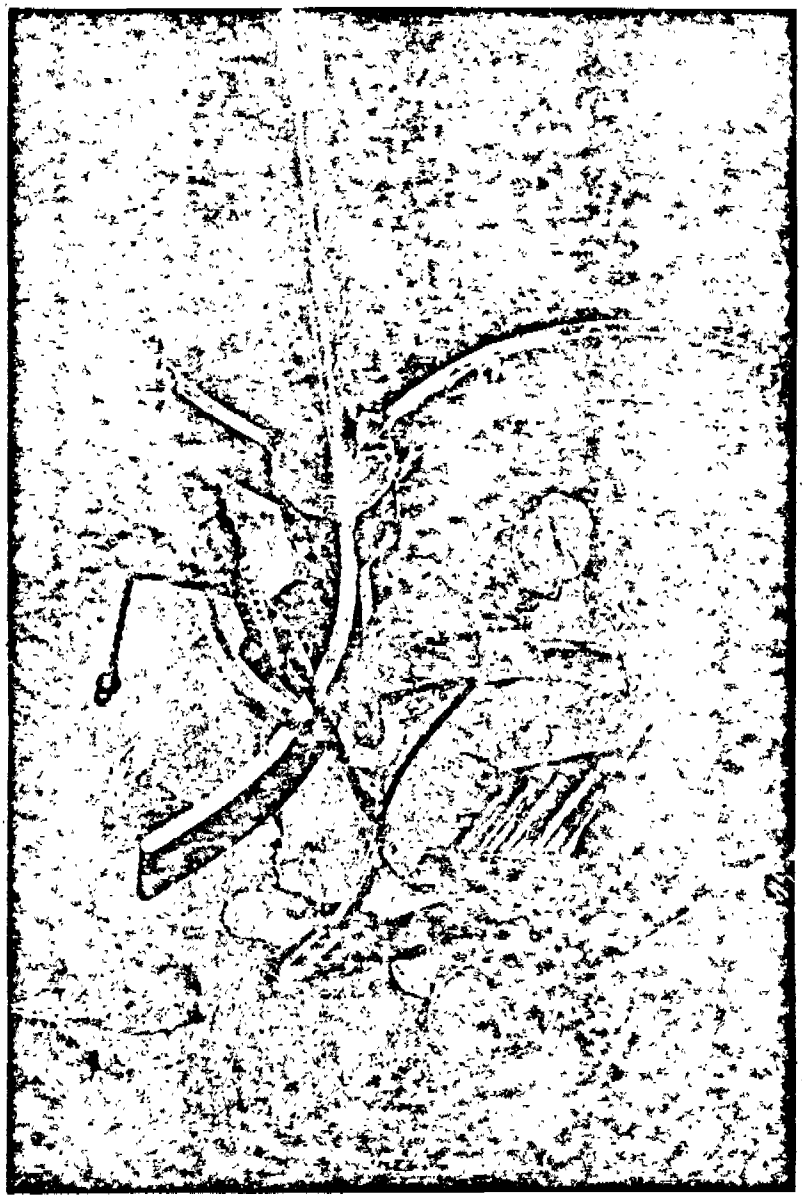
The struggle to meet PVC safety standards

Many producers claim that they cannot comply with OSHA's 1-ppm requirement

The vinyl plastics industry is not ready to show the white flag in its fight to get stringent worker-exposure standards reduced. But the Supreme Court's refusal this week to extend the Apr. 1 compliance deadline does not augur well for the Society of the Plastics Industry's battle to overturn the regulations. So companies that work with the material are struggling to meet the standards in case SPI loses.

The 22 polyvinyl chloride manufacturers are facing the biggest challenge. They polymerize vinyl chloride, believed to cause cancer in humans, into PVC resin, which is then fabricated into a wide variety of industrial and consumer goods. Workers in PVC plants are exposed to high levels of vinyl chloride gas whenever the tank-like reactors in which the polymerization takes place are opened for cleaning. What is more, a PVC plant is a veritable spaghetti bowl of pipes and pumps, and vinyl chloride "excursions" can occur at any one of the hundreds of flanges and valves. Many PVC producers say they cannot possibly comply with the Occupational Safety & Health Administration ruling that by April, 1976, workers may be exposed to an average of no more than one part per million of the gas during an eight-hour shift, and to no more than 15-minute peaks of 5 ppm. To meet these standards, workers may have to wear respirators, a fact that does not sit well with them. As Edwin W. Harrington, director of plastics manufacturing at B. F. Goodrich Co., flatly states, "2 ppm or 3 ppm is the lowest we could ever hope to get."



Henry Groskinsky

Point of danger: Workers are most exposed to vinyl chloride when they clean reactors.

Goodrich effort. Goodrich, the nation's largest PVC manufacturer, is already spending some $42-million on improved cleaning methods and the like. It has managed to lower exposure level at its five PVC plants from 50 ppm to an average of 6 ppm, but the mandated 1-ppm level remains out of reach. Other companies—particularly those with old reactors like Goodrich's that must be manually cleaned every other day, and indoor plants where ventilation is poor—have had similar failures. "The flanges are under 35 lb. of pressure per sq. in., and VC molecules still get through," says one plant manager who says he has spent $25,000 on the development of better gaskets and seals. Such frustrations are not unique. Despite the recession-caused slump in demand, VC and PVC producers are already spending $200-million to comply with the OSHA standards, estimates John R. Lawrence, SPI's technical director. Success remains elusive for most.

Because the leaks are so difficult to eliminate, several companies are turning to better cleaning methods to reduce worker exposure. Japan, with only a 25-ppm voluntary standard for the vinyl industry, is ahead of the U. S. in this area. According to the Japanese PVC Assn., all Japanese plants use mechanized high-pressure water jets to clean facilities in order to minimize workers' contact with gases.

U. S. producers are starting to follow suit. Most have installed powerful vacuum hoses to purge reactors of VC fumes before they are opened for cleaning. And many are using high-pressure spray cleaning devices to reduce the frequency of manual scraping and cleaning operations. After each

SPI's Lawrence. Fabricators may face exposure levels above 1 ppm in PVC resin storage areas, but "the over-all concern for reducing exposure is with the PVC producers," Lawrence says.

The monitoring requirements are a problem for PVC makers. The equipment is not cheap—Diamond Shamrock, for one, has already spent $350,000 to monitor its Deer Park plant. And much of the monitoring technology is still embryonic. Only recently have vapor detectors and analyzers been able to work with levels as low as 0.5 ppm.

Bendix system. Most PVC producers are pursuing combination systems that include continuous area monitoring, portable monitoring, and personal monitors. Bendix Corp. pioneered most of the vinyl chloride monitoring equipment when the original PVC cancer scare broke a little more than a year ago, and the company's monitoring systems are still among the most widely used. At Goodrich's plants, the Bendix system includes funnel-like air samplers scattered throughout the work area. The samplers suck up air and feed it back into a gas chromatograph in a continuous stream. The chromatograph can detect VC monomer concentrations down to 1 ppm. In most plants, the chromatograph is hooked into an alarm system that is quickly triggered when concentrations go above 25 ppm.

If area sampling indicates an upsurge in VC monomer, portable organic vapor analyzers are dispatched to the spot to pinpoint the valve causing the VC leak. These monitors are rarely accurate below a 5-ppm concentration, but that is good enough for the purpose. "They don't actually distinguish vinyl chloride, but tell us if there is alien vapor in the air so we know which trouble spots to check further," says a Goodrich spokesman.

The vinyl plastics industry says $200-million still hasn't produced success

Personal monitoring comes closest to detecting actual worker exposure. This is the method used by OSHA inspectors themselves. Workers wear a battery-powered device about the size of a transistor radio. It houses a charcoal tube, which absorbs VC vapors. The tube is inserted in a gas chromatograph, which can determine the amount of VC the worker was exposed to. Such personal monitoring may prove the crucial area for OSHA compliance. Says Robert N. Rylands, manager of Goodrich's Avon Lake (Ohio) plant, "As far as the OSHA standard is concerned, the real story is told with the personal monitoring."

Even if the vinyl companies manage to meet OSHA's exposure and monitoring rules, they may face additional problems from the Environmental Protection Agency. The EPA is in the preliminary stages of developing an emission standard for vinyl chloride. Unlike the OSHA standard, the EPA rule is unlikely to pinpoint parts-per-million limits. Most industry sources expect that the agency will stress add-on pollution control devices, such as carbon adsorption and solvent absorption scrubbers, and incineration of captured VC gas.

But the SPI's Lawrence and several EPA officials are optimistic that many of the measures that will satisfy OSHA will also satisfy the EPA. Better seals and ventilation in plants, improved maintenance procedures for flanges and seals, and advanced stripping technology can all help. "If they can remove the monomer in the stripping process, they won't need so much control equipment downstream," admits Susan R. Wyatt, departmental engineer at the EPA's Office of Air Quality Planning & Standards. Lawrence agrees, saying: "Many things the industry is doing to meet the OSHA standards will go a long way in meeting EPA requirements." ■