My first book is ‘The Crisis In Science’ - B0DWV44MZW this is the ASIN from the Kindle store.

The History of Homebuilding Software

Chapter One – Early days

My name is Charles Cosby (Chuck) I started programming computers in 1971. I also studied Electrical Engineering. However, my true love and core happiness comes from programming computers for businesses like Homebuilders. In 1975 I started working for Development Consultants, a civil engineering company. I was to be a computer Operator / Programmer. The company’s focus was on designing large master planned communities in the Southwest Houston area where I grew up. I knew nothing about civil engineering. But they were using computer software and a huge flat bed plotter to draw out the blueprints for each subdivision. These would be the streets, storm sewer, sanitary sewer, gutters, water line, electrical line, etc. We just did the design and got the city to approve it.

During the two years I worked there I had no real contact with Homebuilders as the sales department handled that. But I was ‘as they say’ learning the business from the ground up. In 1977 I got a job as a full-time programmer for TOM software in the Seattle area. I’ve been living here ever since.

One of my first programs at TOM software was to write a Homebuilding specific software system. They already had a full general ledger and accounting system, and they would customize it for each special market. I was working with an incredible team that had been put together with none of my effort at all, it was all in place. It consisted of several people who are the key players of this story. This is the story of how the Homebuilding industry got its first fully integrated ERP (Enterprise Resource Planning) system. My role – I programmed it.

The dramatis personas are Mike Johnson, Lee Evans, Chuck and Emma Shinn and of course Howard Bing the CEO of TOM software.

Howard had discovered the NAHB – the National Association of Homebuilders. They told him to talk to Lee Evans. Chuck and Emma Shin are already well connected to the Lee Evans consultancy back in 1977. In fact, Chuck Shinn runs (The Shinn group) to this very day. Emma had written a book on how Homebuilders should do accounting. I referred to that book many times over the years. Mike Johnson is like me, an employee of TOM. He has an accounting degree and is really tech savvy. So he does a mind dump from Lee, Chuck and Emma to figure out the Homebuilding industry. It’s important to note that Lee Evans is the only consultant to earn a place on the NAHB homebuilder’s hall of Fame – all the others are builders. Lee only worked with the best builders. And he made them better. These were production homebuilders doing 300 to 700 homes a year. Some even larger. Lee only worked with builders that wanted to treat the process as a reliable system with proactive management and good management by exception.

Mike figures the whole thing out and then tells me. Together Mike and I design the software to automate the builder process. I’ll go into great detail later, but here’s the short story. Builders need to issue Purchase Orders (POs) for each Subcontract and Material supplier for every House with precise quantities and Unit prices. The POs get turned in as Invoices after the work is done then get paid. All of this is handled by the software. Now back in these days the builders don’t use POs. We have only just

invented the Use-Case for Pos in the building industry. I remember in 1979 I was explaining POs to some very savvy builders, and they thought I was crazy. They didn't use POs, they saw no need for them, but they would. They would learn the hard way.

Back in these days the builders used mostly our accounting software. They entered vendors' invoices, and the system would write the check. They got Job cost reports and other reports. The system had a General Ledger. All of it was totally integrated and even deeply integrated. This was new thinking back in those days. We sold hundreds of builders the TOM system in the late '70s' and early 80's.

Then the recession of 1982 hit. It hurt the builders badly. This was the first time I had seen such a thing. I've seen too many at this point. But wow! 1983 was a banner year! Even in January I had builders coming to use POs because they had double or triple their volume and had to build as fast as possible. We said to them – that's easy, just use the rest of the system that you already have. And that meant they had to use Pos. But this time they gladly implemented the PO's and grew profitably.

I started my first company at this time called C-Tech. I was a reseller of the TOM system to homebuilders nationwide. Mike had helped me sell our primary client - J.D Brooks – a builder in Atlanta. He had 3 home sales in most of 1982, then in December he had 50 sales. Mike and I went to Atlanta and spent several weeks perfecting the system so that they became the actual first ever proving grounds for the automated PO system.

J.D. was a Lee Evans client, obviously, and told everyone how great it was working. Then I got 17 orders over a few days in early 1983. I was on the road a lot those days. But I was also hiring people in Redmond Wa to grow the company. JD Brooks really stepped up in 1984. Mike and I wanted to write the FAST system, but we needed funding. JD funded us $500,000 to get the system written.

In 1984 I sold C-Tech to the employees. Then Mike Johnson and I Co-Founded FAST. We then designed and wrote the FAST system. JD Brooks was our only outside investor for this project. This was basically a complete white paper re-do of the entire TOM system. We even switched from the WANG mini-computer to the IBM PC(s), and Novelle networking to link them. This wasn't just a Homebuilding system it was an entire development environment including a very advanced database.

We sold it to TOM users as a major upgrade replacing TOM completely. JD Brooks was the first client again! Typical clients build from 500 to 2000 homes a year. That requires a rigorous process. You can't just wing it with a spreadsheet or two. Obviously FAST is a totally integrated system, and we had so much experience from the TOM system that we could make major advances. For example, we decided to integrate the Scheduling with the PO system at a deep level. We called it 'Fixed Activity Scheduling Technology'. Or FAST. We told the builders the schedule must drive everything on a daily basis. We would send out Fax notices to the Subs and Suppliers to tell them when to do the work on each house. This created a 'Just in Time' system to get the houses built faster. I should mention that these so-called best builders were already doing some of this stuff – Just manually.

The idea is to get the builder to sell 'Standard' house plans. Each plan might have several 'Elevations' – which just means a different façade. Also, thousands of Options are offered. All this data must be manually built for every house plan in the system. Then the salespeople can help the buyer select the lot, plan, elevation and any options they want, like an upgrade from a vinyl floor to tile. The database also has Bids from all the Subcontractors and suppliers. The system will then generate a complete set of about 100 Purchase Orders to cause the house to be built. In the late '80s we printed a bar code on each

PO. When the vendor turns it in for payment, the builder has someone scan the PO bar codes – real fast. The system then creates the Invoice in Accounts Payable ready for check printing. Any handwritten extras on the PO are ignored. The Vendor must get a pre-approved Variance PO to get paid for extra work.

Of course, we were out to sell this system to the entire Homebuilding industry. We had all the best builders on our system. We told the prospects if you want to be as good as that Builder – we will teach how to do it. The catch was – they had to buy into the philosophy of pro-active management by exception. Their whole entire team would have to buy in, because our software affects the job of virtually every person who works for the builders. Builders are a management company. Try to find a hammer in a builder's office, not going to happen.

The exceptions were handled like this: The Vendor finds a problem that will cost the builder more than the original bid to fix. Before POS, they would add that amount to the invoice. Now – they had to find the superintendent and get a pre-approval authorizing the work to be done. The cost would be figured out in advance and be fixed. A new 'Variance PO' would be issued to cover this. Since we didn't allow Vendors to send invoices (or we just tossed them) the only way to get paid was to have a PO or a Variance PO. This allows for real time variance management. Once a month the builders would sit down with their team and review all the Variances and find patterns. They would then fix the problem at a more fundamental level so it would never happen again in another house.

Of course we had competitors – I will mention three of them: Mokasker, Lloyd Alutaris, and JD Edwards. Mokasker was sold mainly in California, Lloyd was sold mostly in Texas and JD Edwards was sold to the really huge builders doing 20,000 homes a year or more. FAST was sold everywhere else including Canada. I should mention that in 1999 we bought Mokasker and Lloyd Alutaris and we also purchased the Homebuilding division of the JD Edwards company. We got all their clients. More about that later.

Chapter Two – Networking

In 1992 Todd Ullom joined the company to run Sales and Marketing. He had been a builder of large homes in Atlanta and was a FAST client. He loved the system and the controls and the automation so much that he sold his building company to promote FAST as part of the team. He created a fantastic system called drip marketing. We got a lot of leads and a lot of sales. Donavan Conrad also joined the team from NASA where he was part of the space shuttle program. He came to work on AI for FAST (yes, we actually had a working AI system). I was no longer doing programming as we had a team of programmers and QA people. The three of us formed a leadership team to think about new ways to help Homebuilders.

With the AI (we called it IDOS) the user could ask questions in English. A user types 'what were my sales last quarter' – and they would get a report showing sales. We also had a member of our Support team – Megan Johnson – Who was an expert on the report builder in FAST. Once we 'automated' that with Natural Language she became very involved and joined our little AI team.

We had a good system in those days to sell a builder and help them fully implement the system within a few months or – maybe a year or two. We were selling something other than just the software – we were selling a philosophy, and some builders just didn't buy in to it. Didn't mean they were wrong – but

they would not be a good fit for our system. We knew via the hard way that when a builder buys your system and the implementation fails, that can leave a bad spot on your record. Ten great implementations undone by just one failure.

We tended to attract the best builders, and we made them better. We had a fantastic conference of Builder CEOs every year. In 1998 our keynote speaker was Steve Balmer who oversaw sales at Microsoft at the time. We were located in Redmond ourselves and we built FAST on top of the Microsoft stack. On the morning of this conference, we had Microsoft people just drifting in about an hour early. They would just stand around at doors and windows. Then Steve showed up. He asked what I wanted him to talk about in his one-hour Keynote slot. I said three things: The importance of the emerging Internet, the idea that you really do need to spend more money on IT, and the benefits we get for being a Microsoft partner. He got up and off the cuff spent ~20 minutes on each topic doing a really great job!

His story about spending levels went like this: The client was a major international Airline. The IT exec was trying to get approval for $5 million for upgrading computers and software. After two hours discussing the spending plan in great detail the marketing manager walked into the room and said – 'We need to spend $5 million to upgrade our first-class lounges all over the world. The CEO said 'Yea that sounds good – Do it'. The marketing manager left, and the IT spending discussion picked up where it had left off. Wow! Marketing gets approval in 10 seconds and IT takes a couple of hours for the same dollar spend! In the Homebuilder case – I would tell my builder clients that they need to upgrade their hardware after about 3 to 4 years. The Builder says, 'I have a 10-year-old ford truck and it runs fine, why do we need to upgrade the computer hardware?' This was especially true in the mid-eighties as their first generation Wang Mini-Computers had to be ripped out and replaced with PC's and Novell (A networking system). This was a problem we created by deciding to get out of the Wang mini-computer world entirely. Wang would go out of business by 1992. We also replaced the Novell system with Microsoft Windows NT for networking in 1992. It would take several years to complete this process. But this is just business as usual for the Tech world.

There was actually a lot going on at this conference. We were in fact rolling out our vision for connecting the builder supply chain so that Pos's would flow 'In the Cloud' from builder to supplier to manufacturer. CertainTeed and other manufacturers would join in our effort. In fact, this conference was being attended by a representative for Westinghouse Appliances. Todd, Donovan and I and others spoke at this conference mostly to promote this idea of connecting everyone over the internet. We had thought up the idea a year or so earlier when we spent a day at Disney World. It was a very creative holiday.

After the conference we negotiated for Westinghouse to Invest in the company. After a few weeks they sent us a Letter of Intent. At least that is what it was supposed to be. It was, in fact, an entire contract for the whole deal fully worked out. As we read it, we saw poison pill after poison pill. We realized the whole thing was just completely insane. We told them we didn't even want to start negotiations based on such an abusive document. Instead, we invited GE appliances to our office in Redmond. Six executives came to visit us. They were extremely interested. Jack Welch (GE's CEO) had recently told the whole company that the internet was the future, and they better have a plan. Our plan became their plan. They were also much more reasonable on the terms of the deal.

The way it worked back then, each major industrial group within GE had its own VC group within GE Capital. We were working mostly with Doug Hsiese from GE Capital. His division was associated with the Appliances division of GE. One night he called me on the phone and told me that another division of GE Capital is working on funding a North Carolina based software company called BuildSoft. I knew a lot

about them. They had a great software system for small builders. I even knew the CEO Kieth Brown. They had thought up the exact same idea we had.

I had first learned about Buildsoft by seeing them at the NAHB convention and show every January. This is a huge show and typically it is the largest show in the country with the Exception of ComDex. I would see Buildsoft there, and I could tell that they had a great operation. We did not directly compete with Buildsoft as they sold to smaller custom home builders, and we sold to larger production builders. When builders came to our booth that were a better fit for Buildsoft we sent them over there. We knew of several Buildsoft competitors, but we felt that Buildsoft had the best system – so that is who we recommended. Kieth came by our booth to thank us for sending leads his way. What was really impressive about Buildsoft was that Keith was himself a Builder and developed Buildsoft for his own company. Then he went and started selling it to other builders. I have seen this story many times over the years. A builder writes a great system for in-house use, and decides to sell it to other builders. Even Pulte did this at one point. But even Pulte failed as did all the others. Except for Keith and Buildsoft. Needless to say – I was impressed!

Chapter 3 – The Merger

GE wanted the two companies to merge! Todd and I were on a plane the next day for New York to meet with everyone about this. We met Nathon Morton, Kieth Brown, and GE people that day. Nathan Morton played a pivotal role in Home Depot's early expansion, serving as Senior Vice President of Operations. He was instrumental in scaling the company from 21 stores and $400 million in sales to over 100 stores and $2 billion in revenue. His operational leadership helped solidify Home Depot's dominance in the home improvement sector during its formative years. But Morton's influence didn't stop there—he later became the first CEO of CompUSA, where he applied the big-box retail model to the computer industry, turning a small operation into a multibillion-dollar national chain.

He sold his position at CompUSA and was now free to do new ventures. Kieth had recruited him to be the CEO of BuildSoft - to lead the effort. So – we merged with BuildSoft to create BuildNet with Nathan as CEO. This was April 1999, and we raised 32 million dollars at that time. Kieth was chairman of the board, and I was vice-chairman. Plus, I headed up the technical teams although it was really Donovan Conrad that ran it day to day. Mike Atwood was hired from Ross Perot's EDS company to be our COO. Steve Thompson was the CFO of Cellular Wireless phone company, and he had just completed the merger with AT&T. He was then free to come work for us as our CFO.

The idea was to get all our competitors to join us and let us purchase their companies. We bought up most of our competitors and now they were part of our team. We were mainly interested in the volume of transactions that we could facilitate on our network. This really works out to be based on the number of homes that the 'system' is building. Our market share was measured as a percentage of homes in North America built on one of our systems. We had a 50% market share at this point. Half of all the houses being constructed were on one of our systems. On this basis we raised 107 million dollars in December 1999. This was the sixth largest private placement in US history at the time.

During this period, we continued to buy software companies that added to our ability to deliver on the grand vision of linking the Builder supply chain over the Internet. At the time we had about 400 employees. Then we purchased a large software company that had software for Lumber supply companies. Nextrend, I believe was the name. They also had 400 employees, so this acquisition was our largest yet and doubled our workforce. Nathan structured this deal to have a $10 million dollar balloon

payment in February 2002(?) This would be the deal that would ultimately be the death nail in BuildNet's coffin.

Around this time, I introduced Nathan to a software company that had Lumber yard ERP system. They had 50% of all lumber yards in the US on their system! Nathan, Mike Atwood and I went to meet with this company in Greenville N.C. We told them the vision – but Nathan would not offer them a % of the transaction fee that we hoped to earn from automating these transactions up and down the supply chain. His unspoken message was that this company had to 'get on board' or be left behind. I was very opposed to this arrogant position. I was beginning to have doubts about this entire process.

In January 2000, after this round of funding was completed, we immediately went into our 'Quiet' period for an IPO. At this time, I was the single largest individual shareholder in the company at around 20%. We had quite a few outsiders who wanted in on the IPO. They offered me cash for my common stock at the valuation of the last round ($700 Million). I sold about ½ my stock. People all told me that was crazy to sell stock right before an IPO. But that IPO would never happen. I also quit my employment at the company and gave up my seat on the board. I then started my next company Leverance.

Actual live transactions started happening on the BuildNet system in September of 2000. BuildNet was hitting on all cylinders except for fundraising. Kieth described it this way; they had the money to get themselves to the Moon – Now they needed funding to get back to earth! But the. Com bubble had already burst, even still Nathen had managed to create a series D funding round in early 2000. It looked like the company was going to make it! What could possibly go wrong?

In March 2001 BuildNet would fail to make the $10 million payment to the Nextrend owners as per the deal that Nathan had structured. They got with some other creditors and forced BuildNet into Chapter 7. If it had not been for that one bad deal that Nathan did, BuildNet would have probably made it just fine, even with the failed IPO.

Chapter Four – Leverance

This company began its life in June 2000 totally focused on AI. One of my very first employees was Jeremy Halbert. He was in college in Arizona at the time. I hired him and he moved to the Redmond area. He was a Seattle area native, so he was very happy to be back in his old stomping grounds. I hired Donovan Conrad away from BuildNet (I had their approval to offer him the Job). I hired others as well. For the first three years we developed an advanced natural language system. But by 2003 I realized that we had nowhere near the amount of compute power that would be needed to scale this up for mass adoption. We estimated that it would be 15 years or more before the compute power would be available.

At about this same time J.D Brooks called me and asked me to come to Atlanta and help him figure out how to automate his Land Development business. FAST had a Land Development system at that time but it was fairly limited. People would just set up a Job and use the FAST job costing system to manage budgets and cost. JD had so many Land projects going on at the same time. Scheduling was his first priority. I helped his team implement the Microsoft Scheduling system called 'Microsoft Project'. But JD wanted more. He wanted a fully integrated project management system for Land projects. I spent two years learning his business and leading the development of a software system called LandDev. This is a

full ERP system for land developers. It does not have an accounting system. Instead, we interfaced with the FAST accounting system. This just boiled down to transferring approved invoices from LandDev to the FAST AP system.

During these two years I would spend one whole week a Month in Atlanta learning absolutely every detail about how their Land process worked. JD had a lot of projects running at that time. For example, The Manor is a Ted Watson designed Golf course community up north off 400 out of Atlanta. JD was also building all the Pulte Land projects in Atlanta. He had homebuilding projects of his own and had even more projects going – it was a huge operation. I would design the software and Jeremy Halbert, and others would do the programming. We had also hired a PHD computer scientist named Min Kee. We hired him from Microsoft. He wanted to work on natural language processing. When the LandDev project was started he was able to design the architecture using a bran new Microsoft technology called the .Net Framework. The reason he knew so much about it was that he had been on the core team to design it and built it at Microsoft. This gave LandDev a fantastic foundation that still serves the product well to this day. For those who might not know this, the .Net Framework is still foundational to working on the Microsoft stack.

Around the 2004 timeframe we had JD Brooks fully up and running on LandDev. We then started to sell it to other builders. At some point in this process a Canadian firm called 'Constellation' purchased FAST from a Dallas based company that had bought it from the Bankruptcy proceedings of BuildNet. I was always keeping tabs on my former company and especially the employees who were also my friends. They told me that the owner of FAST had no clue how to run a software company and every week there was drama and disaster. They were miserable! After Constellation bought FAST, they started running the company using 'Best Practices' for software companies. The existing employees were ecstatic about the new owners. I asked, 'Why are you all so happy now?' The answer was that Constellation really knew exactly how to run a vertical market software company like FAST. I was impressed to say the least! I learned that Constellation was literally in the business of buying vertical market software companies and then using 'Best Practices' to run them. Later I found out that the Clients were also very happy.

I met with Dexter Salna – who ran this division of Constellation – and we decided to work together to get LandDev into the various builders that used Either FAST or the other major homebuilding ERP system called 'Newstar'. We also did an interface to Newstar. We worked together to sell a lot of Builders the LandDev system. In the fall of 2008, we had sold Pulte LandDev in a trial down in their Pheonix division. They were using LandDev quite successfully. We were dotting I's and crossing T's on a 1-million-dollar contract to roll LandDev out to all the divisions of the company. But the financial collapse would put an end to that. In December that year, Pulte laid off all the people who were in the LandDev pilot – and a lot more as well. This collapse had the potential to put LandDev out of business. We knew that small custom builders and remodelers would probably make it just fine in this economy.

Dexter and I plotted to create HomeDev as a spin-off of LandDev. The target market would be small custom home builders and remodelers. We also did an interface to QuickBooks at this time. This is how Leverence survived the great financial collapse of 2008-2012. Oddly, at this time, Todd Ullom had started a new homebuilding company in Florida called Couture Lifestyles. Huge ~10 million homes. He bought HomeDev and did a fantastic job implementing it. This company uses HomeDev still to this day.

Chapter Five - Builders

This chapter is dedicated to the builders who made the vision of TOM, FAST and LandDev come true in their companies.

I want to talk about one of the first builders that fully implemented the TOM system in this 1983 time.

Don Bowden Homes. They were building about 50 homes a year in the Memphis area. Don Sr. signed off to buy the system, but it was Don Jr that implemented it. He says he just 'Did what the experts told him to do'. It was really quite a bit more than that! He almost single handedly pushes the system to all parts of the business. Once they were fully operating on Pos and no invoice, the local Banks started to take notice. Homebuilders get construction loans from Banks. But the banks don't trust the builders at all. So for each and every house once a week you have to give the Bank a progress report on all the homes they are lending on. The report should be very specific and show all past cost and pending cost and all future cost yet to happen. This report was created automatically by the TOM system. The bank inspectors would use the report to evaluate the state of the actual construction site by going there in person. The banks were very impressed by the Bowden building company. Other Homebuilders in the area were not doing so well. Sometimes one of their projects would fail. The Bank would go to the Bowdens and ask them to take over the project. They did and within a couple of years they were building 500 homes a year – at a real profit.

I want to talk about another great Homebuilder, The Estridge Group out of Indiana. They were an early user of the TOM system and then switched to FAST quickly. Today they use HomeDev and LandDev, two systems that I developed in the 2000's. LandDev is the first ERP system designed to automate the Land Development process, which is hugely different from building the Homes. For Example Taylor Morrison and LGI Homes both use LandDev just for the massive land operations (in all majors and minor cities in the US). Also Brookfield of Canada uses the system. LandDev interfaces with all major software platforms that HomeBuilders use. The Estridge group is today developing the land for it's 500 homes per year operation. It then uses HomeDev for the HomeBuilding side of the business. You would think that a system as old as FAST would be obsolete today and no one is using it anymore. But that's not true. There are about 50 builders still using FAST to this day 4/18/2025.

Town and Country homes. In early 1990's we sold a very large builder in Chicago doing about 1,000 homes a year. This was a great builder to work with, and they helped us with our sales by being a great reference.

Fieldstone. We also sold Fieldstone of California around 1995. This was our first ever sale to a major California homebuilder. They were converting from JD Edwards to FAST, which was a huge win for us. Admittedly they were downsizing to about 500 homes a year. So, Edwards was just too much for them. It went like perfection, they fully implemented in record time for FAST. All that big system experience the staff had really paid off.

Murray Franklin. Ah yes, the two Don's – Don Cline and Don Jasper. This large Seattle area builder had been using a pretty good system that we never competed with, and we were replacing it with FAST. I worked closely with Don Cline as he is the Operations guy. Don Jasper was (is) the deal guy. This was around 1992. In 1995 we did a huge project with them to give the Superintendents a hand held computer in the field. They had actually designed it and hired a programmer to write it and they were successfully using it! Totally amazing really. But they wanted it to integrate with FAST. So we re-wrote it. This was most likely the first ever field superintend system offered for sale to the building industry. We

used a little handheld HP device – Each Superintendent got their own. They real key person in all this was Ally Vasques – she worked for Murray Franklyn and was the project lead for this. We had three Ex NASA employees by then to also work on this project. For example, Donovan had been working heavily on the Grid laptop to orbit for the Space Shuttle right before joining our team. Yea, we were literally using NASA spin off science to do this stuff. We sold this system to many of our clients. I believe this to be the first ever field computer marketed and sold as a turn-key hand held computer for the Superintendents to use in the field.

LGI Homes

Jeff Wright Homes. This is a Seattle area builder. In fact, Jeff Wright is one of the four sons of Howard S. Wright who (as a contractor) built the Seattle Center in the early '60's. A little known fact is that the Space Needle was build and owned by Howard Wright and it passed to his 4 sons after he died. But Jeff was into building homes. He lives on the shore of Lake Washington right next to his very good friend Steve Balmer (In charge of Sales for Microsoft in the '90's). Jeff went to Steve in and said that he needed a full ERP system for his building company. He was hoping that Microsoft would have software for builders or be able to write something for him. Steve said that Microsoft does not write 'Vertical Market' ERP systems like that. Also, that they don't do custom systems. Instead, he told Jeff to find software companies that do focus on homebuilding as a vertical market. Jeff was able to find quite a few. At the time we were very close to having our conversion from Novelle to Windows NT done. Jeff and Steve eliminated some of the vendors leaving only two competitors, My company (FAST) and one other. Steve wanted to know if we were using Windows NT so Jeff asked me about it. I said yes but it is not completely proven. Once Steve heard that he said – don't worry we will have a team ready to go if you run into any problems during the implementation. In Fact we did run into a major problem at one point. We had about 12 engineers working on the problem. It was fixed within about a week. In the end it worked perfectly and now we had a beta test client fully operational with the entire system. On the philosophy side, Jeff was totally committed to the PO system and management by exception.