

CABLE SHEATHING *

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I am glad to have this opportunity to discuss problems in connection with use of lead. The Cable Industry uses about 11% of the total lead used in this country. This includes the lead used for both power and telephone cables and while the requirements for sheaths for different insulations or installations vary, most of the requirements are common to all cables.

The only reason for using lead is to obtain a moisture impervious sheath. If any other material were available which was impervious to moisture and could be applied to cables, the use of lead would be drastically reduced. The many shortcomings of lead justify extensive research to find a suitable substitute. Price is also an important factor in that the higher the price of lead, the more money can justifiably be spent to develop a substitute.

Two years ago Mr. R. K. Spofford told you of our efforts to reduce the use of lead by a 1/3 reduction in wall thickness with a protective covering to prevent damage. Last year Mr. Stover of Western Electric discussed their alternate sheath construction used for certain types of telephone cables to reduce the amount of lead. This was a different type cable but again resulted in some 1/3 reduction in lead used and might easily be extended.

This saving in lead may be desirable during periods of shortages, but in the long run will certainly hurt the lead producers. A reduction in the price of lead will not automatically regain this lead market for, if this time ever comes, prices on the substitute materials will also probably drop. Also the substitute may have advantages which our customers like and they will not return to lead purely on a price basis.

What are the lead producers doing to increase the use of lead in the cable industry? In the wire and cable industry we are always looking for ways in which we can increase the use of insulated cable. During the past few years we developed a type of aerial cable which could be tapped hot so it would be practical to use cable in place of many open wire lines at distribution voltages. This was desired by the users but they did not have the knowledge or equipment to develop such a cable. We saw the possibility of the greater use of cable if it could be developed and spent considerable time and money on its development.

We also developed a high voltage pipe type cable system to replace open wire circuits at transmission voltages. There had previously been the choice of an expensive conventional cable system or the cheap open wire. This new system reduced the cost of underground transmission and resulted in increased use of insulated cable. These two developments did not merely substitute the use of a new kind of insulated cable for an existing type but actually extended the use of insulated cable.

This type of development is being carried out in many industries as a necessary part of their business. It is essential if their position is to be maintained against competitors in their own and related fields.

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I feel that the lead producers could hold their position in the cable field by actively seeking ways to increase the use of lead in the cable industry.

The major weakness in lead sheaths is due to impurities in lead as extruded onto a cable. All cable manufacturers are working on this problem. Methods are available for reducing trouble but not eliminating it. If the lead producers considered this their problem and worked with the manufacturers of lead press equipment, perhaps an earlier solution would be obtained. Lead press equipment has not changed appreciably since the start of the cable industry. The intermittent slug method is slow, troublesome, and subject to many defects. A continuous press is, of course the answer but its development has been slow. Interest by the lead producers might well take pressure off the search of substitutes and keep the market for lead in this field.

Even if properly and easily applied, lead has some shortcomings particularly for paper insulated power cables. It is soft and creeps under steady pressure and is subject to fatigue cracking. Efforts by cable manufacturers and cable users are being made to find suitable alloys to overcome these difficulties. An extensive series of studies have been carried out by the University of Illinois under sponsorship of the Utilities Research Commission. This was largely testing of samples supplied by utilities and cable manufacturers from cable sheaths. The active participation of the lead producers would be helpful in connection with this problem.

There are two types of material which can be substituted for lead sheaths. A metal sheath has the required moisture resistance if it can be applied and handled. Aluminum is the most promising and is now in regular production abroad. The aluminum producers, particularly The Aluminum Company of America, are most interested and have done a large amount of work in development of processes for applying aluminum to cables. They apparently feel that this development will increase the use of aluminum and so are very much interested.

A non-metallic sheath, of which polyethylene is the most promising from a moisture standpoint, is being studied. The producers of possible materials are very much interested in these developments and are most cooperative. Many non-metallic sheaths are now being used to replace lead on rubber insulated cables and may soon be used on paper cables. While in some cases this is because of the desirable characteristics of the non-metallic sheaths, in many cases it is because of cost or shortcomings of lead.

It is my opinion that the use of lead for cable sheaths is falling off because of shortcomings in the processing rather than fundamental shortcomings of the material. Increased interest of the lead industry in helping develop better methods of handling and alloying lead could overcome these disadvantages. Not long ago lead was the only material considered suitable for a cable sheath. That condition no longer exists and unless the producers show a greater interest in technical development of lead sheaths, the use of lead for cable sheaths is due for a steady decline irrespective of the price or supply.