

GAINING CONTROL

MANAGING CAPACITY & PRIORITIES

3rd Edition

JAMES G. CORRELL & KEVIN HERBERT



John Wiley & Sons, Inc.

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Acknowledgments

Upgrading this book that focused on the basics of capacity management and shop-floor control to one that still maintained those basics, brought it up to date with current technology and processes, and looks into the future, was no easy task. The learning that went on in that process was invaluable to both of us. We would like to extend our heartfelt thanks to the many people who played a part in bringing the original, second, and now this third edition to fruition.

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James G. Correll
Sandy, Oregon

Kevin Herbert
Watford, England

Introduction

Throughout our professional careers, while working in industry, teaching seminars, and consulting with companies, we have been troubled by the apparent inability of manufacturing departments to get control of their operations. It's like the story that one company president related not long ago. He said that, as president of a very large enterprise, people believed that he had a great deal of control over what the company did. But, he admitted, he felt a lot like the little boy in the circus parade riding the big elephant. The boy had a little stick. When tapped on the back, the elephant speeded up; tapped on the forehead, he slowed down; tapped on the right ear, he'd turn right. They forgot, said the president, that the elephant could go anywhere he pleased and the little boy was merely making suggestions. This was how the president felt: He was not in control of the company but was merely making suggestions.

Have you ever felt that way? Or, even worse, has the elephant been doing what it wants to do and not what you want it to do? There are two things you can do: Get a bigger stick or educate the elephant. This book is aimed at educating the elephants.

One of the big hurdles we face constantly in industry is understanding terminology. We have tried to be consistent in our terminology, and have for the most part adopted the terminology of the American Production and Inventory Control Society (APICS). We are aware that you may use different terminology in your com-

pany. Since the original publication of this book, new methods and techniques and terminology have been introduced. Enterprise Resource Planning (ERP), Agile, Lean, and Six Sigma have earned their place in industry and will play a key role in the future. New concepts, software, and processes such as Finite Capacity Scheduling (FCS), and Advanced Planning and Scheduling (APS) are starting to make their mark on industry with both bad and good results. We explore each of these so there is a clear understanding of both their potential and their pitfalls. There are many publications on each of them and we encourage you to research them further, while being careful to understand their capabilities and constraints.

This book takes you on the journey of the Hayes Tractor Company, where they have to learn the fundamentals of capacity management and shop-floor control and then begin to reap the rewards as they apply these fundamentals. Unlike many companies, Hayes continues its quest for improvement and ventures into the future, following Effective Management's path to success—Class A. In this book, you will follow the story of Brian Miller, a manager in the out-of-control Hayes Tractor Company. All characters and companies in the book are fictitious, but they are composites of the people and companies we have worked with over the years. The situations are based on actual events: You may find many of the characters and situations to be familiar! The education and consulting firm, Effective Management, and its Class A process are also fictitious, but they follow all the teachings and philosophy of the Oliver Wight Company, where both of the authors are currently employed.

Although the story takes place in the Hayes Tractor Company, which is a metal fabrication and assembly shop, we take numerous side trips to many other companies to expose the reader to a variety of industries, including electronic assembly, food processing, aerospace and defense, and electronics. Our intent in doing this is to show how the concepts and principles explained in this book are applicable to any industry.

Our objective in writing this book is to help you understand what you have to do to get real benefit from the various processes and software that exist today. The answer lies in gaining control of the company, which is often referred to as “closing the loop.” This book shows you how.

We want the book to be fun and interesting to read and we hope we have accomplished this through the use of the Hayes story. Its true-to-life examples show how easy it is to be out of control and how problems can be solved by understanding and perseverance. Crucial to this is educating people to gain understanding so that they can change their behaviors. In applying this knowledge and these techniques to your company, we wish you every success.

Cast of Characters

HAYES TRACTOR COMPANY

Pete Smith	General Manager
Ralph Barnard	Production Manager
Brian Miller	Machine Shop Manager
Dan Milkosky	Fabrication Manager
Mickey Issacson	Assembly Manager
Joan Van Schot	Production Control Manager
Jose Garcia	Machine Shop Supervisor
Larry Placarde	2nd Shift Machine Shop Supervisor
Hank Jones	2nd Shift Welding Supervisor
Jim Romero	Grinding Supervisor
Cecil Nickerson	Machinist
Roy O'Brien	Materials Manager
Harold Bloom	Purchasing Manager
Mac Helm	Personnel Manager, ex-Machine Shop Manager
Tony Alonso	Expeditor, machine shop capacity planner
Alex Handly	Engineering Manager
Elliot Hathaway	Manufacturing Engineering Manager
Lloyd Adams	Design Engineering Manager
Sharon Levy	Controller
Carol Barrow	Quality Control Manager
Lenny Youngman	VP, Sales and Marketing
Jennifer Westlund	Demand Manager

Ivan Solokov	Maintenance Manager
Laura Sanderford	IT Systems Analyst
Carl Mueller	Material Planner
George Turner	Corporate Business Improvement Group
Mark MacDowell	Executive VP

OUTSIDE CONTACTS

Dennis Jones	Effective Management Coach/Capacity Planning
Roxanne Barnes	Effective Management Coach/Integrated Business Management
Les Johnson	Effective Management Coach/Lean
Amy Shinn	Effective Management Coach/Advance Planning Systems
Frank Snider	Teacher, local junior college
Sue Corey-Smith	Production Manager, Missile Systems Company
John Hall	General Supervisor, Precision Air Components
Hal Beckman	Materials Manager, Good Health Vitamins
Marty Bloch	Plant Supervisor, Beartone Manufacturing
Harvey Piscioli	Production Manager, ERON Technology
Rob Ericson	Production Manager, Mercury Electronics
Buster Jones	Manufacturing Manager, McNally Machine Tool
Joe Crowe	Production Manager, Supreme Enterprises
Tom Kirk	Master Scheduler, Supreme Enterprises

Chapter One

Out of Control

Brian Miller rebuilt the 1957 Chevy convertible for his wife as he had planned. She loved old cars and especially the 1957 Chevy. Her dad drove one when she was little and she never forgot it. Brian knew what parts he needed and had them there when it was time to install them. He figured out the proper sequence in which to reconstruct his pride and joy. He even scheduled his weeknights and weekends to ensure that he would complete the car in time to coincide with his wife's 30th birthday, yet not interfere with his family life, and work—in that order. Because things never seemed to work out exactly as planned, he constantly rescheduled his time to get things done. He met his target date a day early. On her birthday night, he ceremoniously opened the door of the Chevy for his wife. She seated herself, turned the key, and took Brian for a ride in her new car.

His planning and execution had resulted in a project completed on time. Why then, he thought from his office at the Hayes Tractor plant, couldn't he get his three production shifts running smoothly? He was the manager of the machine shop. He had a computerized planning and scheduling system that was supposed to provide schedules with which he could run the machine shop. Why was it that he couldn't achieve the same success he'd had rebuilding the Chevy?

Brian had only been at the West Coast plant for two months, having transferred from the company's Midwest division. He was the new guy on the block, and he was learning how to survive in this

good-ol'-boy environment. As he looked out over the shop, he was not a happy man. The plant was in real trouble. Product was never delivered on time, lead times were unpredictable, and productivity was atrocious. The schedule that was generated by the computer was unusable and may as well have been thrown in the trash as soon as it arrived. Things were simply out of control.

It had been 6 months since Pete Smith was promoted from the Midwest plant to replace the retiring general manager. Pete had slowly begun to prune the ranks of the old-guard managers, replacing them with a group of more forward-thinking people.

Brian was one of these, replacing the Machine Shop manager who had been with the company for 45 years and had been moved over to the Human Relations department. Brian came from Quality Control to the Machine Shop, which didn't make the people in the shop too happy. They thought the new manager should have been elevated from within their own ranks, as was the tradition. Ralph Barnard, the Production Manager, had thought so, too.

On Brian's first day on the job, he was called into Ralph's office. Pete had known Brian at the Midwest plant and had arranged for his transfer, feeling that Brian's management style and quality perspective were needed at Hayes. Ralph, on the other hand, didn't know Brian at all. Ralph, who was in his early sixties, wore a constant sour smile as if his stomach were continually in revolt. He closed the door and sank heavily into the high-backed chair behind his desk.

His desk was covered with production reports, shipping schedules, product drawings, engineering changes, and memos about missed schedules. What caught Brian's attention, however, was a statue of a steel-gloved hand with a lightning bolt struck through it. The inscription read: "Cause it to happen!" This exemplified Ralph's attitude.

"All right, it's as simple as this," Ralph said, leaning back in his chair. "You've been brought in here as the Machine Shop manager. But here's the deal, Miller: You've got three months to get productivity up and shortages down. Nobody expects you to meet the schedules that come out of Production Control. That would be virtually impossible, since they're so screwed up. What I want you to concentrate on is the hot list from Mickey in Assembly. That'll tell you the real priorities, and that's what I want you to work on. If you don't, I'll find someone who will!"

Brian slowly lifted himself from his chair and thought to himself, "What have I gotten myself into?" He said, "Well, Ralph, I appreci-

ate your vote of confidence. And I guarantee you I'll work hard to get the job done. I know I can do it."

"I hope so, kid." Ralph couldn't suppress his smile.

Needless to say, Brian left the office concerned about his lukewarm welcome, but even more determined to make a difference at Hayes. He had little idea of what he was up against.

He knew his first move was to try to establish a working relationship with his people, so Brian had his supervisors take him around and introduce him to everyone. He wanted to let these people know that he was a friendly sort and not one to just stay squirreled away in his office.

The second part of Brian's plan was to enroll quietly in a Machine Shop class at the local community college. Since his knowledge about machining parts was limited, he figured it'd probably be in his best interests to get some hands-on experience.

It was after the third class session that his teacher, Frank Snider, came up to Brian, having noticed that his hands weren't exactly the hands of a machinist. "Where do you work, Brian?" he asked.

"Hayes."

"Oh, yeah? What's your position there?"

"I'm the Machine Shop manager," Brian said.

Frank just about fell over. He had retired from Hayes' machine shop and now was teaching this class to stay busy. "I'll give you all the help I can," was Frank's generous reply. Fortunately Brian liked working with the equipment and proved himself to be a quick learner.

Several weeks later, Frank returned to Hayes to pick up some scrapped parts that Hayes had agreed to give the college for its students' use. Brian was on the shop floor, expediting a past-due part, when he found Frank chatting with a group of Brian's machinists who were some of Frank's old buddies. Frank made a point of telling them all about his new star pupil. Brian was embarrassed. But, contrary to his fear that it would lower his workers' estimation of him, it earned Brian a good deal of respect. The old timers were really impressed that the "kid" would take the time to try to learn the trade.

Brian, however, had bigger problems to face with his new job than just earning the respect of his workers. First, there were the daily 8:30 A.M. part-shortage meetings.

Some years ago the company had installed an Enterprise Resource Planning system to generate information that told the material

planners when to release orders. The computer was also providing Brian with schedules and machine-load reports for each of the work centers. The only problem was that they were completely worthless. They didn't reflect the work that really needed to be done, and a large percentage of the scheduled orders were already past due. Consequently, everyone was using hot lists to communicate the real priorities.

The supply chain organization constantly told Brian that there wasn't anything wrong with the computer system. The problem was with the people, who were simply not following the schedules. Brian knew that they were including him in their comments, but he had no idea what he was doing wrong.

Brian also knew there were problems with management. It was as if top management didn't understand the limitations of the manufacturing process. It seemed they just wished things would happen and then expected Brian and the other managers to get them done on time. Sales was continually promising new orders with less than normal lead-time and expecting them to be shipped on time. To say the least, the job ahead of Brian was not going to be easy or fun.

Brian arrived at the factory each morning around 6:30. He wasn't expected to be in the office until 8:00, but expectation and reality had already proven to be two different things. His first action was to find his third-shift supervisor to see what went on the night before. Then, he would track down the expeditor. "Tony," he would yell through the constant noise that permeated the plant, "where's the hot sheet? Get me an update, will ya?" Thank God Tony was devoted and arrived even before Brian.

The next half hour or so would be spent going through the parts on the hot list, checking their status with Tony, and, at the same time, trying to assess what progress had been made and where he needed to concentrate his effort to "cause it to happen." Brian would walk into the plant and check with his own eyes to make sure that the hot parts were running on the machines.

Built in the 1920s, the Hayes facility was an old shop, with a smattering of new state-of-the-art equipment mixed in with mostly older machines. Even though they'd been painted and repainted over the years, there was no escaping the age of the plant and its equipment.

At 8:30, the managers gathered for the shortage meeting: Ralph; Dan from Fabrication; Mickey from Assembly; Joan from Produc-

tion Control; Roy, the Materials Manager; and Harold from Purchasing. It was Dan and Mickey who made Brian's life difficult. But, then, they probably felt the same way about Brian.

Dan was in his mid-forties and had been a buddy of Ralph's for years. They were regular golfing partners, football couch potatoes, and they'd been known to enjoy a beer or two together as well. Mickey was in his mid-thirties—the same age as Brian. Ralph's relationship with Mickey was also special. Ralph had a son of his own, but it was common knowledge that Ralph also looked upon Mickey as a son. The only problem in this little mutual-admiration society was that Dan and Mickey didn't like each other. Neither had any advantage over the other with the boss. Their only common ground was that they could both gang up on Brian.

On this particular day, the shortage meeting got under way right on schedule. It was one of the few things at Hayes that was consistently on schedule. As usual, they started at the top of the list of shortages, which was typically over 300 parts. The status of each and every part was reviewed. Brian was prepared. He'd done his homework and knew where most parts on the shortage list were, and when they should be delivered to Mickey or Dan. Invariably, Mickey's response was, "That's not good enough! I need that part at least two days earlier." Now, everyone in the room knew that Mickey always wanted everything before he really needed it. If a part from Dan's Fabrication department was late, Dan always pointed the finger at Mickey, saying, "The parts are in the paint shop," which was under Mickey's jurisdiction. It was how Dan always got off the hook. But on this particular day, Mickey had decided it was time to push back.

Reading down the list, Ralph came to a cover that was supposed to be coming out of Fabrication on its way to Assembly. Dan, without blinking, said, "It's in paint." Mickey was ready for this, and jumped right on Dan.

"That's a bunch of bull!" Mickey shouted. "I just came from there. That cover's *not* in paint! It's sitting in your hand-grind area."

This backlash infuriated Dan. "You're wrong, as usual, Mickey! We've completed enough on that order to cover the shortage, and they're in paint!" Ralph interceded and cooled the two men down. Brian shook his head in dismay. This was the daily atmosphere in which he now found himself.

After the meeting Dan had taken off immediately. Brian went looking for him to try to learn more about the Hayes environment

and found him just leaving the grind area. Brian asked him if the covers he had so adamantly insisted were in paint were really there. Dan smiled, and said, "The parts are always there when Mickey goes back to look. And they were there this time, too. I saw to that long before the meeting was over. You don't think I have to go to the bathroom *that* much, do you?" Brian was beginning to realize that intimidation was the only way to survive in this environment. You tried to intimidate the boss. You tried to intimidate your peers, and you absolutely had to intimidate the people that worked for you.

It was surprising that anything got built in this factory. It did, but only through sheer brute force and the dedication of guys like Mickey in Assembly. Mickey battled against confusion and chaos, and was in constant communication with his people and the expeditors. He knew what must ship and when. He also knew what was missing to make those shipments and he made sure he let everyone else know.

For Brian, that meant on average 150 different parts in his shop that were all past due and needed in assembly that week. Most of the parts had more than a six-week lead time. Each part had a specific day during the week when it was needed, and it took constant watching to make sure that Mickey got the parts that he needed when he needed them. Brian was continually checking, making sure the right parts were running on the machines.

Every day Mickey would come in with a list of additional parts that weren't on the original shortage list. "You know that motor mount we thought we had? Well, we had some screw-up and we need more." Brian loved to get half a page filled with extras. It just made his day.

Once the part-shortage meeting had been completed, everyone had a new set of priorities. Brian rounded up his supervisors and Tony to let them know about the additions. "Guess what, guys, more hot parts." No one seemed the least bit surprised. "What I live for," said one of the supervisors reviewing the list. Tony added these new items onto the original hot sheets and passed them around to the supervisors. Afterward, Brian was once again out on the floor making sure they were running the right parts.

With 170 employees in his machine shop to deal with, Brian's life was rarely dull. There were grievances to arbitrate, promotions to consider, attendance problems, fixture breakdowns, and industrial engineers plotting new equipment layouts. "The new Libiher hobb

won't fit in the same position as the old hobb and the foundation for it is larger than we expected," said an engineer, looking over the drawing. "This means we'll have to move the horizontal broach." Next there were the personnel meetings to review all the problems about hiring new people. Then, it was time for lunch.

Brian closed the door to his office. He didn't want to see anybody. He just wanted to eat his sandwich in peace. The phone rang—it was his wife. "Yes, dear, just another day in paradise."

After lunch, it was more of the same: more meetings, more problems, more parts to expedite. The frustration level continued to rise. "All I want," Brian thought to himself, "is some decent, reliable information. At least then I might be able to come up with some sort of game plan." At 35 years old, Brian hadn't gotten to the point where he was ready to accept that things couldn't and wouldn't get better. He knew that lots of things were wrong at Hayes. He had graduated from college as an industrial engineer, and that had supposedly trained him to find better ways. Although he wasn't exactly sure just how it was supposed to be, he knew it was not supposed to be like this.

One day, while he was waiting in the expeditor's office, which was located in the middle of the shop, Brian picked up the computer-printed schedule. It listed everything that was supposed to be made in each work center for the next week, sorted by operation start date. He took it to Tony and asked, "Why don't we start using these instead of hot lists?"

Tony sighed disgustedly and told him that the first 12 items on the schedule for the lathes were parts nobody seemed to need. Then, he pointed out that the 23rd item on the schedule was the hottest job in the whole factory, according to the shortage meeting that morning. Brian was confused. He stared down at the computer printout. It was the right concept, but the information on it seemed useless. Not knowing where the information came from or how it was developed, he was at a loss.

Brian realized that the key to getting work done on time was having the right number of people, with the right skill sets, at the right time. To accomplish that, he needed visibility of what was required. All he had was a report that the computer generated every week. It showed the total amount of work in standard hours that were scheduled to be completed week by week for each work center. The trouble was that it always contained a lot of work that was already

past due. The future wasn't any better. He knew he could not believe the amount of work the computer showed. In some cases there was very little work and in other cases the amount of work shown far exceeded what Brian knew was coming. The load was all over the place. He didn't know whether to hire additional people to take care of the past dues, or to lay people off. Brian decided to check it out with Mac, the ex-machine-shop manager, now manager of Human Relations. He must have had some way to predict when and where people and equipment were needed.

Brian walked into Mac's office. Mac was behind his desk, as gruff and grumpy as if he had never left the shop floor. He didn't really like being H.R. manager, but after 45 years, he wasn't about to leave Hayes. Brian put the capacity report on the desk before Mac. "I'm having a terrible time trying to plan the number of people I need. Is it really possible to plan with this capacity report?"

Mac let out an abrupt laugh. "You look at that thing and you tell me." Being his replacement, Brian knew Mac resented him, and no amount of charm was about to melt that girded exterior.

"Well, it seems obvious to me that it's useless. So what did you use to plan with?"

"Well," Mac drawled, enjoying the fact that Brian was having such problems, "when you get a little more experience, you'll get the gut feel, and you'll know."

Brian stared at Mac blankly. He had precious little time to turn things around. Mac had had 45 years, and Brian could see by the chaos on the shop floor that after all those years, Mac hadn't done very well at balancing capacity. Brian felt a deep emptiness.

He walked into his office like a condemned man, picked up the phone, and asked Tony to come to his office. Brian had confidence in Tony. He knew that a good expeditor was the key to survival, and Tony knew more than anyone about the machine shop at Hayes.

Tony entered the office tentatively. The tone of Brian's voice on the phone had suggested that he wasn't very happy. Tony pulled a chair out and sat down. "So, what's the story?" he asked. It was how Tony approached every encounter.

"Tony, what do I do about planning capacity in this place? I can't tell if we're coming or going."

"Is that all this is about?" Tony asked, having already assumed that Brian was going to want to reschedule the whole shop. "Man, that's a piece of cake."

"A piece of cake?"

"Sure. C'mon, I'll show you." Tony led Brian onto the shop floor amidst the constant roar and clatter. "A piece of cake," Brian thought. "Okay, maybe I will survive this place." He was starting to feel better.

Tony walked him over to a group of machining centers. A box was attached to a column nearby and it was jammed full of work orders to be completed. "You see that?" Tony asked, raising his voice over the noise, as one of machines peeled a string of metal chips from a part. "You can just look at the work-order box and know we're in big trouble on these machines. We gotta have more capacity, so we're going to have to work overtime." The two walked down the aisle to a drill press that had one work order. "See that?" Tony pointed to the only order in the box. "We don't have any capacity problems here."

"That's great, Tony. That's just great," Brian said as the sinking feeling returned. "But, it's all after the fact. It's too late to do anything about it. I mean, if I need to hire people, I need to do it a lot sooner than when the work goes past due."

Tony smiled. "When I said it was a piece of cake, I meant that I'd show you how we did it. I never said it worked, but that's the way we've always done it. The problem now is that we're just too big to operate like this any more."

"That's not all," Brian said. "Late shipments just aren't going to be tolerated anymore. Our jobs are on the line here."

Later, while leaning back in his chair and staring vacantly at the calendar on the wall, Brian counted the days he had left. He stared down at the schedule and the capacity reports on his desk. He had the tools that were supposed to be giving him the information he needed, but they weren't providing accurate information. "The computer can't be the answer," he thought. "Look what it produces—junk. If only I knew what I had to do to solve a problem. No matter how difficult the solution might be, at least I could apply myself and do it." But Brian didn't even know what the problem was. And the frustration continued to build.

Then he thought about his wife's Chevy, sitting in the garage at home. He remembered when he had finally finished it, turned the ignition key and it wouldn't start. Why wouldn't it start? He had had to go back and, without a clue, track down the problem. But once he found the problem, even though it meant additional hours of

work, he knew what he had to do. He never minded the hard work. The frustration at Hayes was maddening because he couldn't find the problem.

The frustration didn't just stay at the factory. As the weeks and months passed, Brian began to bring it home more and more. He was tired, angry, and sick of all the endless problems without solutions. He'd snap at his wife, the innocent victim of his frustration. Then, there was her hurt and anger because her husband was never there, with all of his waking hours being consumed by a job that seemed without reward, a job that seemed to be tearing them apart. Maybe they should go back to the Midwest plant. Things had been better there.

Brian tried to explain how out of control things were, but he didn't have the words. All he had was this continual, unnerving agitation. It was often all he could do to keep himself in control. He wanted her to understand, but the problem was that he himself didn't understand. Something had to give.

Sitting in his office, Brian tried to sort through the problems he was encountering. He even thought back to a management problem-solving class he'd taken in college, and suddenly a vision of Harvey Piscoli's face appeared in his mind. Harvey! Why hadn't he thought of him earlier? Brian was on the phone in a second. Harvey was one of Brian's best buddies in college and he was now the Production Manager at ERON Technology, located a few blocks from Brian's old Midwest plant. Brian was never sure what it was that Harvey's company built, but it had something to do with scientific research instrumentation.

"Piscoli!" Brian said to Harvey on the other end. "I've gotta tell you, buddy, I think I've gotten myself in over my head by taking this transfer to the West Coast. And I'm afraid to admit it, but I think I need some help." It lifted Brian's spirits just to hear Harvey's laugh. Brian then explained his desperate and deteriorating situation. "I tell you, Harvey, I come to work each day wondering how I'm going to meet my schedules and productivity goals. I don't even know what the real schedule is. Everyone seems to have their own. I spend most of my time chasing after parts shortages."

Brian continued: "My schedule calls for 800 hours of output one week, 700 the next, and 900 the week after that. And my capacity report always has a bunch of past-due work, and the future is unrealistic. It's gotten so bad, Harvey," Brian said, "I don't have time to

think about who is going to be on vacation next week or what tooling I need or which machines need maintenance.”

“Brian, I’ve been in that situation before. What are you guys using for a scheduling system?” Harvey asked.

“We’ve got a new ERP system, but it certainly doesn’t seem to be much help,” said Brian. “I spend half my day trying to keep up with the changes.”

“Sounds like you guys have to close the loop,” Harvey said.

“Harvey, they’ve got me jumping through the loop. In fact, it kinda feels like that loop is getting tightened around my neck.” Both Brian and Harvey laughed.

“Tell me, Brian, are you getting valid schedules for each work center every day?”

“We have a weekly schedule for the shop, but nobody uses it. The schedules I get now are unreliable; the dates either change constantly, or they’re way past due.”

“What about capacity planning? Are you guys doing that?” Harvey asked.

“I get that capacity report that I told you about every week,” Brian said. “It’s supposed to tell me how much capacity I need, but I haven’t found it very useful either because it only shows me released work, not what is planned for the future.”

“I’ll tell you, partner,” Harvey said, “Capacity planning has made an amazing difference for us. We’re even able to anticipate capacity problems and take the actions necessary to avoid them. The visibility we’re getting today has made this job one even you could probably do, Miller.”

“Talk to me, Harvey. All I wish is that I had some idea of what was really going to happen tomorrow.”

“Not to gloat, buddy, but we’re able to tell what’s happening months in advance. And if we don’t think we can meet the schedule, we get together with the planners before the problem gets to the crisis stage and we work it out.”

“Your system’s supporting all that for you? How do you stay on top of it all? I tell you, Harvey, my boss is constantly monitoring the efficiency, utilization, and output of my departments. If we miss any of the goals he sets for us . . . well, you can guess what it’s like. Then, if I try to talk to him about how far behind we are, he tells me, ‘Put a little pressure on your people. They’ll get the work out. They always have.’”

“Well, don’t get too down on yourself, Brian. It sounds similar to this place a few years ago.” Harvey went on to explain that ERON now had an overall operating plan and the schedules that supported that plan. The impact on his job was significant. His responsibility now was to meet the Master Schedule. That meant making sure he had the equipment, tooling, and manpower necessary to address that demand. “But, the most important part, Brian, is that we have all the information we need to run the factory and meet our schedules. Now, management expects me to make the schedule, but they’ve also given me the authority to make sure that we do.”

All Brian could do was shake his head in disbelief. “Obviously, we’re not getting the most out of our ERP system. And, I gotta tell you, Harvey, it’s gonna be tough to get people at Hayes to change the way they do things. They’ve been doing them this way since creation. I also know they’ve been doing it wrong that long, too. So, where do we start?”

Harvey tried to reassure his friend. “You have to have accurate data to start with. When we first got going, our data was about as reliable as a stopped watch—it was only accurate twice a day. If I were you, I would make sure that the data feeding into ERP is accurate. Then, I would take a look at the routings.”

“Piscoli, I knew you were the man I had to talk to. Now, all I got to do is figure out what you’re talking *about* and go do it, right? Thanks, buddy.”

Brian realized he still had a lot to learn and there would be a great deal of work involved. But, it was like he had always said: “Hard work isn’t the problem.” When you know what you’ve got to do, you do it. It’s the not knowing that makes everyone crazy. Then, you’re just working against yourself, and that’s the hardest work you can do.

Chapter Two

Gaining Knowledge

A few days later, Brian was called up to Ralph's office. He wasn't sure what to expect. He did know things hadn't improved much since he had started, and he was never quite sure when the axe might fall. As he entered the office, Dan, Mickey, and Joan, the Production Control Manager, were already seated. "Have a seat, Brian," Ralph said, motioning to the remaining empty chair. "I realize that things are pretty hard for you guys with this scheduling system of ours, but I'm not accepting any excuses because of it. And Brian has been telling me that he doesn't have any way to predict what his capacity requirements are going to be. There's no question we gotta find a better way to run this place. That's why I want the four of you to attend a three-day course on capacity management next week. Roy tells me the instructors are well known and put on an excellent presentation. He thinks we would learn something from it. He also wants Joan to go along. He said his department will pay for it, so I figure it'll be worthwhile if you pick up a few points." He handed the course brochure to Dan.

Dan thumbed through it and handed it to Brian. As Brian opened the four-page spread, he remembered the last course that he had attended. The speaker spent the whole day talking about things that had little to do with Brian's immediate needs. He could tell Ralph was intent on sending him to this one, so he resigned himself to another three days lost. Ralph was always big on meeting his numbers. This time it was the education and training quota that the corpo-

ration imposed on him. He would just have to come in before the course each day and try to get things lined up and then drop by after the course to see what disasters had occurred each day.

The course was being held in a local hotel. The four members of the Hayes party found seats and filled out their name cards with their company name. Brian was seated next to a woman from Missile Systems, a large, local defense contractor. He looked around at the names of the other companies in attendance. There were people from Good Health Vitamins, Precision Air Components, Dorman Chemical, Beartone Manufacturing, and several other companies. Brian wasn't sure he could understand how all of these different companies with different products and different processes could use the same capacity planning techniques.

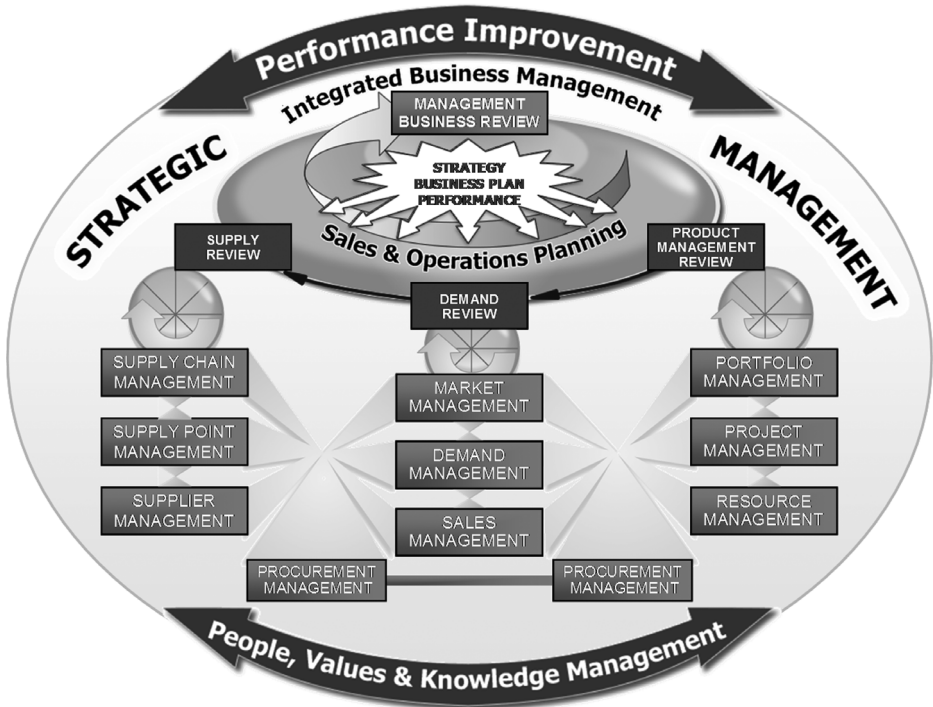
The speakers arrived at the front of the room. There were two speakers: a woman in her late forties and another man perhaps 10 years older—both casually dressed. The lady moved to the front of the group. “Hi, I’m Roxanne Barnes from Effective Management Inc., an education and consulting firm, and next to me is Dennis Jones.” Dennis waved as Roxanne continued. “Our topic for the next three days is capacity management. As they say on the airlines, if this is not your intended destination, now would be a good time to deplane.” Everyone laughed, helping to put them at ease. “We’re here to talk about getting control of your manufacturing operations through capacity management and good scheduling.”

Brian was ready to hear about the solution to his out-of-control problem at work. He listened as the speakers offered their manufacturing credentials and explained the areas that they planned to address that day. When they had finished their introduction, Brian looked across to Joan and nodded his approval. He could see that she agreed with his early assessment.

Roxanne described the material each student had. Among other things there was a book she referred to as the *Class A Checklist* and a course notebook with almost all the slides she and Dennis would be presenting. Each slide had space for notes.

Roxanne walked around the table where her computer and projector sat and said, “In order to for us to apply what we are going to learn about capacity management properly we need to see the whole picture. To accomplish that we will use a model we call the Integrated Business Model.” She then flashed up on the screen Figure 2.1.

Figure 2.1 Integrated Business Model



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“As Albert Einstein once commented, ‘All models are wrong, some are useful’; so too this model is a starting place for all companies to begin building their processes.

“As you can see the model starts at the top with Performance Improvement which means that you must start with performance metrics that drive the right behaviors and hold people accountable to meet them. We will cover the performance metrics for capacity management and shop scheduling in a lot of detail as we talk about the specific topic.

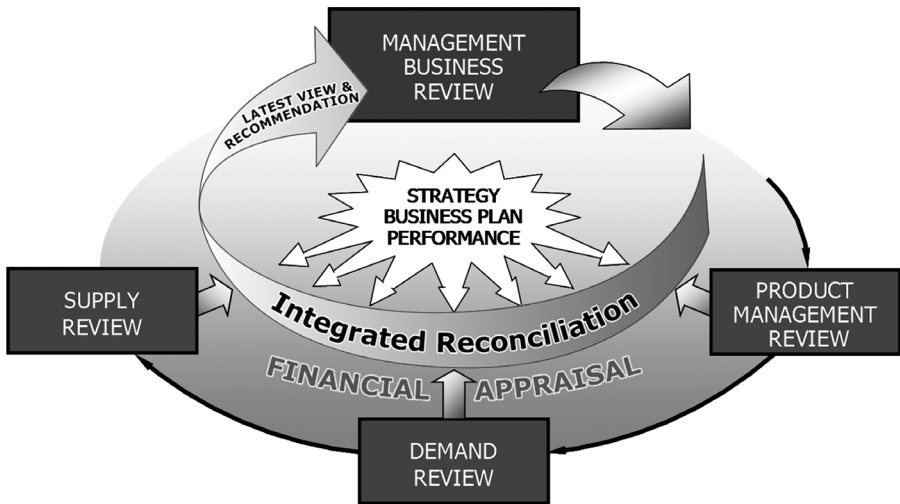
“We will also be referring to Class A as we proceed through the course. We will go into more detail at various points in the course but for now let me give you a very high-level definition. Class A is an industry standard that helps you compare your performance against the best practices as defined in the *Class A Checklist* I referred to earlier. The checklist is made up of nine chapters. If you receive

a score of 5 then you are excellent in that process. Following that logic, if you receive a score of 4 you are very good, a 3 is good, 2 is fair, and 1 is poor. If you are not doing the process you receive a score of 0. Class A companies have achieved an average score of 4.5. We will be focusing on the Managing Internal Supply chapter. To say the least, to be considered a Class A company you really have to be good.

“In the ‘Integrated Business Model’ figure (see Figure 2.1) we are trying to depict the processes that need to be integrated for management to be able to control the business from top to bottom. It shows product management, demand management, and supply management as three ‘legs’ in the center of this diagram. Each of those is capped by a preparatory ‘wheel’ of activities that serves to prepare for reviews within the Integrated Business Management process, which I’ll discuss in a few minutes. We won’t get into detail about the activity within those preparatory wheels, with the exception of the Supply Review wheel. In the vast majority of companies we work with, we find the individual elements within each of the three legs to be poorly integrated, and more often we find competing internal objectives and turf battles going on. Integration across the legs is almost always weak, at best.

“In contrast, companies that follow Class A principles, exhibit Class A behaviors, and reach Class A standards of performance have these functions fully integrated, with a clear multifunctional focus on achieving the business strategy and continuously improving business results. That integration is accomplished through a process we call Integrated Business Management, shown here on the screen in Figure 2.2. This model is simply a more detailed view of part of the previous slide (Figure 2.1).

“I want you to notice that at the heart of Integrated Business Management, depicted by this ellipse, are strategic and business plans with continuous financial review and reconciliation of issues and imbalances. The Integrated Business Management process itself is what successful companies use to deploy their strategic plans and objectives throughout the entire company. In other words, they use Integrated Business Management to link strategy to execution activities. Senior managers review actual business results formally, regularly, and thoroughly in this process, to make sure all functional activities and results remain on target and on strategy. The process culminates in a single operating plan and empowers people at all

Figure 2.2 Integrated Business Management

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levels of the company to make good business decisions from day to day, week to week, and month to month. As a result more good decisions get made more quickly, and good information flows continuously both top down and bottom up and across all functional areas.

“At the very top of the Integrated Business Management ellipse is what we call the Management Business Review. This review is the culmination of the month-long Integrated Business Management process. It is a crisp and concise monthly executive review of recommended plans and allows presentation of recommended solutions to resolve significant issues. If all preliminary work is done well, it is a quick review and approval process. Often, however, there is important debate that allows senior management to test recommendations and evaluate current business conditions and strategies. In the end, it is a decision-making meeting that results in a single set of demand, supply, product management, and financial plans covering the next 18 to 24 months, and clear decisions to resolve current problems and avoid future problems. The approved plans are then quickly and broadly communicated throughout the company. Functional leaders are held accountable for executing the approved plans and for delivering the planned outcomes. With this model in

place, everyone in the organization is on the same page and works with the same objectives. The company's strategy has been solidly linked with functional strategies and with planning and execution processes.

"The Management Business Review can be only as effective as the reviews that precede it each month. I want to spend just a few minutes talking about each of those reviews. The Integrated Business Management process begins each month with a Product Management Review that ensures Sales and Marketing ownership for all product portfolio plans, as well as currency of the plan's deliverables, timing, and cost. This is facilitated by the Product Coordinator (Manager, Director). The focus is normally on what has changed from the previous month's review and care is taken to ensure the resources are available to execute the plans successfully. This monthly review provides the Demand Manager with information that he or she can use to forecast increasing demand for new products and services, and reduced demand for replaced or cannibalized products and services. This critical input to the demand plan on new and changing products and necessary resources is often overlooked by companies doing traditional Sales & Operations Planning, yet is essential in developing accurate forecasts and flawlessly launching new products and product initiatives.

"Moving on to demand, you notice that the Demand Review considers all sources of demand, including non-revenue demand such as sales and professional samples. By this time, the forecasters have incorporated the plans of the Sales organization, Marketing plans, customer promotional events, field sales intelligence, economic trends, and a host of other inputs. Demand management also considers historical patterns, utilizes statistical forecasting tools, and draws information from everyone who has contact with the customers. In this step, performance is analyzed, ownership of all market and customer plans is reinforced, and commitments are made for volume, revenue, and margins.

"The Supply Review, which is where we will focus, is driven from the output of the Demand Review and takes into consideration the strategic and business plans and the operating strategy. Those involved in the Supply Review analyze all potential constraints through the lens of what we call Resource Requirements Planning, which we will go into in detail later on. The executive responsible for Supply Chain plans and performance (in many companies this is the

Supply Chain manager or director) reviews performance, capability, flexibility, and alternative supply strategies when supply constraints create an imbalance between demand and supply. He or she wants to be certain, especially in capital intensive companies, that underutilized equipment is identified as an issue so that plans can be developed either to increase sales of items produced on that equipment, to modify that equipment for other purposes, or to reduce that capacity. The Supply Manager facilitates and coordinates the preparation process leading to the Supply Review, working closely with the Demand Manager to balance demand and supply capabilities throughout the planning horizon. At the same time they maintain inventories as low as possible while simultaneously increasing customer service and minimizing costs. The output of this review is commitment to an achievable supply plan that supports demand and product management requirements, or an assessment of alternatives when a gap between demand and supply cannot be closed. Balancing supply and demand volumes is where the traditional Sales & Operations Planning processes end.

“But the Integrated Business Management process doesn’t end there. It continues by integrating financial analysis continuously in the process and during each of these review steps. We no longer wait for that analysis until all the plans are reviewed in the formal Reconciliation Review, led by the Integrated Reconciliation process leader—usually one of the Leadership team—that follows the other reviews I’ve described. Reconciliation of differences, issues, and gaps is conducted continuously throughout the month. Having the ability to examine financial implications of alternative plans in the individual review meetings empowers people to make decisions at appropriate organizational levels and allows the leadership team to focus its attention on only the most important issues during the Management Business Review. There is normally a brief final reconciliation meeting chaired by the process leader to finalize the information for Management Business Review, but analysis and decision-making are accomplished throughout the month.

“Perhaps the most important thing about the Integrated Business Management process is how it directly links strategic planning, business planning, company-wide projects, and day-to-day detailed planning and execution activities. This linkage gives the Leadership team the ability to ensure that all the daily decisions and activities throughout the organization keep each of your Integrated Business

Management product families on strategy and in alignment with the plans approved in the Management Business Review. There is no ambiguity; everyone operates from the same set of authorized plans and numbers; accountability is unambiguous; and results are tracked and reported. The most eloquent yet simple endorsement we've heard about Integrated Business Management is that it enables senior management to 'hit the numbers' and 'deliver the strategy consistently.'

"On the surface, this linking of strategy to execution through Integrated Business Management appears to be a simple extension of the traditional Sales & Operations Planning process. It is a simple change conceptually, but it isn't easy to implement. And it's just one element of the culture change required on a journey to business excellence. It's a big effort, but it yields significant business benefits quickly.

"Let me quote a couple of specific endorsements for the Integrated Business Management process. At Effective Management we have been teaching and coaching companies on Sales & Operations Planning since 1984. In recent years the rest of the world has been waking up to the power of this process. In February 2004, AMR published the article, 'Sales & Operations Planning Bringing Order Out of Chaos.' The article stated, 'The only enterprise process that balances the supply- and demand-side equations optimally is Sales & Operations Planning. In fact, a formal well-executed Sales & Operations Planning process was identified as one of the top practices of performance leaders in AMR Research's studies.'

"Additionally, The Aberdeen Group published a survey in which they stated, 'Enterprises that deploy S&OP programs strategically consistently outperform by an average 20% in gross margin.'" Roxanne paused.

"Importantly, these findings are based upon the traditional S&OP process, not the Integrated Business Management process that incorporates the strategy and financial aspects to drive even greater benefits.

"If your company isn't ready to go as far as Integrated Business Management, I suggest you start with Sales & Operations Planning. The software needs are really simple and creating the data to support Resource Requirements Planning is a piece of cake in comparison to Detail Capacity Planning.

"Are there any questions about the Integrated Business Management process?"

“So you really expect the sales and marketing organization to forecast?”

Roxanne turned and focused on a man in the fourth row. “It’s Sam isn’t it? And you’re the Production Control manager at Dorman Chemical.”

“Well you got the name and company right, but the title is a misnomer. I’ve never been able to control production,” Sam replied, which was followed by some knowing laughter.

Roxanne laughed also, “Well Sam, yes, we do expect people to forecast and do a reasonably good job of it. We know there is no such thing as a perfect forecast, but we find that if companies follow the best practices described in Chapter 6 of the *Class A Checklist*—Managing Demand—they are able to significantly improve the accuracy of their forecast.”

“Ya gotta class on that? Because if you do I know a lot of sales and marketing people at Dorman that need that class,” Sam responded.

“Yes we do. Please talk to me at break on that, Sam.”

Brian could see Joan making notes and knew that she would be right there with Sam at break time.

“Let’s go back to the Integrated Business Model (Figure 2.1). I have explained what basically happens in each of the three legs to support Integrated Business Management. We will of course go into much more detail on the Supply Review leg, but before we do that I want to point out that if we are doing the process properly we are operating to one set of numbers. That means there is only one demand plan and it drives all three legs. What isn’t specifically shown on the model is finance. Finance uses the same set of numbers to drive all the financial planning and reporting. They simply add to cost portion and they have the financial plan. There is no problem keeping the plans in sync because they are all one plan.

“Lastly, let me direct your attention to the bottom of the model—People, Values, and Knowledge Management. We have all heard the line that a lot companies spout—people are our most-valued asset. People are not going to perform well unless there are values that are lived everyday in the organization. Stating them and living them are two entirely different issues. Taking it a step further, people need knowledge that is not restricted to the way the company operates today. For instance, this course will provide you with perhaps a completely different way to operate. Your company must have thought