



AGRICULTURAL ENGINEERING NEWS LETTER

AGRICULTURAL EXTENSION DIVISION
UNIVERSITY OF MINNESOTA

UNIVERSITY FARM, ST. PAUL—JULY 15, 1936—No. 52

MATERIALS TO BE USED IN FARMSTEAD WIRING

J. ROMNESS

Since Minnesota has no wiring code or requirements, the standards for wiring of farm homes are left largely to local electrical contractors. Some insurance companies require that certain regulations be adhered to and most of the larger power companies insist that the wiring be done according to their specifications. In general, however, the wiring of rural buildings receives negligible supervision as compared with that given in the large cities.

In order to safeguard himself, therefore, the farmer who intends to install electric service should familiarize himself with the approved materials and methods used to obtain an adequate wiring job.

"The National Electrical Code" upon which most local codes are based was first drawn up in 1897 through the cooperation of the various interested groups such as fire underwriters, electrical contractors, architects, and others. Since the original draft, the code has been modified several times, the latest edition becoming effective November 1, 1935. This code contains the regulations of the National Board of Fire Underwriters which is an organization of stock fire insurance companies. Anyone planning a wiring job should familiarize himself with the code and insist that all wiring conform with its recommendations. A copy of the code may be obtained from the National Board of Fire Underwriters, 222 West Adams Street, Chicago, Illinois.

Since the wiring of a farmstead involves the equipping of several buildings it is essential that wiring be done at the lowest possible cost and at the same time that adequate service be assured.

Knob and Tube Wiring. Wiring of this type, often called open wiring, consists of rubber covered wires supported on porcelain insulators or run through porcelain tubes. Practically all the wiring done a few years ago was of this kind. It is approved by the code but prohibited in many of the larger cities. The objection to it in localities where it is not permitted is apparently due to the influence of electrical contractors and others because of the lower material and labor profits.

Knob and tube wiring does not offer the mechanical protection of rigid or flexible metallic conduit, but offers far



Service Entrance Switch in Granary

(Note how the ground wire has been protected by enclosing in rigid conduit.)

greater protection against electrical shock in damp locations such as barns, milk houses, and hog houses. In new homes under construction and in barns where the wiring is not to be concealed this is the least expensive type to install.

Rigid Metallic Conduit Wiring. Rigid conduit is a steel pipe having a smooth interior and especially made for electrical wiring. The conduit is first set in place and rubber covered wires are then drawn into it. This type of wiring offers excellent protection against mechanical injury and should be used wherever the wiring is subject to mechanical strain. For example, the wiring in the haymow of a barn should be in rigid conduit. The accompanying picture shows how conduit prevented the ground wire of the metering cabinet from being broken when a piece of machinery backed against the building breaking the siding.

Rigid conduit should not be used in barns where the moisture content is excessive, because of the possibility of condensation inside of the pipe resulting in a very serious shock hazard. It is by far the most expensive wiring to install.

Flexible Metallic Conduit (generally referred to as BX) offers good mechanical protection to the wiring and is much easier to install in old buildings than either knob and tube or rigid conduit. The cost of the material is somewhat higher than knob and tube, but the labor cost for wiring old buildings where the wires must be fished through is considerably less. It provides very good protection for the wires and it is very satisfactory in dry locations. It should not be used in barns for the same reasons that rigid conduit should not be used there. Flexible metallic conduit which was installed in a hog house about 6 years ago was found to be badly corroded and in very poor condition, whereas in another hog house the knob and tube wiring with non-corroding switches was found to be in excellent condition after 18 years of service.

Flexible Non-metallic Cable which is sold under various trade names such as Romex, Braidex, Laytex, etc., makes a satisfactory material to use in any place on the farm. It is somewhat easier to apply than knob and tube since it is fastened directly to the studs or walls or run through a wall by boring holes just large enough to take the wire. Since all connections with this wire, as with flexible and rigid conduit, must be made in outlet boxes the weakness of the wiring in the past has been that the boxes available have all been subjected to corrosion when used in damp places. Recently a new type of porcelain outlet box has been placed on the market which when used with non-rusting switches and receptacles makes possible a practically shock proof and corrosion proof wiring job. The designing of the new type of box is the result of the research of two electrical engineers at the University of Wisconsin. According to data obtained by the designer the cost of wiring with non-metallic cable and porcelain boxes is about the same as for BX and possibly 15 per cent higher than for knob and tube.

In planning the wiring for a farmstead one should carefully select the material most suitable for each particular location, keeping in mind that a good wiring job should be safe, economical, and durable.