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TAKE 2000

TAKEN AS DIRECTED:
Solutions for Century Compliance
Offer Long-Lasting Relief

A Supplement to Software Strategies

10

Manufacturing's Millenium Party

Take two...magazines. Because this time out, *Software Strategies* is giving you two magazines for the everyday low price of one. It's your lucky day.

By now, any soul with a pulse has at least heard of the year 2000 computing problem. In case you haven't heard it a thousand times, here—for the first and last time in this publication—is a highly condensed version of the story.

The tired old story: Once upon a time, to save time, money, and mainframe computing resources, people who thought the sky would fall before the year 2000 used two places to record the year ("YY") instead of four (Millenium/Century/Year/Year). The problem is real, and the same information technology industry that created the problem has evolved to the point where vendors are now exhorting (and extorting) manufacturers to buy the antidote.

And yet, we're nauseated by the prospect of rehashing the same old problems. And why we designed this editorial supplement to focus on a better understanding of the solutions.

The same old press: The worldwide press coverage on this issue has been spectacular, yet only occasionally interesting for those whose lives are dedicated to managing the integrated manufacturing enterprise. What's been lacking is some honesty about how the century date change will affect this sector of the economy we call home.

The general consumer media dumb the issue down. Generic information technology journals cover programming, but not manufacturing solutions. The newsstand business press covers business issues well, but not the business of manufacturing. Finally, the typical trade rag editor is more interested in telling what the advertisers—some of the same weenies who got the world into this mess in the first place—are selling.

The Web's got a lot, but there's still a need for independent journalism on manufacturing.

Meet the new press: Oh, man, is the time ever right for Software Strategies to lay this editorial supplement on you. It's my job to make sure we bring you journalism that's wor-thy of our name. Here's how it works:

The cover story, **"Take 2000,"** provides common ground with an overview and analysis of manufacturing's business and operational issues relative to the turn o' the century. This is followed by three articles, focusing on a small, a mid-sized, and a large manufacturer. I'd call them case studies, but they're not; they're "solutions in progress." Because the case won't be closed until MM DD YYYY arrives and we see who's still standing.

First, there's **"Light Manufacturing,"** the touching and somewhat controversial story of how a small manufacturer, Illumination Concepts gave its unsupported DOS manufacturing software the boot for a new Window of opportunity (Page 12).

Next, **"Blue-Sky Compliance"** shows how the mid-sized Bristol Aerospace is adding value to its mixed-mode business by tossing its mainframe and tying multiple information platforms and applications into an integrated business system (page 18).

And—got your ears on? In our third stop, **"Head Start on 2000,"** Navistar International takes us down the road to century compliance and into the land of multi-divisional, multi-systems integration against a landscape of UAW labor negotiations, corporate reengineering, and planning for a still-secret next-generation big rig (page 24).

By journey's end, the message is clear that for small, medium, and large manufacturing firms alike, any year 2000 compliance project begins and ends with two simple words: business process.

Our final destination is a three-page **"Y2K Directory"** of books and Web sites for further education or infobahn cruising to find more resources, news, and all the 2000 links you want (page 28). And we're giving it away for a song.

Happy millennium to you.

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The millennium bug has infected manufacturing's corner of the global economy. There's no fast-acting remedy, but a lot of snake oil. Those who act early and follow a prescribed course of action can, however, get long-lasting relief.

By Bob Sperber

TAKE 2000 AND CALL ME

The old saw "Take two and call me in the morning" made sense in the old days when doctors made house calls and Windows were only for looking through. Today, a global economy—and our manufacturing sector of it—is spinning toward the year 2000.

Potentially, year 2000 bugs can infect all things that are old, digital, and date sensitive. It can hit a sytem at the highest levels of advanced planning and scheduling or enterpprise/manufacturing resource planning (ERP/MRP II); the plant/shop-floor level of manufacturing execution systems (MESs) or real-time controls, or any department or function that relies on dates.

The roots of the problem are simple enough: Years ago, computer hardware and software systems, from silicon up through applications, stored dates in two places (97) instead of four (1997). By now, everyone's figured out the problem—1900 looks the same as 2000 to an old computer. This is the problem, and it's simple to understand, even if the solutions are not.

What we all need is some perspective.

Where in the world is manufacturing?

Manufacturing is not going to be the first industry to experience the problem because there's a greater event horizon or lead time to prepare.

Experts say the Wall Street securities industry will be (or is) the first and hardest hit by the problem. According to authors Ulrich and Hayes in their book, *The Year 2000 Software Crisis*, (Prentice-Hall, Upper Saddle River, N.J.), banking, insurance, health care, government, and communications will will also be hit sooner and harder than manufacturing, transportation, utilities, pharmaceuticals, and small companies in general.

All this is cold comfort to manufacturers, because their information technology (IT) resources are leaner, and the industries affected first affect us all.

Many in the industry concur that manufacturers are probably lagging too far behind.

"A lot of companies don't seem to have the will to win in this situation because they haven't created the top-down momentum to succeed," says Bob Cohen, vice president of the Alexandria, Va.-based Information Technology Assn. of America (ITAA) and editor of the organization's Web-based weekly Year 2000 Outlook.

In his considerable time spent serving 11,000 ITAA members, Cohen believes that mid-level technical managers understand the significance of the

problem, "but as far as attracting the attention of the chairman and the board of directors, these year 2000 true believers are left out in the wilderness."

ITAA's Cohen believes that top top managers may mistakenly percieve a year 2000 fix as something that can be bought "as if it were an outside service, like building maintenance. Unfortunately, the size and complexity of the problem cannot be solved with a quick fix."

Within manufacturing, Roland Wilson, manager with Arthur Andersen's business consulting office in Chicago, does "not see a particular segment with markedly different year 2000 issues, as compared to [firms within] the financial and insurance industries, which have very different drivers. In manufacturing, the stumbling block you hit is long-range forecasting, and I don't see that as necessarily hitting only one industry segment within manufacturing."

Considerations beyond forecasting, he says, include accounting, production and capacity planning, customer order processing, inventory control, and other date-sensitive product information such as date codes and lot tracking functions. (see figure: "What Will Fail?")

While there's lots of common ground in manufacturing, definitions of what constitutes mission critical can vary. For example, food and pharmaceutical firms have special product date-coding and process reporting requirements. And companies with highly complex products, such as aerospace companies, have especially date-sensitive issues such as engineering configurations that must be quoted and planned years in advance.

Project Phases, Technical Fixes

When you strip a year 2000 solution down to its basics, there are there are only a few steps:

- preparation (systems inventory and assessment);
- implementation (modify/replace systems);
- testing and validation (quality checking and status reporting); and
- final changeover to new systems.

How simple or complex these phases become is a function of the business enterprise going through the process.

In the testing and assessment phase(s), manufacturing companies must do a thorough inventory that does not overlook critical elements that may, for instance, be embedded in machinery. In the assessment, priritization of risk levels is key.

Moving to the implementation, what are the

options for implementing a fix?

One option is to eliminate software application(s) whose critical functions can be performed by others. Next, install new off-the-shelf software to replace the old one(s). There's also the option of writing new application functions, most likely using so-called "rapid" application development tools (e.g., when legacy runtime systems are still in use but the source code is long gone, as are all affordable programmers.) Finally, there's the option to outsource entire business functions to firms specializing in this practice.

"You're not going to do just one of these, but a composite of these options based on your applications and your business objectives," says Doug Dedo, group product manager and year 2000 guru for Microsoft's strategy-setting enterprise development tools group. Working with Fortune 500 IT managers, he says each company's changeover plans are "absolutely company specific."

Small and Mid-sized Manufacturers

In the community of small-to-mid-sized manufacturers, "there's a great potential for panic buying late this year or early next," says Jorge Lopez, vice president heading up strategy for Columbus, Ohio-based ERP vendor Symix. Citing the lack of a silver-bullet solution, he agrees with the notion that top management does not understand the significance of the problem, and when they do, often fails to see the opportunity in a solution.

"The worst thing a company can do is to automate what exists without regard to improving business pro-

Source: Arthur Andersen
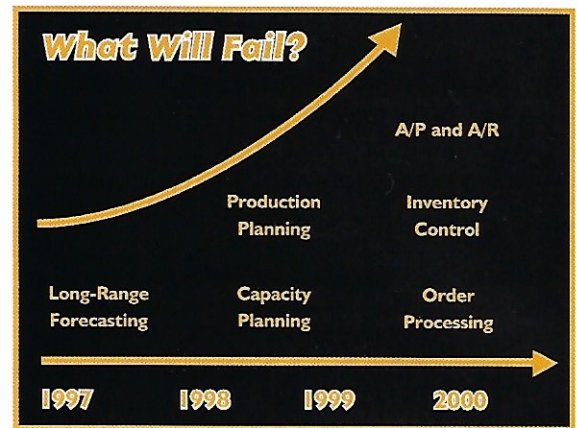
cesses." This business process connection is the mantra at successful manufacturing companies of all sizes and types, and explains why so many have trouble separating their year 2000 budgets from their "had to do it anyway" budgets.

Jim Prevo, chief information officer of Green Mountain Coffee Roasters, Waterbury, Vt., says enterprise-level century compliance was prompted primarily by switching from a customized legacy system to an integrated ERP system. (PeopleSoft beat other short-listers Baan, SAP, and SCT to win the contract.)

The installation, says Prevo, "was really made to accommodate our growth and wasn't directly made as a result of being pressed to comply with the year 2000." The 16-year-old company has been growing 20 to 30 percent a year to reached $38 million revenues for 1996. In light of Green Mountain's motivations, Prevo says, "it

Automotive Industry Winning the Supply Chain 2000 Race

Large firms with upwards of 1,000 suppliers cannot afford to miss a beat. If a supplier to General Motors, for instance, fails to produce a part on schedule, the cars can't come off the line. Now, imagine the complex cacophony that results when the electronic symphony of transactions breaks down due to non-compliant dates.

"Any little part , it could be a key part, and could shut you down," says Don Blair, associate director of the Automotive Industry Action Group (AIAG) based in Southfield, Mich., and an on-loan executive from automotive supplier Dana Corp. With the complex tiers of suppliers—and suppliers to suppliers—Blair explains, "the implications of supply chain non-compliance cascade right down through the sub tiers. You may have everything cleaned up in your house, but it's critical that everyone, at every tier, checks their sub-tiers to assure a continuity of supply."

AIAG was established in 1982 by the Big Three and now includes 1,300 international suppliers to the industry, from parts-makers to software developers. Last year, the group put together an ad hoc year 2000 task force. In March, an

AIAG/Big-Three-sponsored survey went out to suppliers to identify how the problem might affect material forecasting and logistics in several areas: electronic data interchange; financial procurement systems; new (car) model program management; lot traceability and quality data; manufacturing processes; diagnostics; inspection equipment; and bar-code scanning equipment. A more specific checklist is now in the works, and in the coming months, the group is looking to publish a database of year 2000-compliant vendors and tools.

Due to a concerted effort, he believes, "The automotive supply base to the Big Three automakers have things pretty well under control." Specific programming methods (e.g., date-windowing standards) are in the works fir IT staffers, while management initiatives continue on a parallel track.

The consort is now working on a database of year 2000 best practices and industry-specific resources. "At this point, everybody's working on their year 2000 project not only in the office, but on the manufacturing side. Because of what the AIAG and Big Three have done with their supplier base, I think there is a generally positive movement in the industry."

would be very difficult to break apart the year 2000 piece of the budget."

According to Arthur Andersen's Wilson, small companies "can more easily get their hands around the problem and more quickly implement a solution." A single-site company with less complex business processes and less legacy code has an easier time fixing or replacing legacy systems with PC-based client/server systems.

The Large Enterprise

A "bigger they come, harder they fall" mentality pervades most industries regarding the year 2000 crisis, but Microsoft's Dedo considers a high inventory of mainframes the real problem. "The physical size of the company is not as important as where a company is in its deployment of IT systems," he says. In short, it's not the size that determines cost, but what's in the systems inventory. "The number of mainframes does not always map to revenues. For instance, there are zero mainframes in Microsoft's data center, our glass house."

"It's not just a mainframe problem," argues Anne Murphy, vice president at Storage Computer Corp., a Nashua, N.H. firm specializing in hardware/software systems for data storage and backup) commonly used in year 2000 testing). In the large enterprise, however, chances are, there are going to be lots of mainframes and therefore IT complexity.

Before bringing a new software system online, lots of testing is needed, and at this phase, Murphy says the key issue "granularity," the ability to prioritize and select which applications or parts of applications require full-depth compliance testing of system-level code, vs. application-level checking of user-entered information that may be date-sensitive.

This is just one example of the greater level of depth and therefore longer lead times large organizations typically require at all phases of a year 2000 solution.

One top-tier company caught its millennium bug in human resources when seven-year employee benefits projections crashed. The consultant, Cap Gemini and its TransMillenium year 2000 group, inventoried about 6,000 legacy Cobol programs to find 70 percent of them non-compliant. And top-tier drug-maker Eli Lilly and Co., has reportedly saved millions in taxes and reduced customized management reports by 80 percent due to a year-2000-meets-business-process ERP installation.

Arthur Anderson's Wilson is working with a $2-billion-a-year building products maker that has chosen to fix rather than replace home-grown legacy MRP, order entry, and customer service applications, and is evaluating packaged solutions for financials, inventory, and purchasing. "I think these guys are doing a lot of things right," says Wilson, in choosing a mixed fix/scrap-the-app strategy.

Embedded Assets

Just because it's not in a tan box, that doesn't mean it doesn't need a century compliance check. The IT inventory should consider all sources of silicon, including industrial controls and allied systems, which can hide date considerations in areas of storage, transfer, output, and calculation. Furthermore, a site-specific list that includes all embedded software should be a standard part of the IT inventory.

Automation Research Corp., Dedham, Mass., identifies several places where your plant or shop floor might hide non-compliant dates:

Storage

- data historians and trending
- alarm and event logging
- lot/part number tracking
- maintenance databases
- calibration information in smart sensors
- storage and retrieval systems
- inventory management systems
- product tracking databases
- uninterruptible power supplies
- building automation and security systems

Transfer

- production planning
- recipe and batch processing
- statistical process control
- laboratory information management systems
- process information/manufacturing execution systems
- dates embedded in bar codes
- controller programming
- time synchroization of controllers and networks
- keyboard entry

Output

- shift reports
- certificates of analysis
- shipping documents
- operator interface screens

Calculation

- specific operations by day of week
- counters that span the 2000 rollover
- energy management systems
- expiration dates
- comparisons
- custom programs and scripts
- dates as code

Beyond the mainframe, adds Wilson, there are many more "local year 2000 issues [like] local area network management, communication with remote sites, shop floor, equipment controllers. They're approaching these kinds of issues with cross-functional teams—not just the IS group." At press time, plans are being finalized for implementing century compliance changes for programmable logic controllers (PLCs) and the PCs used to supervise them.

Mystery Dates

Many IT staffs overlook control and other industrial devices that often contain out-of-date (and date compliance) microchips. Companies that overlook this in a systems inventory are bound to have their budgets melt down along with their plants come New Year's Day, 2000.

"In manufacturing, utilities, transportation [etc.] there are a lot of embedded systems," says Dedo, citing awareness of all the cell controllers, monitoring devices, and transducer/transceivers in a manufacturing setting. "And guess what? Some companies refer to these as 'non-IT assets.' I think, fundamentally, if you have any kind of computerized or embedded systems…and the scope of your work is based on your assessment, then certainly that assessment phase should apply universally," he adds. Because to the extent that a piece of embedded software is vital to business objectives, a failure could have major implications.

Automation Research Corp., Dedham, Mass., has identified four areas where dates are used in industrial control systems: storage, transfer, output, and calculation. (See sidebar, "Embedded Assets.")

Silicon chips in manufacturing aren't much different from those in your microwave oven at home—including many of the Intel 286 vintage, which often fail compliance checks. Of course, burning a turkey is a lot less critical than downing an airplane, medical device, or a production line, or frying a nuclear reactor core. Hidden in places that don't look anything like the tan boxes the IT guys recognize to be computers, embedded programs can carry the millennium bug anywhere. From building controls on environmental, heating/ventilation/air conditioning, security, elevators through real-time process and machine controls, date-change failures can happen anywhere. Even in products, although the Big Three automakers claim the on-board engine controls won't fail.

Ken Owen, director of Fluor's system integration arm of the $11-billion global engineering firm of Fluor Daniel, Irvine, Calif., agrees that many embedded systems are being overlooked by manufacturers. While lean information staffs and out-sourced allies may help manufacturers get their business systems into compliance, Owen has commented, "I don't think you're going to find a tool to scan the ladder and logic in a programmable logic controller," referring to the language most common for these ubiquitous black boxes running processes and machines in most industries.

The problem is that vendors selling embedded systems to manufacturers are no better equipped or experienced at testing the date-change compliance of their products than many users. There's little way of knowing, short of testing, whether the vendors compliance claim is accurte.

ITAA's Cohen says, "It's just amazing, when you consider all the microprocessors out there…and there are no standards or controls on [compliance testing] at all." The closest thing going seems be ITAA's own compliance program, under which approximately 120 (and counting) companies—from ERP to real-time control software vendors—have received certification so far.

In moving from recognizing the problem to taking a plant or shop floor inventory and making an assessment of year 2000 non-compliance, it's important to make sure the lines of communication are open between engineers and others with specific knowledge of your real-time systems. Then the real work can proceed.

After compliance issues are addressed, the industry can hopefully get back to business as usual. Whatever that will be. **Y2K**