



Keeping the Bedroom Cool – Using EHP Rollboard Insulation

Driving a bus with an engine in the rear, called a "Pusher" or more specifically a "Diesel Pusher" if you have a diesel engine, has a lot of benefits, but it also has its unique issues.

In a front-engine bus, it is easy to keep the engine cooler as fresh air can more easily enter the engine compartment. The airflow to a rear engine is blocked by the bus body itself thereby restricting airflow to the engine causing it to run hotter.

With the engine in the rear, it is harder to keep the engine temperature down, but it has the advantage that the bus is much quieter to ride in as the engine noise is always behind you.

There are several solutions to keeping your rear engine cooler that have been discussed in previous articles, such as rodding out your radiator(s), adding more radiators, adding more cooling fans, installing a water misting system, etc. so, these will not be discussed here.

In this article, I will discuss the issues you may run into because of heat from the engine, by having a rear-engine, or front, or a mid-engine bus for that matter. My bus came converted with a Duxiana mattress. Some of these mattresses can cost as much as \$10,000. They are comfortable, but heavy. Most mattresses have 400 coil springs in them, the Duxiana has 4000 coils and they are made from one continuous roll of wire. They are amazing mattresses and friends that have them, swear by them.

These are heavy mattresses and the weight comes into play when they are over your engine compartment and you need to access your engine compartment for maintenance or repairs. You have to drag the mattress off the bed frame to access the engine compartment and then drag it into another room as there is not much room in a bus bedroom. My mattress was old and dusty and because of the weight and my allergies, I decided to replace it.

I bought a Sleep Number air bed four years ago. I like the lightweight aspect of it as I can deflate it in about five minutes and remove the two air bladders and easily carry them out and set them on my sofa, out of the way, when I need to access the engine compartment.

The Sleep Number bed also is really not a mattress but an air bladder with a zipper enclosed cover so it does not trap in as much dust so my allergies are less prone to acting up. It breaks down into two bladders, one for each person, some foam for the sides, and a mattress wrapper that zips everything inside.

I had to modify my bed to extend the platform so that it would support the entire mattress. Even though I retained a queen-size bed, without a built-in box spring, I had to support the mattress all the way to the edges. I did that by buying one sheet of 5/9" plywood and with a few cuts and some screws, I had the entire surface below my air mattress covered.



Plywood over the original base that extended out about 6" on three sides. Duct tape covered the screw heads.

I completed the modification, vacuumed up the mess, and set up my Sleep Number air mattress on the new platform. I set the Sleep Number compressor on a shelf beside my bed and plugged in the air hoses, plugged the compressor into the wall outlet, and set my Sleep Number to 40 on my remote as a beginning pressure, which turned out to be a bit too high for me.

It should be noted, that I bought a household Sleep Number bed, not the RV-style that has an angle cut on the base where your feet are, to make access around the bed easier in a confined space. The other difference being that the hoses come out at the head instead of the foot end of the bed as they do with the RV-style bed. I wanted the hoses coming out at the head of the bed for my setup.

All went well for several months until I started traveling more in the summer. I laid on my bed one night ready for a good night's sleep after driving all day and ended up laying on the hard plywood. All of the air had leaked out of my mattress. I aired it up to my usual Sleep Number of 30 and it stayed for a while, but by the morning, I was again sleeping on the plywood.

I called the Sleep Number company the next day and explained my issue and they told me it could be one of two things, the air bladder leaking or a defective compressor. They said to take the caps they included in the kit and after airing it up,

install the caps on each air mattress and see if it holds air then. Of course, those two caps came in a small plastic bag that I tossed out when I set up the bed not knowing what they were for or realizing that I would ever need them.

They offered to send me two new caps at no charge. Until they arrived, I slept on the sofa. When the caps arrived, I aired up both bladders and installed the caps, and left the bed alone for the rest of the day. When I returned, the bladder on the driver's side was almost flat. That identified the culprit as an air leak in the mattress itself, rather than a problem with the compressor.

I called the company and explained my findings and they shipped me a new mattress, under warranty, and asked me to ship back my defective mattress. I asked them what could have caused this and they had no idea. I asked them to let me know after they received the bladder back and determine the cause as I did not want this to happen again. They never got back to me.

I had heard that you are supposed to deflate the air mattress when traveling over the mountains to prevent the mattress from over-expanding at higher altitudes. I did not always remember to do that, so I thought maybe I over inflated it causing the seams to come unglued. From there on out, deflating my Sleep Number bed was on my Pre-Flight Checklist.

A few months later, the same thing happened again. I woke up on a hard surface. Luckily, I had saved the plugs and I capped the bladders overnight, and again, I woke up sleeping on hard plywood. I called the company again, and they asked me to perform the same debugging steps. I told them I already did.

Unfortunately, I was on the road this time and there was no easy place to ship a replacement mattress to. A typical problem for those of us who are full-timers. I asked them what they found out about the previous bladder I sent back and they had no record of even testing it. So, I was back to the beginning. A deflated mattress bladder and no idea what caused the problem.

When I arrived at my destination a few days later where I would be long enough to receive a new mattress and ship out my old one, I ordered a replacement mattress. It came under warranty again. This time I remove the entire bed and taped up any screw heads and anything that was protruding at all from the plywood base assuming something may be puncturing the bladders causing the leak.

I then reassembled the bed after receiving my replacement bladder, which by the way was a remanufactured bladder, as that is what they send you under warranty, not a new bladder. Apparently, they get several of these returned that they have to repair.

Once again, I put everything back together and asked what could be causing the air to leak out of my mattress, and again, and they had no idea. I told them I had bought a household mattress, not the RV mattress and she claimed, that is why I am having problems.

She said I should have bought the RV mattress. I asked her what the difference is in the house-hold mattress compared to the RV mattress and she explained some of the differences but none of them would have made a difference in my application that would have affected the outcome.

This happened one more time a few months later. It always happened after a long drive and usually when climbing hills were involved. I noticed that it always happens on the driver's side of the bed, which by the way is where I sleep.

It did not take me long to realize my exhaust manifold and the turbo were on the driver's side of the bed. These create a lot of heat and I suspected that could be related to my problem.

I called Sleep Number again and asked if may-be the heat from the engine could be causing the glue to break down, as it gets very hot in my bedroom and especially my bed after a long day's drive. She had no clue, but said, "maybe".

I asked her if the RV mattress would have prevented this from happening, and she said probably, but she gave me no assurance that those bladders were made to any different specifications which may be affected by engine heat. She did not really know her product. Not unusual in today's world. I suspect there is no difference in the manufacturing materials or method.

She had no idea and had no specifications of what their mattresses could endure and of course, they never did try to track down what caused the problem the two times before.

I found that driving with the bedroom windows open helps to dissipate the engine heat so the bedroom is not like a sauna when I arrive at a new destination. But even this was not enough to keep the bladders cool enough to protect the glued seams.

This time, they sent me both bladders, left and right, and said this bed is now out of warranty but they would send me one last set under warranty, and if the problem continued, I would be responsible for paying for any more replacements.

Even though no one at their company could tell me what was causing these failures, as they never analyzed the old bladders I sent back, I was on the hook for replacing them from there on out. I was not sure if I could continue to use their mattress unless I could solve the mystery as to why they only lasted a few trips before needing replacing.

This time, I was in Oregon for a few weeks, so

I was determined to solve the problem with no help from Sleep Number. I had time to solve the problem once and for all. I thought that it must be the heat from the engine exhaust and turbo that is breaking down the glue they use and I was determined to do something about it.

In the past, when arriving after a few hours' drive, especially when climbing hills was involved, my bedroom was very hot and my mattress was too hot to sleep on. I generally just slept the first few hours on the sofa and by the time I was ready for the second half of the night, the mattress was cooled down enough to sleep on



Slightly open bedroom window whilst driving.

With the Dux mattress, this was not a problem because the mass of the mattress absorbed the heat better and it didn't escape into the cabin as much. It kind of acted like an insulator. But with the Sleep Number air mattress, the heat just goes right through the air and dissipates into the bed-room.

To solve the possible problem of heat breaking down the glue in the mattress, I ordered several square feet of EHP Rollboard from Engine Heat Protection insulation and went to work insulating my entire engine bay to prevent the heat from migrating into my bedroom after a long drive.

There was a lot of insulation under the bed and in the engine compartment from the original conversion in 1996, but it was the old, thick, flammable type that was used back in the day.

I wanted something more modern, something cleaner, and something that was flame retardant to go in my engine bay. If the engine got hot, which I know it does on a long pull up a hill, I wanted to prevent that heat from coming up into my bedroom and especially affecting the glued seams in my air mattresses.

This is what the area under my bed looked like when I started. This is the old insulation. It was also covering the entire engine bay under the bedroom floor. Much of it had deteriorated and was crumbling off in small pieces.



Under my bed showing the original insulation.

I removed all of the old dusty, filthy, 25-year-old insulation that was in this area below the bed. I vacuumed the area thoroughly to prepare for the new insulation. My mechanic was also working on my engine at the same time, so I had to be careful not to drop any old insulation into the engine compartment.



Under my bed after removing my old insulation.

This is the underside of my engine hatch with the old insulation burned through from years of running a hot engine exhaust and turbo just a few inches away from this cover.



The previous insulation was partially destroyed by all of the heat.

This is what I removed. This old heavy flammable insulation gives off toxic fumes when it combusts. Watch the video at the end of this article to see the difference in flammability of the old insulation vs. the EHP Rollboard insulation.



Under my bed showing the original insulation.





Out with the old.

I removed the old insulation from my engine hatch in preparation for covering it with Rollboard from EHP. It was glued and screwed down.



After removing the old insulation

I had a trailer to work on so I rolled out the new Rollboard insulation and measured new pieces to fit my entire engine compartment. It turns out that I used several square yards of the insulation to cover the entire area while cutting it to utilize the greatest number of square inches without waste.



Cutting new Rollboard insulation.

I cleaned the old plywood surface of the hatch and sprayed three layers of 3M 90 Contact Adhesive on the wood and also on the Rollboard and then glued it to the plywood. After it dried in just a few minutes, I sprayed it with a light coating of high-temperature engine paint so it would be easier to wipe off any oil or dirt that came into contact with it.



After installing new insulation. A clean new look. Note: EHP Rollboard was installed both sides of this hatch for double-insulation.

Insulating the entire under-bed area, above the engine compartment, and under the

floor in the bedroom area was a success in keeping the engine heat out of the cabin. I have traveled several months and several thousand miles now and my mattress still holds air so I can sleep through the night comfortably every night. The bedroom is also cooler when I arrive at my daily destinations.



New EHP insulation glued in place.

I concluded that the heat from the engine was penetrating through my engine hatch compartment and into my bed area. This heat was affecting the glue in the mattresses causing it to break down and start leaking air over time.

It usually happened after a long pull up hills on hot days that generated an excessive amount of heat in the engine compartment. By insulating it with EHP Rollboard insulation, the heat could no longer penetrate the bed area and the air bladders have lasted over a year now with no problems. They have lasted longer than any time before I reinsulated this area since I installed the Sleep Number bed.

The Rollboard insulation is very easy to work with. Simply roll it out, measure it, mark it with a marker, then cut it with a sheetrock knife using a square and/or straight edge. Then spray three coats of contact cement on the Rollboard and the surface you are attaching it to. Stick them together and after a few minutes of drying-time, you are done.

If you want to make it easier to clean, you can spray a light coating of high-temperature engine paint on the exposed surface of the Rollboard either before, if it is a hard to get to area like up under the floor over the engine, or you can paint it on after you glue it to the surface.

Rollboard not only provides a fireproof surface, as it does not burn and put off toxic smoke like the old insulation did as it smolders, and it also provides a level of sound deadening to help keep the noise down from the engine compartment. This material is used in race cars to keep the heat off the drivers and because it is fireproof, it is very difficult to even burn through the Rollboard with a propane torch.

In conclusion, if you find your bedroom is too hot to sleep in after a long drive, you should consider using EHP Rollboard (<https://engineheatprotection.com/product/e-h-p-rollboard/>) and insulate the area under your bed. If it is still too hot, you should order some EHP Wet Blanket (<https://engineheatprotection.com/product/e-h-p-wet-blanket/>) to wrap your exhaust with, to trap the heat in the exhaust and force it out of the tailpipe rather than letting it dissipate into the engine compartment. EHP also works well for insulating your engine and your heating compartment to keep the heat and noise in the enclosed area.

To see a demonstration of the flame retardancy of EHP Rollboard insulation compared to conventional heat resistance insulation, click [HERE](https://www.youtube.com/watch?v=d090mONOs1E) (<https://www.youtube.com/watch?v=d090mONOs1E>). The last insulation I tried to burn in the video is the EHP insulation.

NOTE: To see a demonstration of the flame retardancy of EHP insulation compared to conventional heat resistance insulation, watch the video in the blog section titled “Flame retardancy of EHP Rollboard insulation”



Gary Hatt

Since July 2012, Gary Hatt has been the Publisher of Bus Conversion Magazine. Gary does most of his own work on his bus with the help of mechanic friends.

He has owned tents, truck campers, travel trailers, and stick-n-staple motorhomes until he bought his first bus in 1997 which was a 1972 MCI MC-7 Combo.

When he had a chance to buy a 1983 MCI MC-9 Log Cabin bus with larger windows, he jumped at the chance.

On Thanksgiving of 2014, Gary bought a 1967 Model 08 Eagle which he has since been living in and traveling in full time.

You may reach Gary Hatt at
Gary@BusConversionMagazine.com