SHUTTLE NET, TUNA NET

Among a sampling of spinoffs that contribute to industrial efficiency and productivity is an innovative netting designed to boost fishing yield

Last summer, the newly christened *Ocean Pearl,* a 1,200-ton San Diego-based commercial fishing vessel, sailed the western Pacific on a dual mission. Skipper Harold Medina was looking for tuna, but he was also conducting sea trials of a giant new net that could revolutionize deep sea fishing by sharply reducing the time needed for a full catch. Called the Hyperester™ Seine, the net is manufactured by West Coast Netting Inc. (WCN), Rancho Cucamonga, California; its development stemmed from the company's work for NASA in the Space Shuttle program.

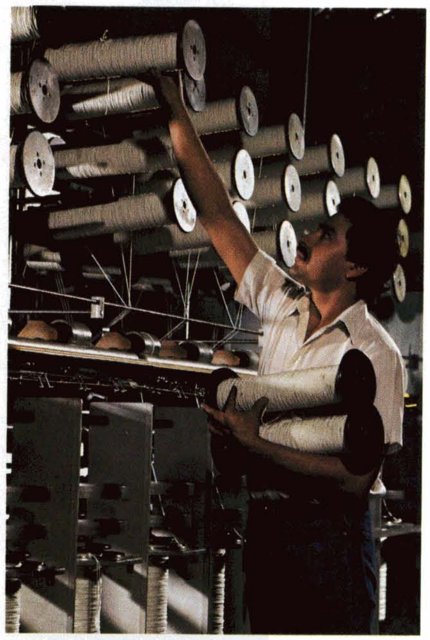
The *Ocean Pearl's* $500,000 net is more than a mile long, weighs 60 tons and covers 86 acres. "It represents," says WCN president Bill L. Kirkland, "the first major innovation in seine fishing—tuna, anchovy, menhaden, herring, salmon—in more than 20 years. It offers a productivity gain of 30 percent."

A prime advantage of the Hyperester Seine is that it sinks faster and arrives at its fishing depth in one-third of the time it takes conventional nets, thus making it possible to trap tons of fish that would otherwise scatter free. Hyperester also fishes deeper and covers a larger area than nets in general use. These factors add up to big monetary gains.

Kirkland cites fuel costs as an example. Large tuna seiners like the *Ocean Pearl* burn $3,000–5,000 worth of fuel a day, so if a ship can reduce the time necessary to make its catch, the savings would be significant. It would also allow more trips annually, hence more fish. The Hyperester net could prove a real boon to a hard-pressed fishing industry whose operational costs have escalated enormously.

™Hyperester is a trademark of West Coast Netting Inc.

The *Ocean Pearl's* Harold Medina feels the net has great promise for improving productivity, based on his initial test of Hyperester, wherein he recorded daily catch tonnages well above the norm. "I personally believe the (tonnages) were, to a great extent, the result of the speed and depth at which Hyperester fishes," he reported. "With the costs of tuna and other fishing operations today, Hyperester is being proven to be a tool of major significance. If it sounds like I believe in Hyperester, you're right. This is the net of the future."



At left, an employee of West Coast Netting Inc. is loading fiber spindles onto a machine that will twist three fiber strands together to produce an exceptionally strong twine. This is the first step in manufacturing a Hyperester Seine, a new type of fish netting that promises substantial productivity improvement. In the lower photo is a high-speed machine that ties 1,400 knots a minute and weaves the twine into netting; the end product is at right.

Though not an x-ray system, AS&E's load management concept for electric utilities also traces its origin to the company's space work, which advanced AS&E's competence in electronics and communications. This competence attracted the interest of a public utility that sought improved control of its electric output. With no prior experience in the field AS&E developed the ASEP® system for managing peak electric loads by remotely controlling residential electrical equipment. The prototype system made its debut only a decade ago, but today ASEP is used by more utilities than any other system.

A two-way communications system allows the utility to "shave" peak loads by temporarily cutting off—with customers' consent—such home equipment as water heaters, space heaters and air conditioners; this can save big money for the utility, and the customer gets a share of the savings as a credit on his monthly bill.

Control measures are taken when electricity demand is high or when the company's generating capacity is reduced. A computer generates the commands that turn off home equipment. The top photo shows the computer room at Duke Power Company, Charlotte, North Carolina, an ASEP-equipped utility. The computer communicates over telephone lines to substation control units, such as the one shown at right. The substations then relay the control signals over power distribution lines to load control receivers (bottom right) located at customers' homes. The communications system also makes possible automatic meter reading.

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Hyperester had its origin in 1979. WCN was then already an established firm with almost 30 years experience, providing nets for sports and circus performers, hospital nets for patients who must be immobilized, capture nets for law enforcement use, and projectile-catching nets for the Department of Defense. Rockwell International, NASA's prime contractor for the Space Shuttle, asked WCN to develop a safety net for personnel working on the Shuttle Orbiter; several such nets would be used to prevent a worker's falling through an open engine cavity a long way to the ground. NASA/Rockwell wanted something more than an ordinary net. It would be relatively small, 100 inches in diameter, yet had to have a tensile strength twice the government standard for safety nets; it also had to be fire resistant and ultraviolet resistant. It posed a difficult development job.

It took WCN six months just to find a fiber that had the requisite temperature resistance and could be treated to resist deterioration from ultraviolet rays; it is a polyester-like material called Nomex.® The next step was to develop a "twine" made of multiple strands of the fiber twisted together. This, too, proved troublesome; using conventional methods of twisting the strands, WCN could not get anything approaching the specified breaking strength. So the company was forced to invent a more sophisticated twisting process in which exactly the same tension is maintained on each of three strands as they are machine-twisted into a three-ply twine. This resulted in a supertwine that met the NASA specifications; a net made of it can sustain a load of 800 pounds falling 25 feet or, to put it another way, a relatively small net could support an average size automobile.

The Space Shuttle nets were proof tested, accepted by NASA and are now in service. But the technology that created them—the combination of Nomex fiber and the innovative twisting technique—offered obvious application in the fishing industry. Twines of various fibers manufactured in this manner have a 30 percent smaller diameter than conventional nylon cords used in other nets; that means less hydrodynamic resistance, allowing the net to move faster in the water. The twine is very dense and

absorbs less water; that's why it sinks faster and fishes deeper. A patented treatment for ultraviolet protection and greater abrasion resistance makes Hyperester nets last longer, and the net's no-shrink feature is an economic bonus.

These advantages, WCN feels, should prove attractive to fishing fleets and it is preparing for large-scale business; it has licensed two facilities in Pennsylvania and Michigan that, along with the Rancho Cucamonga plant, will give the company a total annual production capacity of 3.5 million pounds of Hyperester netting. Bill Kirkland points out an international competition factor: Japan has almost totally dominated the market for a long time and Hyperester is the first American-built net in more than 15 years; it could provide a foundation for American competition in the $500–600 million a year netting industry.

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