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FORTUNE Archives

Title: MANUFACTURING FOR REUSE

Summary: DESIGNING PRODUCTS TO BE TORN APART INTO REUSABLE PIECES THE EARTH GREENER AND CAN MAKE A PROFIT FOR PRACTITIONERS. In a big gray brick building in Highland Park, Michigan, a technician and engineers in shirt sleeves are hard at work killing American ingenuity. Armed with air-powered socket tools, screwdrivers, and hammers, they are tearing apart showroom-new cars—a red Ford Aspire here, a blue Chrysler Neon over there. They dissect subassemblies, weigh each component, videotape and time the procedures. wire electrical harnesses are removed and hung on tall white boards as if they were innards of cats on display for a freshman anatomy class.

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Author(s): GENE BYLJNSKY

Reporter Associate(s): ALICIA HILLS MOORE; KAREN NICK
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FORTUNE Archives

MANUFACTURING FOR REUSE

DESIGNING PRODUCTS TO BE TORN APART INTO REUSABLE PIECES KEEPS THE EARTH GREENER AND CAN MAKE A PROFIT FOR PRACTITIONERS.

In a big gray brick building in Highland Park, Michigan, a half-dozen technicians and engineers in shirt sleeves are hard at work killing American ingenuity. Armed with air-powered socket tools, screwdrivers, and hammers, they are tearing apart showroom-new cars—a red Ford Aspire here, a blue Chrysler Neon over there. They dissect subassemblies, weigh each component, videotape and time the procedures. Black wire electrical harnesses are

H-P, which has been in the disassembly business longer than IBM, already runs a profitable operation, according to executives there. DEC says its Resource Recovery Center in Contoocook, New Hampshire, is "cost effective." Germany's Siemens Nixdorf, on the other hand, says its recycling is not yet profitable because not enough old machines are being processed.

H-P's record with its workstations is unparalleled. It rebuilds and recycles every machine that's returned. Says Tom Korpalski, H-P's manager of product stewardship for small computers: "In the hierarchy of the three R's of design for the environment, the first two--reduce [the number of product parts] and reuse [the parts]--rank above recycling."

TELEPHONES. When monopoly prevailed in telephony, manufacturers leased telephones and then refurbished and rebuilt them to lease anew. The breakup of the Bell System disrupted this process, since most phones are now purchased rather than leased. But profitable leasing continues in Canada. In a big plant outside Toronto, Northern Telecom breaks down old telephones, puts their innards into new plastic housings, and sends them out again.

Beyond that traditional activity, Northern Telecom is switching to companywide DFD. "We're on the threshold of moving to a new platform that will truly change the philosophy behind our entire product strategy," says Margaret Kerr, senior vice president for environment and ethics at Northern Telecom in Toronto.

AT&T, moving a bit more deliberately, is in the midst of a demonstration project called "green product realization" to generate guidelines for green product design.

ENGINES. Sometimes DFD occurs naturally. In a bustling plant in the quaint Bavarian village of Uebersee at the edge of the Alps, the German engine manufacturer Deutz Service International, a subsidiary of Klöckner Humboldt Deutz, rebuilds thousands of Deutz engines a year. They are used in machines ranging from tractors to locomotives. "We noticed that a market had developed for replacement Deutz engines," says Bruno Baum, the plant manager. "Our engines are built in such a way that they are extremely easy to take apart and put back together."

This DFD occurred by happy circumstance. Explains Baum: "A popular trend in the 1970s called for a lot of the metal pieces to be soldered together, pieces that used to be held together with screws. It makes production cheaper, but also makes it hard to recover many of the parts. Fortunately, we didn't go along."

Deutz engine users around the world noticed the ease of disassembly, and small companies sprang up specializing in rebuilds. Deutz decided it wanted that business for itself. It now buys more than 5,000 old engines a year and last year turned them into 3,500 remanufactured versions--"as good as new," says Baum--that sell for up to 25% less than new engines. Adds Baum: "A product take-back law would only be to our advantage because we already fulfill its requirements. Our competitors don't." The company plans to rebuild in the U.S.

Fortune 500 companies such as IBM, Ford, and Digital Equipment have joined consortiums at universities such as Carnegie-Mellon, the University of California at Berkeley, and Tufts to learn more about green product design. The Department of Commerce plans to help small companies master the techniques at the Great Lakes **Manufacturing** Technology Center in Cleveland.

Also coming to manufacturers' aid today are sophisticated software programs such as the pioneering ReStar from Green Engineering Corp. of Pittsburgh. A brainchild of Carnegie-Mellon's D. Navin-Chandra and his associates, who founded the company less than a year ago, ReStar carries a hefty price tag: \$19,600. (You can even get it

times. By weight, 87% of a camera is reused or recycled. Kodak sold about 30 million disposable cameras worldwide in 1993. The flash version of the FunSaver is the company's fastest-growing and most profitable product.

Xerox launched its green **manufacturing** program four years ago under the banner of cost savings. Says Jack C. Azar, corporate manager for environmental design and resources conservation: "We demonstrated to our senior management that we could probably do it very cost effectively and increase our productivity in the process."

Xerox had already been saving \$200 million a year through **reuse** of parts; the focus on green design upped that by \$50 million. Selling senior management on the benefits of wholesale green **manufacturing**, from DFD to remanufacturing and recycling of parts, is paying off at the rate of about \$500 million a year.

At first Xerox disassembled without having designed for it. The cartridge assembly, for instance, was welded together ultrasonically and had to be torn apart by hand. Xerox replaced that demolition disassembly with a design that anticipates recycling. Potentially reusable parts were put in easily accessible places; snaps replaced screws. Common parts, such as plastic panels, were standardized for use in different products. Engineers were taught the elements of disassembly. A 35-person team called Asset Recycle Management Organization helped master the new discipline.

As Kodak, Xerox, and other companies have learned, the topsy-turvy world of DFD suddenly turns the gang in the lab into corporate strategists. It challenges them to take a much wider view of design than they've been taught. The most important lesson learned, says Donald Bloyer, an H-P senior product design engineer with 27 years experience, is not to be rigid. Coping with sometimes contradictory notions and demands, a designer must juggle quality and reliability with green engineering. In building its popular DeskJet printers for disassembly, H-P found, for instance, that a snap-fit—one of the icons of DFD—just doesn't always work best, so it uses standardized screws instead. It's pointless and wasteful to make a green product that's no good.

Recycling has brought another interesting fact to light: Used or refurbished parts sometimes work better than new ones. This is particularly true in digital electronics. A memory chip or a microprocessor, unless it has suffered repeated thermal insults or physical damage, is virtually immortal, since the only moving parts are electrons. So Fox Electronics, a fast-growing San Jose reclaimer and reseller of chips, doesn't even bother to test old chips it resells. The reason: What the trade calls "infant mortality" of new chips during initial tests is 5%, but Fox discovered that old chips are more reliable—only 2% die.

But old beliefs die even harder. Cheap cameras notwithstanding, getting Americans to buy retread products as new will be a tough sell. Xerox is meeting some resistance to selling or leasing refurbished photocopiers as new, even though they carry the same warranty as machines with all new parts. Car buyers will likely balk at a new car with a refurbished alternator. It's one thing to buy a new Ford with 50 reground plastic soda bottles making up its grille liner. But its another to accept a used part—refurbished or not—that moves or rotates and wears down with use.

"We still have some educating to do," concedes Xerox's Azar. "There are pockets in the consumer base—and that includes government agencies—that keep saying, 'We only want 100% new products.'" Azar is pleased that late in 1993 the Clinton Administration, in an end run around Congress, issued an executive order that urges (but doesn't require) federal agencies to buy green products like refurbished photocopiers.

No one knows how many of today's products are green. Maybe 5%, maybe 10%. But in ten years, predicts IBM's Kirby, all products will be made for disassembly and refurbishing—turning both the earth and some