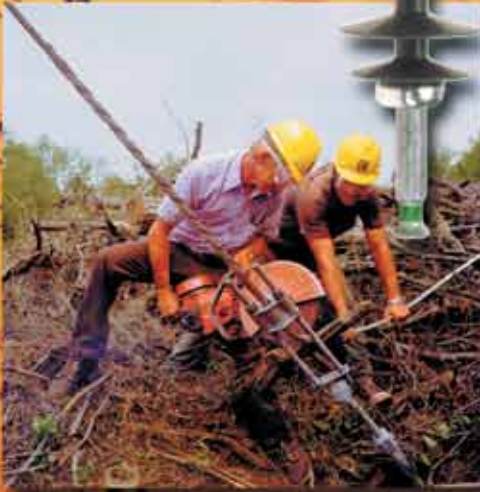
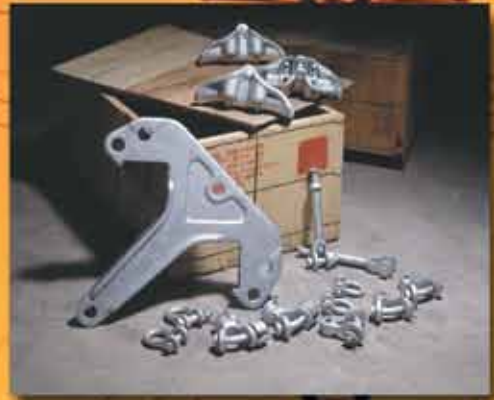


HUBBELL[®] TIPS & NEWS

Vol. 6 No. 3 JULY 2001

<http://www.hubbelpowersystems.com>



CHOOSE OUR TRANSMISSION

We have your transmission
Time after time. Line after line.

Our Extra High Voltage (EHV) products are extensive. We have one of the broadest product lines in the world.

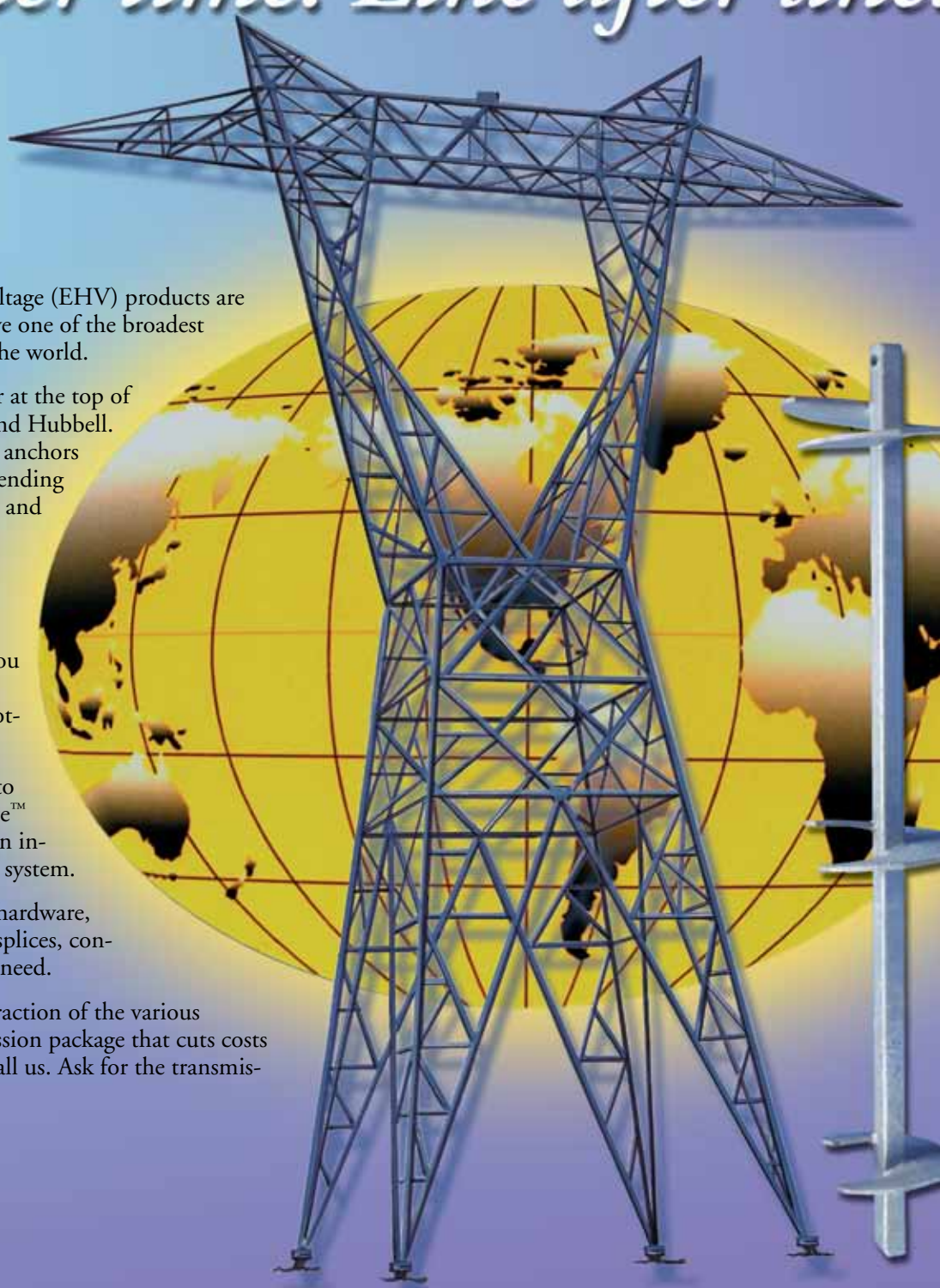
On the ground or at the top of the structure, that's where you'll find Hubbell. Whether it's power-installed screw anchors and foundations or advanced deadending devices, tower hardware, insulators and tools . . . you can count on us.

Get Hubbell involved early in the planning. We'll work with you to configure your construction to be maintenance friendly. We'll help you develop your Chance hot line tool lists, and we'll verify your line is hot-line tool maintainable.

We'll deliver an insulator package to you that will integrate Protecta*Lite™ arresters with Hi*Lite® transmission insulators to insulate and protect the system.

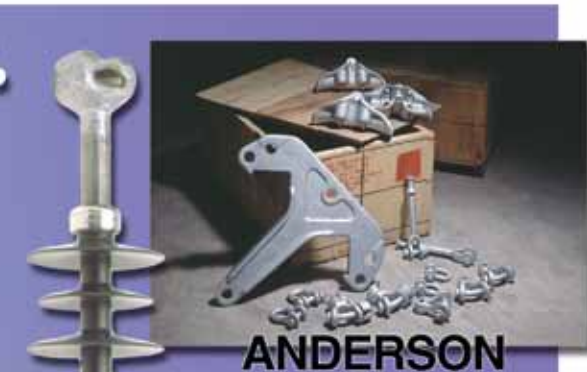
With Anderson and Fargo® tower hardware, you'll find the vibration dampers, splices, connectors, fittings and deadends you need.

We'll help you coordinate the interaction of the various products to truly deliver a transmission package that cuts costs and delivers dependable service. Call us. Ask for the transmission package.



SION PRODUCT PACKAGE

n requirements covered



ANDERSON

Anderson: Connectors and Tools

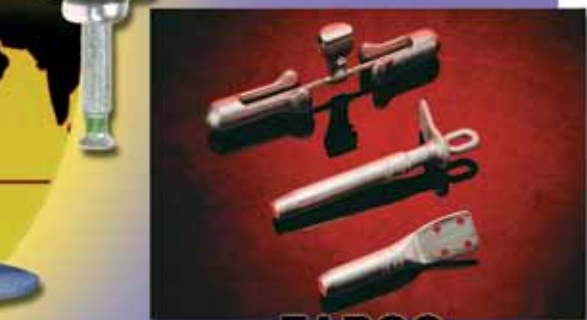
When you use Anderson EHV connector hardware, choose our popular "Special-Delivery Anderson Tower Pack." It includes everything you ordered, packed by phase or tower in the smallest number of wirebound wooden boxes. We'll assemble the tower hardware before shipment to assure a perfect fit for every piece.



CHANCE

Chance: Anchors, Foundations and Tools

As the world leader in power-installed transmission anchors, foundations and EHV tools, Chance has the global experience you need to help cut costs in transmission line planning and construction. From our geotechnical data base and soil analysis for anchors to our consulting service for power installed foundations, Chance can help you save before construction begins, as well as throughout the life of the line.



FARGO

Fargo: Fittings and Accessories

From transmission repair deadends and sleeves to splices, jumper terminals, tee taps and vibration dampers, Fargo has the transmission fittings you need. But, we go further. With our proprietary Tecnosoft™ computer modeling program, we can simulate aeolian-vibration characteristics of your transmission line - proposed or existing. Program output indicates which spans need dampers, quantity of dampers per span, and their optimum placement spacing. This translates to lower construction costs by permitting use of longer spans or lower tower height.



OHIO BRASS

Ohio Brass: Polymer Insulators and Arresters

The Ohio Brass insulator line consists of Veri*Lite and Hi*Lite sub-transmission and transmission polymer insulators, available in voltage ratings of up to 765kV. Polymer suspension and post insulators are lightweight, damage resistant, and easy to install on new and existing structures. OB Protecta*Lite lightning protection systems incorporate the world's leading polymer insulator and arrester to provide transmission line protection from lightning. ■

For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com.

TRANSMISSION CONNECTORS

Fargo® Helps Transmit More Power Over

HIGH AMPACITY CONDUCTORS



Deregulation and "open access" increasing demands on utility transmission systems.

Your challenge is to transmit more power over existing lines. High ampacity conductors offer a quick way to increase line capacity at relatively low cost.

ACSS Conductor Choices

ACSS (Aluminum Conductor Steel Supported) a.k.a. SSAC (Steel Supported Aluminum Conductor) is similar to standard ACSR (Aluminum Conductor Steel Reinforced). The difference is in the temper (heat treat) of the Aluminum wires. The aluminum strands in ACSR are fully work-hardened temper, whereas those in ACSS are fully annealed (softer) temper.

Basic ACSS conductor has the same round-wire strand construction and diameter as the comparable ACSR. Even the code word names are similar - e.g. The 795 kcmil 26/7 ACSR "Drake" has a high temperature equivalent code name "Drake/ACSS."

ACSS/TW is a compact design where individual aluminum strand wires are trapezoidal in shape eliminating most of the air space in the voids, (interstices) between the adjacent wires of round-wire stranding. This "Trap Wire" design provides about 20% more aluminum cross-section area than an ACSR conductor of the same diameter.

CONDUCTORS ACCOMMODATE Existing Lines



Conductor Impact On Your Transmission System, Increased Capacity

An ACSS conductor can operate continuously at 200° C giving it 2.1 times the ampacity of the equivalent (cross-section area) ACSR conductor rated for 75° C continuous operation.

With ACSS-TW, the maximum conductor current rating (ampacity) is about 2.4 times that of ACSR of the same diameter. Thus, upgrading to ACSS has a major impact on transmission capacity.

ACSS has a higher capability for damping of aeolian vibration and a high degree of immunity to vibration fatigue.

Fargo conventional, two-die system compression accessories help you meet the transmission upgrade challenge.

As you increase your use of high ampacity conductors to increase transmission line capacity, and require accessories rated to accommodate 200° C conductor, Fargo compression accessories fit the bill.

Available in most of the popular sizes required by utilities, Fargo deadend bodies, splices and jumper-loop terminals are slightly longer to provide the extra aluminum mass needed to dissipate the added conductor heat. Longer crimp zones give full tension holding strength.

Fargo hydraulic compression equipment and die sets make installation of our 200° C products quick and easy. They'll develop full strand strength and are suitable for marshalling yard assembly and helicopter installation.

As you tackle the challenge of increasing transmission capacity, look to Fargo transmission compression fittings, dampers and spacers to help you complete the job. ■

TJA-SSAC
Tension Joint (Splice)
Assembly rated for use on
ACSS (SSAC) conductors.
Consists of extra-length
aluminum splice body
and standard-length steel
sleeve.



SEDA-SSAC
Single Tongue Eye-Type
Deadend Assembly rated
for full tension deadends on
ACSS (SSAC) conductors.
Consists of standard-length
Steel Eye forging for con-
ductor's steel core, extra-
length Aluminum Deadend
body, and extra-length 15°
Jumper Terminal.

For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com

Ohio Brass® Disconnecter

*Allows quick identification of failed arrester, too.
removes failed arrester from the line*

Today's Arresters Have a Very Low Failure Rate...

But they are still subject to system-generated failures. The majority of failures (although rare) occur with the arrester becoming a short circuit to ground. If a shorted arrester remains connected to the line, it is not possible to reenergize the line. That's where the Ohio Brass (OB) Disconnecter comes in. It disconnects a failed arrester from the line. This serves two purposes. It allows the line to be put quickly back in service and allows the failed arrester to be identified for replacement.

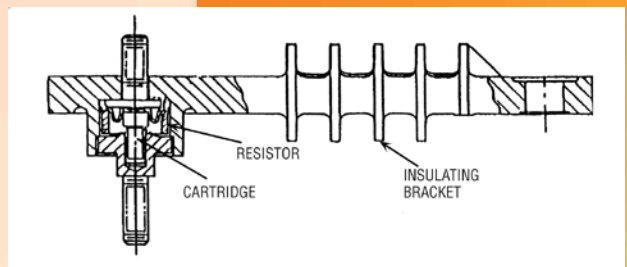
OB PDV (distribution) and PVR (riser pole) arresters are normally furnished with a disconnecter. The disconnecter is incorporated within the housing of the insulating base bracket at the bottom stud area. All OB arresters furnished with the finned insulating base bracket include the ground lead disconnecter.

Subsequent to arrester failure, the disconnecter reacts to a rapid increase in 60 cycle current flow through the arrester. Voltage develops across a resistor in the disconnecter assembly allowing it to sparkover a small gap.

The sparkover causes the arc to terminate on a cartridge. As the cartridge detonates, it separates the ground lead from the failed arrester. Because the circuit is now broken, system lockout is prevented. If a shorted arrester remains connected to the line, then it is not possible to reenergize the line.

Arresters are continuously energized with 60Hz voltage. The disconnecter must not operate under normal service conditions. Standards require the arrester to be tested with the disconnecter installed thus requiring the discharge operation characteristics to be verified. Examples of tests performed with the disconnecter installed are duty cycle, high current, low current-long duration and contaminations.

The time for disconnecter operation is verified by subjecting a sample to be tested to rms currents ranging from 20 through 800 Amps. The time for the disconnecter to operate is plotted as a function of current magnitude. ■



For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com

Total Support System for High Capacities with Fast Installation

- To 300-Kip Range per Support Pile
- To 100-Kip Range per Guy Anchor
- Range of 20 each per Crew Day

Recent technological advances have brought Chance helical anchoring performance to all-time highs! The practical effects for utility applications are literally monumental: Transmission Towers and Substations requiring higher load capacities . . . with the added

advantages of power-installed anchoring speed and convenience.

New Breakthroughs:

- **HELICAL PULLDOWN™ Micropile**

The most significant forward leap in compression-load capacity comes from the HELICAL PULLDOWN™ Micropile. Developed especially for poor-soil site conditions, this expanded innovation of proven Chance screw-anchoring products is helping utilities keep up with the pace of demand in difficult situations.

- **HeliCAP™ Engineering Software**

Another first is the anchor-application design capability of the new HELICAP™ Engineering Software. It lets an application professional see how various Chance screw anchors can be expected to work in a PC simulation of any particular job site.

- **Compatible System Components**

The “product family” of Hubbell Power Systems includes adapters and terminations for any foundation and/or anchor project. Let our application-engineering staff’s experience and knowledge help you put together this complete package for your project.



Report: TVA Substation goes on line over new deep foundation solution

HELICAL PULLDOWN™ Micropile masters site soils

As part of a cost analysis for the Tennessee Valley Authority’s new 500kV substation to be built near Memphis, TN, the structural consultant Mesa Engineering contacted Chance application engineers.

Problem Soil Conditions:

Soft silty clay ($N < 5$) extended from the surface to a depth of 30 to 35 feet. This soft layer was underlain by very dense clayey gravel. A deep foundation of some type was required to transfer the loads from the

(Photos above) Tennessee Valley Authority’s new 500kV Substation structures near Memphis, TN, sit on 388 HELICAL PULLDOWN® Micropiles (HPM). Average production rate of 20 per day, installation ease and economies resulted in TVA decision to use HPM as their deep foundation solution.

Continued . . .



substation structures, through the soft silty clay layer, to the very dense clayey gravel layer below.

Deep foundation options included driven concrete piles, cast-in-place concrete and Chance HELICAL PIER® Foundation Systems. The latter proved to be the most economical of these potential solutions.



On-Site Testing:

An SS175 pile was selected for a test. Chance application engineers suggested the SS175 pile alone was not adequate for the required ultimate load of 100 kip in this particular soil. However, the client requested an SS175 be installed to 9,500 ft.-lb. and then tested. At a compression load of 60 kip, the anchor buckled in the soft silty clay layer.

Chance application engineers recommended the HELICAL PULLDOWN™ Micropile (HPM) to significantly increase resistance to buckling in soft soils at a typical cost of only 15 to 20 per cent more than the standard anchor. This HPM consisted of an SS175 lead with 8-, 10- and 12-inch helices, a single 14-inch helical extension and 35 feet of plain extension shafts for a total installed depth of 45 feet. The upper 33 feet of shaft were encased with a 5-inch diameter grout column.

A test pile of this HPM was installed within 8 feet of the first test pile (standard SS175). A compression load of 125 kip was applied to the HPM before the reaction anchors started to pull out.

Solution Results:

Chance conducted a training seminar for the substation's general contractor, L.E. Myers, and certified that company as qualified to install the HELICAL PULLDOWN™ Micropile system.

A total of 388 HPM were installed with an average production rate of 20 micropiles being completed each day. This rate of production, ease of installation and comparative economy versus alternative methods reaffirmed TVA's decision to use the HELICAL PULLDOWN Micropile as their deep foundation solution.

Technological breakthroughs impact transmission foundations, guy anchoring

HELICAL PULLDOWN™ Micropile extends capacity

Based on more than 35 years of research, engineering, development and testing, Chance screw-type foundation systems have been perfected for their savings in transmission tower construction. That is, savings of labor, materials, equipment and time.

A major new breakthrough significantly extends capacity where surface soil conditions are poor. A composite end-bearing/frictionpile, the HELICAL PULLDOWN Micropile (HPM) combines power-installed screw anchor technology with an innovative use of an integral grout column. Connections to superstructures may be by steel-fabricated brackets or integration into rebar gridwork of concrete pile cap.

High installation production rates

Whether using Chance standard screw-anchor foundations or HPM methods, tower foundations for lattice-steel, self-supporting structures usually install at the rate of two to three towers per crew day. Single-element foundations for guyed towers generally install at five or six per crew day, including guy anchor installation.

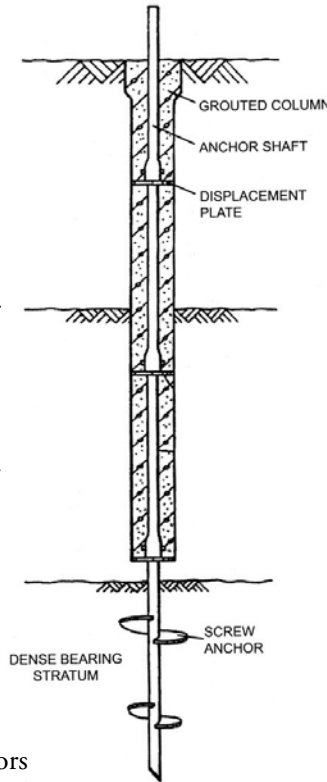
The only anchor design software!

Truly revolutionary to specifying helical anchors for most any application is the recently introduced HeliCAP™ Engineering Software. This copyrighted design tool is exciting news for engineers who design compression and tension anchoring applications. Based on your project's criteria (soils and load requirements), it provides bearing capacities of various anchor configurations. Available on CD, it is the only interactive software of its kind, works in a PC Windows environment and can be previewed in a free demonstration on our web site at www.hubbellpowersystems.com.

This is the same process Chance anchor-applications engineers employ daily to analyze problems and help project engineers find solutions. You are welcome to consult them for assistance in solving your foundation and guying project challenges.

Guy connection selections complete the package

Choose guy deadends in either the compression-type by Fargo or the formed-wire Adjust-A-Grip type from Chance. Available in high ratings for transmission loads, both may be applied at the structure end or the anchor end of the guy. Let our total transmission anchoring package complete your work from structure staging area to installation location.



Total Transmission Support: Job-specific teams
Chance helical foundation and guy anchors plus top and bottom guy deadends in Chance Adjust-A-Grip® and Fargo brands.



For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com

NOW MORE Added-Value Aluminum Products

Selection growing to your demands

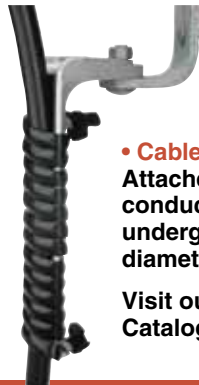
Now joining the parade: Cable Positioner, Single and Wing-Cluster Transformer Mounts

The line of Hubbell aluminum products has grown to include the most recent additions: Wing Type Cluster Mounts, Thru-Bolt Single Position Mounts and Cable Positioner. These complement earlier developments: Banded Cluster Mounts, Conduit Standoffs, T-Slots, Cabinet Mounting Brackets, Platforms and Capacitor Racks.

Shipped assembled to save you time

Even the largest, most bulky items are shipped fully pre-assembled. Let us help you gain the advantages of

New for your growing systems



New!

• Cable Positioner

Attaches to suitable bracket to support conductor at the transition of overhead to underground service. Fits cable with outside diameters of .75" to 3".

Visit our web site or request Supplemental Catalog Bulletin 5C-4.2.

Hubbell aluminum products' economy, rapid delivery and performance superiority. ■

New for your growing systems

New!

• Thru-bolt Single Position Mounts

Thru-bolt mounts are pre-assembled for single transformers, reclosers or sectionalizers with NEMA A, B or C lugs. In two sizes for 3 through 100kVA or with adapter plates for 167 through 333kVA, models available for 6" or 9" pole-mounting distance.

Visit our web site or request Supplemental Catalog Bulletin 5B-4.3.



New for your growing systems

New!

• Wing Type Cluster Mounts

Cluster mounts for NEMA A, B, or C lug distribution transformers are factory assembled. In two sizes for 50 and 100kVA, single-unit mounts permit attaching up to three transformers on the ground before hoisting for pole attachment.

Visit our web site or request Supplemental Catalog Bulletin 5B-4.1&2.



For your convenience, get this quick reference to other manufacturers' "equivalents" of Hubbell aluminum products.



Request Bulletin 05-2101 or see it on our web site: www.hubbellpowersystems.com

For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com

the TERMINATORS

The Hubbell Connection

NEW 600 Amp System Products

Bushing Extender



Insulating Cap



LRTP

SafeOp



Hubbell is expanding our offering of 600 amp cable termination products to include a new SafeOp™ Tap Plug that taps a 200 amp loadbreak interface off an existing 600 amp deadbreak interface. When equipment is isolated for repair or removal, the SafeOp bushing well can be used so the grounding elbow never has to be removed.

In addition, our new Loadbreak Reducing Tap Plug (LRTP) instantly taps a 200 amp loadbreak interface to existing 600 amp deadbreak interface using a time proven bolted connection. The LRTP is also used for grounding and isolating 600 amp systems.

... continued



NEW

SafeOp™ Tap Plug

SafeOp incorporates the use of a 200 amp loadbreak bushing well. The bushing well accepts 15 or 25kV bushing inserts. Product complies to IEEE requirements 386.



LRTP Tap Plug

The LRTP (Loadbreak Reducing Tap Plug) is fault-close rated to 10,000 amps and complies to IEEE requirements 386. Rated to 15 and 25 kV.



Bushing Extender

The 600 amp bushing extender is primarily used to increase the distance between the apparatus and the location at which cable enters the 600 amp elbow. The extender is insulated and shielded to protect deadfront integrity. Works on standard 600 amp deadbreak interfaces. Submersible 15 and 25kV ANSI/IEEE compliant.



Insulating Cap

The 600 amp insulating cap isolates unused 600 amp interfaces. It is insulated and fully shielded to provide submersible protection for energized 15 and 25kV deadbreak interfaces. Use for temporary or permanent installation on 15 and 25kV deadbreak bushings and junctions. Meets ANSI/IEEE 386 requirements. Use with other Hubbell Cable Accessories.



NEW

Products Join an Established Line of Hubbell 600 Amp Cable Products

Hubbell deadbreak elbows, modular splicing kits, epoxy accessories, TapMaster™ Junctions, Stand-Off Bushings and Shield Adapters have been mainstays of the Hubbell 600 amp Cable Accessories product line for a long time. The addition of the new products gives you more capability than ever to obtain visible breaks and to gain safer conductor access for grounding, isolating and testing.

For underground cable products, look to Hubbell as a source of quality, innovation and dependability.

Other Hubbell 600 Amp Cable Products*

Deadbreak Elbows

Terminate and splice main feeder circuits. Meets IEEE Standard 386.

Modular Splicing Kits

Splice power cables by assembling multiple elbows using epoxy accessory products.

Other 600 Amp Accessories

Hubbell also offers an assortment of 600 amp connecting plugs, basic insulating plugs, reducing tap wells and shield adapters.

TapMaster™ Junction

Gives a single junction for locating 200 and 600 amp products together. Compact. Practical. No stacking. Meets ANSI/IEEE Standard 386.

Stand-Off Bushing

A single deadbreak interface used to isolate and sectionalize energized cable. ■

* All products available in 15 & 25kV ratings.

For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com.



Popular Hookstick Switches now offered with polymer insulators

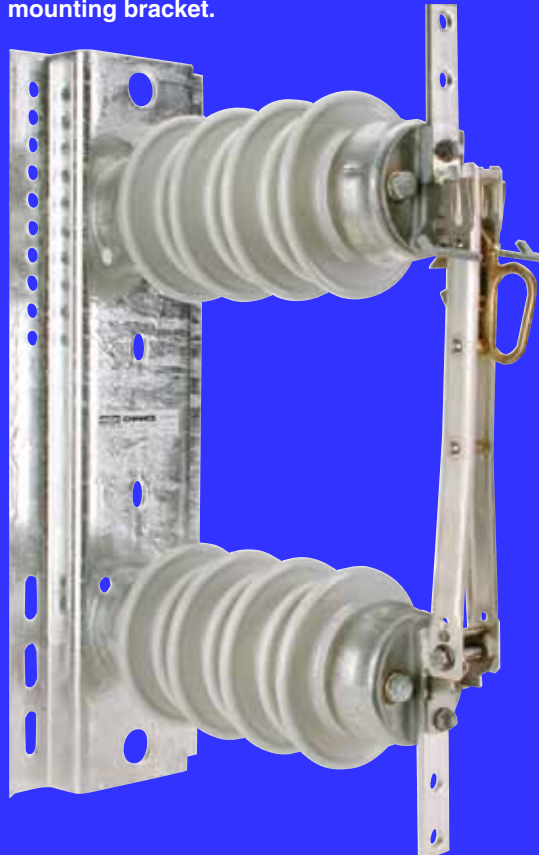
- **M3 in Distribution and Station Class models**
- **ALTD in-line comes in Loadbreak version, too**

If you're on the crew hanging disconnect switches, size – especially weight – matters! The lighter ESP™ silicone-alloy-rubber insulators also bring improved performance to the new M3 and ALTD Distribution Switches. But if your system standards call for porcelain, the M3 still delivers . . . in Distribution and Station Classes.

60% lighter weight than porcelain

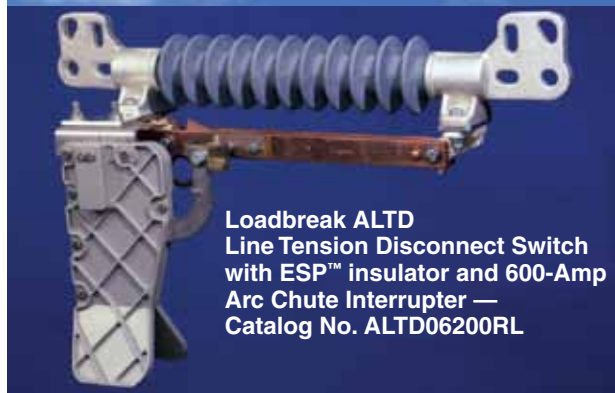
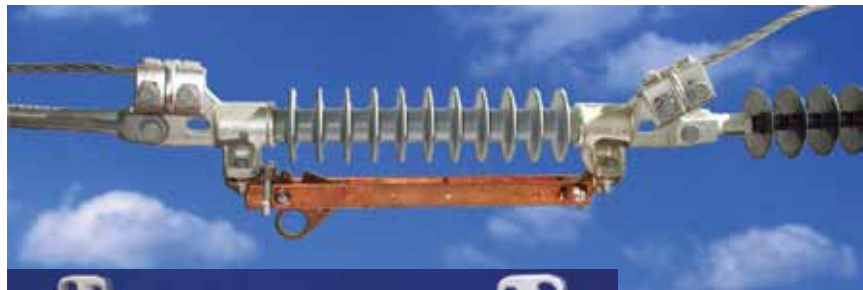
Weighing only 38% of porcelain counterparts, ESP insulators significantly reduce efforts to hang an M3 Switch. This is the average difference for insulators actually furnished on distribution class M3 switches.

Station Class Type M3 Switch comes in a choice of polymer or porcelain insulators for 15kV and porcelain for 25kv systems. Base is designed for mounting on a steel structure. Pole mounting requires an aluminum or steel mounting bracket.



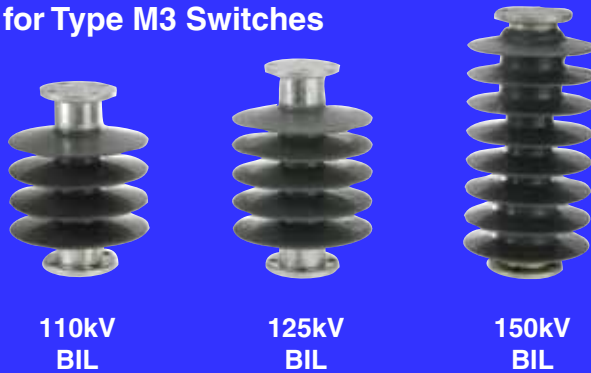
Distribution Class Type M3 Switch for up to 38kV distribution systems comes rated for 600 or 900 Amps continuous, 40kA momentary and 25kA sym. 2-second short-time withstand. May be mounted on dip/riser poles, single or double crossarm where a disconnect switch is desirable for line sectionalizing. Optional bypass studs allow for bypassing reclosers, regulators, capacitor banks or metering devices.

Loadbreak ALTD Line Tension Disconnect Switch for up to 38kV distribution systems with ESP™ insulator comes rated for 600 Amps continuous, 40kA momentary and 200kV BIL.



Loadbreak ALTD Line Tension Disconnect Switch with ESP™ insulator and 600-Amp Arc Chute Interrupter — Catalog No. ALTD06200RL

ESP™ Insulator, available in three sizes for Type M3 Switches



Higher leakage lengths, equal strengths

ESP™ insulators provide notably longer leakage distances than porcelain equivalents for M3 Disconnect Switches. Magnitudes of 15 to 40% more leakage protection are provided by the three Distribution Class sizes and the 110kV BIL polymer Station Class size. All other electrical ratings for the switches and mechanical ratings for the polymer insulators either exceed or equal those for porcelain models.

This performance derives from the ESP insulator structural design. Its central fiberglass rod is filled with electrical-grade glass fibers with strands aligned for maximum tensile strength. Ductile-iron cast end fittings are crimped directly onto the rod to achieve high strength without potting compounds or adhesives.



Resilient, tough, proven performance

Weathersheds of ESP insulators are the same proven material used in PDV arresters, Hi*Lite and Veri*Lite insulators, and PDI deadends. Developed by Ohio Brass, this proprietary polymer is made by alloying silicone and EPDM rubber. For these applications, it offers the best balance of toughness, resistance to tracking and hydrophobic characteristics.

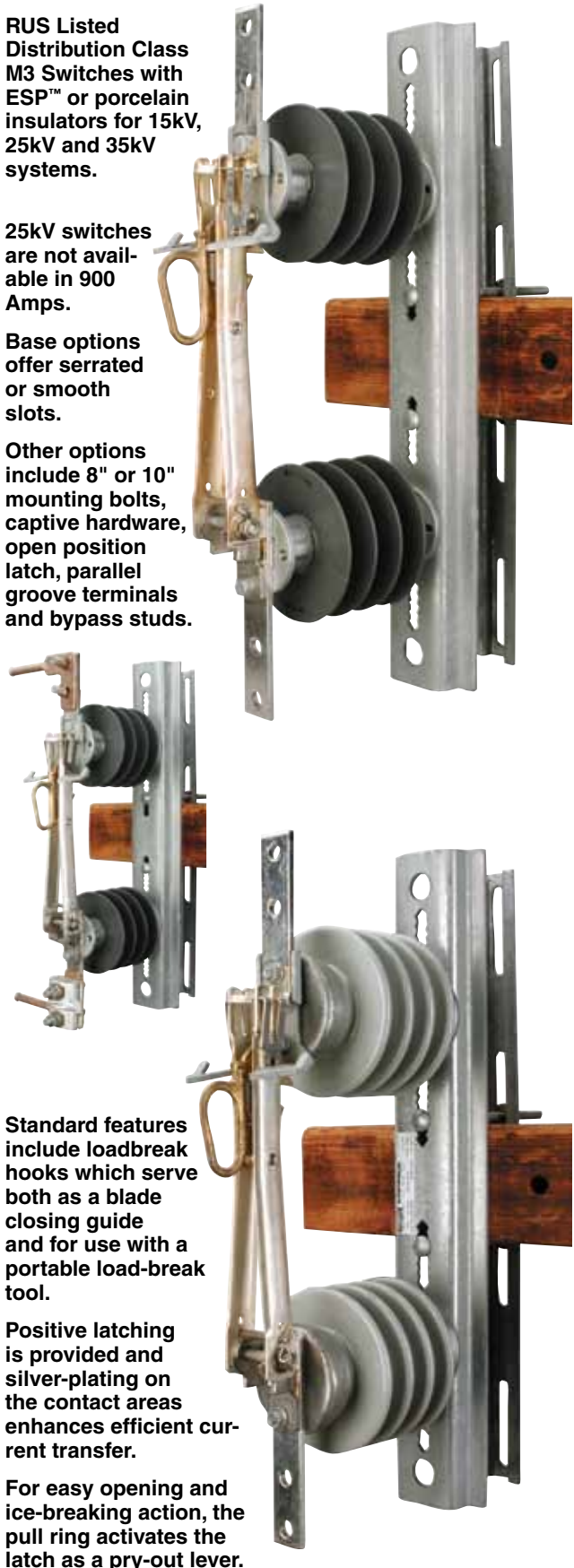
To assure quality, ESP insulator material is evaluated by a battery of performance tests to simulate your field switching conditions. ■

RUS Listed Distribution Class M3 Switches with ESP™ or porcelain insulators for 15kV, 25kV and 35kV systems.

25kV switches are not available in 900 Amps.

Base options offer serrated or smooth slots.

Other options include 8" or 10" mounting bolts, captive hardware, open position latch, parallel groove terminals and bypass studs.



Standard features include loadbreak hooks which serve both as a blade closing guide and for use with a portable load-break tool.

Positive latching is provided and silver-plating on the contact areas enhances efficient current transfer.

For easy opening and ice-breaking action, the pull ring activates the latch as a pry-out lever.

For more information, contact your Hubbell Power Systems representative, fax 573-682-8714 or e-mail hpscontact@hps.hubbell.com.



Chance Helical Anchor & Foundation Seminar

**Oct. 1 - 5, 2001
Centralia, MO**

If you are a utility engineer, project manager, project engineer or construction supervisor involved in the design, installation or material specification of anchors and foundations for distribution, transmission and substation structures, attend this seminar.

See how to use techniques to determine the proper application, installation, material selection and specification of helical anchors and steel foundations. Seminar participants will be involved in the classroom and in the field.

Instructors from Chance and academia. Class size limited. Registration deadline is August 15. First come. First serve. For complete details and fees visit our web site www.hubbellpowersystems.com or e-mail jlthomas@hps.hubbell.com or fax 573-682-8714.

NOTE: Because we have a policy of continuous product improvement, we reserve the right to change design and specifications without notice.

Vol. 6 No. 3

JULY 2001

Hubbell TIPS & NEWS magazine is published to inform personnel of electric utilities and associated companies of new ideas and techniques in transmission and distribution practices. The magazine, under different titles and formats, has been published since 1932.

Your suggestions and editorial or photographic contributions are invited and may be submitted to **Hubbell TIPS & NEWS**.

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