



"The great strength of this tool is the way in which it encourages you to look at the dynamics of a whole system, rather than a relatively static view of a subsystem."

--Robert Bresticker, Senior Staff Manager, Motorola, Inc.

Case Study

The Need for Visual Thinking

The manufacturing arena has been the site of many innovations over the last few decades. "Just in time", "total quality", CIM and CAM are but a few of the more prominent innovations to penetrate this arena. Manufacturing people must address an extraordinarily diverse range of issues. These range from traditional line-balancing and inventory management type problems, to make-buy decisions, technology strategies and re-skilling of the work force.

Despite the diversity, virtually every manufacturing issue in some way resolves around a basic flow that stretches from raw materials through intermediate goods to finished product. No matter which tool is applied, it is essential that an accurate representation of this basic flow of materials be achieved.

The *iThink* software is built around a stock and flow framework. This makes it ideal for capturing the essential manufacturing flow infrastructure. But, unlike many of the higher-priced tools available to manufacturing people, the *iThink* software also can easily accommodate the other kinds of variables, which populate manufacturing issues. Things like average skill levels, productivity, burnout, and the average quality of the relationship with design engineering are all fair game for the *iThink* software.

The Setting: A Fortune 50 high-tech manufacturer

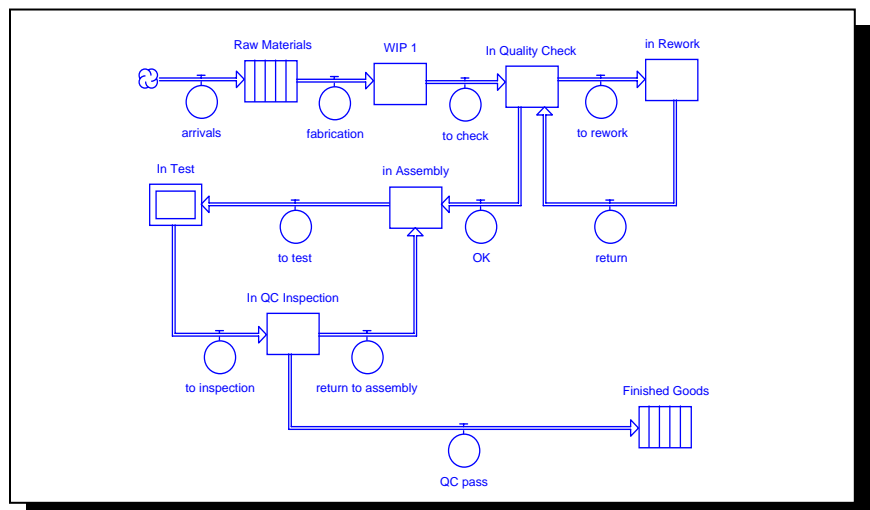
The Topic: A long-term manufacturing strategy.

The Challenge: Tremendous complexity and change.

Background: The case unfolded a large group within the manufacturing organization of a major US-based high-tech manufacturer. The group was charged with setting the direction for the Company in securing one of its strategic component parts. The group was buying nearly 70% of the components from outside vendors (including its own competitors). At the same time, the Group's own manufacturing operation was saddled with a host of operating issues, including some major yield problems.

Step 1: Map the Current Process. The strategy team's first activity was to create an overview map of the basic manufacturing system for the strategic component of interest. The simplified map below shows only a very small piece of this system. The full map was a highly elaborate network that linked process design, pilot line and volume manufacturing operations. The map also dealt in great detail with manufacturing headcount and the associated skill-mix issues.

Step 2: Model. Once the basic manufacturing map was laid out, attention turned to incorporate the assumptions about how the system worked. One of the key relationships in the system



was that between expertise of the volume shop operators, and the average yield of the volume operation. The *iThink* software makes it easy to incorporate such non-linear relationships using the graphical function (illustrated at right).

Step 3: Simulate. Once all the assumptions had been sketched or clicked in, the next task was to simulate. The *iThink* software can display simulation output in several ways. In many manufacturing situations, it is effective to make use of the *iThink* software's animation capability. This lets people see exactly where the manufacturing flows are clogging up or breaking down. In this case, one of the dynamics that emerged clearly via animation was the reallocation of headcount from development and pilot activities into volume production when the plant was less than fully loaded. Reallocation helped by raising ship volumes, thereby spreading the fixed cost base over a large number of units. The problem was that although reallocation helped with short term profitability, it also caused an expertise and technology gap to develop in both the process design and pilot operations. These, in turn, caused yields to decline, and reliance on outside vendors to increase – both of which were threatening the Company's long-term strategic advantage.

Step 4: Test Policies. Once an issue like headcount reallocation is surfaced, the *iThink* software's automatic sensitivity analysis can be used to explore alternative policies for addressing the issue. In this case, the management team wanted to see what the bottom line implications of a "no reallocation" policy were. This was easily done using the *iThink* software's comparative plotting feature.

Step 5: Celebrate! The *iThink* software enabled the group to grapple with a very broad set of issues, and to emerge with a clearly defined strategic vision, and an associated set of operating policies for competing effectively in the years ahead.

