Building a Mobile Brooder, Part 2

—Dave Shields

Two versions of the mobile brooder designs at Pastured Life Farm. Version 1 is on the right and utilizes a cattle panel hoop. Version 2 is on the left and uses EMT conduit to form the hoop.

There are multiple parts to a mobile brooder you need to wrap your head around before starting construction. By no means is this a difficult overall build, but it has more considerations than a stationary or in-field brooder. In general, you need to have a trailer frame or trailer concept, a flooring system to support your brooder structure, the brooding structure itself, and the roll away floor design (my personal key benefit). The way I have constructed this brooder is certainly not the only way. There are plenty of construction methods out there and everyone has a style or method they are most comfortable with. Use the ideas presented in this build and adapt to your own style and available materials.

The mobile platform itself

The first element of construction requires a mobile platform to build your structure, which needs to consider the approximate square footage requirements of your brooder, which is based on your average batch sizes. You want to ensure the platform itself will properly support your structure and have the right sort of bones on which to build your flooring system.

My preference is to use a pull behind camper trailer frame or any trailer easily adapted to this purpose. Wagon frames work well but maneuvering a wagon frame backwards is difficult, due to the pivoting front axle. I have yet to master the art of backing up a wagon frame without 20 attempts and a frayed temper. Nonetheless, we happened across a good deal on an old Dodge pickup chassis with good tires for just $200 on Craigslist, so it looks like I get more practice. The good news for us, in this case, is the chassis already had two beams in place on which I could fasten a simple flooring system as the foundation of the brooder.

Building your flooring

Before you build your floor, you need to consider the type of structure you intend to build. If you are handy with wood and plan to build using stick construction, then you want to make sure you consider how you plan to attach this to your floor. In our case, we use mostly hoop construction, so we will be attaching a hoop structure right on the platform. Most floor systems are built the same way, beams for your spans and joists resting on your beams with some sort of decking fastened to your joists and so on.

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Our design is for a 200 sq. ft. brooder to accommodate our batch sizes, be it broilers, day old pullets, or turkey poults. To help decide your brooder size, reference the below chart based on Fertrell's recommended brooder space. In this example - we are building for 400 bird batches for up to two weeks in the brooder:

It is easier to reduce floor space for smaller batches, so build your brooder based on the upper end of your batch sizes and length of time in the brooder.

Space Required to Brood 400 chicks		
Time in Brooder	***Sq. Ft. per bird***	***Total Sq. Ft.***
1 week	**.25**	**100**
2 weeks	**.5**	**200**
3 weeks	**.75**	**300**
4 weeks	**1**	**400**

The length and width of your floor will be based on your square footage requirements and other variables, such as maneuverability requirements through gates or access to areas you plan to store your brooder. In our case, we settled on a 10 ft. width since it would be easier to maneuver the brooder in and out of the pasture and around obstacles. With a floor width of 10ft. our length automatically became 20 ft. to hit the 200 sq. ft. requirement.

Our platform design employs a standard joist and beam concept using 2x8 joists on beams and then plywood for flooring. If you have ever built a deck, this is likely the same method you used with the exception of plywood flooring. It's important to size your lumber correctly and to simplify your design as much as possible. There really isn't much static weight associated with a brooder; however, the depth and density of your bedding will become a factor.

The Sstructure

As I mentioned, we use a lot of hoop construction to build our field shelters and ancillary buildings. This has proven to be a very cost effective, surprisingly

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The floor is framed out using 2x8 joists as the foundation for the mobile brooder.

The hoop structure creates a height of 6'6".

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resilient, and low labor building system that is also very quick to assemble. Using greenhouse plastic as your covering offers great insulation and heat accumulation properties, which is it's intended design. The other great benefit of the hoop structures is it gives many great locations to hang feeders, waterers, lights, and heaters. This has been put to great use in our field shelters and now brooders, too.

The hoop design annexes the natural strength of arches and lends well to weight bearing loads within the structure. Certainly, this design is not limited to hoop designs, and I am sure with proper planning it could also be built using simple wood construction, especially if you are more comfortable with that. Be sure to consider all of your design requirements before putting together a structural design.

The only issue I have had with wood construction in the past is that it tends to absorb moisture in our high humidity environment, which increases weight and rot. It's also generally more cumbersome.

The design of our structure is going to rest on a 10 ft x 20 ft platform, therefore, we needed 10 ft. diameter hoops for this build. Since we had a requirement for standing height ceilings (at least 6 ft.) we added an additional 2 ft to our hoops at the base of the bend. The radius of a 10 ft hoop is 5 ft., so we add two feet of straight, or un-bent pipe, to the hoop to give us 7 ft. ceilings. We built the structure using standard greenhouse construction and simply fastened the hoops to the side of our flooring system with metal straps. The hoop overlaps the floors approximately 6 inches on each side so this netted 6'6" ceilings, which fulfills our needs of not having to bend over in the brooder. It will provide enough height to allow for proper air exchange.

The other benefit of the hoop design is that both the ends are fully open and can be customized to your needs. In our case, we needed one end to have a dump door that spanned the length of the end of the brooder that would be used to remove bedding and brooder occupants when transferring to the field. The other end will have a pedestrian access door.

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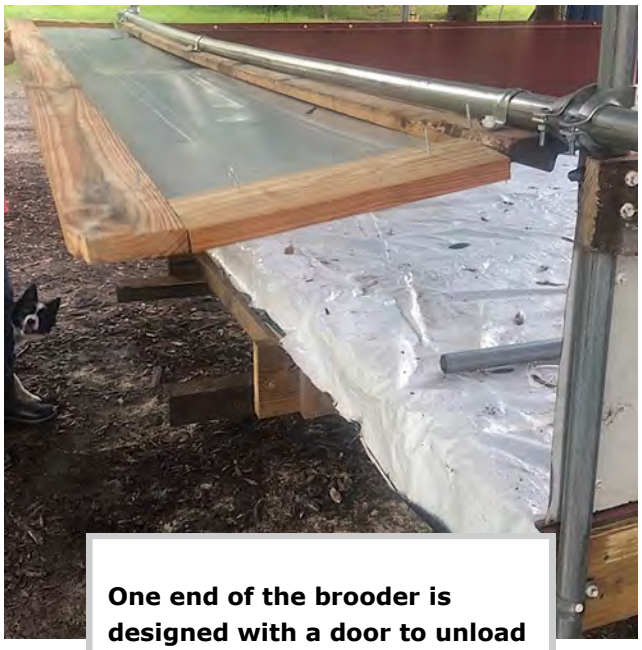

One end of the brooder is designed with a door to unload bedding and birds.

The hoop structure is covered with green house plastic.

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On the dump side we attached standing seam roof metal to a top rail pipe which would hinge up to allow access. On the pedestrian access side I assembled a tube door using corner fasteners and chain link gate hinges. We kept the floor unobstructed because of the plan to incorporate the roll-out floor, which will easily remove bedding.

Roll out flooring system

The second requirement for this design, aside from mobility, was a method to remove bedding without significant labor or heavy equipment. We also wanted a system that was easy enough for children or interns to use. Like most tasks, the easier and simpler they are, the more likely they are to be done. After evaluating whether there was a readymade solution commercially available that could be adapted, and after studying the roll-away truck bed systems, we determined that we had many of the components already on farm. In our case, I scrounged up an old billboard tarp of sufficient size, a 10 ft piece of 2" EMT (metal conduit) to roll the tarp onto, and I bought a $20 hand crank trailer winch rated for 1200 lbs. from Harbor Freight as our mechanical advantage.

The design is simple. Cut the tarp to approximately 9'9" x 22' (about 3 inches shy of your unobstructed floor width) and lay out on the floor with the excess hanging off the dump door end. I left about an inch gap between the tarp edges and the inside wall so I wouldn't have an issue with the tarp catching on the side walls when we roll out the bedding. Naturally, as probably happens on most farms, in the middle of this brooder build we had turkeys show up before I was able to complete this portion of the project. Fortunately, I laid the tarp down before adding bedding and then loaded the poults. This gave me some time to come up with a simple but effective way to design the rolling arm.

I took the 1200 lb. hand winch and modified it to provide the force needed to turn the roller that would roll up the tarp and expel the bedding out the back of the brooder through the dump door. From conception, to implementation and installation, this took only a couple hours to put together. The hand winch essentially has a bracket that holds a spool in place with a bolt through the center of the spool securing it to the bracket. On one side of the spool is the hand crank and the other side is a nut holding the bolt in place. The side opposite of the hand crank is the side of the bracket I cut out. First, I removed the nut, bolt, and

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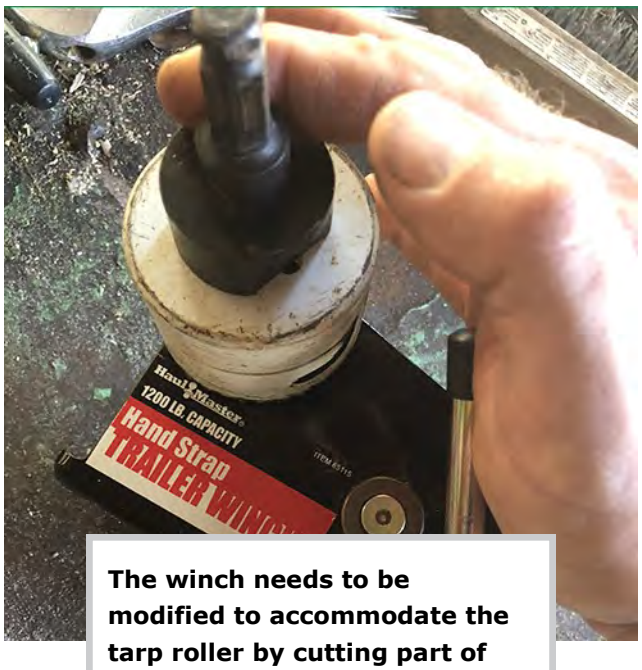
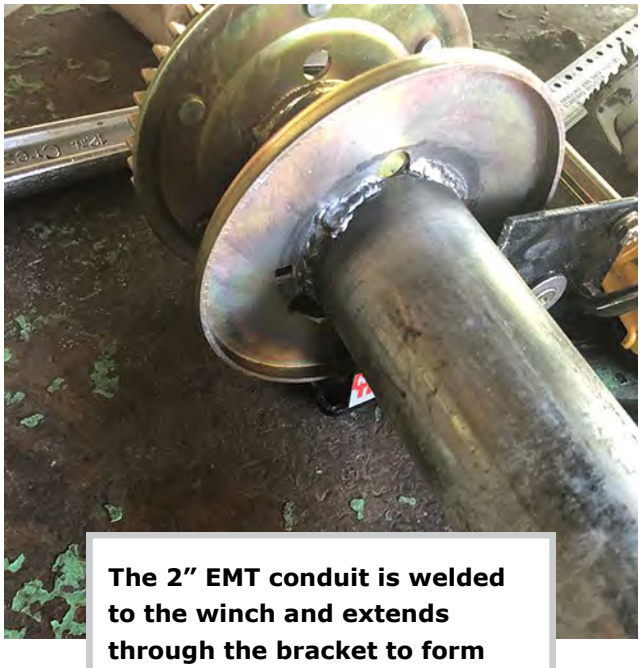


The winch needs to be modified to accommodate the tarp roller by cutting part of the bracket out.



The 2" EMT conduit is welded to the winch and extends through the bracket to form the mechanism to roll the tarp.

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spool so I could cut out a section of the bracket that would allow me to weld the 2” EMT to the center of the spool. Before welding the EMT in place I drew a 2” circle on the center of the spool and then fastened the spool back in place; it was only secured by the handle side of the bracket because the other side was cut out. I placed the nut on the bolt before welding on the EMT. In future designs, I would likely just weld on a nipple pipe that I could seat inside the roller pipe/tube so this can be taken apart if needed, plus this would give me the ability to adjust the roller length.

The only other piece that needed to be conceived was a way to receive the roller tube on the other side. I thought I could use some sort of bearing or find a coupler that would seat the 2” EMT conduit, but simpler is better. I took a piece of 2x8 at 9” long and cut a 2.5” hole using a hole saw. I needed to seat the conduit in the hole and attach the 2x8x9 board section to another longer piece of 2x8 that I would attach at the right place on the side of the floor supports. This would allow me to adjust the roller end simply by positioning the board wherever needed. On the hand winch side, I bolted the winch bracket to a piece of 2x8, which I then also screwed in place at the proper position on the floor supports. I allowed myself a few inches of space between the roller tube and the back of the brooder floor system to provide the tarp enough room to roll up onto the 2” EMT conduit. When positioning the roller, make sure the top of the roller tube/pipe is level with the floor so you are not having to pull the tarp at an angle against the back edge of the floor when rolling it up, creating additional resistance (Read: MORE WORK!).

Other nice to haves

Since the turkeys came a bit sooner than we were prepared for, I wasn't able to install my power circuits as intended. The original plan was to place a 50 AMP 220-240V RV plug and small power panel on the brooder so I could plug in wherever I had a 14-50R plug. This would allow me to have a 120/240 circuit for various things such as heaters, lights, exhaust fans, etc. In this instance, I will place a distribution panel with separate breaker protected circuits allowing me to avoid having extension cords dangling from all over. I will run conduit and receptacles down the center purlin, giving me easy access to diversified circuits. Rest assured, when I build the next brooder, aside from using a regular trailer frame (non-wagon style), I will integrate the electric feature as well.

The assembled hand crank mechanism ready to be mounted to the brooder.

The hand crank assembly mounted to the back of the brooder shown with the tarp rolled up onto the pipe.

Final words of wisdom

I never would claim to be a wise man, but I have made enough mistakes to offer the occasional nugget of relevant information on certain topics. As far as mobile brooding goes, I have tried skid designs and honestly, I don't feel they are a perfect match for mobility for multiple reasons. A mobile brooder, in general, is much heavier than a field shelter since you have a floor and an accumulation of bedding, which only gets heavier with added manure, feed and moisture. Like a wagon frame, I would see a skid design almost impossible to backup, which takes away some of the key benefits in my mind. It doesn't mean if you have plenty of room to always "pull through" and not back up it couldn't be used. Just bear in mind it will limit your mobility and adds to the challenges of mobile brooding. The same goes for a wagon frame. I have yet to meet someone with the expertise to back one of these up precisely where they intended for it to go on the first try (or ten), let alone an intern or children helpers. Keep it simple and feel free to reach out if you have any questions or need any help.

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