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# PLASTICS

## WORLD

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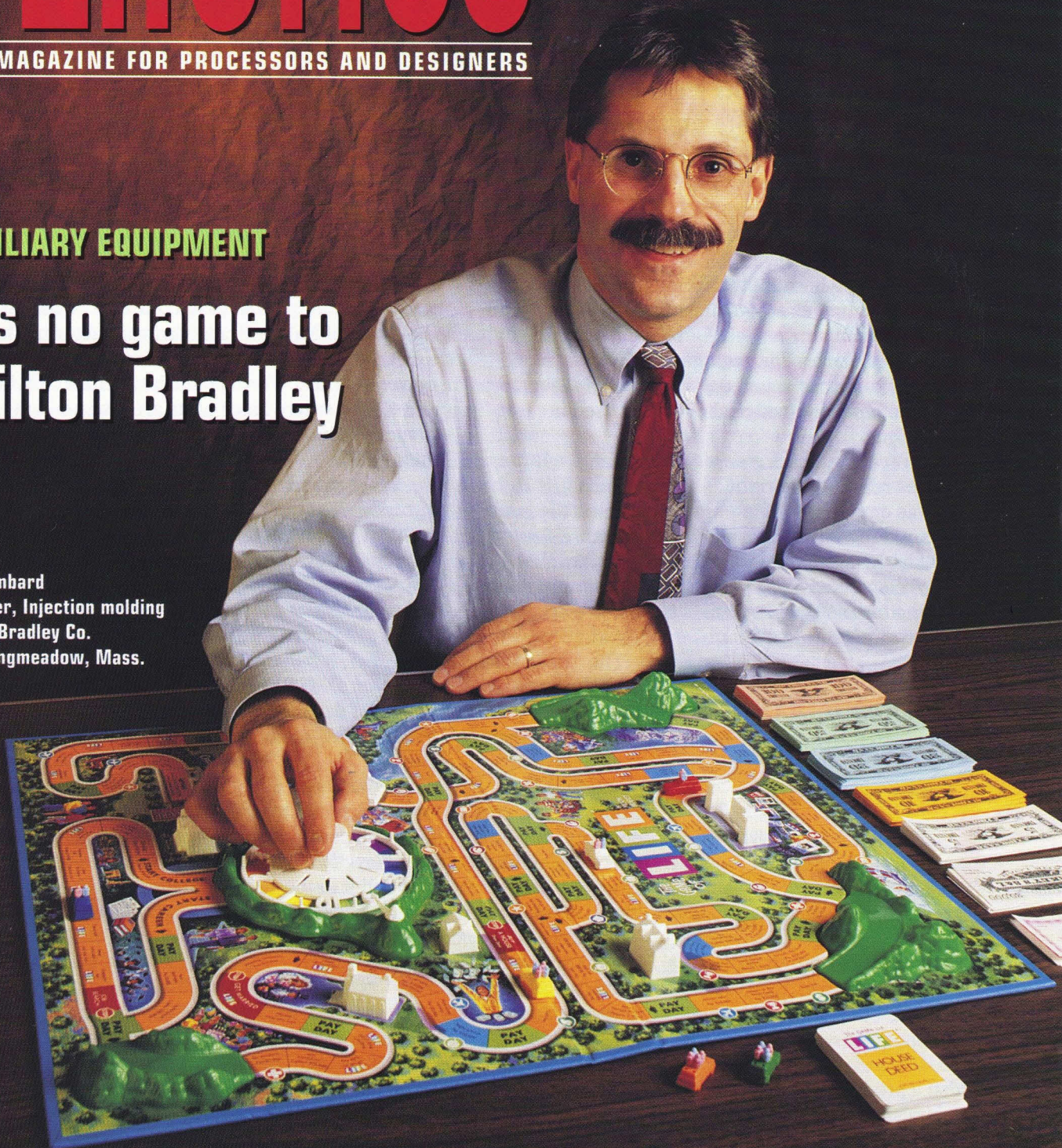
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### AUXILIARY EQUIPMENT

## It's no game to Milton Bradley

Jeff Lombard  
Manager, Injection molding  
Milton Bradley Co.  
East Longmeadow, Mass.



# GAMES

## tip the scales at Milton Bradley

*Getting part counts right on the money wasn't exactly Candy Land until operators switched to digital scales fed by automated conveying equipment.*

**By Doug Smock, Executive Editor**

**T**he factory where Milton Bradley and Parkers Brothers games are manufactured produces a billion plastic parts a year. And it's important on Christmas morning that each game contains the required number of spinners, pink station wagons, rooks and pawns, or red-peaked hotels used in Monopoly.

Until recently, making sure that the exact number of pieces reached the right assembly line at the right time was one of the vexing problems facing the company's production system. "I would say more than any other single issue, this caused credibility problems for us," comments Gary P. Brennan, director of manufacturing for the Hasbro Games Group, in a recent interview with **PLASTICS WORLD**.

*'When 4,000 plastic spinners are requested, there is no time for inaccuracy.'*

*—Jeffrey R. Lombard, manager of injection molding*

The man on the firing line was Jeffrey R. Lombard, manager of injection molding at the company's largest domestic molding operation, in East Longmeadow, Mass., a suburb of Springfield. "I used to receive frequent calls from managers who didn't have enough parts to

finish a production run," Lombard says. The result was a rush to mold the requisite parts.

Add to this the fact that rush orders for toys from

empty-shelved retailers late in the year can allow little, if any, time for planning. And moving quickly is one of the fortes of Milton Bradley's manufacturing department. After all, most toy and game injection molding moved to Third World countries, particularly Mexico and China, where labor costs are lower — but response time is slower. But the Milton Bradley operation of Hasbro likes to mold domestically so that it can react quickly to rush orders. Also for that reason, virtually all of the molds used in the plant are made within a 90-minute drive. That's another anomaly in the toy manufacturing business, which was one of the first to source tooling in large quantities offshore.

So when an order for 20,000 sets of Sorry or the Game of Life arrives from a Wal-Mart or a Toys R Us on Nov. 1, it behooves the manufacturing department to deliver 20,000 perfectly assembled games within a matter of days. That's not easy when you're talking about oodles of multi-colored Lite Brite pegs or poker chips.

"We had been using balance-beam scales, which were not accurate to the degree we needed, especially for small-part inventory," comments Lombard. In a former Playskool manufacturing plant, injection-molded part count in the 1980s as determined by balance beam scales was off 2-4%. For blow molded parts, the count was off 5-8%.

### **Bulk weighing**

As parts are molded they are packaged in bags or boxes for delivery to a warehouse or right to the assembly line. The packages are weighed to determine part count. Each time an assembly line runs short, there are significant disruptions throughout the manufacturing system. "What we place into

inventory may not be requested for weeks," Lombard notes. "However, when 4,000 plastic spinners are requested, there is no time for inaccuracy."

Lombard decided to upgrade to newer weighing technology, specifically electronic counting scales. The company contacted National Scale of New England, a distributor in Springfield. They selected the Super Count and Quick Count scales manufactured by Setra Systems Inc., Boxborough, Mass. "We chose the Setra scales because of their accuracy, weighing capacity and ease of use," said Lombard. "We now have 36 of their scales in our molding operation and one scale on a cart that can be taken on to the floor for quality checks."

Molded parts at Milton Bradley are typically fed automatically via conveyors to a holding area where they can be visually inspected periodically by an operator. Then the operator pushes the parts into a bag or box where they are weighed. Many parts of the process throughout the plant are automated. For example, at one station parts are automatically bagged, weighed and then blown into a box with a puff of air.

The part count accuracy with the electronic scales is  $\pm 1\%$ , even for thousands of parts weighing as little as a gram apiece. Lombard says there has been a dramatic reduction in downtime part outages. In addition, the inventory system typically adds a 1% variance to even further minimize disruptions. If there are a few parts left at the end of the game assembly? "We give them to the customer," Brennan adds.

Separately, the Setra scales are used to weigh parts in a statistical process control procedure. If the part weight is  $\pm 1\%$  of target weight,



**Use of an electronic**

scale dramatically improved part count determinations. The Super Count and Quick Count scales offer counting resolution as fine as one part in 500,000 and weighing capacity to 110 pounds.

it is acceptable. Underweight parts may be faulty and unusable. Overweight parts are chewing up too much plastic.

In one example of the SPC process, five sample shots are automatically collected every half hour from an Engel press equipped with closed-loop process control. Data is electronically entered into a personal computer near the press and plotted showing the weight range compared to upper and lower limits. The monitor is easily visible to an operator nearby.

If the line goes beyond the con-

department in East Longmeadow runs 65 injection molding machines and one vacuum forming machine. The injection presses range in size from 66 to 750 tons. Milton Bradley does most of its own molding, but requires a little help from custom molders in the New England area. Injection molding at the company dates to 1962 with four presses located in a greenhouse. Some of the first presses in the plant were Reed-Prentices, which were manufactured just a mile away.

As the plant grew and took over other molding operations, other brands of machines were used: Cincinnati Milacron, Van Dorn, Mannesmann Demag and Engel. Now Lombard is conducting a machine investigation to standardize on one brand in a gradual replacement process. "Factors we will consider are first, machine reliability and repeatability and then customer service issues, particularly in regard to training and service support," notes Lombard. The company is leaning toward closed-loop presses.

### **Mattec beta site**

Milton Bradley was a large company beta site for Mattec in the late 1980s and relies heavily on its data output for management control. "I couldn't do my job without that infor-

*Part count accuracy with the electronic scales is  $\pm 1\%$ , even for thousands of pieces weighing as little as 1 gram.*

control points, a setup person is summoned to the workcell. He then makes changes in the process based on a predetermined list of common causes of trouble. He may, for example, first increase injection pressure. If that doesn't help, he may next increase fill speed, and so on. Samples are later weighed in an off-line process as an additional check.

The Milton Bradley molding

mation," comments Lombard. At five locations in the plant, a monitor displays cycle times and other operating data for a group of machines. A setup person can see at a glance, based on a color coding, which machines need attention. Milton Bradley uses its own proprietary inventory control system, which is why Mattec isn't used for part counts.

The company was founded in 1860 by a man named Milton

Bradley, who was a lithographer. He printed a lithograph of Abraham Lincoln, which was very popular until the newly elected president grew a beard.

Bradley then used his printing skills to invent a game called "The Checkered Game of Life." Inspired by the "Checkered Game," The Game of Life is a staple at Milton Bradley, whose other classics

include Chutes and Ladders,

Candy Land, Twister, Yahtzee, Big Ben Puzzles, Scrabble and Lite Brite.

Milton Bradley and its subsidiary Playskool became part of Hasbro Inc., Pawtucket, R.I., in 1984. Other toy companies that have joined the Hasbro group include Coleco Industries, Tonka, Kenner Toy and Parker Brothers.

Today, the company is highly integrated.

That's one of the reasons Hasbro operates molding departments in Massachusetts, Texas, Mexico, Spain, Holland and New Zealand. In Vermont it even operates its own sawmill and woodworking plant to make the racks and letter pieces for Scrabble and wood blocks for Jenga.

Part of the reason is the ability to respond on the fly to last-minute orders. But costs are also an important issue. The 34-year-old plant in Massachusetts is in effect competing against low-cost labor plants in China and Mexico.

"We are constantly re-evaluating



**The Game of Life**, like many Milton Bradley games, uses a myriad of small plastic parts.

our manufacturing operations and everything we do must be cost-competitive," Brennan notes. That even includes bidding on orders. For example, the mission of the tool shop in Massachusetts is primarily to maintain and repair tools. But it also wins two to three orders a year to make tools for the molding operation, which has 300 active tools.

The machine utilization rate for Lombard's operation is 90%, high by anyone's standards, particularly given the age of some of the molding machines.

Part of that, of course, is due to the system: long production runs, making parts for storage. But it's mostly due to how the plant is run: down time for mold changes average 70 minutes. Molds are kept in tiptop order.

"Before we put a mold back in service, we know that all the heaters work, the mold has been preventatively maintained and that it will make good parts," Lombard says.

Another strategy the plant is

using to maintain its global competitiveness is cell manufacturing. In some situations that means mating several presses with a minimum crew. In others, it means complete assembly of the finished game in a highly automated process started with the injection molding press.

Automation figures heavily in the cells. In one, a Yushin robot is used to verify a 32-part count of black or white chess pieces, separate the runners, release one set of 16 pieces into a bag and then release another set into a separate bag. The process used to be manual.

Lombard is investigating other changes in the process to further improve efficiency and quality. One is greater use of new closed-loop presses. Another is replacement of an auger-based blending system the company's own engineers developed.

"Our goal is to be more cost-effective than any molding operation in China, Mexico, or other nondomestic locations," Lombard states. **PW**