**Career Episode 1: Improvement of a Product Line Overall Equipment Effectiveness (OEE)**

**Introduction**

* 1. This first career episode started in June 2000, when I was employed by company X, located in, Philippines. The company has four manufacturing plants, and I worked in one of the factories called X
	2. The activities in this career episode happened for over two years. Within those times, I started as a Junior Production Engineer from June 2000 to June 2001 and then later on promoted to be a Logistics and Materials Planner from June 2001- November 2002.

**Background**

* 1. In June 2000, a new manufacturing line is being set-up and our cross functional team was formed. We were assigned as the start-up task team for the improvement of the overall line efficiency. I was appointed as the one of the leaders of the group.
	2. The objective is to release the manufacturing line with a benchmark measure of Overall Line Efficiency or Overall Equipment Effectiveness (OEE). OEE is the product of three Key Performance Indicators; Availability, Performance Efficiency and Yield.
	3. The nature of the work is in an electronics manufacturing area producing modules. The new product line will be called LDMOST (Lateral Double-diffused MOSFET) line. LDMOST is based on Flexbase technology concept which is proudly a trademark of company X. Here, dies are mounted directly on heatsink making it more rugged and not prone to cracking. Printed Circuit Board or PCB’s with improved Surface Mount Device (SMD) soldering are placed on top of the heatsink. Wire bonding is done on PCB and dies with less wires and complicated loop heights. And these products will have better linearity and higher gain suited for EDGE-GSM (Enhanced Data rates for GSM Evolution) and CDMA (Code Division Multiple Access).
	4. The Manufacturing Director leads the whole factory or what we call a Business Fulfillment Group. As a Junior Production Engineer, I report directly to the Production Manager for a product line Base Station Modules. While the project is on-going I was promoted to a different position as Logistics and Materials Planner, reporting to the Logistics and Planning Manager, but working under the same product line Base Station – LDMOST group.



Organizational Chart

* 1. As a Junior Production Engineer, my duties and responsibilities were the following:
* Capacity Improvement - Recommend ways to increase capacity and performance based on analyses and actual line observations.
* Labor Performance Efficiency -
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* Simplified movements of workers/methods at the workplace that utilized economy of motion.
* Machine and Process Analysis – Conducted work methods and production studies, to integrate machines/processes & multi-machine operations.
* Quality Improvement Programs - Participated in cross-functional team meetings, provided data, information, ideas and helped in the design, conceptualization and implementation of improvement programs.
	1. For the Logistics & Materials Planner position, my tasks were:
* Demand Planning and Confirmation – Central point of contact of the Market Sector Teams and Business Line Planners from the company headquarters in Netherlands. Helped to interpret demand forecast/backlog and determine the material supply and capacity required.
* Demand Fulfillment – Providing primary focus on fulfilling customer orders, taking into consideration production loading, material safety stock target and logistical requirements.
* Cross Functional Team Coordination – On time communication of all delivery related issues with all teams; internal (Manufacturing, Engineering, Purchasing) as well as to external counterparts (Market Sector Team and Business Line Planners)

**Personal Engineering Activity**

1.9 As a fresh engineering college graduate, I was able to impart knowledge on using different types of manufacturing versus product categories. I introduced the use of the Product-Process matrix as a backbone guide of our analysis. Since this is not used often, I presented and made several examples to explain the matrix.

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|   |   | Low Volume / Low Standardization | Low-Med Volume /Multiple Product  | High Volume / Few Major Products | High Volume / High Standardization |   |
|  | Continuous Flow |  |  |  |  |  |
|   | Connected Line Flow |   | **LDMOST New Product Line** (Target Position) |   |   |   |
|   | Disconnected Line Flow |   |   |   |   |   |
|   | Job Shop |   | **Base Station Modules** (Current Position) |   |   |   |
|   |   |   |   |   |   |   |

* 1. After sufficiently studying the production line, evidences can be seen are; bottlenecks brought about by the unbalanced capacities between processes, bottlenecks as a result of downtime between processes, manual handling, suboptimal changeover schedules, long transport between workstations, few real integration or in-lining or processes. In the start of the project, Base Station Modules is in the lowly job-shop square. Therefore the project goal is to take out Base Station Modules out of the Job Shop square, in this way, it will be in a better productivity and throughput position.
	2. The introduction of new product line LDMOST became the opportunity to solve this problem. The target is to move the production line from Job Shop to Connected Line Flow square.
	3. I also introduced a new measurement to the team called OEE or Overall Equipment Effectiveness. OEE became the perfect measurable for the improvement project because of its holistic focus. OEE tackles the totality of a station by covering all possible losses that can happen in a machine. By extending the concept of one station to one production line, the measurement will be Line OEE that points to; line imbalances, bottlenecks and compounded rejections.
	4. Thus the objective of the project is anchored on moving Base Station out of Job Shop, formulated as SMART objective; “To introduce an advanced production line with a Best-practice Line Overall Equipment Effectiveness (Line OEE) of 80% (from 36%) by the end of 2002.”
	5. With the target of improving the Line OEE, all of its three components must be carefully examined by creating one group for each component. I was the leader of the Performance Efficiency Team, together with one Production Operator, a Production Supervisor, and a Technician. Performance Efficiency is the component of OEE that measures the speed of production as a percentage of available time to produce. Available time is handled by the Availability Team. Therefore from the formula of: ***Performance Efficiency = (Qty Parts Produced \* Ideal Cycle Time) / Available Time***, our main objective is to increase the number of parts produced over the available time.
	6. The first action was, I determined the bottleneck or the station that constrains the line because it has the lowest capacity. I compared the net capacity of each station and the top 2 lowest are, Diebond and Reflow-2 processes.
	7. Based on the initial data, Diebond has the lowest Performance Efficiency of 64%. I led the team in the root cause analysis by using Ishikawa or Fish Bone Diagram. Data gathered and analysis showed that this is due to two factors; reduced speed and idling/minor stoppages. For the reduced speed, it was observed that the long pre-heat time pulls down the performance efficiency. Almost 1 minute is wasted just to wait for the right temperature for the eutectic diebonding to proceed. I led the information presentation and brainstorming session on all possible solutions. After several engineering trails, the best solution was to include in the conveyor a pre-heating stage while another one is being processed. This action totally eliminated operator’s adjustment before bonding.
	8. For idling and minor stoppages, I conducted several method studies and concluded that the frequent and long inspection time, with redundant data logging on different data logbooks made the operators stop at continuous loading. Together with the rest of the team, actions implemented were; definition of critical inspection points and criteria, continuous training and recertification of operator’s qualification, and I designed a single logbook that captures all required data without re-entering information.
	9. The second bottleneck is Reflow-2 process. The reduce speed was caused by slow method of flux application, and materials are being wasted in inefficient flux application using cotton buds. I coordinated with our Purchasing Specialist, and alternative sourcing of flux application materials from another supplier provided us with a flex pen. I requested for the process engineers to start an engineering trial, and the result consistently made the application more efficient and faster. This result was validated by statistical data and performance report by the operators.
	10. On the second loss, the cause is the usage of just one loading track due to unregulated nitrogen gas (N2) in the machine. I analyzed and proposed the possibility of using several tracks for the reflow. The engineering trials concluded that the maximum capacity can be improved from 1 to 6 tracks after installing a damper. After implementation, Reflow-2 process improved its capacity and is no longer on the top bottleneck stations.
	11. Since OEE is a newly introduced KPI in the company, data collection from operators and workstations are difficult. I coordinated with the training department to include the OEE as part of the yearly certification program for all employees. I presented an overview of OEE to the higher management, led the training for all 1000 production operators, and provide detailed training to approximately 150 engineers and technicians. This training program is to improve their understanding on the measurement and to enhance quality of data logging thus improving data calculation and reporting of the OEE results.
	12. The improved single logbook was implemented in all the workstations. A procedure was released to standardized work instructions on logging information at least every processed batch, once every hour, and more importantly complete the data at the end of each work shift. As part of the data collection and reporting process, these logbooks will be collected and data input to an Excel-based OEE tool will be done by each technician in charge. This whole process was developed to help in the data collection and calculation of the results.
	13. As part of the continuous improvement process, weekly meetings were done with the Performance Efficiency Team. This is for follow-up on open action items and assignment of duties for new actions. At the end of each month, meeting for the whole Line OEE team is done to report the results and consolidate the three components. This was also done to review and gather other suggestions from other teams.

**Summary**

* 1. Starting from the measurement for my team, Performance Efficiency of 64%, the team measured a 29.65% increase (from 64% to 93.65%) by the end of September 2002. Together with improvements of the other components (14.25% increase in Yield, 22.04% increase in Availability), the Line OEE increased by a tremendous 126% improvement (from 36.4% to 81.88%). This is higher than the overall target of Line OEE of 80%.
	2. The project was completed successfully in 2002. I led the team to the presentation and we were awarded as best improvement team in our company’s Philippines Quality Improvement Competition (QIC). The team represented the country in the Asian QIC in Kunming, China, and bested 15 other Asian teams for the top prize. As the Asian QIC Winner, we competed with 12 teams in the World QIC in Hawaii, USA in 2003. We were commended for our problem solving approach and presentation skills.
	3. As a leader of one of the groups, my contribution to the whole team is to make sure that we meet our objectives. Also, I was able to provide a fresh approach in problem solving. As a new employee in the company, I was given an opportunity to have a good view of what is the real scenario in the manufacturing plant versus what is taught theoretically, make comparison and balance what is right and what is practically feasible. Most importantly, working in this team, I learned that a product release can be done faster with dedicated involvement of a cross functional team.

**Career Episode 2: Man-Machine Ratio Improvement (Simulation)**

**Introduction**

* 1. The career episode happened from June 2003 to October 2003. The project was part of my final requirement for a course in Simulation for my Master’s degree in Industrial Engineering.
	2. The project was conducted in company X . In one of its factory called X, more specifically under the Base Station product line. My position then was System Implementation and Process Engineer

**Background**

* 1. The project is about Improvement of Man-Machine Ratio (MMR) for Base station modules. While other semiconductor companies boast for a high MMR (1:2, 1:3 and even 1:4), currently all operations in Base Station Modules has 1:1 man-machine ratio, and the labor utilization is calculated at 27.08%.
	2. The objective of the study is to improve the station Diebond. It was selected because it was one of the basic operations in semiconductor process, and improvement of this station improves the whole production line. The study will compare and analyze different scenarios of MMR (1:1, 1:2 and 1:3)
	3. The product line Base Station manufactures devices that are used for mobile communications base stations. It produces 1800 MHz and 900 MHz device types for customers such as Nokia, Ericsson, Siemens, and Powerwave.
	4. At the time of this project, my position was System Implementation and Process Engineer reporting directly to Special Projects task force leader, who reports to the Manufacturing Director. My main area of responsibility is with the implementation of a Shopfloor Control System called MES-Insite and Cost Reduction Projects. While working I was enrolled for my graduate studies. Classes are held at night and during weekends.
	5. Statement of Duties for System Implementation and Process Engineer:
* Functional Requirements Analysis – Led the team for work procedure analysis and definition of functional requirements. Worked with the technical team.
* Factory Acceptance Test - Data preparation, report formats and factory acceptance testing. Documented new procedures for implementation.
* Implementation and Training - Designed, evaluated and facilitated implementation plans, including training of users of new Shopfloor Control systems.
* Cost Reduction Projects - Determined & proposed cost reduction programs to maximize resources utilization.
* Quality Improvement Programs - Participated in cross-functional team meetings, provided data, information, ideas and helped in the design, conceptualization and implementation of improvement programs.

 Organizational Chart

**Personal Engineering Activity**

* 1. A system simulation study was conducted to validate the current labor utilization of 1:1 MMR. Furthermore, the initial objective was to determine the effect of increasing man-machine ratio of 1:2 and 1:3 on the over-all operator’s labor productivity. A simulation modeling tool called ProModel was used.

* 1. Diebond operation is one of the basic processes in semiconductors; the opportunity for improving this is so big. Machine investments are very high for this operations, and with this study, possible savings can be avoided if implemented. Diebond is the process where sawn wafers, individually known as die, are attached to a carrier, which is the substrate.
	2. Data gathering for the required information were conducted; such as production standards specifically for the so-called “UPH” or the units per hour, this data is used as processing time of units. But this time is converted to “Processing time per batch”, for all the measurement is synchronized.
	3. For the time of manual movements, like the assist on minor downtimes and set-up and also for visual inspection of batches processed, fifty (50) observations were collected. Operators were timed randomly in different dates and different shifts for 3 weeks. Information was then entered in the STAT: FIT and recommended distribution with the highest ranking is chosen after all the sample data were auto-fitted. These distributions (for Assist and Visual Inspection) will then be used as their service times. The selected distributions were; Pearson 5 for Assist Time and Log-Logistic for Visual Inspection Time. For the minor downtime occurrence (assist), percentage over the total observation time was used. A Random number is also used to simulate if the machine is down or operational.

Summary of all Input data are as follows:



* 1. A simulation model was created using ProModel software. Entity called “Batch” is created for processing. Arrivals are scheduled with the fixed 300 batches average customer order per week. Simulation will stop after the 300 batches are processed. Replication was done 10 times of 300 batches
	2. To describe the simulation activity, a batch will come in the box, then batch will be dispatched to the nearest available machine. Batch will then be processed given the processing time (18.8633). A random number is generated, if the random number is less than or equal to the % Machine Downtime (0.4029), then the machine will stop and operator will assist. The Assist time is describe by the probability distribution Pearson 5 (P5(1.681, 0.2577)), but if the random number generated is greater than the % Machine Downtime, then the operator will just continue Visual Inspection, whose time is given by the probability distribution Log-Logistic (2+2.374\*(1./((1./U(0.5,0.5))-1.))\*\*(1./2.722). If the machine is not down, and the operator is not doing visual inspection, then this is considered as operator free, which means the operator is idle.

Original: MMR 1:1 Scenario 1: MMR 1:2 Scenario 2: MMR 1:3

* 1. Three scenarios presented above were run using the simulation model, changing the necessary input data in each scenario. Summary of the results are presented below comparing the Percent utilization of the Operator and the machine.

Original

1

2



* 1. The conclusions were; as we increase the MMR ratio, the Operator % Utilization also increases. The increase of MMR, did not affect the Machine % Utilization. The best scenario is Scenario 3, because it gives the highest Operator % Utilization at 77.4550, without affecting the Machine % Utilization still at the average of over 98%. Although the simulation time increased by 0.70 hours or approximately 40 minutes, this must be considered carefully in the production process planning.
	2. Statistical analysis is needed to be able to check any differences in the different scenarios. Comparing the different alternatives on the basis of a common performance measure can really give a clear view whether a significant difference is evident between the current scenario versus the proposed alternatives. Each scenario is then compared to the original scenario, and the two proposal scenarios are then compared to each other. The T-critical value and their corresponding confidence intervals per comparison are calculated.
	3. The Upper and Lower interval contains no zero, therefore results show that there is a significant difference. All the confidence intervals are totally to the left of zero, which means that the second scenario being compared is better than the first one. Scenario 1 and 2 are better than the Original, and all in all, Scenario 2 is the best among the alternatives.
	4. The collected data, specifically the UPH, were validated and signed by the Methods Engineers and Production Supervisors. Also, Assist time and Visual Inspection Times fall within the acceptable Factory Standard. After verifying the validity of the data and the model, and looking at the scenario results, it can be concluded that the output of this simulation study can be applied in the production line.
	5. I presented the project to the factory managers for implementation. Although there were hesitations from the operators, I helped them understand that the findings on the simulation clearly states that the current scenario only measures a very low 27% utilization and the remaining 73% of their time is considered waste. It was concluded that initially, manufacturing standard will be changed and will pursue with implementing the 1:2 ratio and eventually 1:3 ratio.

**Summary**

* 1. I completed the project within 5 months, in time for my course duration. The project reached its objective of proving the feasibility of increasing the current scenario of 1:1 MMR to 1:2 and then to 1:3. The project provided a theoretical overview of how MMR studies are done. This clears doubts from old-school knowledge of engineers, production supervisors and operators that this is not possible.
	2. The project was presented to the company and pursued in implementing the 1:2 ratio and after few months will be the 1:3 ratio. This action will save the company on headcount cost approximately US$30,000 per year. The manpower idle time and under utilization will be reduced making them more productive. This recommendation is initially for Diebond operation, and later on can be used as basis for other MMR Study for other processes.
	3. The simulation model created for the particular process was shared with the rest of the Methods Engineers in the factory and to the other factories as well. This can be used as a base line model for all other process improvements using simulation studies.

**Career Episode 3: Quick Response Manufacturing Approach: Daily Delivery Scheme and Self Directed Teams**

**Introduction**

* 1. My third career episode started in June 2006 and ended in December 2006 I was employed by Company X under one of its factories called X.
	2. During this particular career episode, my job title was Senior Industrial Engineer leading the Industrial Engineering Group. And at the same time I was the Overall Coordinator for a special project called Self-Directed Team for the whole factory.

**Background**

* 1. The project is two-pronged; first, it is about the implementation of Daily Order Confirmation versus the previous Weekly Order Confirmation and secondly, formation of small manufacturing groups called Self-Directed Teams. The areas for improvement being looked into are the reduction in delivery time and further increasing customer satisfaction level. Two metrics are perfect indicators to measure these performances, the Delivery Lead Time (DLT) - the period between the placement of a customer's order and delivery of the final product to them, while RLIP (Requested Line Item Performance (RLIP) is the percentage of customer line item delivered over the total line item requested or ordered.
	2. As the overall project coordinator, I led the team on the implementation of moving from Weekly Cut-Off Resolution of customer orders (Monday being the order placement cut-off) versus a shorter time horizon, that is, Daily Resolution Scheme (Daily cut-off). Before the project, A maximum of 7 days (25 days vs. 18 days) is added to the total delivery leadtime, if a customer places orders after the Monday order placement cut-off, because the order will be processed only the following Monday.
	3. The project objective was formulated as: **“**To reduce Delivery Lead Time by 7 days (from 25 to 18 days), and increase customerlevel satisfaction from 94% to at least 96% by Q4 2006.”
	4. The whole factory is divided into three product groups, CATV, Base Station Modules and Transistors. With more than 1000 production operators working in three - 8 hours shift, 24 hours a day.
	5. As the Group Head for the Industrial Engineer and the Special Projects Coordinator for Self-Directed Teams, I report directly to the Manufacturing Director. I handled 3 regular Industrial Engineer employees and several student trainees at any given time, and 1 Administrative Assistant for special projects.
	6. Statement of Duties:

Sr. Industrial Engineer

* Manufacturing Standards – Lead the team in formulating Standards, Defining Capacity and Space Management
* Product Costing/Cost Reduction Projects - Managed product costing for old and new product development, Cost Reduction Projects, Process Improvements, Budgeting and Cost Controlling activities.
* Business Balanced Scorecard Review - Analyzed activities and requirement, proposed and implemented plans and solutions according to business plan in order to have an efficient flow of materials and processes through BBS and KPIs periodic review and audits.
* Quality Improvement Programs - Participated in cross-functional team meetings, provided data, information, ideas and helped in the design, conceptualization and implementation of improvement programs.

Self-Directed Team Coordinator (Special Projects)

* SDT Implementation - Designs programs, trains and coaches the SDTs in the use of new tools, performance indicators and glass wall.
* SDT Audits - Arranged and facilitated audits, training programs and workshops for Self-Directed Teams (SDTs).



**Personal Engineering Activity**

* 1. The project started with the Team creation. I led the team which composed of members from Production, Process Engineering, Systems and Procedures, Logistics and me from the Industrial Engineering Department. A project Gant-Chart was created for the project team.



* 1. The schedule was formulated based on the following activities; Project Start-Up will include discussion on changes in the way of working as well deployment schedules to all concern working groups especially to production personnel. Functional Testing tackles system update and preparation, at this point system simulation will also be done to check possible failures in the system parameters. Pilot Run in a selected production line will be conducted, and assessment will be made to ensure all problems are solved at once, thus minimizing effect. Implementation to all the factories will be done after the pilot run assessment has been successfully completed. Final Project Evaluation will verify that after the implementation, there are no negative consequences on other metrics and certainly desired objectives are met and/or exceeded.
	2. I presented an overview of how the over-all system should work once the project is implemented. The Daily Resolution Scheme is a new way of working that promises to receive and confirm daily placement of customer orders, and also, with this new system, it commits to deliver customer orders in a daily time bucket, as oppose to currently implemented Weekly Cut-off. A reduction of seven days (7) of order lead-time from placement of assembly order until receipt of products by the customer can easily be realized upon implementation.
	3. As a Process/Project Risk Assessment Tool, I led the team to conduct a Potential Failure Mode and Effects Analysis (PFMEA) assessment. It is a systematic process for identifying probable design, process and system failures before they occur, with the intent to eliminate them or minimize the risk connected with them. The assessments were done looking at all possible effects on Manpower Requirement and Management, Materials at Planning, and Methods.
	4. The scoring was based on the established criteria of Severity, Occurrence and Detection, and a standard scoring system, each criterion is assessed to come up with a single number, the Risk Priority Number (RPN = Severity x Occurrence x Detection).
	5. Based on the guidelines by the PFMEA, the items were ranked from the highest to the lowest RPN and prioritized. For example, the failure mode with the highest RPN (480) is the issue on Customer Input process. Failure of Daily Resolution Scheme may occur if a customer’s order was rejected, the effect is that orders will not be delivered, and the reason is because they are unaware of the new way of working, therefore customer lumps or consolidates the orders on a weekly basis as what they are currently doing. Current Process Controls to detect or prevent the occurrences of such failure is defined as ‘NONE’, getting the highest possible score of 10. Meaning there is no current control for this failure. The recommended action was assigned to a combined Deployment to Customers by the Logistics Group, and this included information on a defined Capacity constraint data by the IE team. These actions are believed to bring down the risk of occurrence of the potential Failure mode, from RPN of 480 to 96.
	6. After all the issues identified in the PFMEA were addressed by an action item, we proceeded to the functional testing, to check that all parameters were set correctly in the system. After that a pilot implementation of Daily Order Confirmation was done, but results were not impressive. Although there was a clear reduction of about 3 days in the Delivery Lead Time, the order fulfillment measure (RLIP) declined to 79.8 % from the previous 96.3% when the scheme was still in Weekly Order Confirmation.





* 1. These results presented a new problem to the implementing team. I initiated review on the pilot run and it revealed several crucial concerns such as loading, scheduling and prioritization on the start of the process and at the downstream processes. A thorough analysis with the help of a Cause and Effect Diagram presented in the next page was made. After careful examination and verification, importance on the 3 areas (Machine, Man and Method) was given emphasis. This concludes that no significant concerns were found true for the Materials part.
	2. The following root causes were verified as true causes:
* Machine
	+ Frequent change-over and machine set-up
	+ Incorrect capacity planning and utilization
* Man
	+ No focus on manufacturing of small production batches due to frequent change-overs
	+ Each area is concern with own performance.
	+ Fragmentation of work
* Method
	+ Process Layout gives more flexibility but not speed.
	+ Shared responsibility and accountability for the over-all performance of a large team is difficult to achieve
	1. The 100% implementation was put on hold (for 3 weeks) to concentrate on rectifying problems that occurred during the pilot run. Based on the identified issues from the fishbone diagram, I proposed a major action to change of layout from process to product layout, with each segment catering product family or products with mostly the same set of processing requirements. This change in the layout gave also the opportunity for me to change the Self Directed Team’s current structure from Front Line and Back End grouping, and to form mini-production teams that will have a focus in the production of orders from start to finish.
	2. As the Leader of the team and the Industrial Engineer Head, I created 13 SDT groupings, taking into consideration the production loading, equipment capacity, and category per product family. Each team has its own sets of equipment, operators and defined capacity, giving them the full ownership of their line, and empowering them on their responsibility.
	3. I defined the installed capacity per team, and as part of the actions identified, it was later communicated to the customers. The new structure has now focus on the manufacture of assigned product family, though this may look as a sign of inflexibility, the new production structure is not limited to its assigned product family as other situations may take place. As an example, Team 1 is assigned to manufacture product Family 1, while Team 2 is assigned to manufacture product Family 2. Though each product family has its own processing requirements, some adjustments can be made to be able to allow processing of Product Family 1 at Team 2, and vice-versa. Sample layout below.



* 1. I presented the plan to the management team and agreed to have a pilot re-run. At this point, implementation was organized one team at a time, according to each mini production teams defined per product family. After implementing all the actions based on the assessment after the 3-week Pilot Run, the results immediately show improvements both on Delivery Lead Time and Required Line Item Performance.





* 1. To standardize all the changes, including the new way of working for each SDT, I documented the process and achieved the management approval. Also as part of the motivation and empowering each mini-production team, I proposed to the management that the company’s rewards and recognition program be linked in their team’s performance such as the RLIP and DLT, which is controllable solely by the team. Activities from order loading to delivery to the warehouse will be taken as full ownership of each member of the team, with their production supervisor as their team leader.
	2. As the leader of the project team, I made sure that meetings, action items and follow-up on issues were done regularly. Although there was a major blockage happened after the first pilot run, I focused, came back to the original objective of the project and analyzed carefully what was the issue. At the end, I managed to bring the team to a successful completion. I recommended each member to be recognized by the management team for their efforts in making this project possible.

**Summary**

* 1. The new production structure allows for faster reaction time, and on giving focus on reduction lead-time per product family, concentration on process will draw attention to all possible problems and then later on will be solved immediately. And most importantly, employee morale is boost up, since belonging to a particular team, means valuing them more not just an individual but also providing platform to contribute to a team by empowering them.
	2. The improvement was very evident, from the average DLT of 20.66 days during the Weekly Cut-off, to 17.18 days during the pilot run, and further, the Lead Time was reduced to 15 days after implementing SDT. The Required Line Item Performance was 98.3%, this is 2% higher during the weekly cut-off. Another improvement was the level of Work-in Process (WIP), inventory in the production area has a reduction of 102,601 pieces. Due to the faster response and on-time daily ordering and production, inventory became lower, which uncovers the whole production line, making it tidier and more organize.
	3. More than leading the team in the analysis and data gather and preparation, my biggest contribution was, I created an environment for the SDTs that makes it possible to promote healthy competition among teams, therefore increasing level of performance, and tying it up with the company’s performance bonus. With this, they will be empowered to continuously strive better, by delivering more, with quality and on time.