Cable Lore

ANACONDA

BY POWER CABLE ENGINEERING AND RESEARCH

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"QUALITY"

The word quality denotes a peculiar and essential character. It signifies a degree of excellence. When quality is ascribed to a cable it is inferred that it has characteristics, attributes, properties, features or distinctiveness that qualifies it to be graded higher than similar cables with less distinguished credits.

When the word quality is used too lightly, loosely or without substantiation, it loses its impact. It then becomes a cliche crutch or catchword without substance. It could reflect lack of knowledge or incompetence on the part of the communicator. Overuse and misuse of the word quality in describing products has diluted and jaded its meaning to a point where a new approach is required to described a cable of outstanding merit.

A cable design lives up to its expectations when it provides reliability and safety over an expected or reasonable lifetime. This could vary from a few months in the hostile environment of a shuttle car cable application in a coal mine to several decades for a power cable in a less demanding environment.

In comparing several cables, the best one is the cable that offers the highest probability of survival with safety in a given application or environment. During service a cable will be exposed to at least three and sometimes all four of the following environments.

1. Electrical
2. Thermal
3. Mechanical
4. Chemical

These environments react simultaneously to deteriorate cable components. It is essential that a cable with a high probability of survival in service must have properties, attributes and features that will offer maximum resistance to the deteriorating effects of its total environment.

The prime purpose of laboratory evaluation of cable prototypes is to accelerate and measure the effect of various environments on a specific cable design and materials and to predict or extrapolate its probability of survival in these environments. The more nearly the test or tests simulates actual application conditions the more accurate the judgement or prediction.

To choose a cable design and materials with a high probability of survival requries two basic sets of information:

1. An accurate assessment of the total environment to which a cable will be exposed during its service life.

2. Intimate knowledge of the properties, attributes, features or distinctiveness of a particular cable to make certain that a credible matchup is made with the environment.

The mere mention of the word "Quality Cable" to satisfy the above information invites a rebuttal of "Compared to What." The following suggest a method for making a cable choice.

1. Weigh the consequences of cable failure?
   Cable failures that shut down processing facilities, manufacturing plants, stripping shovels or critical equipment can run into many thousands of dollars per hour. Losses may exceed the original cable investment many times over.

2. Recognize that each property of a cable contributes to its survival in actual operation.
   Two or three outstanding properties cannot compensate for an inherent weakness in less spectacular properties. The "weakest link in the chain" concept will prevail. Overall cable performance will only be as good as the total environmental resistance of all its parts.

3. Delineate the balance of cable properties required to insure a high probability of survival and safety.
   As previously mentioned, cables will be exposed to three or all four of the following environments: (1) Electrical (2) Thermal (3) Mechanical (4) Chemical.

   In any given application one particular environment might override the others to some degree. A trailing cable on a 100-yd. dragline, for example, will require primary emphasis on the mechanical environment. A power cable of the same voltage in a direct burial application will require emphasis on the electrical-chemical environment. Both cables, however, require a balanced set of properties that insure survival upon exposure to all environments.

4. Relate how each property makes a contribution and substantiate by actual performance data.

ENVIRONMENTS AND RELATED CABLE PROPERTIES

Electrical	Thermal	Chemical	Mechanical
S.I.C.	Heat Aging	Moisture Resistance	Conductor Fatigue
P.F.	Hot Modulus	Oil Resistance	Flexibility
I.R.	Deformation	Resistance to Organic Chemicals	Cut resistance
Dielectric Strength	Shrink Back		Abrasion Resistance
Impulse Strength	Expansion	Resistance to Inorganic Bases And Acids	Tear Resistance
Shielding System	Conducting layer Stability		Bending Diameter
Fault Capability			Tensile Strength
Conducting Layer Resistance	Cold Bend	Fumes and Industrial Atmosphere Ozone resistance	
Corona Levels	Emergency Rating		
Treeing Resistance	Normal Rating	Radiation	
Cyclic Loading	Short Circuit Rating		

5. Make a decision on the best cable for the application based on maximum probability of survival, safety and economy.

Steve Bunish
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