A common characteristic of keeping older equipment is that some parts to make repairs can be extremely difficult to locate. For example, finding a replacement for a cracked intake or exhaust manifold on a unique tractor or odd brand can be a frustrating and downright impossible mission. So, what is an alternative solution to scraping out that ‘one of a kind’ piece of history? First, decide if you are one to try a repair yourself or have someone else do it.

If you are uncomfortable about doing cast iron repairs, by all means, find a reputable local welder and machine shop to do the repair. Cast iron is more difficult to repair than simply dropping a bead on a slab of steel. It needs to be properly prepared, preheated, and the correct method used to weld it. A local welder will probably be acquainted with the correct and necessary procedures for doing a good job. If not, most machine shops will have the proper facilities for preheating and post heating the cast in order to retain its characteristic properties for its intended use. They will also be able to do any required machining to bring the piece back up to specs.

If neither of the above services are available then you can enter the realm of the die hard tinkerer and give it a shot yourself. Here are some guidelines to follow. We will stick with the general topic of manifold repairs for this paper.

Intake and exhaust manifolds are usually made out of a cast iron type of material. The four basic types are: white, gray, malleable iron, or ductile cast iron. The type of iron will depend on the application and the manufacturer of the piece to repair. Basically, white iron is a very hard and brittle material which has been cooled rapidly after casting. It is very difficult to machine and is, unfortunately, the most common type of material which will result after a home repair. Grey iron has been cooled very slowly after pouring by placing the mold in casting sand or a furnace. It is machined easily and can be maintained by preheating and post heating a piece before and after welding. Malleable iron is a factory process which gives the material a ‘layered’ treatment, the hardest of which is at the surface. It is not recommended that it be welded as it will turn the layering into white or grey iron. Brazing can be a satisfactory repair on this material. Ductile iron is a patented process developed in the late 40’s. It has a number of alloys in it which gives certain characteristics for certain applications. It can be readily welded with a nickel/iron electrode. Each type of cast iron requires a different method for welding.

Intake and exhaust manifolds are usually made out of a cast iron type of material. The four basic types are: white, gray, malleable iron, or ductile cast iron. The type of iron will depend on the application and the manufacturer of the piece to repair. Basically, white iron is a very hard and brittle material which has been cooled rapidly after casting. It is very difficult to machine and is, unfortunately, the most common type of material which will result after a home repair. Grey iron has been cooled very slowly after pouring by placing the mold in casting sand or a furnace. It is machined easily and can be maintained by preheating and post heating a piece before and after welding. Malleable iron is a factory process which gives the material a ‘layered’ treatment, the hardest of which is at the surface. It is not recommended that it be welded as it will turn the layering into white or grey iron. Brazing can be a satisfactory repair on this material. Ductile iron is a patented process developed in the late 40’s. It has a number of alloys in it which gives certain characteristics for certain applications. It can be readily welded with a nickel/iron electrode. Each type of cast iron requires a different method for welding.

Unfortunately, it is difficult to determine which type of material is in your particular manifold without having an intimate knowledge of the testing procedures. These include a grinding method which identifies the types of sparks a grinding wheel gives off when in contact with the various materials, a ring test which helps tell the material by the ringing vibrations it gives when struck with a hammer, a chemical test, fracture test, etc. Because it is
important to identify the material type before a repair is attempted, and since experience is the only real way of knowing how to interpret the tests, we will, therefore, examine some creative approaches for manifold repairs without necessarily determining the type of material we are working with.

One way to repair a cast iron manifold is to braze it. Brazing is the process of melting a nonferrous material with a lower melting point onto a base material with a higher melting point. The brazing temperature is, generally, at or above 800 degrees F. In this case a brass rod will be melted into a prepared groove on the manifold crack. It is important to properly prepare the surface to be brazed. Locate the crack in the manifold and grind a groove along its length with a grinder. Extend the groove a half inch or so beyond the crack that you can see. Then take a coarse file and file the grinder marks off of the groove. You do this because the grinder tends to smear the graphite particles over the grains of iron and results in lower adhesion of the brazing material. Select a brass rod, usually one that is high in copper content with some nickel added. The nickel has adhering properties which provide for a stronger braze. Also select a torch tip which has a high heat output with low gas pressure. It is good to preheat the material to be welded in a furnace so it won’t crack under isolated heat stress. Use a special flux for cast iron brazing and when the bead is completed cool the piece slowly in a bed of casting sand. Brazing can, generally, be used on the various types of cast iron with the least amount of risk.

Another type of repair on cast iron is to weld it. Arc welding can be tricky because, as mentioned previously, certain types of cast require different procedures. But, in a pinch, a gambling repair with good odds can be accomplished using good welding techniques. Prepare the item to be welded as previously mentioned. Use of a high content nickel/cast rod or a nickel/cadmium rod with a cast iron friendly flux should be used. The thickness of the material to be welded will determine the heat setting and speed of the bead layment. Try to preheat the manifold to cherry red in a furnace. If a furnace is unavailable try to heat as much of the damaged section and surrounding area with a torch. Strike an arc and weld the crack up. If preheating is not practical strike an arc and weld only an inch or so, stop and let the item set so as to absorb and spread out the heat, then repeat. A long bead on a cold piece will probably warp and cause a sudden stress crack elsewhere on the item resulting in a worse condition than when you started. In welding cast iron it is important not to get in a hurry. If possible, slowly cool the welded material in a furnace or bed of sand as this will give less chance in creating the hard, brittle, and unpreferable white iron.

One last option to consider when dealing with manifolds is to prepare and use an epoxy compound as repair. If it is in a relatively cool area of the engine, and is not a stress area like a bolt flange, then an application of epoxy on a filed groove, such as an intake manifold, can eliminate air leakage into the motor and clear up an irritating miss. Making sure the area is free of loose paint, grease and grit is important when working with chemical solutions.

On rare occasions you run into a manifold that can only be deemed unrepairable. Many older tractors that have been stored outside have had the manifolds, especially the exhaust manifold, simply rot away. The material has been severely pitted, extensively rusted, and is too thin to weld or braze. If no replacement can be procurred it presents a rather difficult problem to deal with. One idea would be to locate a small foundry which does small-time work for larger companies. If the original piece still has some integrity to it, the foundry could remold it and pour it fresh. The rough piece would then be taken to a machine shop for final milling and finishing.
All in all, home repairs for manifolds are not preferrable, but by following certain preparation and careful brazing/welding techniques satisfactory repairs can be done.

**Fast Shipping!** Most of our stocked parts ship within 24 hours (M-Th). Expedited shipping available, just call! Most prices for parts and manuals are below our competitors. Compare our super low shipping rates! We have the parts you need to repair your tractor. We are a company you can trust and have generous return policies. **Shop Online Today** or call our friendly sales staff toll free (800) 853-2651. [About Us]

Copyright © 1997-2016 Yesterday's Tractor Co.

All Rights Reserved. Reproduction of any part of this website, including design and content, without written permission is strictly prohibited. Trade Marks and Trade Names contained and used in this Website are those of others, and are used in this Website in a descriptive sense to refer to the products of others. Use of this Web site constitutes acceptance of our User Agreement and Privacy Policy.

**TRADEMARK DISCLAIMER:** Tradenames and Trademarks referred to within Yesterday's Tractor Co. products and within the Yesterday's Tractor Co. websites are the property of their respective trademark holders. None of these trademark holders are affiliated with Yesterday’s Tractor Co., our products, or our website nor are we sponsored by them. John Deere and its logos are the registered trademarks of the John Deere Corporation. Agco, Agco Allis, White, Massey Ferguson and their logos are the registered trademarks of AGCO Corporation. Case, Case-IH, Farmall, International Harvester, New Holland and their logos are registered trademarks of CNH Global N.V.

Yesterday's Tractors - Antique Tractor Headquarters