Many people may be unaware that their home could have a permanent wood foundation because foundations have traditionally been composed of concrete. More and more houses are being constructed with a wood foundation rather than a concrete. Why? This article will explore some possible reasons why wood is used instead of concrete as a type of foundation. I will provide some information as to some benefits and advantages that this particular foundation provides, and also point out some concerns.

As with anything else, superiority is subjective and a matter of one’s own opinion. Foundations are no exception to this rule. Many believe that the only acceptable type of foundation is that which is constructed of concrete. There are always people who tend to be creatures of habit and may view the only type of good foundation as a concrete one. Others may be interested in using wood as an alternative form of foundation. It does not really matter which category you happen to fall under, but here is some information that will hopefully provide you with some insight.

Wood foundation systems were originally developed in the 1960’s after plywood and preservative-treated lumber allowed wood materials to be used in applications in which they were previously subject to decay. Pressure treated wood has been used exclusively for residential purposes such as playground equipment, decks, outdoor furniture, trellises and retaining walls. Industrial applications include railroad ties, utility poles and bridge members. There are numerous chemicals used as a wood preservative for lumber, but the most widely used for residential purposes is chromated copper arsenate or CCA, which makes up over 90% of the market. Southern pine is the predominant wood
type treated with CCA. In February 2002 the EPA announced the voluntary decision by the three manufacturers of CCA to discontinue production of the arsenic-containing treated wood for residential purposes by the end of 2003. After this date, the EPA will not permit the production of CCA products. The current cost of treated wood with alternative pesticides is estimated to be nearly 10 to 20 percent more expensive than CCA-treated wood. Results of scientific studies that have been published suggest that over time, arsenic leaches. However, this leaching varies considerably depending on such factors as climate, age of the wood product, rain and soil acidity, and the amount of CCA that was applied. According to the information from the Environmental Protection Agency, “they have not concluded that CCA-treated wood poses unreasonable risks to the public for existing CCA-treated wood being used around or near their homes or from wood that remains available in stores. The EPA does not believe there is any reason to remove or replace CCA-treated structures, including decks or playground equipment. The EPA is not recommending that existing structures or surrounding soils be removed or replaced” (EPA Article February 12, 2002).

### Alternative Preservatives

<table>
<thead>
<tr>
<th>Preservative Name</th>
<th>Abbreviation</th>
<th>Distributing Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammoniacal Copper Quat</td>
<td>ACQ-Types A, B, and C</td>
<td>Chemical Specialties, Inc.</td>
</tr>
<tr>
<td>Amine Copper Quat</td>
<td>ACQ-D</td>
<td>NatureWood by Osmose</td>
</tr>
<tr>
<td>Copper Azole-Type A</td>
<td>CBA-A</td>
<td>Wolmanized Natural Select by Arch Wood Protection (formerly Hickson)</td>
</tr>
<tr>
<td>Borate Oxide</td>
<td>SBX</td>
<td>AdvanceGuard lumber by Osmose and SmartGuard products from Louisiana Pacific Corporation</td>
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The above chart lists other chemicals used in the treatment of wood other than CCA. The identification of treated wood is extremely difficult for the lay person. If wood has a green discoloration, that does not necessarily mean that CCA or other arsenical preservatives were used. The green color suggests the presence of copper, which is contained in many other preservatives. Some manufacturers have produced non-green,
CCA-treated products in hoping to appeal to the buyers that dislike the green color. Over time, all wood, treated or untreated, will weather to a gray hue due to water and sun effects. Therefore, color is not a reliable tool for identification. If the wood is treated, there is a good chance that it was treated with CCA. Lumber is often marked with a stamp that is indicative of the standards under which the lumber was treated. These stamps, however, may not always be present and can fade or may become obscured over time.

Manufacturers and related associations that produce preservative-produced lumber have developed guidelines and procedures for constructing wood foundations. Due to the fact that wood foundations are much lighter than block walls or concrete, they may be placed on gravel beds, eliminating the need to cast a concrete footing. A concrete slab may form the floor within the foundation, but many manufacturers promote the use of a treated wood floor, which eliminates the use of any concrete work altogether. By doing this, construction can proceed through any weather and work with the same crew that will do the rest of the framing. The wood foundation or “Permanent Wood Foundation”, is a foundation that is constructed of pressure-treated 2x6 or 2x8 wood studs and pressure-treated plywood. The wood preservative used to treat the wood is similar to that used for a deck, but has a much higher

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**Foundation Composition includes:**
- 2x6 or 2x8 wood studs
- Pressure-treated plywood
- Stainless steel or other corrosion resistant fasteners
- A concrete or wood floor
- A gravel bed
The preservative used in combination with proper exterior drainage and waterproofing prevents fungal decay. There is currently not enough experience with these foundations to know if they will eventually suffer from decay, but many manufacturers offer a 75 to 100 year warranty. These types of foundations vary in cost and they may be more or less expensive than a conventional concrete foundation. Following excavation, a base layer of coarse sand, gravel, or crushed stone is placed and leveled out. Panelized foundation sections can now be set in place or the foundation site can be framed for conventional wood walls. Fasteners must be stainless steel or some other corrosion resistant material. Typical material dimensions include 2x8 studs on 16” centers, covered with 1/2” or 5/8” treated plywood. Exterior plywood surfaces are covered with a minimum of 6 mil polyethylene before back filling.

Many builders and home buyers across the country are beginning to choose a Permanent Wood Foundation over a conventional concrete foundation. The Permanent Wood Foundation was developed in the hopes of eliminating problems that had arisen through the years with the use of concrete foundations, such as cracking and moisture retention, just to mention a few. To construct a wood foundation, manufacturers estimate costs to be approximately $45 per foot of 8’ wall, which includes foundation coating, a 6 mil. Poly vapor barrier, and hardware. A benefit of wood foundations is that it has a complete drainage system that ensures that the basement area is warm, dry, and odor free. This foundation type also allows for smaller construction crews and fewer on-site labor hours, which means lower construction costs thanks to the time saved. Finishing costs also tend to be lower because the wall studding is
already in place, which eliminates the need to construct a separate wall inside the foundation to accept the insulation. The installation of plumbing, wiring, insulation, and ductwork are all simplified and employ the same techniques used for other framed wall systems. Nearly 37 percent of heat loss that occurs from a house is lost from the basement. Wood’s low thermal conductivity along with thick batting insulation is excellent for below-grade applications. Wood foundations also allow the choice for a number of different heating systems that provide an even heat throughout the lower floor and a reduction in the common drafts found in a conventional concrete basement. Permanent Wood Foundations allow more actual living space in basements than houses that have a concrete foundation. Basements are larger because the interior frame wall that is required in concrete foundations is eliminated. For a house of average size, there could be more than 100 square feet of extra basement area. Renovations are easily accomplished because wood foundations can be altered or expanded with little difficulty. Another advantage of Permanent Wood Foundations is that they are designed to absorb and distribute wind, earth, stresses and seismic loads that would frequently split and crack other foundation types. Wood foundations are extremely resistant to damage from cold weather, and cracking that occurs from soil settlements is largely reduced.

The pressure treating process causes the preservative chemicals to become permanently locked into the cellular structure of the wood. The chemicals actually form a bond with the cellulose in the wood, a process known as “fixation”, which eliminates the food source upon which wood destroying organisms (such as termites) thrive. As a result of this process, treated wood products exhibit little or no out-gassing and should not leak out into the soil surrounding them. Modern chemicals that are used to treat the wood products are water-born solutions that leaves wood clean, non-oily, nontoxic and completely harmless to animals, plants and most importantly, humans.
Here is a checklist that includes key items to look for when a wood foundation is involved:
- Grade, sizing, and spacing of wood framing members, grade and thickness of sheathing materials (typical basement walls are 2x6 or 2x8 studs at 16” or 12” on the center, and the plywood is typically 5/8” in thickness).
- The treater’s stamp indicates proper preservative treatment of the wood products.
- Corrosion-resistant fasteners should be used.
- Proper drainage, back fill and an exterior polyethylene water barrier should also be employed.
- The floor slab should be poured against the bottom plate of the wall.
- The walls should be properly fastened to the floor system.
- Note any signs of excessive bowing or cracking of studs or movement of the top wall.
- Pay attention to any signs of water entry.

Based on the research, a properly constructed wood foundation should be as good, if not better, than a traditional concrete foundation. So why do we not see more construction of wood foundations in the Midwest? To answer this question, I have contacted several experts in the local real estate market and conducted interviews. Most experts indicated that even though a wood foundation may be as good as a concrete foundation, they are new. Most people have the notion that all wood rots and this could potentially lead to this type of foundation may not ever be widely accepted. However, most indicated that as more homes are built with these foundations and home owners begin to realize the advantages, over time, they may become as prevalent as the concrete foundations. However, the Midwest is typically behind other areas of the country in the acceptance of new products, indicating that acceptance may be some years off.

Most valuation experts, such as real estate appraisers, indicate that although adjustments can not be proven due to a lack of sales of these types of homes, negative adjustments to value are warranted. However, the amount of the adjustment varies based on who is questioned. The typical answer is an adjustment within the range of 1% to 10% of the value of the home is warranted, and this varies based on the quality of construction of the home. The primary answer for why this adjustment would be applied is that there is a general lack of market acceptance of wood foundations. However, over time,
most believe that if wood foundations become more prevalent and are as good as manufactures say, the reduction in value could be reduced.

So, what is the final consensus on permanent wood foundations? It appears as though that is really a matter of personal preference. For some people, it could be a viable alternative to the conventional concrete foundation. Others may stick with the notion that the foundation of a house should be constructed of concrete, utilizing the beliefs that “all wood rots” or “wood foundations are not as structurally sound”. Real estate experts in the Midwest, along with most home owners, are not sold on the concept of a wood foundation. Across the board, the greatest impression is that a variance in value exists between wood and concrete foundations with the typical concrete foundation having a higher value. The main reason for this variance is that the typical buyer in the marketplace does not believe that a wood foundation is as good as a concrete foundation. Most believe that a wood foundation is not as structurally sound and will not last nearly as long as a concrete foundation.

Whether buying or building a house, you now have some information to consider when a wood foundation is involved. For additional information on wood foundations feel free to contact our office.

The information analyzed within this article was obtained from [http://www.epa.gov](http://www.epa.gov), [http://www.toolbase.org](http://www.toolbase.org), [http://www.muextension.missouri.edu](http://www.muextension.missouri.edu) and [http://www.woodfoundations.com](http://www.woodfoundations.com). Opinions expressed are based on observations and analyses conducted by the author and interviews conducted with real estate experts.