

OHIO BRASS MANAGEMENT REPORT

The big question: "how much?" not "how little?"

BY ROGER A. BLACK
PRESIDENT, OHIO BRASS COMPANY



Certainly, no threat is intended or implied, but in recent weeks we have heard manufacturers of electrical equipment make such statements as: "How can we continue to spend large sums on research and development when our competitor spends less and gets the same price for his product?"

ELECTRIC UTILITIES make parallel comments such as: "We know you do more research and development but what are we supposed to do when your competitor offers a similar product at a lower price?" Let's examine the Ohio Brass attitudes toward these two questions. First question. Despite what the competition is doing, Ohio Brass will continue to spend as much on research and development as our products need, and that, in special circumstances, our customers request as necessary to their planning.

WE ASSUME THAT THE VALUE of these efforts will be recognized in the market place, maybe not today but ultimately. This brings us to the answer for the second question: It is our obligation to communicate to customers the product differences that have developed from research and development.

LET'S LOOK AT AN EXAMPLE. What could be more ordinary than a suspension insulator? Yet there are subtle differences in suspension insulator design that can be tremendous assets on lines where vibration or corrosion might be a problem.



WE'VE BEEN RUNNING a series of articles for the past year on the subject of insulator duty in our publication, Hi-Tension News. It gets amazingly complicated. But out of it comes proof, among other important disclosures, that the length of a pin can be a critical factor in insulator life. This and the dozens of other points that have come from our engineering research efforts can be extremely valuable to the builder of any transmission line, and especially to the builders of the 9000 miles of extra-high-voltage line that are scheduled before 1973.

WE WOULD SAY THEN that our attitude is one of "How much?" not "How little?" can we do to make our products more attractive and useful to electric utilities. Naturally, we would appreciate your support in the market place when we show you that the results of our efforts are meaningful to you.

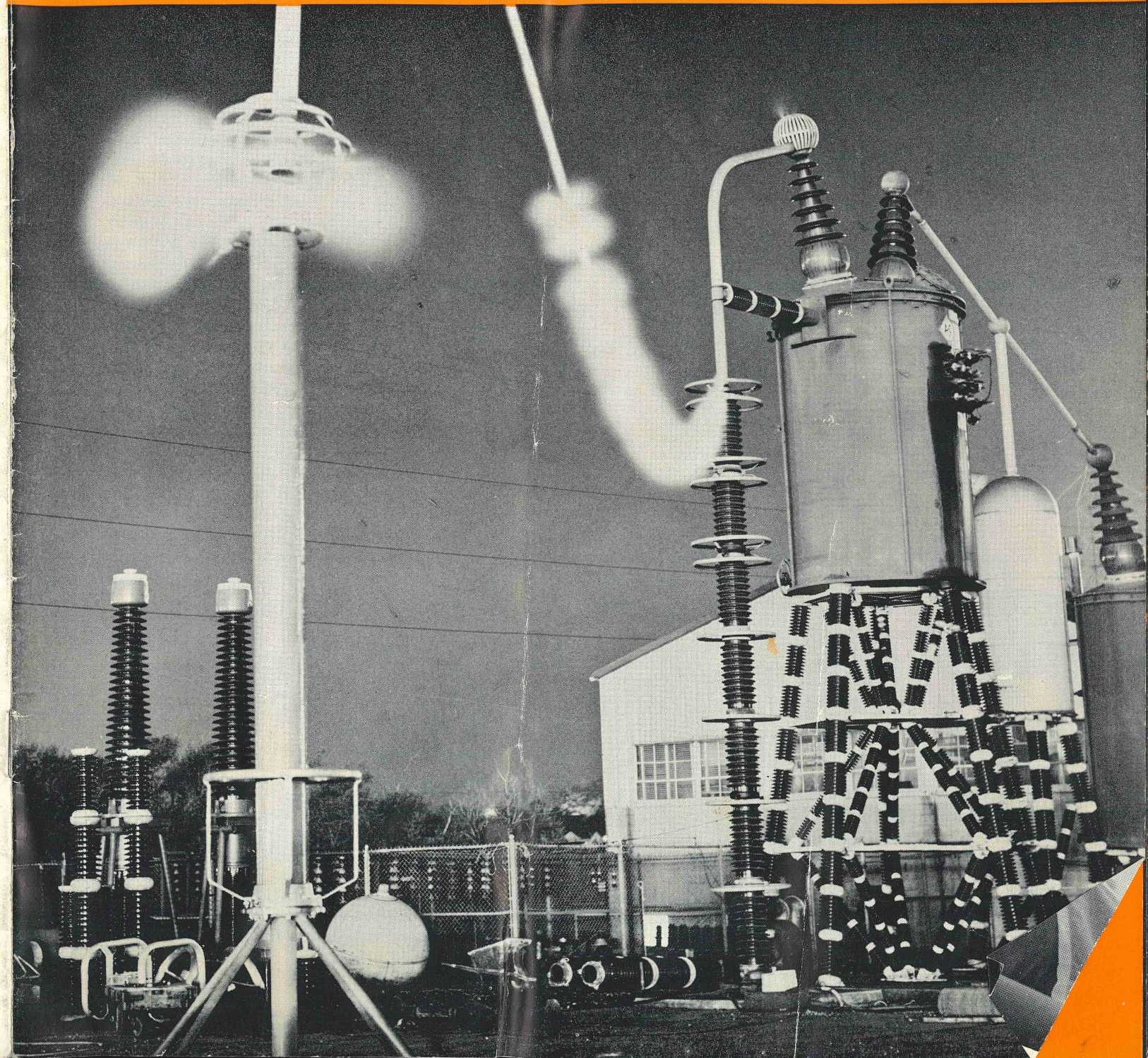
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HI-TENSION NEWS

PUBLISHED BY OHIO BRASS COMPANY, MANSFIELD, OHIO VOL. 33 NO. 4 - APRIL 1964

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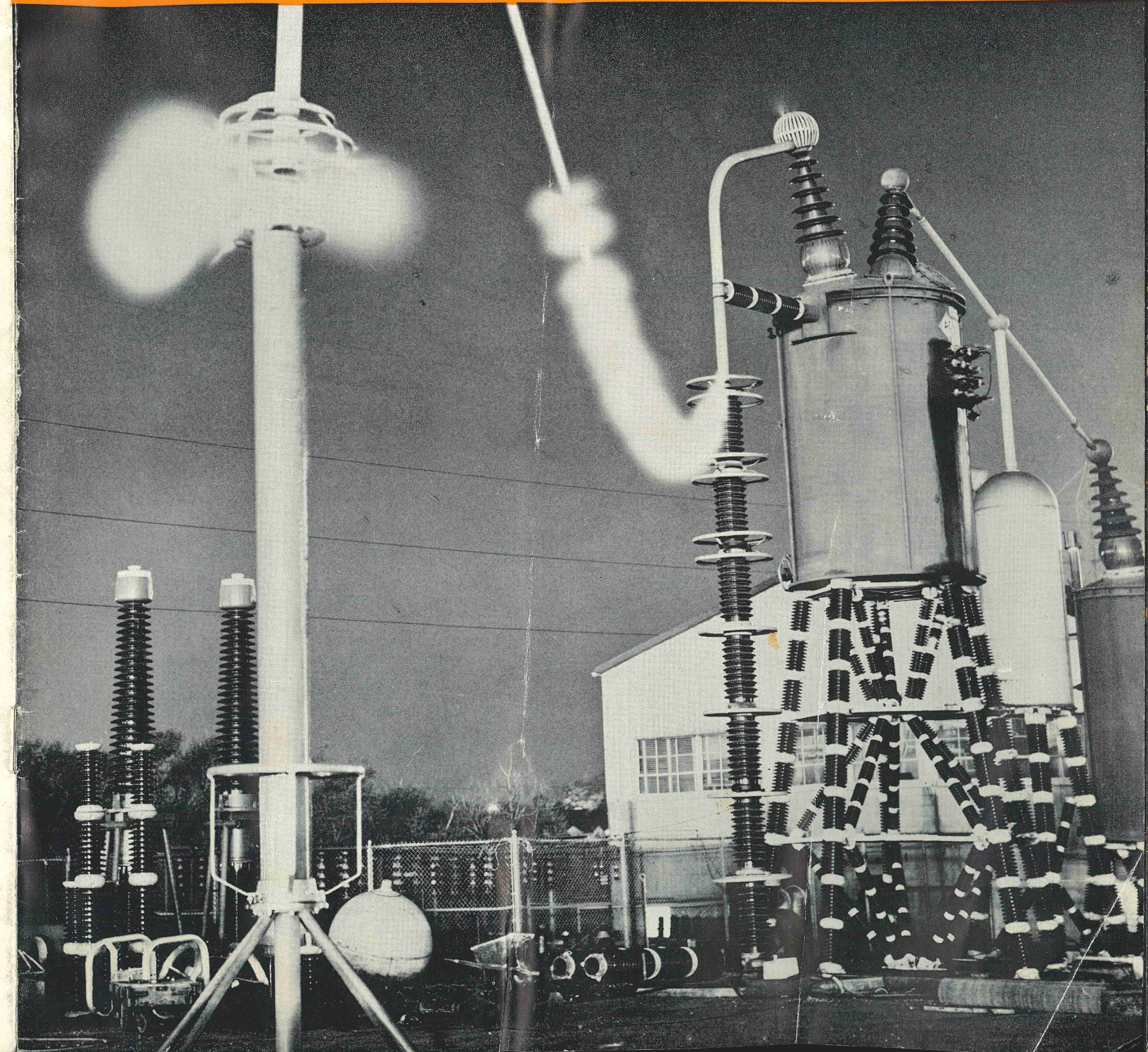
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AS EHV GOES UNDERGROUND...

O-B has service-proved pothead designs ready for the job

Putting EHV underground? Probably not for some time, but in preparation for those who are, an East Coast cable manufacturer has added three special potheads to its indoor laboratory. Their primary purpose will be to terminate EHV cable lengths in accelerated aging and electrical tests using 60-cycle voltages as high as 800 kv. These potheads were designed and built by Ohio Brass for this specific application, and are so advanced in design that many features may not find commercial application for several years.

O-B has designed and built special laboratory potheads for nearly 30 years, but they were usually only modifications of commercial designs. The three new assemblies presented a new and rigid set of specifications which required a completely different design approach.

Since testing would be conducted indoors, a lightweight and maneuverable assembly was desired. Conventional porcelain housings would add considerable weight and be cumbersome. Most lightweight materials were not strong enough and would burst under the 500 psi test pressure. Excellent grading characteristics were necessary to distribute voltages as high as 800 kv from line-to-ground. End construction must also be lightweight, but strong enough to maintain a tight seal and sustain internal pressure.

One of the special 800-kv potheads is placed on a test stand in the O-B outdoor laboratory prior to 60-cycle testing. Special lightweight materials allow ease of handling for this unit, especially important for its indoor application where it may be moved about with a light-duty crane.

To solve these problems, O-B obtained a special filament-wound fiberglass tube. Aluminum end plates and hardware were added for further weight reduction. With the addition of the internal structure it was found that the new assembly weighed 60 per cent less than a conventional size pothead.

Preliminary tests were conducted in the O-B laboratory, exerting hydraulic pressures $2\frac{1}{2}$ times normal on the pothead's interior. Tube walls and end coverings sustained internal pressure and performed without failure. Then, full-scale electrical performance tests were conducted.

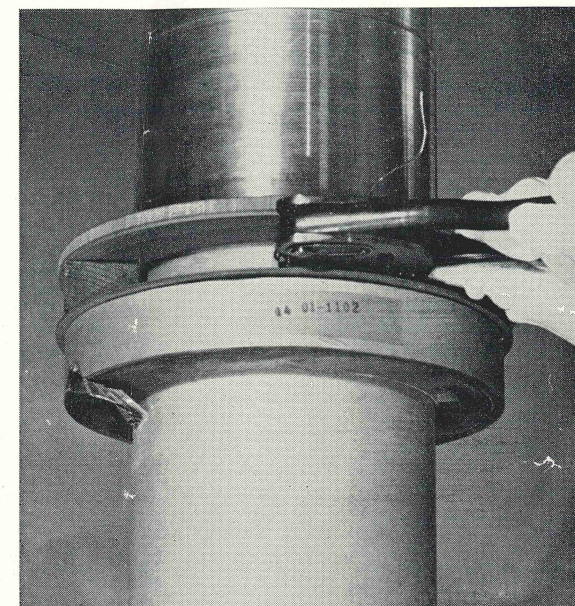
Electrically the new potheads are rated at 800-kv. Line to ground grading is accomplished through a series of special doughnut-shaped capacitors similar to those used in O-B's commercial potheads. Each "doughnut" is made of seven capacitor elements in series. Eighty of these capacitors evenly distribute voltages, ranging from ground near the bottom to 800 kv at the top, along the $13\frac{1}{2}$ -foot length of the pothead. Capacitance grading provides uniform voltage stress at a safe volts-per-mil level.

Upon final assembly of the three potheads, each was again given a thorough examination in the O-B High Voltage Laboratory. Impulse, 60-cycle withstand, and radio noise tests were conducted. All three units performed well and met all customer requirements.

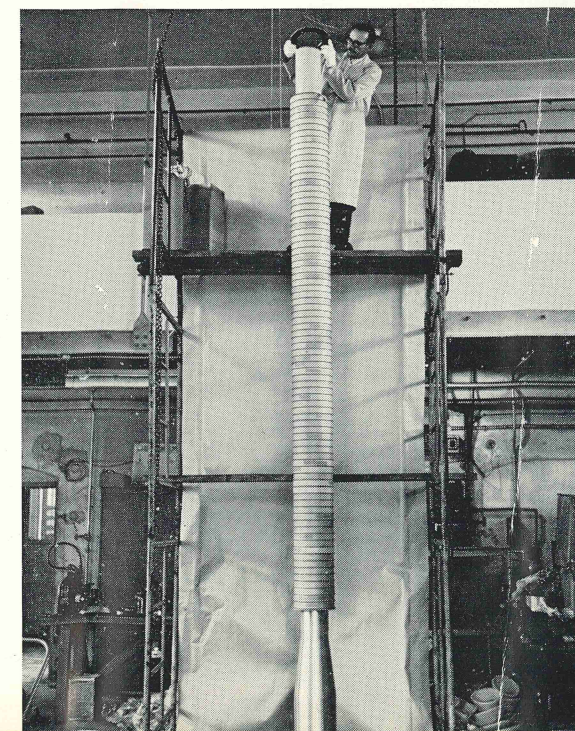
While the special design incorporated into the new potheads may never find commercial application, it illustrates one point. When EHV goes underground, there will be a manufacturer with the necessary experience to provide potheads. O-B's total background offers the best value in EHV development.



Upon final assembly of the three potheads, each was thoroughly tested in the O-B High Voltage Laboratory, in order to prove the pothead's capability to withstand 800-kv application. These three units were designed and built by O-B for an East Coast cable manufacturer's new indoor laboratory.

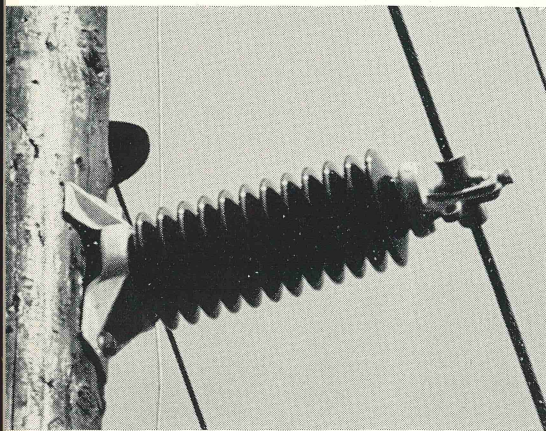


First of the doughnut shaped capacitors is added to the pothead's inner tube. A special cold weld tool makes the connection between capacitor tab and ground wire.



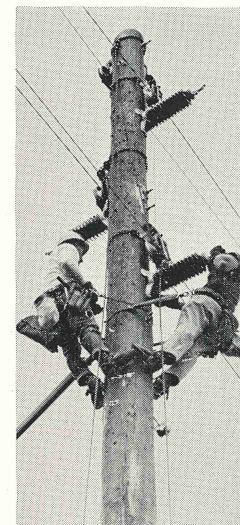
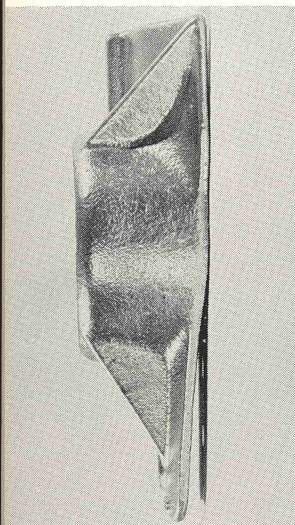
Eighty special capacitors provide uniform grading along the 13.5 foot length of the pothead tube. Here a phenolic ring is added to cap the stack.





UNIQUE BASE DESIGN FITS ALL POLES

Malleable iron mounting bases allow flexibility in application of O-B horizontal line posts . . . match all pole diameters . . . resist corrosion



SOLID MALLEABLE iron base firmly holds an O-B horizontal line post at five-degree upward pitch.

LINEMEN REACH the clamp with relative ease from their position on the pole. Short length of horizontal posts, compared to equivalent cross-arm construction, considerably simplifies stringing and clipping-in of conductor on 69-kv line.

CURVED BASE PLATE for O-B horizontal line posts. One plate fits all pole diameters ranging from seven inches to thirteen inches. Tight-gripping action produces a minimum of compression in the wood pole.

O-B engineers eliminated many pole-mounting problems when they designed the mounting bases for O-B horizontal line post insulators.

For engineers, O-B mounting bases will save worry about whether or not O-B line posts will fit the structures and stay there properly after installation.

SIZE RANGE

Bases for O-B horizontal posts are designed to accommodate a wide range of pole diameters. The range varies from a minimum of seven inches to a maximum of 13 inches.

In order to make up for long-term shrinkage of wood fibers in the pole, which affects the angle of the line post, the O-B mounting base supports the post at approximately five degrees above true horizontal position.

O-B mounting bases, with their tight-gripping fit on a wide range of pole sizes, are designed to produce a minimum of wood fiber destruction. This keeps the insulator above a horizontal plane when pole shrinkage occurs.

Maximum recommended working

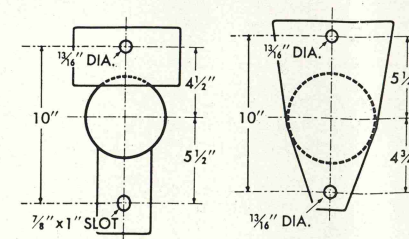
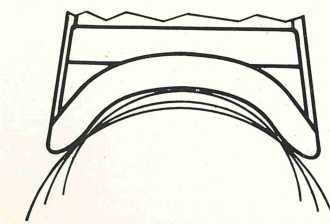
load for Ohio Brass horizontal line posts is 40 per cent of the rated cantilever strength.

The listed length of a horizontal post is the distance from the pole face to the center of the conductor. Seven lengths . . . varying from 11½ inches to 25¾ inches . . . are available. Local construction practices and contamination experience will govern the selection of the O-B horizontal post you will want to install in your system.

Short length of horizontal posts, compared to equivalent crossarm construction, considerably simplifies stringing and clipping-in. Linemen can reach the clamp from their position on the pole with ease.

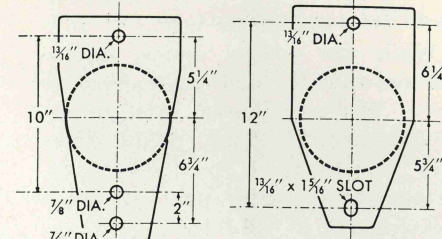
You can buy O-B horizontal line posts on special order with mounting bases similar to those of vertical line posts, for mounting with a single stud.

SCHEMATIC DIAGRAMS of O-B horizontal line post insulator bases indicating size and position of mounting holes in relation to center line of insulating member.



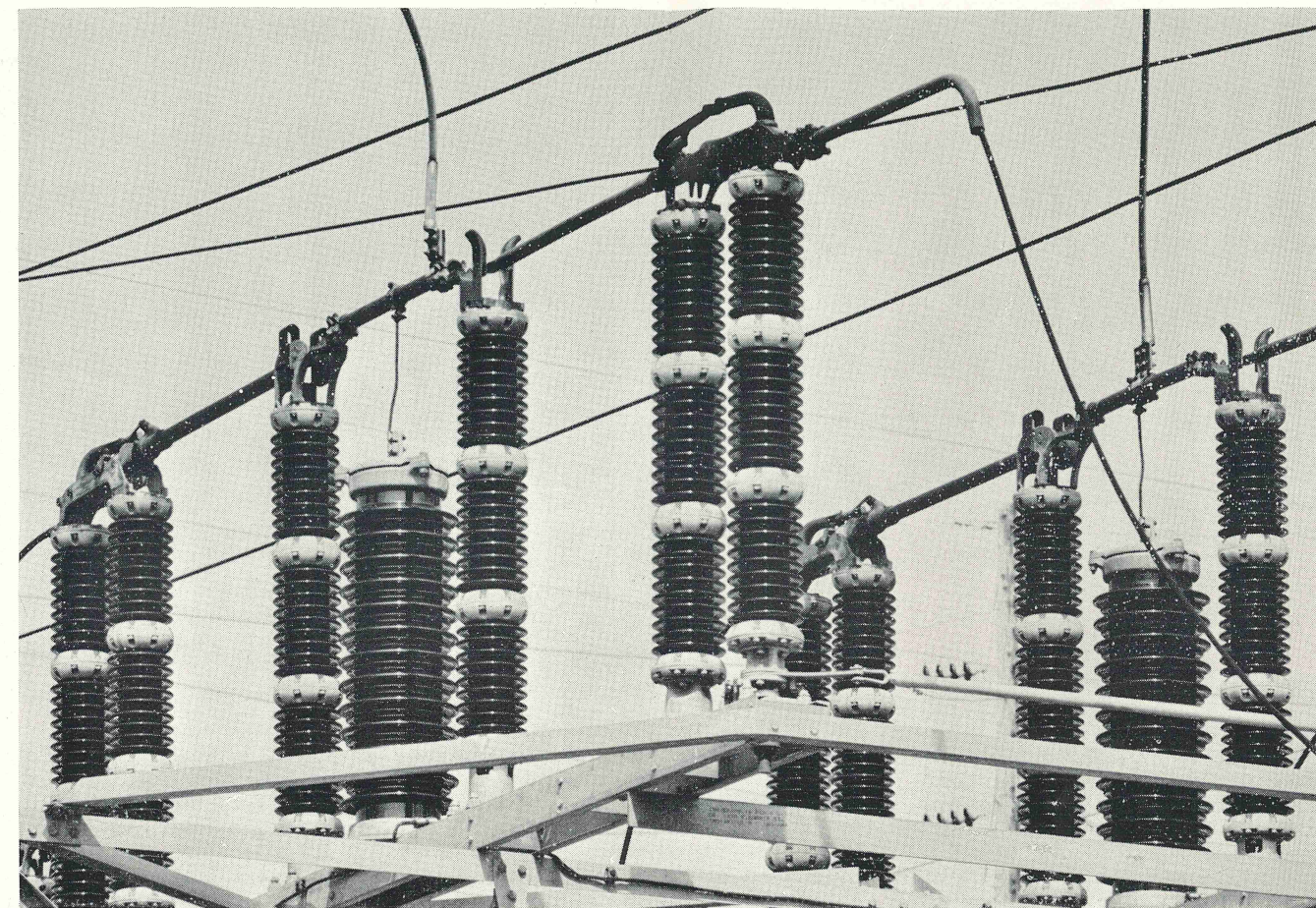
Catalog Numbers 43920 43930

43940



43950 43960 43970

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DEFLECTION CHARACTERISTICS MAY INFLUENCE SELECTION OF INSULATION STACKS

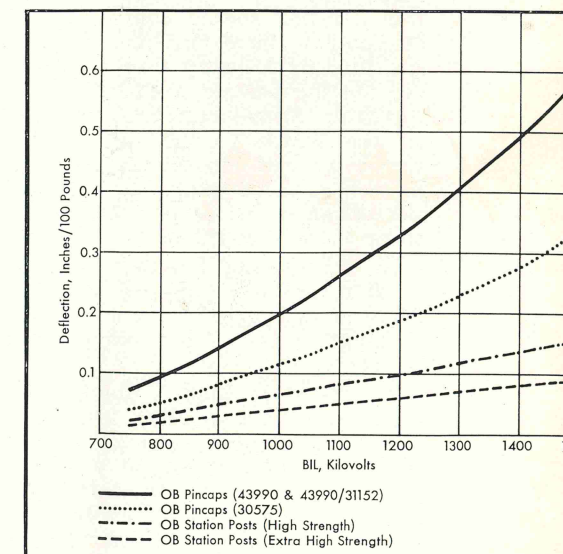
The increased height of station insulation to provide the higher BIL's associated with EHV has been reason to examine the deflection specifications of stacking pin-caps and station posts of corresponding cantilever strengths. Typical values of pin-cap and station post stack deflection are compared in the curves of Figure 1 for BIL's from 750 to 1470 kv.

The graphical analysis of deflection as a function of voltage indicates a negligible difference between pin-caps and posts at lower range BIL's. The spread in deflection values becomes more pronounced as the voltages and stack heights increase. At 1470 kv, pin-cap deflec-

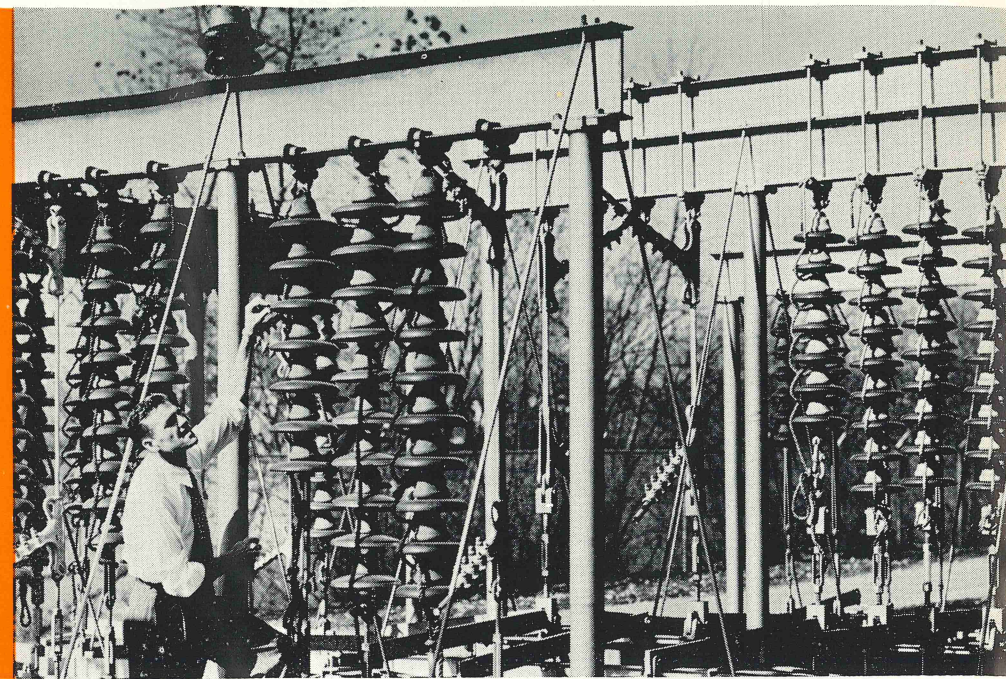
tion is several times that of the high-strength station post and as much as 6½ times as great if compared with O-B's extra-high-strength post.

Deflection of insulating stacks is strictly a mechanical consideration and has no relation to electrical characteristics. The significance of the diverging stack deflections at the higher BIL's varies with the type of equipment being supported. As illustrated in the photograph above, one of the more obvious applications where minimum deflection can be an asset is in the mounting of the live parts of large air-break switches.

Figure 1 - Comparison of pin-cap and station post deflection at EHV insulation levels.

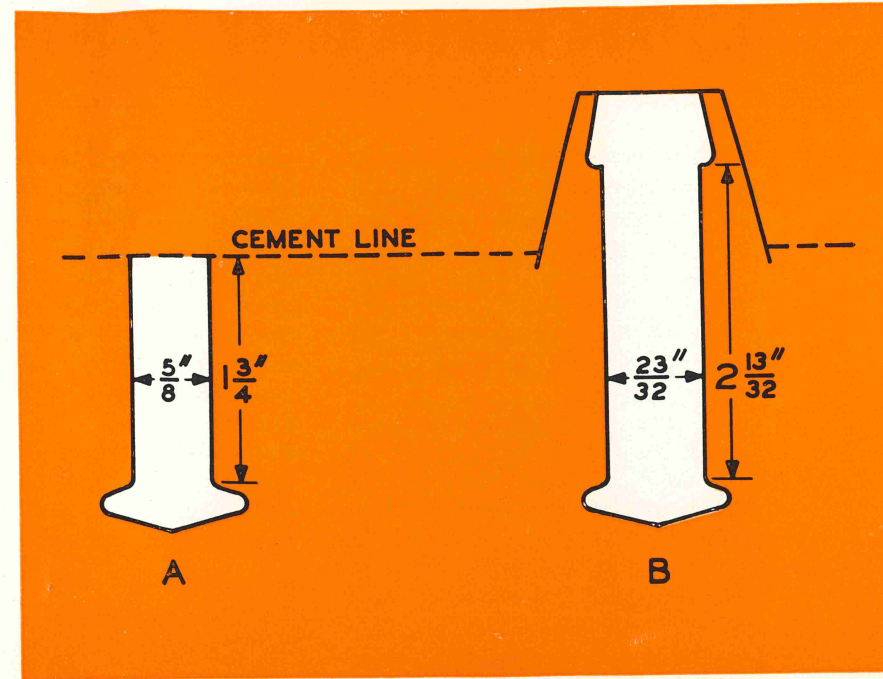


HIGHER STATIC STRENGTH IN AN INSULATOR DOES NOT IMPLY GREATER DYNAMIC DURABILITY



Left: Insulators in the O-B High Voltage Laboratory have withstood as much as 30 years' time-loading test at their full rating . . . twice recommended maximum working strength. A string from these test racks that has made an enviable record under this high static loading, however, might be destroyed in minutes and at very low static load under severe dynamic duty.

Right: Pins in (A) insulator Number 32440, and (B) the Futura series. While (B) has a greater bulk of metal to resist corrosive attack, and this increased diameter would imply lower fatigue resistance at a given amplitude and loop length, there are two compensating factors. First, the resistance of this more rigid pin to flexure requires a greater amount of aeolian energy, which occurs in only limited amounts, and thus has a tendency to prevent the attainment of damaging amplitudes. Second, while its diameter is greater, its proportions are even more favorable than (A). Flexure length of (A) is 2.81 times diameter. Flexure length of (B) is three times diameter. The combination of these two factors accounts for the excellent vibration performance of the Futura series, and Number 32440.



Fatigue tolerance of the pin, related to loop length and amplitude in a vibrating string of insulators, was discussed in the previous chapter. As was pointed out, fatigue is a localized condition, occurring at the fillet above the ball on the pin of a ball-and-socket insulator connection. This fatigue is dynamic in character. It is not directly related to mechanical or static tension.

Since fatigue at the ball fillet of the pin is the focus of insulator damage under vibration, it logically calls for a close look at the mechanics of pin failure. Before looking, however, let it be understood that shapes and dimensions in the ball-and-socket connection of suspension insulators are closely specified by industry standards and are not the private property of any insulator manufacturer. Variations in the shank portion of the pin above the ball connection, however, have a material effect on vibration performance and do not fall within these close restrictions.

In considering fatigue, we first must divide our thinking into two separate categories; static stress and dynamic stress. The two must not be confused.

At the O-B High Voltage Laboratory are time-loading test racks that have contained strings of suspension insulators for 30 years or more. Some of these specimens are static - loaded as high as 100 per cent of rated strength (twice

recommended maximum working strength). Such a record suggests excellent strength characteristics. Yet, based on our present statistical knowledge of dynamic duty, we could take one of these strings that has already demonstrated its durability and cause it to fail in less than five minutes at no more than 25 per cent of its rated static strength. This illustrates the potency of dynamic fatigue as compared to pure static loading.

A 5/8-inch diameter pin for a 15,000-pound-rated insulator has a cross-section area of .3068 square inches. At the maximum recommended working load of 7,500 pounds, the pin has a static stress of 24,400 psi. At half maximum working load, pin static stress drops to 12,200 psi. These would seem to be generous safety factors since a 5/8-inch pin has a rating of approximately 100,000 psi ultimate under static load.

Under dynamic action, however, fatigue stresses are concentrated at almost microscopic areas on the pin's surface, as the static load present is alternately applied as a stretching force while the pin deflects back and forth in the antinode of a vibrating loop. These highly localized stresses can exceed the elastic strength of the material in the very small area involved.

As soon as a skin fracture develops in the pin, further vibration

causes it to grow. Static loading then becomes a factor, since the higher the load the more readily it tends to open the line of fracture. As a fracture develops, the area of sound metal is reduced, causing a proportionate increase in stress at a fixed static load.

We have been considering the worst condition, namely, pin failure. A steel pin has considerable elasticity, and a definite elastic tolerance. As long as we stay below the fatigue point we have a perfectly safe and satisfactory device. This is amply proved in the service records of over 50 million ball-and-socket insulators that have operated successfully, in some instances, for more than 40 years. But these have not encountered the rigorous dynamic duty imposed in some modern line construction.

Increase in effective flexure length of a pin of given diameter correspondingly increases the double amplitude fatigue tolerance of that pin for a given loop length. Please refer to Figures 1 and 2 in previous chapter.

But there is another factor involved, namely, pin diameter. An increase in this diameter naturally provides a greater bulk of material to compensate for corrosive attack. At the same time, this greater diameter has an adverse effect on double amplitude fatigue tolerance, to a certain degree.

Fortunately, this larger metal diameter demands a higher aeolian energy input in order to produce a given double-amplitude at a given loop length. Therefore, the limited aeolian energy in a conductor will, on fewer occasions, be able to supply the necessary mechanical forces to drive the larger diameter pin to an amplitude approaching its fatigue tolerance.

These variables are well described by the O-B Number 32440 suspension unit, having a pin 5/8-inch by 1 3/4-inch flexure length, and by the Futura series, having pins 23/32-inch by 2-13/32-inch flexure length. Both of these units have generated excellent field records. In addition, laboratory studies demonstrate that neither unit has produced a vibration test failure at double amplitudes of 0.6 to 0.75-inch and 100-inch loop length. We would expect, however, that the fatigue tolerance of either of these standard ball-shank designs would be approached or reached if the string was driven at twice these double amplitudes.

We keep harking back to the fact that field observation of insulator vibration is a highly inexact process. Even under convenient laboratory conditions, readings of any accuracy must be taken with vibration gauges. From the ground with a telescope it is practically impossible to read extremes of movement in the blurred image of a string. And,

assuming a good reading, what assurance is there that this is the most active condition the string has ever encountered in all the time it has gone unobserved?

This does not impose an impossible situation, however. Conductor manufacturers can predict with considerable accuracy the susceptibility to aeolian vibration of a given cable under given conditions of stringing tension. If vibration is a probability, adequate vibration-absorbing devices can be applied at support points, or other means such as alteration of tension can be investigated. It costs little or nothing to find this out ahead of time, but this certainly cannot be said about finding it out too late!

Our studies emphasize one point we wish to make . . . and make as strong as we know how! All insulators are cataloged and sold on the basis of static strength. A few thousand pounds of extra static strength are sometimes used to tempt a buyer into "getting something for nothing." We have insulators on time test at twice their rated normal static duty, and they are living an apparently healthy life. Yet we know how to destroy them at a fraction of this static load, and in a matter of minutes. And we use vibration as a means for this destruction . . . a condition that is prevalent in varying degrees on modern transmission lines.

It is inconceivable that a standard

dimension pin in an insulator can have any influence on the over-all static strength of the unit. Pins never break on M&E tensile test. The pin is likely to have in the order of twice the strength of the porcelain and cement assembly. Yet the pin is the vulnerable element to dynamic attack, and "beefing-up" the rest of the insulator is simply a case of working on the wrong end. Sixty years have taught us a great deal about making an insulator stronger, as evidenced by our recent announcement of a new 50,000-pound suspension unit, but only lately have we isolated the vibration problem that is entirely separate from static strength.

This problem is not insurmountable. It is the result of higher stringing tensions, in longer, heavier spans typical of modern construction, and in the action of wind on these more taut conductors. In many cases, aeolian vibration is sufficiently minor to be ignored. It is, and always has been, present in some degree. In other cases it can be controlled by proper energy-absorptive means, change in tension, or rendered harmless to the insulators by clevis connections. The only danger that exists is not recognizing the factors that lead to pin damage, and in being misled by the concept that higher static strength in one part of an insulator implies greater dynamic durability in another part.

LIGHTNING IMMUNITY FOR SALE... at no extra cost!

O-B Pintypes undergo electrical tests to assure each insulator shipped is an exact duplicate of the perfected prototype.

Ohio Brass distribution pintype insulators have earned their reputation for lightning immunity. We like it and strive to keep it that way.

The idea comes from the insulator's successful history -- an average of only one failure per one million insulators in service. Many think this is a pretty good record. An increasing number of pintype prospects think this record is worth the "risk" and are insisting on O-B pintypes for their distribution lines.

But WHY can O-B do this consistently and build the reputation for lightning immunity in low voltage pintypes? There are several reasons:

DESIGN TESTING

Impulse testing of the pintype design is the prime reason why O-B distribution pintypes offer lightning immunity. Low-voltage pintypes

bearing the O-B trademark have been design tested for lightning discharge, revised when necessary, then retested until they finally graduate with honors. Through such qualitative measures as design-and-test procedures, Ohio Brass engineers have developed the most rugged generation of small pintypes known to distribution men. Once the design has been evolved, it is the responsibility of Ohio Brass to faithfully reproduce these characteristics in its commercial product.

BETTER PORCELAIN

Here's another reason why O-B has a long-standing reputation for lightning immunity: We manufacture porcelain better than anyone else in the business. It's a big statement. But like Dizzy Dean, the famous sports figure, once said, "Bragging ain't bragging if you can prove it." And prove it we have, many times.

When proper attention is given to the manufacture of porcelain, as it

is at Ohio Brass, dielectric qualities of the porcelain are enhanced and a better insulator results. A detailed analysis and inspection of O-B porcelain pintype products, and the procedures O-B uses to produce them, will provide the proof necessary. You will learn more about the proof of the superiority of O-B wet-process porcelain manufacturing in future discussions of O-B distribution products.

QUALITY CONTROL

We have mentioned how lightning immunity is present in Ohio Brass pintypes because of good design and superior manufacturing techniques. Another aspect is close control of quality during manufacture.

You are assured that O-B pintypes are lightning-proof because they are now and have been subjected to the scrutiny of our quality control people since the beginning of the design. And once a pintype design has evolved we don't rest on our laurels. Production is

sampled and tested to confirm the ability to surpass standards time after time when called upon.

In this way, O-B quality control people are working for you. With their eye constantly on the results of our research, they work to develop advancements in the design without adding to the cost. Our development engineers continually effect improvements in design and our quality control experts determine if the quality of the product has been affected in the course of production. You are the winner with the best possible insulator at the very lowest cost.

Periodically, a portion of O-B pintypes is subjected to tests in the O-B High Voltage Laboratory. These tests are not mandatory and are performed at the discretion of Ohio Brass. They require specialized equipment few possess, and personnel capable of using the equipment properly and analyzing the data correctly.

O-B engineers created a test, through close research in the field, which was more severe than actual service conditions. These O-B pioneers then used the test to develop pintype insulators that could withstand lightning. The prototypes were designed this way and all insulators that followed incorporated similar design principles. Hence, we have lightning immunity for sale at Ohio Brass.

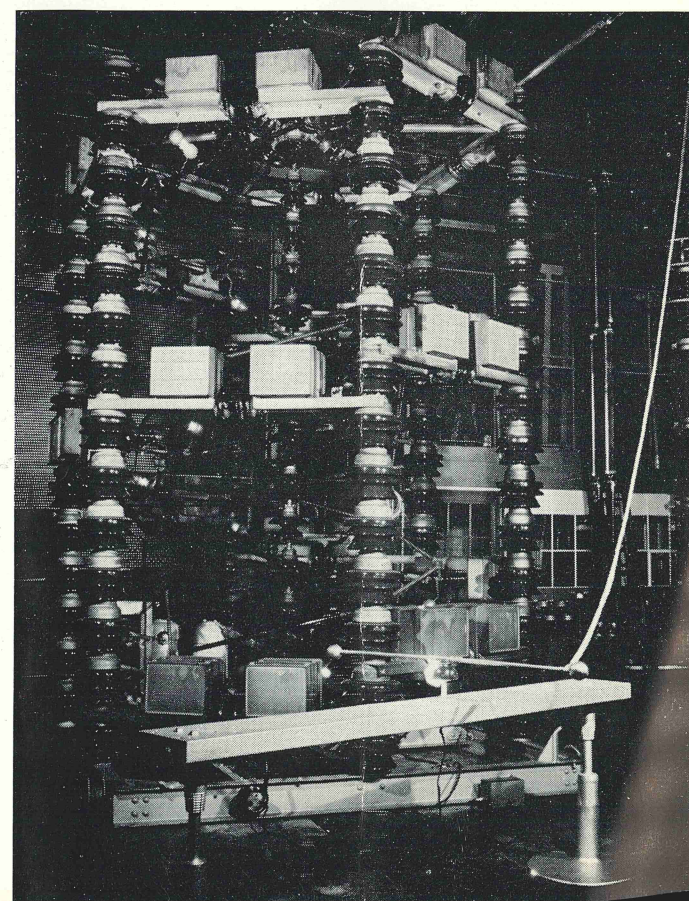
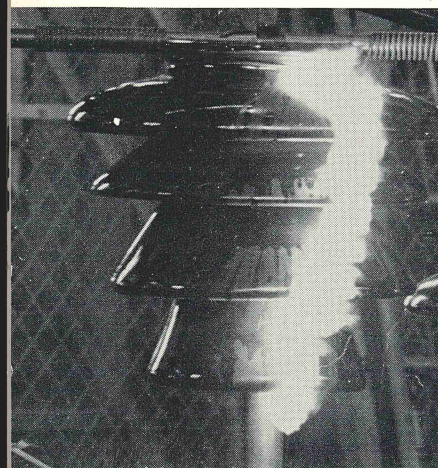
Shortly before shipment, O-B one-piece pintypes are put to a routine electrical test, which O-B has been conducting for almost 40 years -- long before the test standards were set up. This test of production detects only the insulator with gross deficiencies. All manufacturers adhering to ASA standards use this test. It is necessarily a test of moderate severity to preclude the possibility of hidden damage to insulators intended for commercial service. It is not indicative of the lightning-proof characteristics of a design.

SUMMARY

Thus, with the design methods used and quality control checks, every distribution pintype insulator in the Ohio Brass catalog has taken a stiff course in lightning behavior and can be relied upon to stand up to lightning when it strikes. And this quality doesn't come at a premium -- it's just an extra plus that does not show up on the invoice.

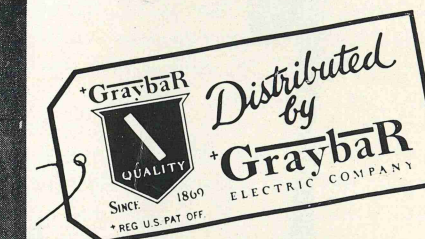
As a poor alternative consider the cost of a lightning-punctured pintype -- the time a line crew spends replacing the defective unit on a stormy night. Consider lost line revenue and lost good will. Fifty times the cost of the insulator might be a conservative estimate of the cost of repair!

Lightning immunity costs nothing. But lack of it can cost plenty. We suggest you get the lightning immunity your O-B and Graybar sales representatives have to offer -- at no extra cost!



DESIGN TESTING in the O-B High Voltage Laboratory. Low-voltage pintypes bearing the O-B trademark were design-tested for lightning discharge, revised when necessary, then retested until they finally graduated with honors.

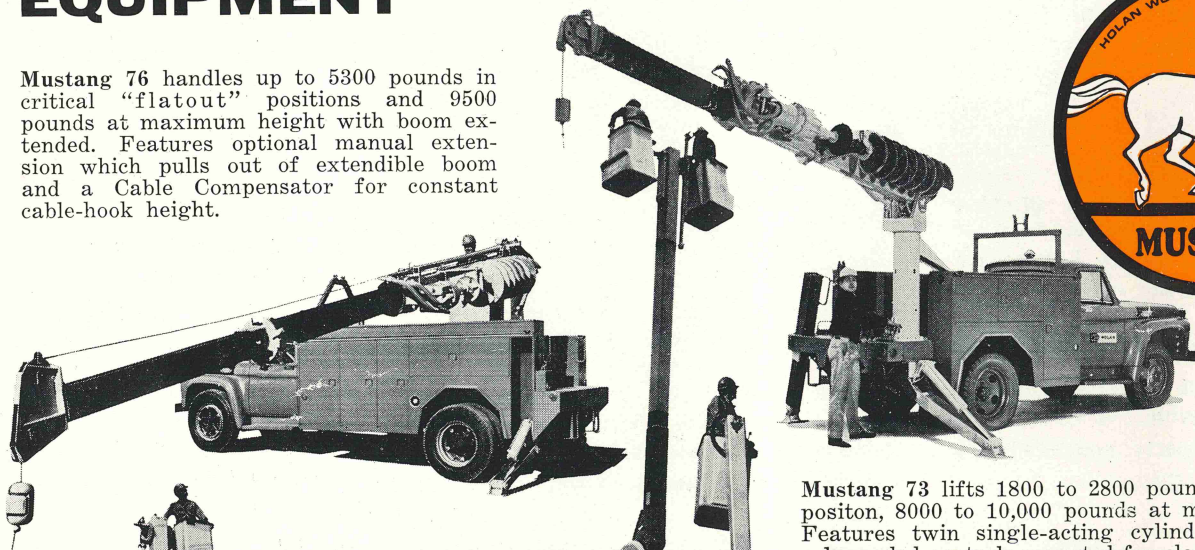
EVERY LOW-VOLTAGE pintype insulator manufactured per ASA standards by Ohio Brass is subjected to a "routine" high-frequency electrical test. O-B has been doing this test for almost 40 years -- long before the ASA Standard was set up.



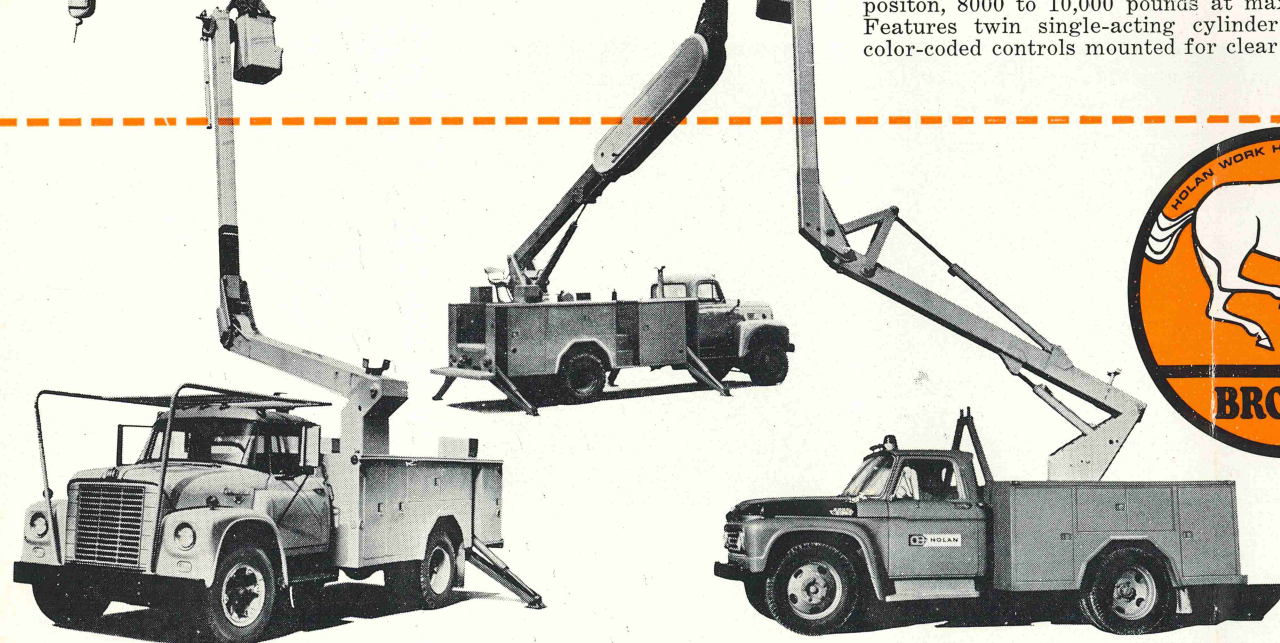
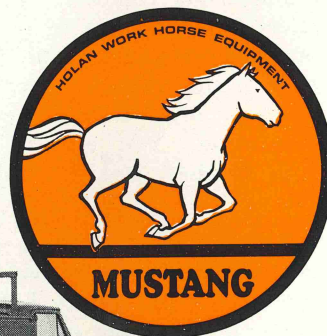
A new line of truck-mounted power equipment for utilities has been introduced by the Holan Division of The Ohio Brass Company. The line, known as Holan WORK HORSE EQUIPMENT, includes a new Bronco series of Elbows and the Mustang series of Derricks. Five pieces of this new equipment are ready for order from Holan. For complete information, write Holan Division, The Ohio Brass Company, 4100 West 150th Street, Cleveland, Ohio 44135.

HOLAN INTRODUCES NEW WORK HORSE EQUIPMENT

Mustang 76 handles up to 5300 pounds in critical "flatout" positions and 9500 pounds at maximum height with boom extended. Features optional manual extension which pulls out of extendible boom and a Cable Compensator for constant cable-hook height.



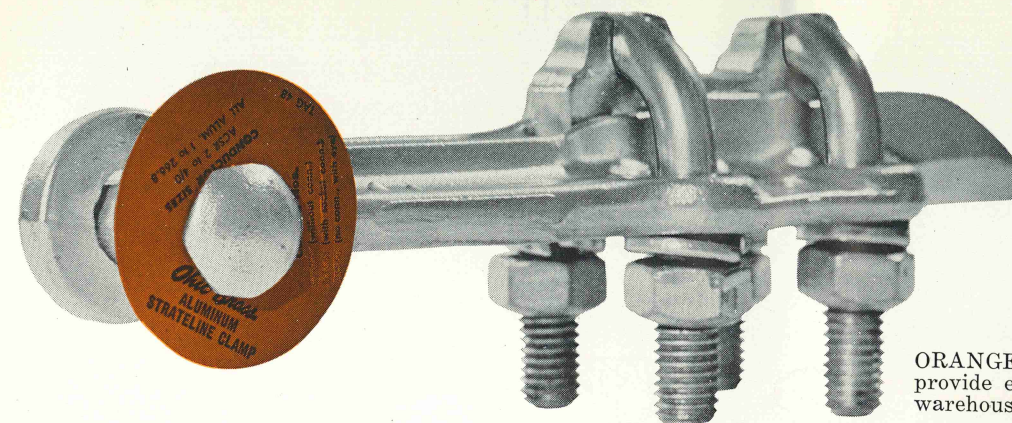
Mustang 73 lifts 1800 to 2800 pounds in horizontal position, 8000 to 10,000 pounds at maximum height. Features twin single-acting cylinder rotation and color-coded controls mounted for clear view of work.



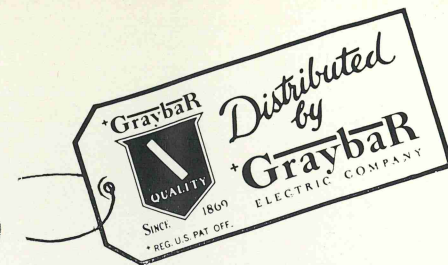
Bronco 85 is available in 40, 45, 50 and 55-foot models and will lift up to 2200-pound payloads. All lift and actuating cylinders are enclosed; upper arm action is 270 degrees. Rated and tested for Live Line Barehand Method voltages to 345 kv.

Bronco 88 is the industry's first material handling Elbow with up to 1450-pound payload capacity in all positions, up to 3000 pounds in limited positions. Available in 52- and 57-foot models, rated and tested for Live Line Barehand Method to 345 kv.

Bronco 83 is a new light-duty Elbow for trouble crews, available in 37- and 41-foot working heights. Bucket is side-mounted and upper arm travels 195 degrees, lower arm 90 degrees.



ORANGE TAGS on O-B distribution clamps provide essential product facts for warehouse and line crew personnel.



LOOK FOR THE DOUGHNUT-SHAPED TAG

identification tags quickly show warehousemen and linemen the necessary facts about O-B deadend distribution clamps

"We like the tag end of your business," punned one of our customers in reference to the unique way O-B identifies its distribution clamps.

He was commenting on the round tags attached to O-B Strateline Clamps, Universal Clamps, and Cooline L-W Clamps. The informative labels on these top sellers are an attention-getting orange and are printed with essential information important to anyone handling or installing the clamps.

First there is the name of the product. As an example, Ohio Brass Aluminum Strateline Clamp.

Next, the conductor size appears on the tag. Continuing with the example -- ACSR 2 to 4/0, All Alum 1 to 266.8.

The third item of essential information contained on the heavy-

paper disc is the O-B catalog number. Again, the example:

89650 (without connector)
89651 (with socket connector)
91550 (no connector, with eye)

That's it, short and sweet; all there is to know about these products is contained on one small, orange tag -- the name, conductor size, and O-B catalog number. Warehouse and line personnel are attracted to these product I.D. tags for good reasons:

FOR WAREHOUSEMEN

1. Tags provide ready identification for orderly stocking of item.
2. Requisition-filling is facilitated.
3. Inventory can be expedited.
4. Re-ordering is easy with all the information contained on one round tag.

FOR LINEMEN

1. Clamps are easily identified three ways.
2. Conductor sizes are clearly printed.
3. Tag is easily removed and discarded after installation of the clamp.

The identification tags are affixed to the clamps during final assembly in the production line. A tag is put on the hex rivet just before the rivet is assembled with the body of the clamp. Even with rugged handling, these well-designed identification tags seldom pull off. Therefore, they are working constantly, in their small way, to do a big job of communication with the users of O-B distribution clamps. Another reason to ask your O-B or Graybar sales representative about Ohio Brass distribution hardware.



DOUGHNUT-SHAPED TAGS quickly identify the type of clamp, the conductor size, and the O-B catalog numbers.

OHIO BRASS MANAGEMENT REPORT

The big question: "how much?" not "how little?"

BY ROGER A. BLACK
PRESIDENT, OHIO BRASS COMPANY



Certainly, no threat is intended or implied, but in recent weeks we have heard manufacturers of electrical equipment make such statements as: "How can we continue to spend large sums on research and development when our competitor spends less and gets the same price for his product?"

ELECTRIC UTILITIES make parallel comments such as: "We know you do more research and development but what are we supposed to do when your competitor offers a similar product at a lower price?" Let's examine the Ohio Brass attitudes toward these two questions. First question. Despite what the competition is doing, Ohio Brass will continue to spend as much on research and development as our products need, and that, in special circumstances, our customers request as necessary to their planning.

WE ASSUME THAT THE VALUE of these efforts will be recognized in the market place, maybe not today but ultimately. This brings us to the answer for the second question: It is our obligation to communicate to customers the product differences that have developed from research and development.

LET'S LOOK AT AN EXAMPLE. What could be more ordinary than a suspension insulator? Yet there are subtle differences in suspension insulator design that can be tremendous assets on lines where vibration or corrosion might be a problem.



WE'VE BEEN RUNNING a series of articles for the past year on the subject of insulator duty in our publication, Hi-TENSION News. It gets amazingly complicated. But out of it comes proof, among other important disclosures, that the length of a pin can be a critical factor in insulator life. This and the dozens of other points that have come from our engineering research efforts can be extremely valuable to the builder of any transmission line, and especially to the builders of the 9000 miles of extra-high-voltage line that are scheduled before 1973.

WE WOULD SAY THEN that our attitude is one of "How much?" not "How little?" can we do to make our products more attractive and useful to electric utilities. Naturally, we would appreciate your support in the market place when we show you that the results of our efforts are meaningful to you.

OHIO BRASS COMPANY • MANSFIELD, OHIO
Canadian Ohio Brass Co. Ltd. • Niagara Falls, Ontario



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HI-TENSION NEWS

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Corona tests are run on O-B's new lightweight 800-kv test pothead. (see page 2)

