

Knob-and-Tube Wiring

By Ken Greene of Hudson-Mohawk Inspections, LLC

Knob-and-tube (K&T) wiring was one of the earliest standardized methods of electrical wiring in buildings. It was commonly used in home from the 1880's till the early 40's. This type of wiring, while still in use in a large number of older homes, is considered obsolete and can become a safety and fire hazard depending on the situations present.

How Knob-and-Tube Wiring Works:

K&T wiring consists of copper conductors passing through the house framing via insulating tubes inserted into the drilled holes. Porcelain knobs are used to support the wire along its length while it is run parallel to the house framing. A loom of cloth or rubber is used to insulate the wire whenever it entered a wall or connected to a switch or device such as an outlet.



Facts about Knob-and-Tube Wiring:

- In its original installed state it is not inherently dangerous.
- The dangers from this system arise from its age, improper modifications.
- K&T is an air insulated system and becomes a fire hazard when it is buried in house insulation.
- K&T is an ungrounded system and therefore cannot be used with modern equipment that requires a ground.

Advantages of Knob-and-Tube Wiring:

- Because K&T wiring is air insulated, it has a higher ampacity than wiring systems of the same gauge.
- K&T wires are less likely than Romex cables to be punctured by nails because K&T wires are held away from the framing.
- The porcelain components have an almost unlimited lifespan.

Problems Associated with K&T Wiring:

- Because K&T wiring has been in use for so long there is more opportunity for it to have been improperly modified by amateurs and therefore made unsafe.
- In older systems, wiring is insulated with varnish and fiber materials that are susceptible to deterioration.
- The insulation used on the wire itself is a fire hazard because of its makeup.
- It lacks a grounding conductor. Grounding conductors reduce the chance of electrical fire and damage to sensitive equipment.

Modifications:

When K&T wiring was first introduced, toasters, tea kettles, coffee percolators and clothes irons were about all there was for household electrical appliances. During the late 18th century a time during which electricity too many was seen as a passing fad, the electrical requirements of mid- to late-20th century homes could not have been foreseen. Existing K&T systems are notorious for modifications made in an attempt to match the increasing amperage loads required by televisions, refrigerators, and all sorts of other electric appliances. Many of these attempts were made by poorly trained handymen, rather than experienced electricians, this work made the wiring system vulnerable to overloading.



- Many homeowners installed higher amp rated fuses to try to overcome the inadequate amperage of K&T wiring. This caused the wires to be damaged by the extra heat created by the higher amp load.
- It was not uncommon for inspectors to find connections wrapped with masking tape or Scotch tape instead of electrical tape.

K&T Wiring and Insurance:

Many insurance companies refuse to insure houses that have knob-and-tube wiring due to the risk of fire. Exceptions are sometimes made for houses where an electrical contractor has deemed the system to be safe.

Advice for those with K&T Wiring:

- Have the system evaluated by a qualified electrician. Only an expert can confirm that the system was installed and modified correctly.
- Do not run an excessive amount of appliances in the home, as this can cause a fire.
- Replace any K&T wiring that is brittle or cracked. Proper maintenance is crucial.
- Any location that a ground is required, such as kitchens bathrooms or outdoors, K&T wiring should be replaced. Wiring must be grounded in order to be used safely in these locations.
- Rewiring a house can take weeks and cost thousands of dollars, but unsafe wiring can cause fires, complicate estate transactions, and make insurers skittish.
- The homeowner or an electrician should carefully remove any insulation that is found surrounding K&T wires.
- It is recommended that prospective home buyers should get an estimate of the cost of replacing K&T wiring. They can use this amount to negotiate a cheaper price for the house.



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