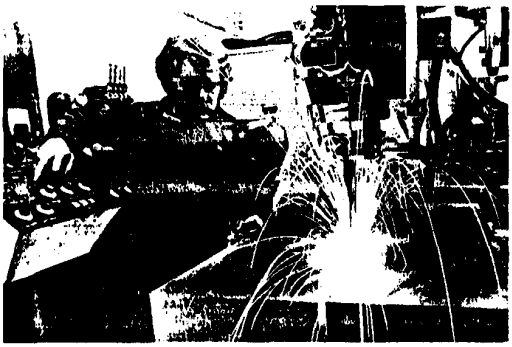

Developmental welding process cuts time, saves metal

Welding time will be reduced and less weld metal will be required when Westinghouse completes development of a narrow-gap welding process now being carried out at the company's R&D center. The company says that "substantial progress" has been made in laying down a continuous puddle of molten metal in a gap as narrow as $\frac{3}{8}$ inch in heavy plate, as demonstrated here by senior project engineer Ronald P. Simpson. Conventional welds frequently run as wide as $2\frac{1}{2}$ inches. A laboratory comparison run by Westinghouse showed that a narrow-gap weld required only 100 hours of preweld preparation time, compared to 150 hours for a conventional weld; 102 hours of actual welding time, compared to 350 hours; and only 175 lb of weld metal, compared to 2000 lb.

PCB users looking hard for ideal replacement

For insulating electric transformers, the "ultimate replacement" for polychlorinated biphenyls hasn't yet been found. That opinion was delivered at the American Power Conference in Chicago last month by Harry R. Sheppard of Westinghouse Electric's transmission and distribution group.

Chemical producers and electrical equipment makers are investigating a variety of materials, Sheppard notes, including phosphate esters, fluorocarbons, and other halogenated hydrocarbons. It may even prove feasible to use water as a coolant in transformers, in conjunction with solid dielectric materials. Some of these "developmental" fluids may be ready for field testing within a year, whereas others, because of technical, economic, or environmental problems, may never be ready.

Meanwhile, however, the nonavailability of PCB's hasn't shut down the transformer industry. Alternatives are commercially available, Sheppard says, although none possesses the combination of fire resistance, good electrical characteristics, and low cost that made PCB's the insulating fluids of choice.

For instance, silicone-insulated transformers have been available for several years. Compared to PCB's, silicones have a greater coefficient of thermal expansion, higher viscosity, and a tendency to absorb moisture (which degrades electrical properties). But these factors can be compensated for by proper design. Improved hydrocarbon fluids, having higher flash and fire points than conventional insulating oils, also are being used. However, neither silicones nor hydrocarbon fluids are as good as PCB's in terms of fire resistance; also, transformer arcing can generate combustible gases from both types. These characteristics, together with the relatively high cost of silicones, "tend to limit their acceptance as the ultimate replacement," Sheppard says.

Satisfactory PCB substitutes for impregnating power capacitors already are at hand, according to other speakers at the power conference session. McGraw-Edison's John Lapp says his company has developed "Edisol" fluid, a mixture of alkylchlorodiphenyl oxides. Dielectrically, Edisol is almost equivalent to PCB's. But, Lapp says, it is significantly less toxic to fish and mammals and much more biodegradable. Flammability characteristics, although not as good as those of PCB's, are acceptable.

Westinghouse, however, has opted for isopropyl biphenyl ("Wamcol" fluid) as its new capacitor impregnant. According to Westinghouse capacitor engineer George E. Mercier, isopropyl biphenyl has outstanding electrical properties and satisfactory flammability characteristics. Additionally, all tests to date have shown isopropyl biphenyl to be practically nontoxic, nonmutagenic, and rapidly and completely biodegradable, he says. □