STEWART FARM
YEAR ROUND INSULATION SYSTEM
FOR BEE HIVES

Insulating a standard Langstroth bee hive
with permanent insulation
without affecting the design of the internal components
or the normal routine for managing the hive

Developed by

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Patent Pending

We welcome and encourage beekeepers to try this system on their own hives, for non-commercial purposes.
This can be done using materials which can be purchased at any home improvement store.
The most recent version of this document with drawings and a video are available online at
bees.StewartFarm.org.

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Introduction

This system is not for those who are firm believers that bee hives should not be insulated and that hives must have lots of ventilation. This is only for those beekeepers that want to insulate their hives and are looking for a better way than wrapping them temporarily with roofing paper.

As a beekeeper living and working in Michigan's Northern climate, the design of the standard Langstroth bee hive has bothered me since I started beekeeping. Every winter I lost colonies due to, I believe, the weather conditions. The ¾" solid wood walls, floor and top provide no insulation from the winter's cold and the summer's heat. Within a few hundred yards of my apiary I have observed feral bees living in holes in trees and surviving the winters with no problem. Generally the thickness of wood surrounding a feral bee hive hole in a tree is at least two to three inches thick and part of a large mass of wood which acts as a heat sink. The thickness of the walls of feral bee hives provides more insulation from cold and heat, and the additional wood mass moderates temperature swings from day to night and during short extremes in temperature.

As an architect I decided I wanted to try to design a better living environment for my honey bees than I was providing with the standard Langstroth hive. I looked at the design of the hive to figure out how I could insulate it for winter conditions. Since I don't install insulation in my home each fall and remove it in the spring, I wanted something fairly permanent for the hives as well. Also, I felt the hive could use some summer insulation to protect it from overheating in the direct sun. At first I thought through insulating the inside of the hive, but soon gave up that idea when I realized how much that affected the size and quantity of the frames. I wanted to keep all of the components of the hive as standard as possible. After some experimentation with various designs I came up with a system that puts all of the insulation on the outside of the hive except the insulation installed in the top cover. It remains in place year round, so once it's installed it stays there. The system increases the insulation of the hive components from approximately R-1 to R-5 and reduces the transfer of energy to about one fifth that of a standard hive. All materials needed are readily available at home improvement stores; the tools needed are very basic and all of the work can be done by one person working alone. It can be installed in the shop to new hives or in the field to existing hives without disturbing the bees. All of the parts of the system can be easily removed or replaced as needed. Nothing needs to be, or should be removed for the summer. We no longer have to make that very tough decision in the spring about "When is the right time to remove the winter insulation wrap?" and we don't hesitate from doing an internal inspection in February because we would have to remove and replace the insulation.

The system is very simple. Cut panels from ¾" foam board, locally available as a wall sheathing material, and hold them in place with sections of 1 by 2 screwed to the wood hive components through the insulation. Put a sheet of ¾" foam board under the bottom board and one under the upper cover. That is basically it, but, with a few little details added which I will explain. Once you have the materials and tools ready it should take about an hour and a half to cut and install all the components needed for a single hive.

Three-quarter inch solid wood has an insulation value of approximately R-1. With ¾" foam board added to the wood the result is an insulation value of approximately R-5. The insulated wood in the hive will transfer energy at one fifth the rate of the standard un-insulated wood. A standard four medium-super hive has approximately 2500 square inches of exposed surface area. The Stewart Farm year-round bee hive insulating system leaves approximately 300 square inches of that surface exposed without insulation, at the joints between supers, around the entrance and at the bottom board sides. The result is that the total amount of heat lost or heat gained directly through the wood surfaces is reduced to approximately one quarter of that of an un-insulated hive.

In this system all materials needed are readily available at home improvement stores; the tools needed are very basic and all of the work can be done by one person working alone. The system can be installed on hive components in the shop or to existing hives in the field. All of the parts of the system can be easily removed or replaced as needed. Nothing needs to be, or should be removed for the summer.

Tools

Tools needed to fabricate and install the system are as follows:

- tape measure
- pencil
- powered screw driver or a standard screw driver and drill with bits
- utility knife or hand saw
- optional - propane torch

Supplies

Supplies needed to insulate three hives, each with four medium supers are as follows:

- Two sheets of 4' x 8' x ¾" foam board insulation - $28
- Eight 1 x 2's by 8 foot long (optionally you can use pressure treated lumber)- $16
- 120 - 2" long exterior screws (about one pound of screws) – $8
- Two rolls of 3/8" thick x 3/4" wide x 10' foam weather stripping tape - $16
- Optional – 18 – 1.25" exterior screws and 18 large washers or ceiling buttons

Cost

Total cost to insulate three hives each with four medium supers is about $60. That's just $20 per hive. The weight that this system adds to a typical medium super is only about a pound.

Installation notes

While installing the foam panels it is important to have each panel held tight to the hive at the perimeter of the panel. If air can infiltrate under any edge of the panel, the result will be the same as if there were no panel at all. This is one reason that I prefer ¾" foam board to ½" or ¼". The foam board is easily cut with a utility knife or hand saw, however if you use the saw or the utility knife that is not sharp it will leave a ragged edge on the foam board. If you care to you can smooth out the ragged edges with a light pass of a propane torch. Many foam boards come with a clear plastic sheet on the surface. I leave it on the surface that is exposed to the weather. You don't have to leave it on but it will come loose as it weathers unless you lightly melt it to the foam board with a propane torch. I like to run a propane torch over all the panels after installation. It melts the foam slightly and seems to create a harder surface that I think might hold up better to the weather and impacts over the long run. Avoid breathing the fumes when heat the foam because many foam boards can be toxic. If you use a propane torch to sanitize your supers you should be able to continue to do that without affecting the insulation panels. Most foam boards have printing on one side. For aesthetics you might want to make sure you put that side to the box so the printing doesn't show.

Supers

For super panel cutting patterns I have used a side and front from an unassembled super. At one time I cut the side panels longer so they overlapped the ends of the front and back panels. I later abandoned that practice when it turned out to be more work and sometimes caused problems if the side panels were a little too long. The quickest way to cut the panels if you have a lot to do is to first make ¼" plywood patterns of each size needed and nail four ¾" brads into them so the brads stick out one side by

½". You then place the pattern on your foam board for cutting and the brads hold it in place until you are done cutting all four edges. In addition, the pattern does not have the rabbits cut out of the ends and since the pattern is only ¼" thick instead of ¾" wood it is easier to cut the foam board below.

Outer Cover

The dimensions of your top cover may vary a little from those shown in the drawings. This may affect the thickness of foam board needed to bring the bottom of the foam down to the bottom of the perimeter board around the edge. You can have the bottom of the foam a little lower than the perimeter board but not vice versa. If the perimeter board is lower than the rigid foam board it will rest on and possibly damage the insulation around the edge of the inside cover. You might need to calk around the edge of the foam board. I found that ants like to get up under the cover if I don't. This does not seem to be a problem around the panels on the supers, just under the top cover.

Unfortunately this insulation modification to the outer cover defeats its telescoping feature. The top cover will need to be weighed down properly to assure that it does not slide off or blow off. To avoid wind, rain and snow from blowing into the slot of the inner cover you can cut a small piece of milk carton or juice box to act as a canopy over the slot. Tape it to the inner cover. If you don't want to lose the telescoping feature you will need to make a custom outer cover 1½" wider in each dimension and ¾" deeper than the standard cover. As an option you can make a metal cover for the top the usual size, but, bring the sides of the metal down about 2". Have the bottom edges of the sides turned up so the bottom edge is not sharp. Insert a piece of ¾" foam board, calk it and you are done.

Inner Cover

The inner cover is insulated at the perimeter with foam insulation weather stripping self-stick tape. Though the amount of exposed wood on the inner cover is very small this is a very important step. Cold temperatures on the edge of the inner cover are easily transferred to the remainder of the inner cover and could result in condensation on the underside of the inner cover, the build-up of ice, and water dripping on the bees. With the telescoping feature of the outer cover not working you could get a little blowing rain entering the ventilation opening at the rear of the inner cover. You may want to tape a small piece of plastic on top of the slot to act as a canopy. See the drawings.

Bottom Board

The design of bottom boards seems to vary a bit and yours probably doesn't match mine. You'll have to figure out what works on your style bottom board. A foam board bottom or a piece of foam board mounted to the bottom or above your current board is the most important component of insulating the bottom board. I happen to have a screened bottom with a slide-out board below the screen. The slot for the slide-out board is about ½" deep, but because of slight warping of the frame a ½" thick insulation board would not slide into the slots. However, two ¼" layers of foam board would fit when I put one in first and then slid in the second one. I like these foam board bottoms, because they are so inexpensive that I consider them disposable. After I flip them over for a second use I replace them with a clean boards at a cost of about 50 cents. Unfortunately I only found the ¼" foam board at the home improvement store in a 200 square foot package for $38. I now have a lifetime supply. One concern I had about replacing the wood bottom board with foam board is that critters can scratch or bite through the foam board and enter the space between the screen and the foam board or just allow air to enter and defeat the insulation. To avoid this I put the original solid wood board between the bottom and the hive stand to prevent animals from getting to the foam board.

If you don't have a slide-out bottom board, you will need a piece of insulation below your current board. An easy way to do this is to set the hive bottom on the foam board sitting on the hive stand.

Though I don't really feel it is needed for insulation purposes, you may want to insulate the sides of your bottom board. In that case you can use scrap foam board left over from cutting the other components from the large sheets. The sizes of the scraps you need will depend on your particular bottom board dimensions. The size of the cleats to hold these small pieces in place could just be the standard size cleats we use everywhere else. We really don't need the cleats to act as handles on the bottom board so, if you don't mind getting a few more hardware items you can also put on the small pieces of foam board with 1.25" screws and either washers or ceiling washers. So far I have had no insulation at all on the sides of the bottom boards, and the colonies are doing great. I almost think it might be better to allow the sides of the bottom board to be colder so if there is any moisture in the hive it will condense near the bottom where it won't drip on the bees. I'm going to try to monitor this next winter to see if I am getting any condensation at all. One other advantage of insulating the sides and rear of the bottom board is that it will act as a guide to help you align the first super with the bottom board when you place it following an inspection of the bottom board. Though it is hard to see the wood you can just align the outside of the insulation.

Queen Excluder

The queen excluder does not need to be insulated, because it is only used in the summer. The problem with the summer heat is not the air temperature outside as much as it is the direct sun radiation on the hive. The total surface area of the edge of the queen excluder that is exposed to the summer sun is minimal and does not have a great effect on the internal temperature of the hive.

I've developed a set of drawings to illustrate the installation of the system components as well as patterns for conveniently and economically cutting the insulation panels for deep, medium and shallow supers from standard 4' x 8' sheets of foam board insulation. These drawings are available at http://bees.stewartfarm.orgs

Hive ventilation

There are plenty of opinions about ventilation for the hive in the summer and the winter. Here's just another beekeeper's opinion, mine. *If we insulate the hive well enough, very little ventilation is needed.*

We accept that the bees need to breath, their respiration generates moisture and that too much moisture in the hive is not good. There always needs to be some ventilation. The question is how much. In the winter too much ventilation will make the bees too cold. Too little, and the moisture can build up and can create unhealthy damp conditions.

Some say that winter is the damp time of the year. Cold air does not hold as much moisture as warm air and cold air will not accept evaporation from surfaces as quickly as warm air will. The reason things seem damp in the winter is not that there is more moisture in the air, but rather, that there is less moisture in the air and more moisture on surfaces. Moisture which is in the air can condense on cold surfaces and make those surfaces damp. Moisture does not condense on warm surfaces.

As I understand it, in the winter the bees keep warm by exercising their wing muscles to generate heat. Heat, moisture, carbon dioxide and waste are the products of the bees consuming honey and oxygen, and then exercising. The colder it is in the hive the more the bees have to move to keep warm and the more honey and oxygen they consume to generate that heat. The more honey ingested and converted to heat, the more

moisture and waste is created. If we give them a well-insulated environment, they will not need to move as much, they will not consume as much honey or create as much waste, they will not create as much moisture and therefore will not need as much ventilation to expel the moisture. They will also be consuming less oxygen and therefore will need less ventilation. The more insulated the hive is, the warmer the inside surfaces, and the less chance that moisture will condense on those surfaces. It is the condensation that can compromise the health of the bees. With less ventilation there is less cold air entering in the winter and the hive will stay warmer with less work from the bees to keep their cluster at the proper temperature.

In the summer when the sun shines directly on the hive, the heat inside the hive increases. The bees ventilate the hive by moving air through the hive using their wings as fans. The more heat that radiates into the hive from the walls and top, the more ventilation is needed from the bees. More bee activity in fanning generates more body heat, physically expends the bee's resources, uses more honey reserves, and leaves the bees less time to forage for nectar and produce honey. A hive insulated in the summer should produce more honey and even increase an individual bee's chances of survival and therefore result in a larger colony, more likely to survive the following winter.

For ventilation I leave the top entrance open year round and the bottom entrance adjusted from the smallest opening over the winter to almost fully open in the summer. Through the spring I enlarge the bottom entrance as access needs increase and night time temperatures rise. I don't increase the entrance until it appears crowded and I resist increasing it even when it is crowded if I think we still have some cold nights ahead. In the fall I set the bottom entrance ready for winter without hesitation.

Less waste and better survival rate

As described in the ventilation section above I believe that an insulated hive results in the bees consuming less honey and creating less waste. Less waste being created results in fewer trips outside the hive to excrete that waste. This results in the bees having less chance of exposing themselves to extreme cold temperatures which can result in their death. I believe this also results in a higher winter survival rate.

Observations

To put into perspective the results of my experiences with this hive insulation system you would probably like to know that my apiary is located on Harsens Island, in Lake St. Clair, southeast Michigan, just north of Detroit. I do not treat my hives for any diseases or mites and I do not do any supplemental feeding with sugar water. I am kind of a hands-off beekeeper. I don't go into the hives more than four or five times a year and I vary rarely disturb the brood supers.

Every year I was experiencing winter losses. In the fall of 2010 I had four active colonies, three first year colonies with two medium supers and one older colony with two deep supers and two medium honey supers on top. I insulated one of the first year hives of two medium supers with the system described. That was the only colony to survive the winter of 2010-11. In May of 2011 I retired the hive with the deep supers and bought and installed two replacement colonies in the two double medium hives that had expired. The colony that had survived the winter of 2010-11 did well that summer, and by the fall of 2011 it had grown to five mediums. I should have harvested at least one super but the colony was quite large, needed the space, and the top supers were not full. If I had known then that they would use almost no honey over the coming winter I would have removed one or two honey supers from the top. The two new colonies from the spring were still just double medium supers. I insulated all of the hives for the coming winter, the sides, outer covers, inner covers and the bottom of the bottom board. I did not insulate the sides of the bottom boards. I figured if

there was going to be any condensation it would be best for it to condense at the bottom of the hive where it wouldn't drip on the bees.

That winter, 2011-12, was very mild. There was not a period of more than a week that stayed continuously below freezing. Normally we would have two weeks or more continuously below freezing with some days below zero. This may not have been the best winter to judge the results of this insulation system however, here's what I observed in on March 7. All three colonies were out flying, active and appeared healthy. When I opened the two hives that had just two medium supers each, there were lots of bees, right up to the top, including between the inside and outside covers. I was surprised to find that they had not used very much honey. In the top supper most of the honey that they had in the fall was still there. There was no need to do any feeding at all. When I cleaned out the dead bees from the bottom screen via the entrance opening slot, there were less than two dozen dead bees in each hive and there were none on the ground nearby. I was amazed because usually I would be pulling out 50 to 100 or maybe more. I checked the last hive, the one with the 5 medium supers. The top three supers appeared to be still filled with the honey that they had in the fall. There were plenty of bees in the bottom two supers. When I cleaned out the bottom screen there were only six dead bees. I could hardly believe it.

This was the first time in my six years of beekeeping that all my hives survived the winter. I called a friend of mine who has hives about two miles from me to see how his did over the winter. He had just begun beekeeping the previous year and all his hives were new small colonies. He reported that out of his 30 colonies about 10 survived the winter.

Conclusion

I believe that a well-insulated, minimally ventilated hive increases the winter survival rate, increases honey preservation over the winter and increases honey production in the summer. I believe that the increased winter survival rate is due partly to less physical stress on the bees and partly to the reduced chance that the honey reserves will be expended before the bees can replenish them in the spring. Some benefits to the beekeeper are not only that they are less likely to need to replace a lost colony in the spring, but also, less or no early spring feeding should be needed, more honey reserves should be remaining in the hive in the spring to give the hive a start towards giving us a good harvest of honey in the summer, and lastly, the more bees that survive the winter the larger the colony to start collecting pollen and nectar in the spring. I believe that honey production is increased also due to resulting larger colonies and the bees spending less time ventilating the hive in the summer, leaving more time for harvesting nectar and producing honey.

If you try this insulation system for yourself I would love to hear your experiences and the effects you observe on your colonies, the winter survival rate and your honey harvest. In addition, if you have any questions or comments on the installation of the components of the system or on the instructions please send them along.

I have a free email newsletter called "bees.StewartFarm.org Newsletter" to provide updates to this document and the drawings which accompany it and to share the results which others have when using this system. If you would like to be on the newsletter emailing list please drop me an email. Send your name and email address to xharpspah@aol.com and put "subscribe bee insulation newsletter" as the subject.

Thank you,
Robert Williams
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Below are some observations, comments, comparisons to other insulation systems and concerns or possible disadvantages of using this system.

Observation – Less propolizing

It seems to me that the bees do less propolizing of the joints between the supers than they used to before I insulated the hives. I would be interested to know if others observe something similar.

Comment - Things tried that didn't work

In the process of developing this system I tried a few things that didn't work. I'll mention them here in case you are going to do some experimenting on your own. At first I glued on the foam board panels. I thought I would need to glue or caulk the foam panels to the super in order to limit the exterior air getting behind the edges of the insulation panels. It was difficult to find glue that held well to both the foam board insulation and the wood. Some glues are made for wood, others for foam board. I could not get the panels to stay on over the winter using just glue.

At first I left openings in the insulation panels for the hand-holds in the sides of the supers. Later, for better insulation, I didn't put in the hand-holes, but rather, glued wood handles to the outside of the foam. Handles came off. I then screwed the handles on. The screwed on wood cleat handles I use in the current system seem to be a good solution. They hold the insulation tight around the edges and they act as handles. This system also allows for later removal of the panels if needed.

The first time I put in the foam bottom boards they were too large and stuck out the back of the hive so I could easily grab them to pull them out. Two weeks later I observed one pulled out a bit and some claw marks on it. It looked like an animal tried to get in. I cut the bottom foam boards down to remove the excess part sticking out. I then realized that having just foam board between the exterior environment and the bottom screen might provide an area where a mouse or other animal could easily make an opening in the foam board and thereby defeat the whole insulation system. It turned out that in the spring the bottom foam boards were all still intact and there were no signs of any animal attempts at intrusion. I won't assume that it won't happen in the future and would like to have some type of solid material protecting the bottom of the foam bottom boards. Next winter I may substitute one layer of 1/4" foam board and one layer of 1/4" hardboard.

Comment - Some beekeepers say that the honey frames provide insulation

Some beekeepers have told me that they don't feel insulation is needed because honey frames #1 and #9 and maybe #2 and #8 act as insulation for the cluster during the winter. The problem with this theory is that this would only be insulating the cluster from cold on the sides, not from the cold surfaces on the front or rear of the hive. In addition, the bee space around the outside edge of one medium frame is over 18 square inches of free area. That is comparable to the free space of a 5" diameter hole. There is too much bee space for air movement to get any insulation value out of the honey frames on the sides of the cluster. These honey stores do however provide a valuable service in buffering the temperature swings within the hive. The heat stored in the honey is released into the hive when the temperature in the hive drops below that of the stored honey. This moderates the temperature swing from warm days to cold nights but does not actually provide any insulation value from the cold wood surfaces of the super.

Comment - Some beekeepers insist that no insulation is needed

Many colonies survive in a standard hive. Some colonies survive with no hive at all. This is true. Though some survive under these conditions, not all will. Survival vs. demise may depend on the health or strength of the colony going into winter, the type of bee, the local weather conditions, etc. However, it would be difficult to

see where any colony would be better off in an exposed environment than in a protected environment. I believe that those which survive without protection will not be as strong in the spring, both in health and numbers, as those which are protected from the cold. I know many homeless people survive the Michigan winters in cardboard boxes. I think I am better off and healthier living in a house with insulation and I think my bees are too. Langstroth himself promoted insulated hives in the form of double walled construction. Today's version of the Langstroth hive overlooks this very important feature of his original hive design. I believe the double wall has been eliminated for ease of construction and economy, but, not because it is any better without it.

Comment - Some beekeepers mention that the temperature inside the hive is usually the same as outside
In any case, when the temperature during a winter day might range from a low of 10 degrees at night to a high of 40 degrees in the afternoon the temperature inside an insulated hive may only range from 20 degrees to 30 degrees or the length of time at night when the bees need to endure the 10 degree temperature may be shorter. I suspect the swing of temperature from day to night is as detrimental to the bees as much as the absolute temperature itself. Feral hives in tree trunks have a large mass of wood which keeps the temperature in the hive from varying greatly in any 24 hour period.

Comment - The cost
$20 per hive does not seem like a lot of money to me, especially when you consider the possible cost of replacing the colony with a package the following spring. Even if you don't lose your colony over the winter I believe that the honey harvest will be better the following season due to more and healthier bees. If cost is a concern you might want to consider seeing if you can find some scraps of foam board insulation and lumber at local construction sites. The small size pieces needed for hives are basically throw away scraps in building construction projects.

Compared to standard winter wrap insulation
Stewart Farm year round system stays on all year round. No installation next fall. It is not in the way if you want to go into the hive on a warm winter day. No removal needed in the spring. No packing up and storing hive wrap materials over the summer. No sorting of materials in the fall to match the size of the wrapping materials with the size of each hive. No damage to materials due to removal, packing, transporting, storage and later reinstallation. The insulation value of this system is more than most systems involving winter wraps.

Compared to BeeMax Polystyrene foam hives
BeeMax hives are made completely of rigid foam. They too provide insulation for the bees in both winter and summer. Many people who use BeeMax hives agree that winter survival rates are better than non-insulated hives and that honey production is increased. A few differences between the BeeMax hives and the Stewart Farm Year-round Insulation system for Bee Hives are as follows:

BeeMax	Stewart Farm system
Bees exposed to foam interior.	Bees exposed only to wood interior.
An animal penetrating the foam can get to the bees.	There is always a layer of wood keeping out critters.
Foam interior will not absorb excess moisture.	Wood interior will absorb excess moisture.
If a super is damaged it needs to be replaced.	Any individual damaged panels can be replaced.
Known to sustain some hive tool damage over time.	The hive tool contacts the wood, not the foam.
Must be purchased from a supplier.	Materials are at any home improvement store.
You need to buy new hives to convert to BeeMax	You upgrade your current hives and do it yourself.

Concern or possible disadvantage - Storing supers
The supers are obviously larger with the insulation installed. If you normally store your unused supers stacked up with some inside of others you will not be able to do this with the insulated supers as shown. However,

instead of using ¾" material you could use ½" thick insulation and cleats everywhere. That would reduce the heat loss and gain to about 1/3 the standard un-insulated hive instead of the 1/4 we obtain with ¾" material. Then the supers will fit inside each other. Also, supers being stored on their sides or ends are not as stable as supers without the insulation and cleats. They are balancing on the cleats.

Concern or possible disadvantage – Frame hanger needs to be modified

The frame hanger rack will need to be modified slightly to clip over the super plus the thickness of the insulation. I first wrapped a little stiff wire around the hook portion of the hanger rack and created a new wider hook from that. Later I tried a better system. I made the cleats on one of the long side of each super 18" long instead of 12" and put a ¼" thick piece of foam board under most of it except where the frame holder would hook on the cleat. For me an advantage of using the cleat to hold the frame rack is that now I don't put a super back on the hive and then find I forgot to remove the frame rack.

Concern or possible disadvantage - Outer Cover loses its telescoping feature

It's important to have the bottom of the foam board a little lower than the perimeter board of the top cover. If the perimeter board is lower than the rigid foam board, the perimeter board will rest on and possibly damage the insulation around the edge of the inside cover, and in addition, leave a larger than bee space gap between the inside cover and the insulation. Unfortunately this insulation modification to the outer cover defeats its telescoping feature. By losing this feature you lose the normal method of opening or closing the upper entrance slot in the inside cover by sliding the outer cover one way or another. If you don't want to lose the telescoping feature, you will need to make a custom outer cover 1½" wider in each dimension and ¾" deeper than the standard cover. In addition depending on the depth of the edge around your cover you may need to add a second layer of 3/8" thick weather stripping around the edge of the inside cover.

Concern or possible disadvantage - Realigning the supers after an inspection

With the insulation panels in place it can be a little harder to see that you are getting the supers aligned with the bottom board and with each other when reassembling the hive after an inspection. After doing a few inspections you will get used to aligning the supers using the insulation as a guide. It is important that you use the same thickness insulation on all parts and all sides of your hives so you can use the alignment of the outside of the insulation as a guide to know that the wood supers are aligned. This also is a reason to consider insulating the sides and rear of the bottom board, not necessarily for insulation purposes, but rather to make it easier to align the super above.

Concern or possible disadvantage – You can't use standard hive staples when moving the hive

If you are going to pack up and move your hives with the bees in them you will not be able to use standard hive staples to attach supper to super unless you cut off part of the insulation (not advised) or unscrew and remove the cleats and insulation on some sides. You may choose to strap the hive together instead of using staples.

Concern or possible disadvantage – Rainwater

I don't know yet if this could become a problem. Since the insulation is not calked to the supers rainwater could migrate between the two and would not dry out as quickly as surface water. I am wondering if over a period of years or decades this could lead to deterioration of the supers. I do paint all of my supers and am hoping that provides adequate protection for the wood. On the other hand, having the insulation over the painted super is providing additional protection for the paint from sun and wear and tear and I shouldn't have to repaint my supers in the future. Time will tell.

Concern or possible disadvantage – Replacing entrances

Many beekeepers install entrances by pushing on the entrance with the end of their hive tool until the hive tool hits the super. At that point the entrance is flush with the outside of the super. With the insulation in place this method cannot be used unless a couple of small notches are cut from the insulation to expose the surface of the super just above the entrance.