



SCHAEFER NEWS

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ELECTRICAL HAZARDS FROM ALUMINUM WIRE AND FEDERAL PACIFIC BREAKERS

From time to time we notice that there is confusion regarding how to deal with certain safety issues that may be found during the course of a home inspection. The reason for this confusion is simple. There often is not a specific right or wrong answer to resolve some of these issues. Therefore, you may have a solution offered by one home inspector, a different one by another home inspector, one by a trades person in that given field and other solutions offered by Realtors who have had to address this problem in the past and may be passing on as "the right solution," a method represented to them as acceptable. In this newsletter we will address two such issues: Aluminum wire and Federal Pacific Stab-Lok breakers.

SINGLE STRAND ALUMINUM WIRE:

The State of Connecticut's Standards of Practice governing home inspections requires the following regarding aluminum wire: "The inspector shall report on the presence of solid aluminum branch circuit wiring." It should be clear that it specifically states "solid aluminum wire." Multi-strand aluminum wire is still used and is acceptable in current building practices. Solid aluminum wire was used during part of the 1960's and 1970's but has since been prohibited due to safety issues. Heat caused by electrical current effects aluminum wire more significantly than copper wire. Aluminum wire will expand more, creating the potential for loosening connections at the breaker and at the fixture, outlets or switches they are be connected to. Periodic checking and anti-oxidant paste at the breaker panel can maintain acceptable connections in the panel. The larger problem exists at the connections found at the wire's destination. At the time of installation, aluminum wire was simply connected to fixtures, outlets and switches that were not designed for aluminum wire. At best, a small length of copper wire was spliced to the aluminum wire with a wire nut, allowing the copper wire to make the connection to the fixture. The problem with this is the wire nut may not have been designed to be used as a connector of aluminum and copper wire.

WHAT'S THE SOLUTION?

FURTHER CONSULTATION BEYOND YOUR HOME INSPECTOR. This brings us back to the to the place where there may not be a specific "right" answer. First we should begin with the home inspector. We believe that once the solid aluminum wire is observed and reported, the recommendation of the home inspector should be to consult with at least one or more qualified electricians, experienced with repairs to aluminum wire connections. Discuss with him the various methods of repair and the level of safety each method may offer. A call to the local electrical code enforcement officer may also shed light on what may be recommended or even required by local authorities.

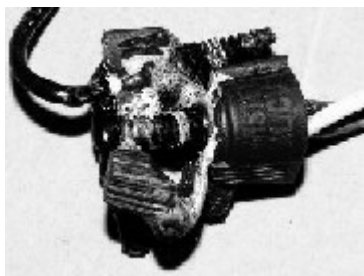
SOME OF THE REPAIR METHODS AND WHAT WE KNOW

COPALUM CRIMP

The U.S. Consumer Product Safety Commission recommends only one method for correcting aluminum wire connections: A specially designed crimping connector called COPALUM. However, the U.S. Consumer Product Safety Commission does not have legal jurisdiction to mandate the exclusive use of this method. While the CPSC only recommends this method, the following information should be noted. This is likely to be the most expensive method of repairing aluminum wire connections. It is made by only one company and not all electricians are qualified to use it. There is a special crimping tool needed for these crimps, which can only be obtained by renting it from the copalum manufacturer. They will only rent them to electricians who have been certified by taking their course in proper installation of these crimps. These restrictions greatly reduce the pool of electricians who can provide this repair method and in some areas may eliminate it.



WIRE NUTS



There are many wire nuts; not all are designed for aluminum wire connections. "IDEAL" manufactures a wire nut that is UL listed for aluminum wire connections. This method is most likely what the majority of electricians will recommend because any electrician is

qualified to use it. These wire nuts are UL listed and make the installation cost more practical for most home owners. Even though it is UL listed the CPSC still does not recommend its use because they feel it has a higher rate of failure than the copalum crimp (see photo). Nothing is perfect, every thing has the potential to fail and we have talked with electricians that feel these wire nuts are a satisfactory answer to this issue. A UL listing cannot be obtained without the product showing, under test conditions, that it will perform adequately.

OUTLETS AND SWITCHES MADE FOR ALUMINUM WIRE

There are also outlets and switches that are UL listed according to manufacturers for direct connection of aluminum wire. These switches and outlets will be marked CU AL or CO/ALR; however, electricians have reported to us that these are becoming harder to obtain. These, however; will not help in repairing the connections any other type of electrical fixtures or appliances where aluminum wire is involved.

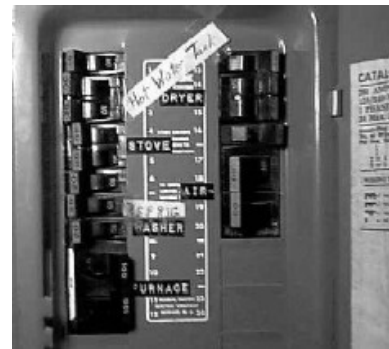
FEDERAL PACIFIC STAB-LOK BREAKERS

The mounting information against the Federal Pacific Stab-Lok breakers (and their panels) has mounted over the years and the answer to what to do with them is more clearly becoming "replace them." There is still however, some lingering perceptions to the contrary and thus some confusion may exist depending on who you ask. These breakers and panels were UL listed when manufactured, therefore, many presume they are safe. We have asked local electrical code enforcement officers of their opinion of the safety issues related to these breakers and found that some of them are not familiar with the problems related to these breakers. One town inspector told us he had them in his house and had heard of no safety problems.

The problem with these breakers is a latent one. They do not pose a hazard by themselves when all conditions in the electrical system are good. In other words, you will never know you have a problem unless you have a condition that creates an overcurrent that demands the breaker to trip. This may or may not ever happen. However, in most homes, overcurrents do happen at some point and you want to know your breakers will provide the protection they are designed for. The U.S. Consumer Product Safety Commission has done testing on these breakers, particularly the two pole breakers using the UL standards.

They have found that many of the two-pole Stab-Lok breakers may jam when trying to trip from overcurrent on one pole. This type of failure occurred in about 10% of the two-pole breakers. There are other problems associated with one pole breakers and the breaker panels themselves. However, these are too lengthy to elaborate in this newsletter. You may wish to visit <http://www.inspect-ny.com/fpe/fpestlouis.htm> that details information from a 2004 ASHI seminar in St. Louis.

We believe on this issue, when these breakers are found in a home, the home inspector should recommend additional consultation and evaluation of the panel and breakers by an electrician who is familiar with this issue and who has studied the available test data.



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