

Electrical Distribution and Application

- Survey your plant electrical loads
- Group similar loads for economical layout
- Use modern voltages and distribution arrangements
- Build protection into all parts of your system

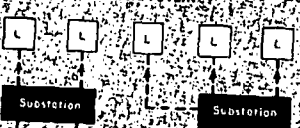
Distribution Geometry

LARGE AND SMALL LOADS



Major loads are served direct from high-voltage supply substations or close to groups of small loads. Reading low voltage usually 440 v.

DOUBLE RADIAL SYSTEM



Here all substations have two independent sources of high voltage. This gives protection against shutdown.

SECONDARIES TIED TOGETHER



Where the substations are served from separate high-voltage lines, tying secondaries together gives you shutdown insurance.

OVERHEAD BUS DUCT



Manufacturing changeover is the frequent cause of motor overloading. Overhead bus duct gives maximum flexibility and keeps floor uncluttered.

Every sound electrical modernization program starts with a load survey. That means finding out the present size of each load and when and where it occurs. And it means estimating the same for future years.

Study the geometry of the load. Separate ways to handle heavy horsepower drive separately from lighter equipment. Consider feeding the heavier loads in high voltage directly from the primary substation. Often the small low-voltage loads can be conveniently grouped and fed from secondary substations.

Still keeping things of a kind together, try to separate "jumpy" and intermittent loads from more steady loads. Where continued operation is essential, provide "load insurance." The sketches here and on page 83 give ideas.

Load Voltages. When otherwise practical, raising voltage can save a lot in copper cost, line loss and voltage drop. Very often some, or even all, of the existing load can be swung from 220 to 440 v. In many cases, existing 220-v. motors can be reconnected for 440 by simply juggling leads at the motor.

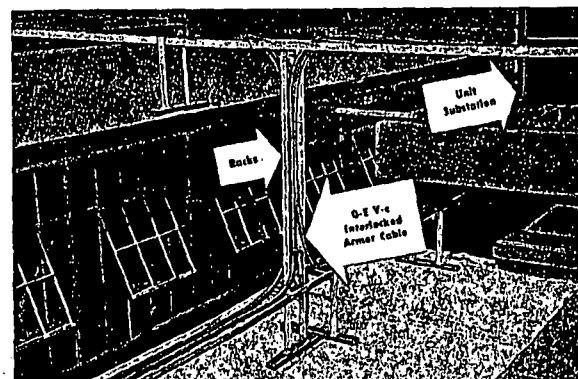
Motors and Control. Classify all motors broadly as induction, synchronous and direct-current. Integral-horsepower induction motors break down into squirrel-cage, wound-rotor and commutator type variable-speed ac motors. Wound-rotor permits greater starting torque.

The synchronous motor, a constant-speed unit, should be considered for all heavy loads. It may well fit into your modernization program by efficiently handling certain large loads (such as compressor drives) and correcting pf.

The dc motor is still the old standby for adjustable speed, better in this respect than any ac motor. For wide speed variation the direct-current motor is often the best answer, even if it involves the complication of a motor-generator set or equivalent arrangement to supply dc from ac.

Your modernization program should. (Continued on page 83)

How to Modernize a Plant's Power Supply System in a Hurry



Utilize existing structures... and the G-E V-c INTERLOCKED ARMOR CABLE SYSTEM

To distribute power in a modernized plant, an eastern manufacturer used 12 G-E unit substations on the roof and then installed G-E V-c interlocked armor cable system to bring high-voltage power to these substations. More than a mile of G-E V-c interlocked armor cable was used. The cable was 3-conductor #2/0, 15,000-volt, No. 1799 varnished-cambrie-insulated with a thermoplastic plastic and bronze armor.

Underground duct work would have meant costly tearing up of concrete floors. And an ordinary conduit installation was not feasible because of the uneven contour of the buildings' roofs. Either of these methods also meant more installation time and more cost for materials.

Aluminum racks

Aluminum racks, only 12 inches wide, were used to carry the cable over the many rises, slopes, and bends on the roofs. Because the G-E V-c interlocked armor cable system is light and flexible, no difficulty was experienced in pulling long lengths by hand over and around the bends and angles.

Easy to inspect

G-E V-c interlocked armor cable on racks is always open for visual inspection — always accessible — quickly spliced with simple mechanical joints. To our knowledge, no installation of G-E V-c interlocked armor cable has ever suffered mechanical damage sufficient to cause electrical failure. It will pay you to investigate the G-E V-c interlocked armor cable system. For more information, write Section W64-F63, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Easy to bond.

Corrosion and projections present no installation problems for the G-E V-c interlocked armor cable system.



ESTIMATED INSTALLED COSTS FOR 15,000-VOLT CABLE

	Cable Size	Method of Installation	Feet per 100' of Run	Estimated Installed Cost per 100' of Run (at \$1.00 per foot)
Varnished Cambrie Insulated Interlocked Armor Cable	2/0	Racks	163	\$2.80
Rubber-Neoprene	3/0	Steel Conduit	197	4.20
Rubber-Neoprene	1/0	Messenger	182	3.10

*Based on 77 C copper for V-c and 80 C copper for rubber-insulated cables at 40 C ambient.

You can put your confidence in—
GENERAL ELECTRIC

