar panel, battery, wiring), not practical for large flocks
  2. can't have open door at night unless outside fencing is truly predator/pest proof
- D. human access (ingress/egress)
1. more is seemingly better, but can impact structural soundness/rigidity, especially for small structures
  2. think about how human access limitations affect all other design considerations, like egg harvesting or cleaning
- E. roosting areas
1. 6-9" per bird
  2. shouldn't hinder daily husbandry duties
  3. if above nesting boxes need slanted cover over nest boxes (or nesting birds will get urinated/defecated on)
  4. should be of material, size and shape suitable for chicken foot (which, as it turns out, is highly dependent on who you ask – can be anything from ~1 3/8" wooden closet rod (Ross Shoop tip: ask for irregulars at lumber yard) to rounded 2x4s (could put either dimension end up)
- F. nesting areas
1. Maximum 5:1 ratio of birds to nesting boxes
  2. size recommendations vary greatly – if birds are crowding in a nest box, trying decreasing their size
  3. use nest mat (e.g. Astroturf Poultry Nest Pad) to cushion eggs and be sure to pad the vertical end of the nest box as well (so that the egg rolls against the pad)
- G. protection from environment
1. main concerns: sun, rain and wind
  2. roofing
    - a) *solid: better protection, longer lasting, heavier, more costly*

- b) *not solid (welded wire, hardware cloth, etc + shade cloth in summer and waterproof tarp during rainy season): cheaper & lighter, high maintenance, tarps/shade cloth degrades faster than solid*
  - 3. siding:
    - a) *solid: better protection especially from wind, vertical rain; higher cost, leads to poor ventilation, adds weight*
    - b) *not solid (welded wire, hardware cloth): cheaper & lighter, built-in ventilation; poorer protection*
  - 4. sun specific concerns: if coop is not elevated high enough for chickens to gather underneath (and this also requires a solid floor so they aren't defecated on) then separate shade structures will need to be provided
- H. protection from predators
  - 1. nothing less strong than hardware cloth (even smaller predators can rip through chicken wire) on coop itself
  - 2. if primary fence not predator safe (and really, no fence is), consider secondary electrical fence surrounding coop(s) – can be solar powered
  - 3. consider livestock guard dogs if you have the time and energy to train them (if not, don't bother; great resource is the Livestock Guardian Dog Association, [lgd.org](http://lgd.org))
- I. protection from pests
  - 1. if coops sits directly on the ground (and not on skids), be aware that any exposed hole size of siding/flooring material if not solid (like hardware cloth) should not exceed ½" (we've seen mice in the coops even with ½" holes);
  - 2. no floor vs. hardware cloth/other welded wire floor vs. solid floor: all tradeoffs of weight vs. ease of cleaning vs. protection
- J. ease of sanitation (cleaning): often overlooked design consideration
  - 1. will litter fall to ground or need to be cleaned out?
  - 2. how easily is it to disinfect coops between flocks? Porous material (like wood) less easily cleaned/disinfected
- K. access to eggs: for smaller structures, best done from outside of coop (so slant bottom of nest boxes to make eggs roll that direction);
- L. lighting: increases egg production during short days, but incurs cost/complexity; can be solar powered (kits available)

### III. References

- A. [simplifiedbuilding.com](http://simplifiedbuilding.com) : aluminum and steel tubing and connectors (not cheap!), **tons** of project ideas and instructions for a variety of structures that could be used on farm
- B. [goo.gl/vvPQAx](http://goo.gl/vvPQAx) : good YouTube video on coop building basics
- C. [www.backyardchickens.com](http://www.backyardchickens.com) : forums have a lot of posts on what worked, what didn't, etc.
- D. [chickendoors.com](http://chickendoors.com) : exactly what you think it is
- E. <http://ucanr.edu/sites/poultry/> (look under "Backyard Poultry" and "Micro Commercial (Small-Scale) Production)

Many thanks to Deb Niemeier (engineering professor), Ruby Chen and Jake Parkhurst (previous engineering students – now graduated!) and the countless farmers that have contributed valuable tips in conversation!