

Book review on Finite Capacity Scheduling by Gerhard Plenert PhD and Bill Kirchmeir

I met Gerhard and talked with him for an hour at a customer's office of one of our franchisees in Reno NV, which specializes in antique car restoration and maintenance. Gerhard was in the waiting room reading what may have been Steven Hawkins, so we began talking. Imagine my surprise to find he had worked with so many great companies in the early computer days and with the automotive industry and many other heavy Equipment Industries. Well since I had him there for 1 hour, I barraged him with questions from converting Space Energy (radiation and different light spectrums into energy for our planet), to taking his methods to the service industry. He too barraged me with questions on franchising, and later we talked about the status of expert and we both laughed when we found out we were both published in our fields of expertise. He admitted to writing books about his subject so I ordered one and it shocked me that it was \$55.00 plus tax, after reading it, I was shocked that so much information on the reality of efficiency had ever been compiled in one place.

First off I would like to say that this book is not just for Manufacturing Executives. I believe this book should be read by our Military for infantry Logistics and moving forces into a hostile area for possible future engagement. It should be read by NASA who occasionally has missed appointments with Asteroids or launches. As NASA learns how to attain multi-dimensional space travel it will be imperative to be at the right place at the right time and to jump dimensions of space time otherwise it does not appear that travel beyond the speed of light will occur in our life time. Computers are here to stay and they can help us streamline efficiency and allow all business models to work in real-time. The new way of manufacturing will be FCS and not Infinite Scheduling Backwards Pass (ISBP). Many aspects of this book dealt with the implementing of such a system and also with the reality of change and the fear and roadblocks by conventional wisdomers.

Great Quote;

Newtons Law to manufacturing;

For every expert with a perfect solution there is an equal and opposite expert with a perfect solution.

Now, there lies the problem. How to get there. We all want the same results in government, we want utopia. In Economics we want stabilization, in manufacturing we want the ultimate efficiency. So in US governments we have Democrats, Republicans and now we have CHADs. In Economics we have Friedman and Keynes. In manufacturing it used to be Deming and TQM vs. the old way of thinking. Today it is finite capacity scheduling (FCS) with software scenarios vs. other systems we have been taught, such as Material Requirements Planning (MRP), Supply Chain Management (SCM), Schedule Based Manufacturing (SBM), Enterprise Resource Planning (ERP) all of which may appear to be viable on first glance and work for a limited purpose if all things are equal. However it does not appear that in the history of our Planet all things have ever been equal. In theory maybe, yet even on the most level of playing fields, they

are skewed in one way or the other, by size, weight, strength, materials, wind, etc. There is always a variable or a gray area (thank god otherwise attorneys would all be out of work eyh?). Incidentally god did not make attorneys, otherwise they would still be arguing if Adam and Eve should receive belly buttons, and with no supreme court yet established to kick it back to a lower court the human race would never have come to be, during those last days before the rest. Or maybe god got so tired of dealing with attorneys he had to rest.

The book went into detail the cost to expedite a job, and to deliver on promises made by sales staff to acquire the order, which were impossible considering all the other promises, which were to be scheduled simultaneously. This caused over time and accidents and problems with compliance issues with many agencies and still did not get all the jobs done so the customer base was in constant attrition. In wartime you need to expedite everything and one of the reasons that we beat the Germans was because we built 96,000 aircraft to their 30,000 that last year of the war. It was not that we had better aircraft. They had equally brilliant minds on their side, and a hell of a head start. We of course had the desire to win. And we had the manufacturing and the resources as Germany was running out of everything. Charles Lindbergh warned us on his visit of the Luftwaffe and their incredible planes and weapons of war that the Germans already had pre-war (many called him a NAZI sympathizer, which is hard argue, but we should have still listened. He was definitely enthralled with their innovations). It truly was the manufacturing and the great American push to move mountains that won us the war. Everyone participated and helped in the war efforts. Breaking the backs of the Germans was not easy, breaking their manufacturing abilities and running them out of resources is what helped almost as much as the actual fighting. It will be hard to fight waving sticks when B-1 Bombers are flying overhead; because by the time you see them it is too late. Saddams army never had a chance since we had logistically won the war before it started. Many battles in history, even our own civil war was about train tracks, supply and troops moving and feeding armies. The South had factories but found it hard to match the output of the North. Larger Armies more guns, better stabilized currency. Innovation helped when they changed the bullets and muskets, which could shoot farther with better accuracy yet within months both sides had all the same technology. In WWII Germans were working on the hydrogen Bomb and so were we, at least Einstein in his letter to the president indicated he believed they were working on it when he asked for funding of the Manhattan Project.

Innovation in Manufacturing is important it helped Pirelli and Firestone and a few other tire manufacturers increased production and leap frogged other technologies. But in the end they all had the new technology and the real problem was who could build the most using the same technology. Cold War days, we simply out spent and bluffed our way into winning the cold war. We may have to do this again. We and the Russians both had the technology, and the resources, yet our great economic machine was too powerful, probably due to the productivity derivative of a capitalistic society vs. a communist one. Even though none of the last three paragraphs were in the book, it is necessary to further point out why this book is so important.

Another great quote in the book;

Behold the turtle who only makes progress when he sticks his neck out.

I believe that FCS is the solution to DaimlerCryslers dilemma in Europe. Many countries there and their citizens favor a customized car like a Dell computer delivered in less than 30 days. Not the one size fits all car, which has been Fords answer to profit taking in Europe. Tomorrow and todays new demands are for zero inventory and immediate delivery with maximum efficiency; this can all be achieved with FCS. It also can work in training of new Army recruits, Navy pilots, and third world dictators. I believe car wash guys can easily implement such a training version of FCS even though no one has ever done it before. I also believe that we can deliver real time services to our customers and allocate the necessary resources without wasting by GPS tracking, real time scheduling changes, labor, supplies, equipment and crews. There is no difference fundamentally between labor at a manufacturing facility and labor on a job site or multiple jobs sites for that matter. A computer does not cry when you add perimeters and does not need more food or coffee to run by the seat of its pants. It is not an emotional issue, it just is. Likewise a computer can calculate many equations simultaneously, many can easily do 10,000 possibilities per second. Still want to play chess with a computer? So does that mean the death of the entrepreneur? Does that mean the Howard Hughes days of innovation and flying by the seat of your pants are done forever? No there will always be prototypes, with no parts available yet, but what it does mean is that the entrepreneur can see his dreams come to fruition better because they may actually make a profit. Does it mean that there will be no more defective units? No, there will always be defective parts from manufacturers who rely on sub parts, which are not built in the same way. In Taiwan many company have experienced up to 35% more productivity by only changing to the methodology of Finite Capacity Scheduling. So for America to complete its productivity without affecting its bottom line we simply produce more with the same amount of labor and manufacturing abilities. Think of it. Even if the dollar is strong a shit we can still sell for less because we are producing more with the same fixed base costs. This means we can beat everyone still. Let the innovators innovate and the manufacturing Schedulers schedule using FCM systems and we will increase our output and win, even if we are all using the same secrets stolen from our scientific communities. The book refers to Peter Drucker who stated that the true measure of productivity is the output per unit of time given the finite resources. Yes I believe this to be and have always said the money is in the time and not the completed job. This should be obvious to anyone who has bid a job to low and later completed the job quicker than anticipated due to a new method of operation discovered upon commencing of the job. Sometimes it takes a few times to see how to actually do the work and then refine the technique, in actuality you are performing manual Finite Capacity Scheduling even though it is the most elementary part of the actual FCS model. Now add jobs, labor, and resources to the equation and then try to factor in all the materials and times the materials, soaps, supplies, etc are needed and what do you have? A complex mess, which requires lots of thought and time. Now add ten more car wash trucks, with the corresponding work to be done and add two more shifts to each truck to achieve maximum capacity and what do you have? 12 hours worth of scenario scheduling and moving around resources to see what

fits best. What if a computer did it in 20 minutes? It can you know. Even though Swartzkoff has an IQ of 165 it does not mean he does not need to use the finite capacity scheduling methods to help him arrive at the most efficient scenario. It just so happens that it will work and he can use his brainpower to decide which scenario will work based on his knowledge of human motivation which may or may not be computer ready, based on the battle at hand. Another reason why it is not such a bad idea to send unmanned fighter planes into a battle zone to fight and why it is necessary to have a missile defense system set up at our perimeters. FCS scheduling works in all the tests our strategic team has placed on it from a Blitz marketing mission to a customer response system for services real time using e-commerce. FED Ex does use a finite capacity approach to overnight package delivery. It does not look like one on the surface yet it most certainly is. As teams of people use all resources at hand and move the flow real time to the next job as completed. All with such precision that it is truly predictable to schedule. Impossible? Go to Memphis at midnight and take the \$200.00 tour. Every President of the US should go see it once. Every executive of every company who wants to be here in five years ought to see it. Few companies do it as well as Fed Ex. I believe the FCS model taken to its fullest could actually increase the Fed Ex system, although at first glance it would be hard to believe that anything could be more efficient than that.

FCS can handle just about anything, I put together scenarios of rain, energy shut downs, union walkouts, overruns, demand increase post commenced projects, delivery date changes, weekends, holidays, force majuers, increased prices, material missed shipments. It can all be accounted for a re-scheduled without stopping production using these methods. When Nokia and Erickson lost the chips they needed, which were produced in NM and the fires burned down the Philips plant producing the chips last year. FCS would have saved Erickson, and perhaps they would still be in the cell phone business today, instead, huge write-downs unfulfilled orders and exiting of the market sector. Nokia would have been killed too, except they scrambled and produced half the demand necessary. Each company although would have been effected would have been effected less using these methods, that I am sure of. And producing a computer model to give the answers needed is possible because the computer can re-tabulate and change no matter how far from normal.

In wartime you create the fires in the enemies supply chain or distribution channels, which pissed off the FTC when Microsoft played out side the normal battle field of what was considered and went to the supply side to wage war, as skilled practioners of the game often do, but are seldom taught. Why would they not wage war there since they built the distribution channels in the first place? They were previous victories and trophies on the wall, and Netscape wanted them for free, even though they had a half a billion dollars in an IPO to build their own. In the civil war the North needed the rivers to move supplies and troops even though they were in the souths territory. Look at a disease, its job is to spread to procreate and take over living in its host, our job is to kill the disease since it will kill us first. It spreads anyway it can. To prevent it, it maybe necessary to think outside the box and quarantine an entire country like Africa until volunteer efforts can go and stabilize the situation, which might take 10 years. We have to kill its supply chain. Each time a person gets on a plane and travels to another place it

spreads, that is its supply chain. You could actually build a finite capacity-scheduling model to determine when a disease will be eradicated or how a terrorist might attack the water supply of the US to kill the most number of people in the quickest time. Then by doing a reversal of the FCS scheduling you could easily find a way to combat such an effort or prevent its overall effect if not prevent its start. And knowing this why would you not use such a model on everything that is a system or process either to roll it out or prevent it.

Saddam continually knew that he had 90 minutes move surface to air sites and re-camouflage them, and to move aircraft while the satellites could not see them. Of course we also playing the game to maximum efficiency recommissioned some SR-71s for random fly bys during the 90-minute lapse. Unknown to them we had the advantage of superior knowledge of our enemies position. We effectively took the time out of his model. Nowhere to run, no time to hide. Bingo.

General Patton use to say an army moves on its stomach, well then move them further faster and feed them less between locations. The faster they move the more distance they travel between meals and therefore less food per mile. Precisely the objective of the FCS model. The book does point out that if the whole team is not on the same page then the FCS methods do not work. Look at the Battle of Midway where the Japanese were caught with their pants down. Guessing rather than playing it safe, Heroes have been made of hunches yet FCS scheduling would have prevented this error. They screwed up. We would have beat them anyway, but it would have come at a much higher price as in one or two of our carriers also. Ask our torpedo bomber hero, and former President George Bush Sr. he was involved in this type of tactical strategy at a very personal level. It almost killed him. 3 days in a tiny one-man life raft in the Pacific was bad enough plus throw in ditching a torpedo bomber in the water without flipping it when it has been battle damaged.

Will Rogers was quoted in this book when he said Common sense is not common. With that truth revealed. It is much easier to fix the problem, first admit you have the problem and then reason through a logical answer using ALL the facts. This is why I also recommend the book Total Capacity Management by CJ McNair and Richard Vangermeersch. It is interesting the differences cited in this book in types of capacity management in that you cannot predict total capacity management unless you have pushed the envelope to new heights and find that in fact the capacity was underestimated as new innovations occur out of necessity. Such as attempting to build more muskets in the North in the Civil War to arm the troops to fight the South. Remembering the at the same time the South was commandeering factories and turning them into war manufacturing plants to compete to arm their side. Total Capacity today is not the same as tomorrow when some lunatic entrepreneur goes and breaks all the norms and industry standards. Once the barriers of thought and the limits of time, space, distance and speed are reduced or increased then the boundaries of that industry are no longer relevant. It would also be interesting to consider that the total capacity of anything is everything or nothing, depending on how you look at it. As many motivational speakers will tell you with the connect the dot trick, make one cut trick or paper cut out trick. The glass may

actually be bottom less and completely empty although to you it appears half full. In the instance of Gold Mining when raw dirt and rock are processed and what appears to contain no gold has over 8 ounces in it. And therefore if all the cubic dirt and rock were processed then the total capacity of that element within that area would be astronomical in economic terms. Problem is how to mine it efficiently and there in is the other Total Capacity problem. If one could convert lead into gold it sure would be easier, the total capacity of conversion would be the issue. These authors talk about tactical and operational management and define the two types. Operational being getting the supplies near the work stations to use, which in itself involves many vendors and who also have a scheduling systems to deliver as promised. Tactical involves the decision making process used to decide while flow of production is in process. I believe that FCS can be integrated into this process and improve it. There is one last component to add to move this to service based applications, such as with the car wash guys. By adding the e-commerce and real-time call center demands from customers and knowing that we can deliver a car wash in 30 minutes or less, keeping in mind that Tom Monahan had a bigger problem and that was making the Pizza, which had its own processes. Think of the simplicity for initiating the system. Now look at the possibilities of watching the process real-time with GPS, systems, on-line transactions, using a zone defense pattern which can change to man-to-man coverage with some or all of the fleet of units. Now add in the possibility of 24-hour operations washing multiple types of items, scheduled and known accounts and on the fly call in Absolutely, Positively has to be washed overnight. Is this impossible? No it is easy, but complex. Look at the 1-800 flower case-study, combine that with Fed Ex delivery, and Dominos Pizza computer system remembering the customers name and last order. Well do not stop here, Mr Walton was no idiot either, he knew what would sell and how much of it to whom and when. A life time of studying your market dynamics will essentially drive any man to act like that, think like him and come to the same conclusions. With the whole World dirty and everything needing a wash and different elements being washed at different times, why would it not be possible to have crews on top of crews who had scheduled work and then fill in the gaps of any extra space. Total Capacity Management right? Yes in the service sector. Does anyone else do this? Yes a few companies one out of Austin Texas, which hauls dirt and does construction, another out of Sacramento and Bay area CA who does this to do short deliveries. But they are doing it half way. Richocet in the Bay area has real time solutions for Palm PC users and it is easily possible to use the C-Store methods for keeping track of inventories to keep track of pizzas delivered, Fed Ex packages taken in or Inventory realized and real-time ordering as in 7-11. By adding in a center half back as in a soccer game to take care of the call in orders while the other crews handled the normal accounts, until which times scheduled crews reversed their positions and falled back on the increased call ins on a day before a three day weekend. Thus taking all the work and increasing cash flow and good will amongst customers by servicing everyones needs. With this all possible the price could be lowered to a back breaking competitive level giving lower prices to consumers who voted with their dollars while retaining a huge number of proficient hours each time period. It is amazing that with all the freight forwarding software, inventory software, manufacturing scheduling software that no one sees the obvious uses to streamline services. Look at a Taxi Cab company, police dispatch, air traffic controller, train master at a rail yard with trains moving all directions

and many 300 miles away all converging and departing simultaneously. Or the Phoenix missile system used by the government which when put onto an F-14 could track and kill 8 target 150 miles away moving at almost any speed in and direction on a three dimensional plane. Ever wonder why no F-15 has ever been shot down in combat? Even a gondola wire could not stop it, it always wins. So is it safe to say that when you have the best of everything that the odds are stacked so far in your favor that knowing the percentages is irrelevant to the game. All that needs to happen is to set fire in motion.

If anyone has ever watched Fed Ex work they use nearly the maximum of human resources as pilots load their own planes and help with the production of the sort. This can only happen when the norms of union workers were broken where one guy drives a fork lift, one guy drives a truck and they take breaks at different times and if the truck driver moves the fork lift then the fork lift driver who is on his 1 hour break files a grievance with the union. Scary, productivity level? Not much. Same with highway workers who really need a shovel with a kick stand since they are not needed to hold it up anymore. If one guy works and fifteen guys lean on their shovels while one strong tenure supervisor sits in his pick-up waiting for his supervisor to discuss the next coffee break. Yet with finite capacity scheduling even these dilemmas can be averted to some degree. Yet the total capacity management plan cannot achieve any additional savings in job completion frequency.

The only way this will work however is that all the team take ownership in the scheduling system and not try to change it by calling in with a bogus excuse such as tire is low, I need to get air. Traffic is busy, I cannot get there. This one we can mitigate knowing the speed of the vehicle by GPS/GIS and correlating that to the traffic reports. Without being a big brother, you can have a strong team like ours in every micro team unit. Working together to win and sharing in the economies of scale by profiting when goals are met. Keep in Mind that we can do better than the GE Way where if goals are not met heads roll. Fear is an excellent motivator, but it burns people out and screws with their psychy. It is much easier to win by other winning and through diplomacy and reward for achievement like in sports, or medals for war heroes, or status and profit incentives all inline with FCS, it can easily work together. Add in bonuses for new customers signing up for with customer and employees and watch referrals skyrocket and all this can be tracked as well. Imagine a company tracking its referrals not by secret codes on print media or post card mailins, but with regards to days of the week, area, type of services, employee who did the last job before the referral came in. A small business person can keep track of this with out too much problem if he has one unit and all the referrals come from him. But what about the multiple unit operator of a plumbing company, tow company or National Tree Trimming Company? What about a national franchise company. Where things vary from region to region on some services and others are almost an identical match such as the friends and family programs and can be figured out by DMA service region and census (or tiger files) population formulas.

I would recommend that anyone on our team reading this search the internet for mobile car wash scheduling and come up with all the previous postings. Try Alta Vista,

Northern Light and the search feature on this bulletin board and you will see the tremendous progress we have made in discovery and research.

I think the best point in the book was made for the nay Sayers of FCS, here it is.

No matter how good a software package is, if the users do not have ownership in it, it will fail.

Conversely; No matter how bad a software package is, if the users have ownership in it, it will succeed.

So obviously education and proper motivation is the key, the company and good will that has been built up is at risk.

If you think this book review is crazy, think of it as a discussion of thoughts after reading such a book. FCS is very efficient and it is even used by HMOs to schedule patients, and during operations. Remember that the efficiency in an HMO is how they make their money, not by making you healthier or better. But by doing that minimum promised at the lowest possible price. Luckily the FCS model is sound otherwise in this case it could literally cause death. Hospitals use these systems to manage inventories, supplies, labor, machinery, and all facilities. Makes since. Problems may occur if you are maximizing surgery equipment and rooms and doctors, when someones surgery takes longer than anticipated and the next scheduled is a kidney transplant. This is why in the customer service business that the limits of capacity are drawn and jobs of little importance can be moved to a later time while time is of the essence jobs are to happen forthwith. In fighting a war one cannot stop because a component is out. The enemy does not stop if you stop for tea. But in the case of logistics and moving reinforcements into position it is of the utmost importance to have these processes in place to look ahead fifteen chess moves. This is why Schwartzkoff said on CNN that Saddam was not very good military strategist. Maybe he is right, however, by then we had knocked out significant communication lines, SAM sites and blown up half his strength. I would have to thank Schwartzkoff the airforce, Navy and AWACS for destroying his logistical operations before the ground war started. Then the Marines first in and first to die, had no problems at all. We won the logistical battle. In business it is the same game, strategic partners and alliances to secure distribution channels for rapid advancement or roll out of a product line. Then to win the war it is all about delivery of desired services or products in the proper amounts to the proper places at the most efficient methods. FCS. Both operational and tactical. Logical thinking with an experience of true reality of the market place. Pencil Neck geeks with little round glasses reading spread sheets and answering every question in such a way that would make their college professor proud does not work. You cannot outsource your FCS software needs to someone who has never been in the war and flown by the seat of their pants. There is a reality of the market place and if it is the only consideration next to the customer you will win, you need both and if a professor who cannot teaches someone who has never how can the customer be enlightened enough by great service to repeat their orders? This is why Gates left school, Paul Allen was the coach and Steve Balmer is now running the company and why they

won so well in the market that the government had to find something wrong with them even if they did not understand what and could only get complaints from competitors as no consumer was ever actually damaged.

It is necessary to track everything to have the right answers and providing you have built an FCS system correctly you are in a good place. The rest of the process is to cut out the waste and complexity. As long as you know you know you are the best, like we do at the Car Wash Guys, you do not need to create for the sake of creating, you create for the sake of achieving, everything else is wasting. Which by the way wasting does not calculate in the logical world of FCS. If we follow our competitors we would be really complicated and achieve less and less as we grow bigger and bigger on a per store basis. If you copy your competitor it will not help you beat your competitor. You only have to think like him to find him and know how he thinks to beat him all the while thinking beyond him. That is how the Bizmark was found caught and sunk. And why Alexander the Great won so many battles.

I liked the way the book ended with this quote, probably another quote to go with the famous quote; If you do not know where you are going any road will take you there. He finished the book with this quote. Even if you know where you are going, if you do not move fast enough you will be run over. Yes precisely.

Just another exercise for the team in brain power. Think allot and call me when you have a good idea, so we can implement, adapt and stay leading edge.

No need to read through this book completely, the highlights as they relate to winning the car wash war are within these previous chapters.