

METROPOLIS

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MACHINES FOR SITTING

The complex job of making
your office chair simple





SOME
DIS-
ASSEM-
BLY
RE-
QUI-
RED

By Julie Taraska

Ninety-nine percent recyclable, the Think chair can be disassembled in five minutes using common hand tools. The chair's parts are separable rather than fused to increase the likelihood that they will be recycled at the end of its life.

Courtesy Steelcase



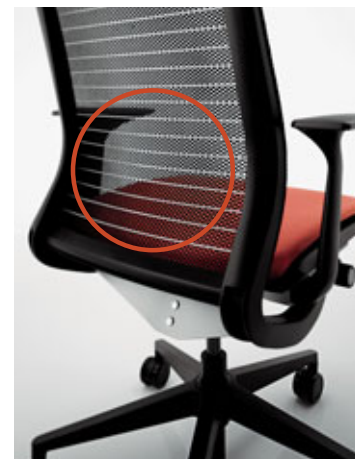
Sometimes how something comes apart is more important than how it comes together. This was the case two years ago when Steelcase began developing the brief for its new Think chair. The company wanted an elegant, ergonomic, and environmentally sustainable midpriced (\$600–\$1,200) contract chair. And so Steelcase began at the end—consulting its network of recyclers. “We asked them, ‘Realistically what would you recycle from a chair?’” says Ken Tameling, head of marketing for seating at Steelcase. “They said, ‘Well, if I could take a common hand tool and get a lot of materials from the chair in five minutes, then I’d do it. But if it takes longer than that, forget it.’”

From that response, Think’s ethos was shaped. The chair, which will be available for order this month, is made to be disassembled so that after its useful life components can be easily accessed, sorted, and returned to the raw-materials stream. To make this cradle-to-cradle strategy truly work, Steelcase had to ensure that the goal was supported by all steps in Think’s life cycle—from the chair’s design, engineering, and materials to its production, transport, and reuse. It had to rethink its manufacturing process and create a new program to help customers determine the most responsible way to dispose of their chairs and assist them in accomplishing that.

Other companies may have redesigned their products for environmental benefit, using recycled content, altering production techniques, or even—like BMW and appliance manufacturer Matsushita—experimenting with take-back policies. But nothing yet has approached Think’s carefully plotted-out sustainability strategy.

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Threaded through Think’s back and seat panels is a set of flexors that expand and contract with the user’s movement. Like the muscles along one’s spine, which hold the vertebrae in place, each flexor works individually and has its own separate limits; together they form a coherent surface that gently pushes the back into an ergonomically correct shape.



ENGINEERING + DESIGN

“It was first about the reduction of physical and visual weight,” says Glen Oliver Löw, the chair’s principal designer. For Löw, whose long career includes designs for Gebrüder Thonet, Kartell, and Vitra, the transparency of the chair—in its look, elements, and assembly—became a driving force. “I wanted everything to be visible,” he says, “with all the components showing their function clearly to the user.”

During design development Löw conferred closely with Kurt Heidmann, Steelcase’s chief engineer. After conducting a raft of research—including tension and thermal studies, computer and physical modeling, video ethnography, and hands-on experimentation—Heidmann and his team concluded that Think should be a weight-activated, ergonomically correct chair, which users would find, in Löw’s words, “as intuitive as sitting on a beach.” To achieve this balance between ease and science, the engineers developed a number of new mechanisms: **Your Profile**, a parallel set of stainless-steel flexors threaded throughout the chair’s back and seat panels; **Your Preference**, a back selector that offers a choice between three reclining positions; and **Your Power**, a u-shaped mechanism that allows for fluid, springy motion of the back frame and seat.

Heidmann struggled with a way to affix the back and seat frames while allowing for free

movement of each. His “aha!” moment came while attending a lecture by biologist Robert Full, who suggested that to create more natural motion in robots springs should be used rather than joints or limbs. Heidmann applied the idea to Think, replacing the previous machinery with a single bouncy u-shaped mechanism.



Although Think is weight-activated, its engineers still had to account for user physiology, work styles, and personal preferences. So the team added the chair’s single adjustment knob, Your Preference, which offers a choice between three reclining positions.

75%

PERCENTAGE OF STEELCASE
PRODUCT THAT IS SHIPPED
WITHOUT PACKAGING.

WHAT'S INCLUDED

ALUMINUM	6.8%
STEEL	22.4%
ZINC	15.9%
ACETAL	4.0%
PA (POLYAMID/NYLON)	28.5%
PE (RECYCLED SODA BOTTLES)	0.1%
PP (POLYPROPYLENE)	6.2%
RUBBER	0.4%
TEXTILES	18.0%



LIFE-CYCLE ANALYSIS

Niki Bey, a consultant at the Institute for Product Development in Copenhagen, used the Environmental Design of Industrial Products (EDIP) methodology to tabulate Think's cumulative effect on the environment throughout its lifecycle. Bey focused on key environmental impacts like smog, global warming, and acidification, taking into account such elements as the location of Think's suppliers in relation to the manufacturing facilities, and the amount and types of energy used to create the chair's materials. With Wolfgang Wimmer, from the Technical University of Vienna, he summarized the results in an Environmental Product Declaration (EPD), which will be publicly available later this year.

To complement Bey's tabulations, Steelcase also looked at the impact of the 14 raw materials used in Think. Utilizing the Cradle-to-Cradle Protocol, a proprietary method developed by MBDC, Jay Bolus evaluated seven of the chair's higher-volume substances, assigning each to one of four categories: green (little or no risk to humans and the environment), yellow (low-to-moderate risk), orange (no indication of risk, but further data needed), and red (high risk). Only green and yellow materials were used in the chair. Bolus and Bey's work ensured that Think met the requirements for Japan's Green Label, France's NF Environment Label, and the United States' Greenguard Certification.

WHAT'S NOT INCLUDED

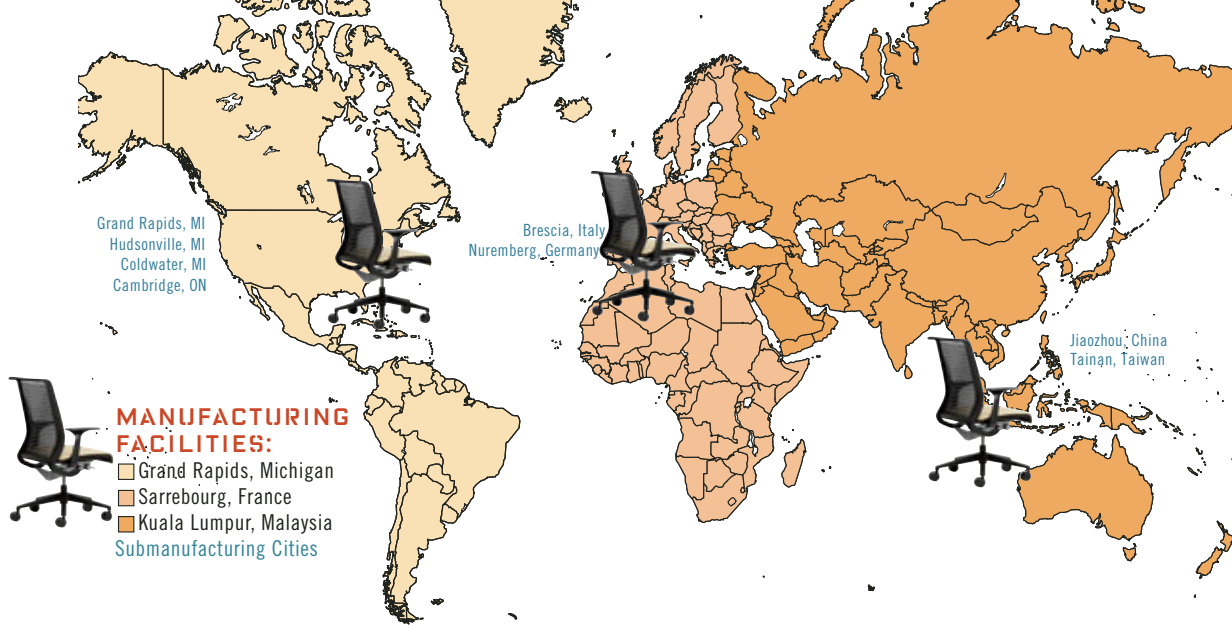
PVC, ASBESTOS, SOLVENT-BASED COATING, CFC, PBB, METHYLENE CHLORIDE, FORMALDEHYDE, HCFC, MERCURY, BENZENE, STYRENE, TDI, PLATED CHROME, LEAD, TOLUENE, VINYL, LATEX

THINK IS
99%
RECYCLABLE



Think is designed for disassembly: these stills from a video, which will be posted on the Steelcase Web site, show just how easy it is to take apart the chair and sort its pieces. "A lot of designers and manufacturers don't take disassembly into account when they make their products," says MBDC's Bolus. "They pick the right materials, but then they put them together in a way that makes it difficult to get those materials back and reuse them."

Courtesy Steelcase



MANUFACTURING FACILITIES:

- Grand Rapids, Michigan
 - Sarrebourg, France
 - Kuala Lumpur, Malaysia
- Submanufacturing Cities

MANUFACTURING + TRANSPORTATION

Companies often produce a product on one side of the world and then ship it to another; this approach may even save money, but it wastes fossil fuels and adds to air pollution. For Think, Steelcase has centralized its manufacturing process, minimizing the distance between the company's factories, suppliers, and customers. The chair's 12 subassemblies are supplied by eight fabricators, each of which is located as close as possible to one of Steelcase's manufacturing plants. These facilities have been placed to serve specific sections of the global market: the Grand Rapids, Michigan, plant will fulfill orders in North and South America; the Sarrebourg, France, factory will serve Europe and Africa; and the Kuala Lumpur facility (to open May 2005) will provide for the Asian and Australian markets.

SHIPPING

Steelcase will ship Think in plastic wrap rather than in cardboard containers, and is encouraging its suppliers to transfer parts to and from the company in reusable totes. The chair can also be sent fully disassembled so that more will fit into each delivery truck or partially assembled in boxes that do not contain dye, eliminating the environmental damage done by ink.



USE, REUSE, + END OF LIFE

Think is calculated to have a 20-year life expectancy, although that estimation is the absolute minimum because chairs often find second and even third lives in homes, universities, and nonprofits. For that reason, with Think, Steelcase is debuting the "Steelcase environmental partnership," a combination take-back and brokerage scheme that taps into a nexus of suppliers, charities, and recyclers in the United States and Europe. Intended to help the company better serve its customers, as well as to keep Steelcase products out of the landfill, the process starts with customers answering a series of questions about the age, condition, amount, and location of the furniture involved, as well as what they'd like to accomplish with the items. Based on those answers, Steelcase suggests one or more of four scenarios: refurbish the chair, sell it to a third party, donate it to a charity, or recycle its component parts.

STEELCASE ENVIRONMENTAL PARTNERSHIP

→ CHAIR IS IN GOOD SHAPE



→ CHAIR IS IN BAD SHAPE

→ 1. REFURBISH
REPLACE SEAT AND/OR BACK CUSHION
ADD/REMOVE ARM RESTS AND LUMBAR SUPPORT

→ 2. RESELL
→ 3. DONATE
CASE BY CASE BASIS
THROUGH A NETWORK OF BROKERS AND NON-PROFITS IN THE U.S. AND EUROPE

→ 4. RECYCLE
GUIDELINES FOR RECYCLING OPTION:
1. CUSTOMER PAYS FOR TEARDOWN AND FREIGHT COST
2. WILL ONLY ACCEPT STEELCASE FURNITURE
3. CUSTOMERS WILL BE ASKED TO SIGN A LETTER OF UNDERSTANDING ABOUT THESE CONDITIONS.

Steelcase®

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