# Fairmont Motorcar Brakes and Brake Assemblies

By Perry R. Frye

Proper functioning brakes and brake assemblies are paramount to safe operation of our motorcars. When we need to occasionally adjust the brakes, this presents a good opportunity to assess the conditions of the brakes, and the brake rigging. Brake components on motorcars are recipients of many corrosive and abrasive

*This brake block and liner have reached the end of their useful life and should be replaced*

compounds due to their proximity to the wheels and rail. Water, dirt, grit, steel flakes from rail and wheels, and even weeds and sticks all work to degrade and corrode brake components. Normal brake wear also enters the equation. And rust (the formation of ferrous oxides) can impart tremendous forces in confined spaces making disassembly more difficult. My goal is to share some of my experiences with M9, M-14 and M-19 brake assemblies. Much of this information applies to other models as well.

I remember the first time I needed to adjust the brakes on my M-19 after a total tear down and rebuild only three years prior. While loosening the jam nut against the toggle arm, and pulling the toggle link pin, I couldn't imagine that there was so much corrosion that I could not remove the yoke from the toggle arm by hand. After some application of WD-40, it finally came loose. From that point forward, I have routinely used thread lubricant on reassembly of yokes and eye bolts into the toggle arms.

The goals of rebuilding brake assemblies should be that all components operate freely, brake liners and blocks are still within useful life, and once the jam nuts are loosened, yoke and eye bolts should turn in and out of the toggle arms without the use of tools. Motorcars that are frequently operated and stored inside usually have brake riggings that are fairly easy to disassemble.

A best practice is to snap a picture before disassembly of the brake riggings to assure correct reassembly. If a brake assembly is significantly corroded and rehabilitation is needed, I have found it easiest to remove the entire assembly by pulling the cotter pins from the front and rear pivot studs, and the cotter pin from the upper toggle link pin. Once the rigging is removed, apply liberal amounts of your favorite penetrating oil to threads and joints. Most parts should

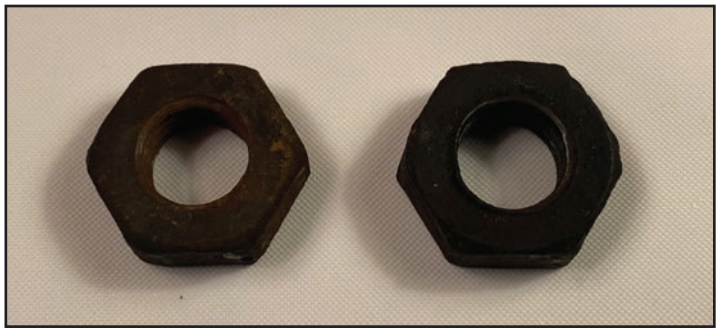
*An example of a heavily corroded Fairmont M-19 brake assembly in need of rehabilitation*

disassemble within a few hours. Care should be taken when loosening the jam nuts on the assembly as they are narrow and can easily be stripped if the end wrench is not engaged correctly. Heavy corrosion makes this process more difficult.


*The primary components of a Fairmont brake assembly*

Once the brake rigging is removed, this is a good time to inspect the pivot studs for any fractures, and also checking that the hex half nut is tight, keeping the pivot stud snug to the motorcar frame member on reassembly. Begin by rigorous steel wire buffing of the neck of the pivot stud. Use a magnifier and inspect this area for hairline fractures. If found, replace the pivot stud. I once fractured a pivot stud on a motorcar run back in the 1990's. It was as if I had lost about 70% of total braking on my next brake application. Not only did I lose braking ability, but the motorcar attempted to "bind" between the rails while braking...a very uneasy feeling. Unfortunately, it was time for the tow bar.

At this point, it should be noted that pivot studs are manufactured with United States Standard (USS) course threads designated as 1/2" X 13 TPI (Threads Per Inch), while the toggle arm, yoke and eye bolt that are a 1/2" X 12 TPI. Original Fairmont jam and half nuts in these thread patterns were both able to be tightened

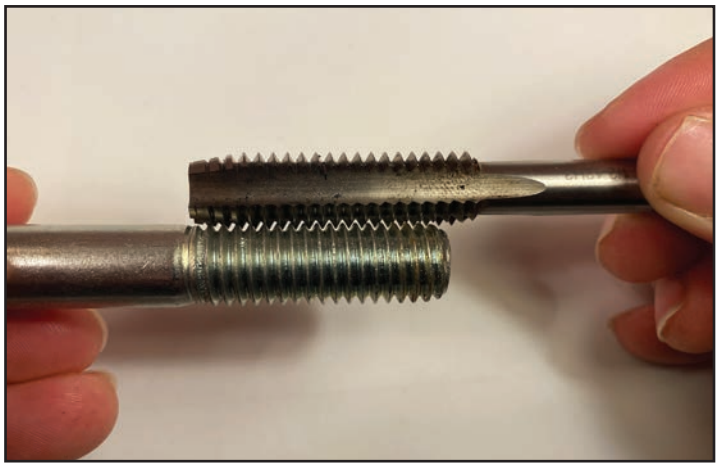


*These two original Fairmont nuts taken from brake assemblies appear the same, and require a 13/16" end wrench, but each has different thread patterns.*

by a 13/16' end wrench. These nuts appear identical yet have different thread patterns. Referring to Fairmont Bulletin 415, section 4-42 for M-19 Series E Inspection Cars, Fairmont listed the *13 TPI half nut* as Hex Half Nut 1/2", part number M2737. The *12 TPI jam nut* for the same model is listed as Jam Nut 1/2"-12 thds, part number F2702. However, modern 1/2" X 13 TPI hex half nuts are tightened with a 3/4"

*Above, a Fairmont yoke and eye bolt with original 12 TPI jam nuts, and below a NOS pivot stud with a modern 13 TPI half nut*

end wrench, rather than 13/16" wrench. These USS course thread half nuts for use on the pivot studs are readily available at most hardware stores. Rather than placing loosened nuts in a box, it is a judicious practice to reattach these nuts to the corresponding parts after disassembly as original Fairmont jam and half nuts of both thread patterns are very similar in appearance. New 12 TPI jam nuts used on Fairmont motorcars are not widely available. Unintentional cross threading of theses nuts could ruin valuable brake components. Exactly why Fairmont chose to use different 1/2" thread types on brake systems may be lost to history.



*A 1/2" USS 13 TPI "course" cap screw laid against a 12 TPI tap demonstrates the differences in the two thread types present on Fairmont brake riggings*

As built and assembled, the toggle arms could not physically separate from either the eye bolt or the yoke. However, the jam nut tightens (or jams) these components together, to reduce thread wear caused by regular compression and tension actions associated with brake application. Yoke-to-toggle arm assemblies are typically in the rear on both sides of the car and eye bolt-to-toggle arm assemblies are forward.

For older motorcars that have not been operated for a long time and have high levels of corrosion, total disassembly of brake riggings can be much more challenging. At this point, a bench vice is valuable for supporting the brake assembly. Brake hanger pins normally come out the block/brake liner assembly easily, after removal of the cotter pin. However, if warranted, I use a brass punch to remove the hanger pin to avoid damage to the pin itself. Make sure to recover the hanger pin spring as well and replace if needed. If initially unsuccessful in loosening

the jam nuts, use a steel wire brush or wheel, and moderately brush all the exposed thread areas. Apply penetrating oil and wait for a few hours, then try the end wrench again. (Everyone has their favorites, but I have not observed significant differences in penetrating oils).

If disassembly is still unsuccessful on a few parts, I usually go to torch heat (I prefer oxy-acetylene). Keep cans of penetrating oils at a safe distance when using torch heat. Using torch heat to work corroded parts loose is more art than process, and patience is required. Learning comes with experience and time. I normally heat the jam nuts to light red and then allow them to naturally cool. The heat helps to remove water and any organics, and to degrade some of the corrosion substances allowing more space between threads. Because of the expansion of steel with heat application (approximately 0.07 %/100°F and the rate increases with additional heat) followed by contraction during cooling, corrosion substrates are disturbed, realigned, and "crushed" allowing more room between the corroded components. Torch heat is also very valuable when removing cotter pins. Keep high heat away from bare threads as much as possible. After cooling is complete, try the penetrating oil and wrench again. A second and third heating may be required but eventually, even the hard cases will break free. Above all else, avoid removing jam nuts when hot. It is possible to "skid" jam nut threads if removed when too hot, ruining the nut and possibly other components. Also, some brake riggings utilize aluminum toggle links versus steel, and torch heat must be used with extra care around any aluminum part.

If the yoke and/or eye bolt are rusted tight to the toggle arm, it is good to know that the threads extend into the toggle arm for approximately 5/8" to 3/4". The outer surface of this area should be heated as appropriate. Once disassembled, I also inspect and "chase" all threads with the appropriate tap/die.

With a complete rehabilitation, I typically sandblast all steel brake components, except brake liners, blocks, and threaded areas. Immediately after sandblasting metal parts, I will brush on a coat of red oxide primer, followed later by a brush applied second coat of chosen color, and a third sprayed coat. I typically only paint exposed threads with one or two coats of light spray, so as to not gum threads. I prefer oil-based paints if available. There are many good paint protocols, but this is what I have found to be successful for long term corrosion prevention.

At this point, reassembly should be straight forward. I believe cotter pins should be replaced on every rebuild and most Fairmont motorcars utilize a standard 3/16" X 1" cotter pin. Be aware that using cotter pins longer than 1" risks unintentional shunting of rails through the braking system and wheels when brakes are applied. The final step in the process is to adjust the brakes as appropriate, tighten jam nuts against the toggle arms, and visually inspect the finished brake assemblies, making sure all cotter pins are inserted and spread as appropriate.

*A nearly complete brake rehabilitation. These brakes will not only work well and are ready to bring your ride safely to a stop, but also look great when finished.*