Competency Demonstration Report (CDR)

CAREER EPISODE

NO#1

A Project I have worked on:

Improvement of Assembly Line of Air Conditioner (Cooler AC35) Using Line balancing & Simulation in [redacted] Factory

Introduction:

CE1-1 This project is about the improvement of assembly line of Air Conditioner (Cooler AC35) using Line balancing and Simulation in [redacted] is located next to [redacted] .It is one of the largest factories in Iran which produce household devices. The project started in Feb-2008 and finished in Aug-2008 .It was my university final project which I submitted to university as my thesis. My peer and I were introduced to Production Planning and Quality Control departments to start the project.

Background:

CE1-2 To make a clear image about the project I have to mention, because of different types of wastes such as a large number of operators, long waiting time in queues for different parts and lack of on time delivery of various parts to assembly line of Cooler AC35, which resulted in down time of assembly line, this project was defined. Therefore, the nature of the project was analysis and optimization of Assembly Line of AC35, using Line Balancing and Simulation. Also, two side production lines of Plate and Blower Blade which directly entered the assembly line were analyzed, as well.

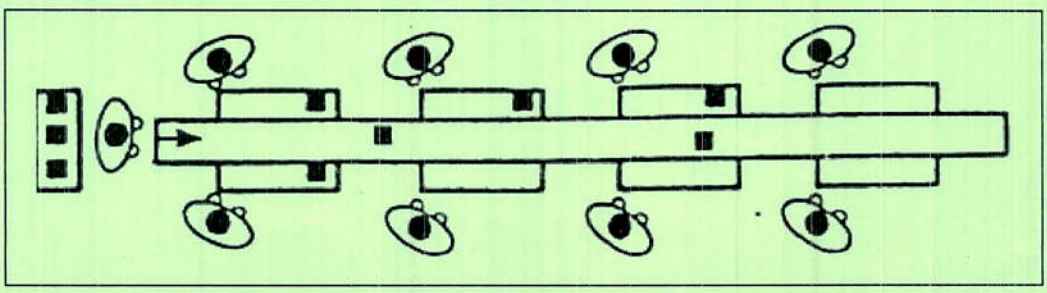
CE1-3 This project was proposed by me because, I had done Six Sigma project in [redacted] factory on the Idle time of Press Machineries in [redacted] roduction plant in my noviciate period .Therefore, I was aware of numerous problems involved in assembly line of AC35 .I began my job as a simulator of assembly line and I worked directly with my university professor and production planning manager.

Personal work place Activity

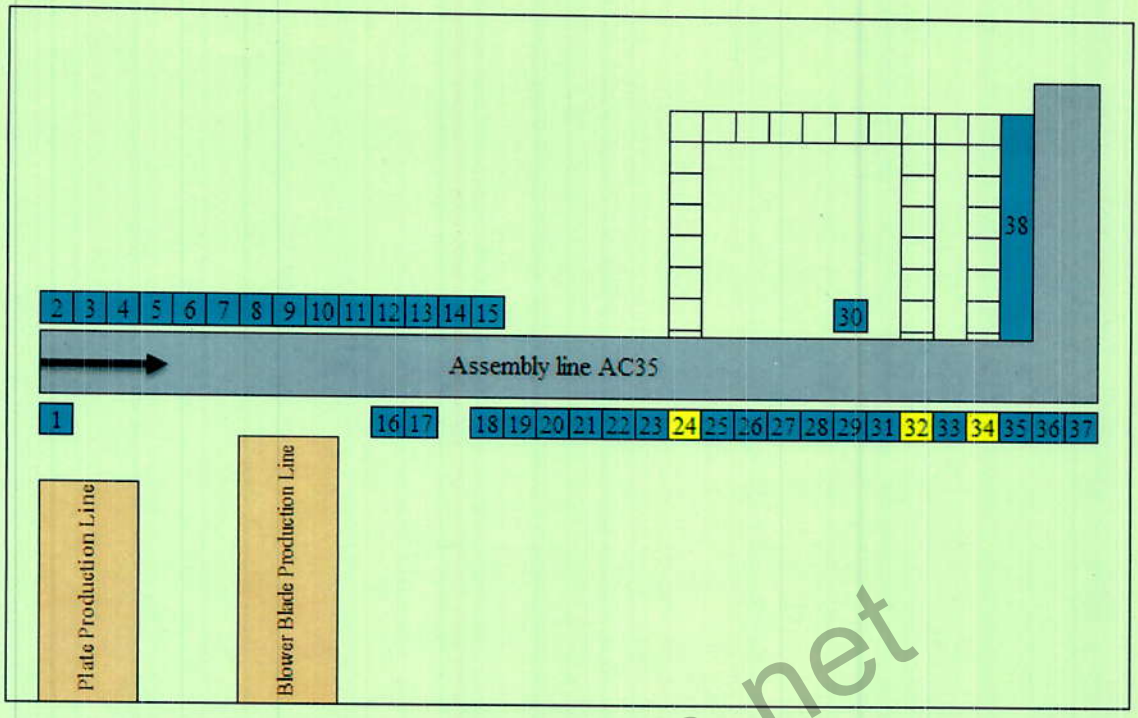
I should mention all the activities related to assembly line of AC35 were done by me and those were related to two side production line of Plate and Blower Blade were taken by my peer. The SAME activities which will be described, (three phases: time study, line balancing and simulation) were taken for these two categories both.

CE1-4 This project had three defined phases, included time study, line balancing and simulation. These three phases were scheduled by Microsoft Project Software in detail.

CE1-5 The array of assembly line of AC35was one conveyer in the middle that operators worked around it in both sides. Its layout illustrated in the Fig.1.



CE1-6 In the first phase which was time study, all working stations of these lines were determined. The layout of these lines is illustrated bellow (Fig.2).



CE1-7 Time study is not an easy job, all standards of this job need to be taken into account. In order to achieve above aim, we tried to do time study in specific time of the day to maintain correlation among the times. I carried out time study of assembly line by using stop watch method. In cases which operators didn't cooperate and tried to kill time or increase it, I stopped the watch. To enhance the accuracy, I took time of each working station 10 times and calculated its mean for each station.

CE1-8 In order to calculate standard time for each working station, we used formula bellow:
Normal time = Performance rate * Mean
Standard time = [1+ Sum of Allowances in percentage]*Normal time
Performance rate for each operator is different. It depends on how fast they do the job, skills, correct motions and etc., alters from 0.8 to 1.20. If the operator obeyed all rules, 1.20 was allocated to him. On the contrary, if he wasted a lot of time, 0.8 was allocated to him.

CE1-9 In allowances for those who worked while they were seated was 0.14 and 0.16 for operators who stood. For those, that some times were seated and sometimes not 0.15 was considered. I used excel software to insert the above formula that calculated all needed information automatically.

CE1-10 After time study finished, second phase which was line balancing began. Win QSB Software was used for this purpose because, it has various industrial capabilities and had different options. One of these options is F.L.L. (Facility Location & Layout) which was used in this project to balance the lines.

CE1-11 The required information for FLL Software was task number and task time. FLL considers priority and allocates tasks to working stations in order to reduce idle time.

CE1-12 At first we entered the current task data (41 tasks) and received report bellow:

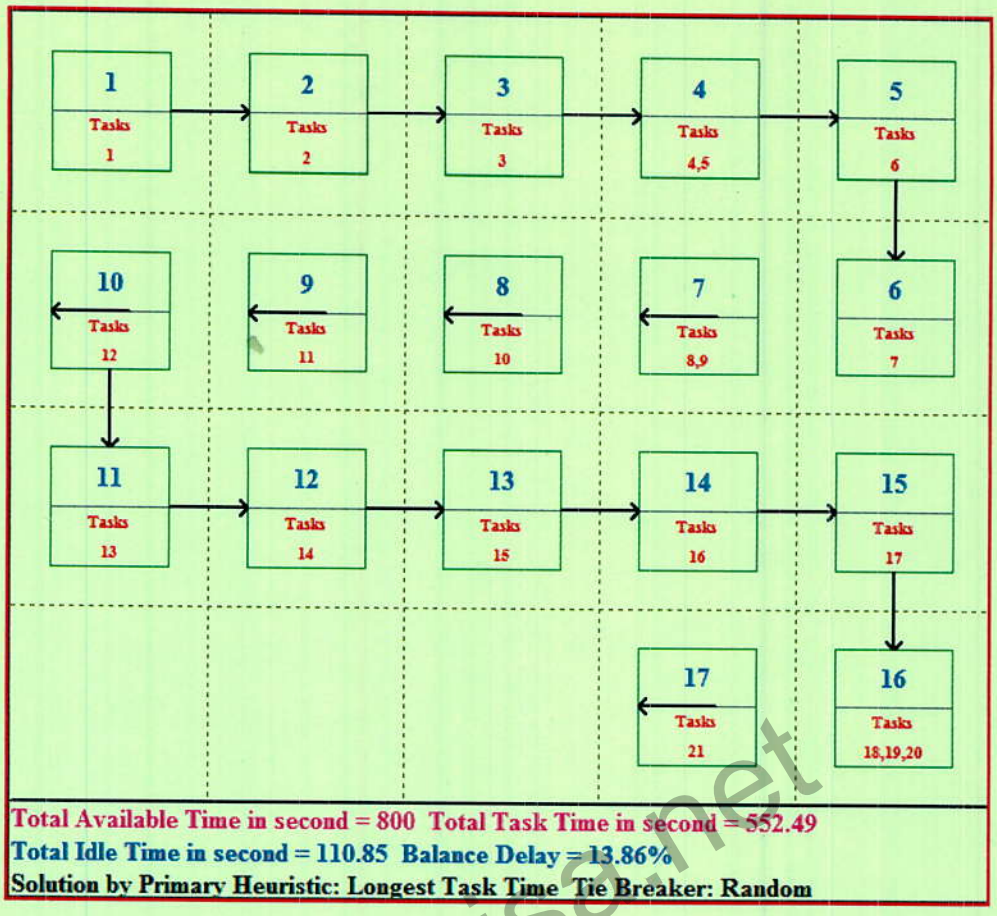
09-16-2008	Item	Result
1	Desired Cycle Time in second	40
2	Number of Line Stations	17
3	Number of Required Operators	17
4	Total Available Time in second	680
5	Total Task Time in second	538.54
6	Total Idle Time in second	141.46
7	Balance Delay (%)	20.80%
	Solution has been obtained by	
	Primary Heuristic: Longest Task Time	
	Tie Breaker: Random	

This report depicts that idle time in current layout is 141.46 seconds (20.80%).

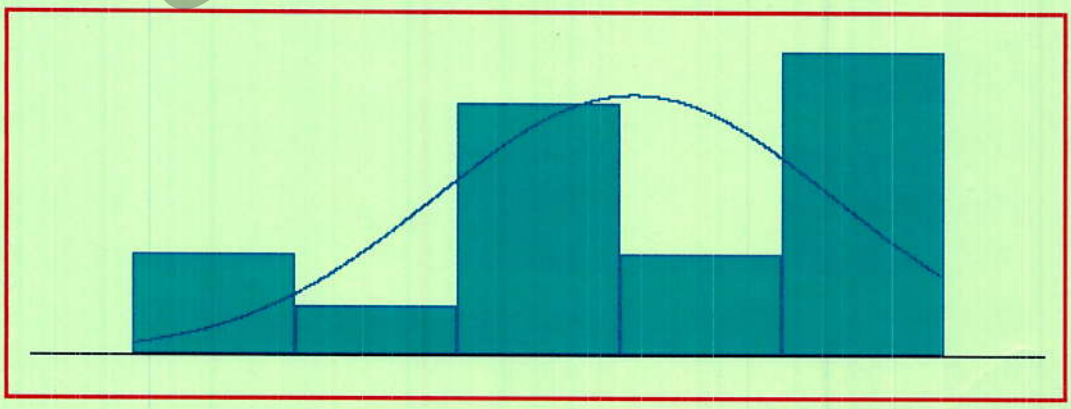
CE1-13 In order to reduce the total idle time and wasted time by operators, I merged some tasks. In this way, I reduced the number of the tasks from 41 to 21 and the bellow report was illustrated:

09-16-2008	Item	Result
1	Desired Cycle Time in second	40
2	Number of Line Stations	17
3	Number of Required Operators	20
4	Total Available Time in second	800
5	Total Task Time in second	552.49
6	Total Idle Time in second	110.85
7	Balance Delay (%)	13.86%
	Solution has been obtained by	
	Primary Heuristic: Longest Task Time	
	Tie Breaker: Random	

It can be seen that idle time is reduced to 110.85 seconds (13.86%), which shows the optimization of about 7percent. The graphical layout of working stations is illustrated in optimized model:



CE1-14 After allocating tasks to working stations with F.L.L, probability distribution function of each task should be defined, this was the beginning of third phase. For this aim we used Input Analyzer in ARENA software. Input Analyzer is capable of test various distribution functions on the date entered for each task and select the best one which suits the task based on Kolmogorov-Smirnov Test. One of the tasks, as a sample, is shown.



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        Distribution Summary

Distribution:   Normal
Expression:     NORM(33.3, 0.732)
Square Error:   0.087160


Kolmogorov-Smirnov Test
  Test Statistic        = 0.16
  Corresponding p-value > 0.15

        Data Summary

Number of Data Points   = 16
Min Data Value          = 31.7
Max Data Value          = 34.2
Sample Mean             = 33.3
Sample Std Dev          = 0.756

        Histogram Summary

Histogram Range         = 31.4 to 34.4
Number of Intervals     = 5
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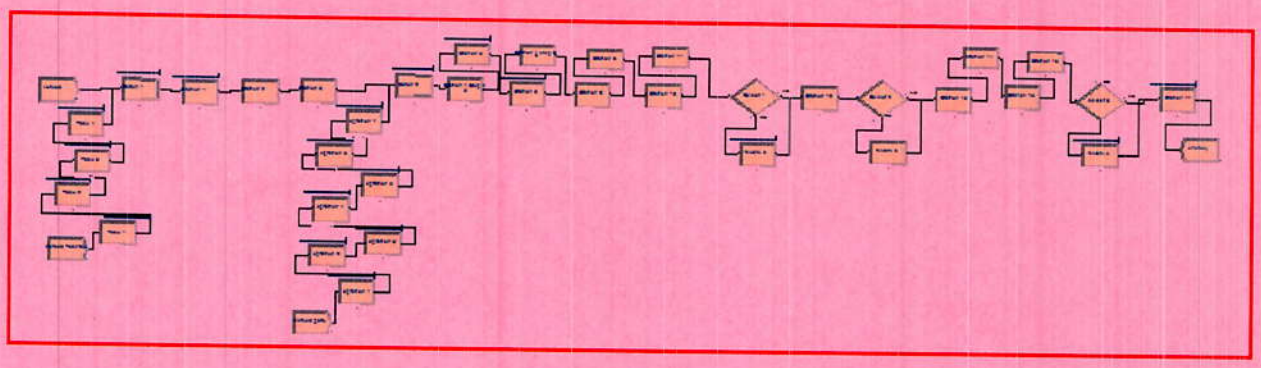
CE1-15 The probability distribution function of each task was defined because, it was one the required inputs of ARENA software. ARENA is simulator software, which we selected to simulate lines with. It has different modules such as Process, Batch, Create, Decide and etc. I should mention that, I used different modules for various purposes. For instance, Process module was applied to determine task times by using their probability distribution functions or Decide module was used as a quality controller.

CE1-16 At first, current model was simulated. Then, I simulated the optimized model which was output of FLL, but I should take into consideration two limitations of ARENA included:

- The total number of modules in a model should not exceed 40.
- The total number of current entities in a model should not be more than 150.

After simulating the optimized model several problems arised. One of them was gathering a large number of entities in some stations because, the number of entrance modules were more than ejecting modules. For solving this problem, I used "Delay" instead of "Seize Delay Release" in Process modules. This would cause entities wait a little in stations. Therefore, bottle necks were omitted, because "Delay" coordinated the stations by causing delay. The optimized model is illustrated bellow.



CE1-17 ARENA is capable of submitting various reports. After simulating both current and optimized model, related reports to them were analyzed. For example, Queue Report showed that waiting time in queues in current model was greater than optimized model. Comparing different reports indicated that optimized model was more effective and efficient than current model. Finally, I drew new (OPC operation Process Chart) because; some of the tasks were merged in optimized one.

Summary:

CE1-18 I believe this was not an easy project, for me as a student, but I could handle it by organizing different meetings with production department members, using brain storming to solve various problems. Also, I had close contact with my professor to submit weekly reports and manage the project perfectly through his guidance.
In my opinion, if [redacted] implement optimized model, it will definitely benefit from it. That is to say, this model will decrease the total idle time of assembly line and consequently results in much production.

CAREER EPSIDE

NO #2

A Project I have worked on:

Establishment of Quality Management System Based on ISO 9001:2008

My position:

Project Manager and Quality Expert

Introduction:

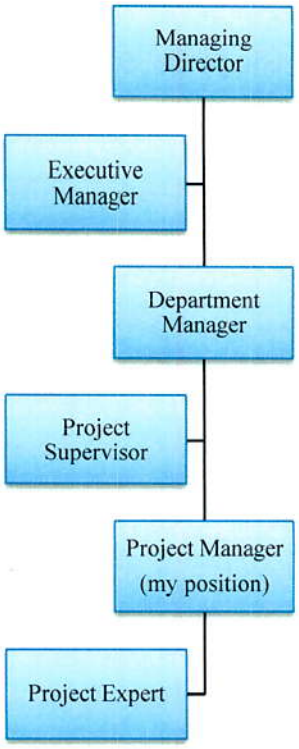
CE2-1 This episode is about establishment of Quality Management System (QMS) in [redacted] manufacturing photo luminescent boards which are used for producing safety signs. [redacted] is located in [redacted]. This project began in Jan.2010 and finished in Sep. 2010. When this project offered me as a consultant to execute the project, I was full time employee of [redacted] but I had 2 days free (weekends) which let me handle it. My position was project manager and quality expert.

Background:

CE2-2 In order to demonstrate the clear image of the project, it is necessary to mention that [redacted] quality control was carried out completely traditional and visual. There were no instructions for this purpose and no data was monitored. Therefore, this project was divided into two phases. The first phase was establishment and implementation of quality control system and the second phase was establishment, documentation and implementation of quality management system based on ISO 9001:2008.

CE2-3 The main objective of this project was creating methods for quality assurance which suited [redacted] activities. Although the traditional methods were used, but they were no longer appropriate for mass production which was one of the consequences of increasing demand.

CE2-4 The work environment was friendly but also demanding. Because I was project manager, I should take responsibility for every particular action that taken during the project. I was in direct contact with production manager and managing director. Project structure is illustrated in Fig.1:



Personal work place Activity:

CE2-5 As it was mentioned the first phase was quality control system establishment. Thus, I decided to use SPC (statistical process control) tools. In this phase I spent a lot of time to determine processes of [redacted] For this aim I organized various meeting with production manager and experts, which resulted in preparation of preliminary Process Map and Control Sheet. Control sheet was included types of safety sign's defects, numbers and dates of occurrence. Because of the various types of the defects, I used Pareto chart to take into accounts those occurred more.

CE2-6 Those defects that occurred more were related to photo metering, thickness, width and length of the boards and uniformity and tenacity of printed colors. Therefore, monitoring and measurement of all these specifications needed documented quality control instructions.

CE2-7 The first documented instruction was about how to collect sample. One of the problems I faced was, production experts were unfamiliar with standards for this aim. Therefore, I combined different standards such as MIL-STD-105D, MIL-STD-414, ISO 2859-1 and ISO 1916 to formulate heuristic method that becomes more applicable for [redacted] the sampling instruction, various inspection levels were defined and lot or batch sizes were determined in the same table. For normal situations, Level Inspection II was selected. According to its batch size, the sample size code letter was chosen. In the second table the sample size was

illustrated. By taking into consideration AQL=2.5, the acceptance and rejection numbers for each batch were defined. Then, according to specifications' test instruction such as thickness measuring instruction, photo luminescent measuring instruction and etc., decision for rejection or acceptance of batch was made. That is to say, each test instruction had basic control chart (Xbar-R).If the number of sample which their value fall outside the control limit, was more than rejection number, the whole batch was rejected, otherwise it was accepted. I collected samples for each specification based on Sampling Instruction for ten days. According to collected data, I drew basic control charts, used Minitab Software.

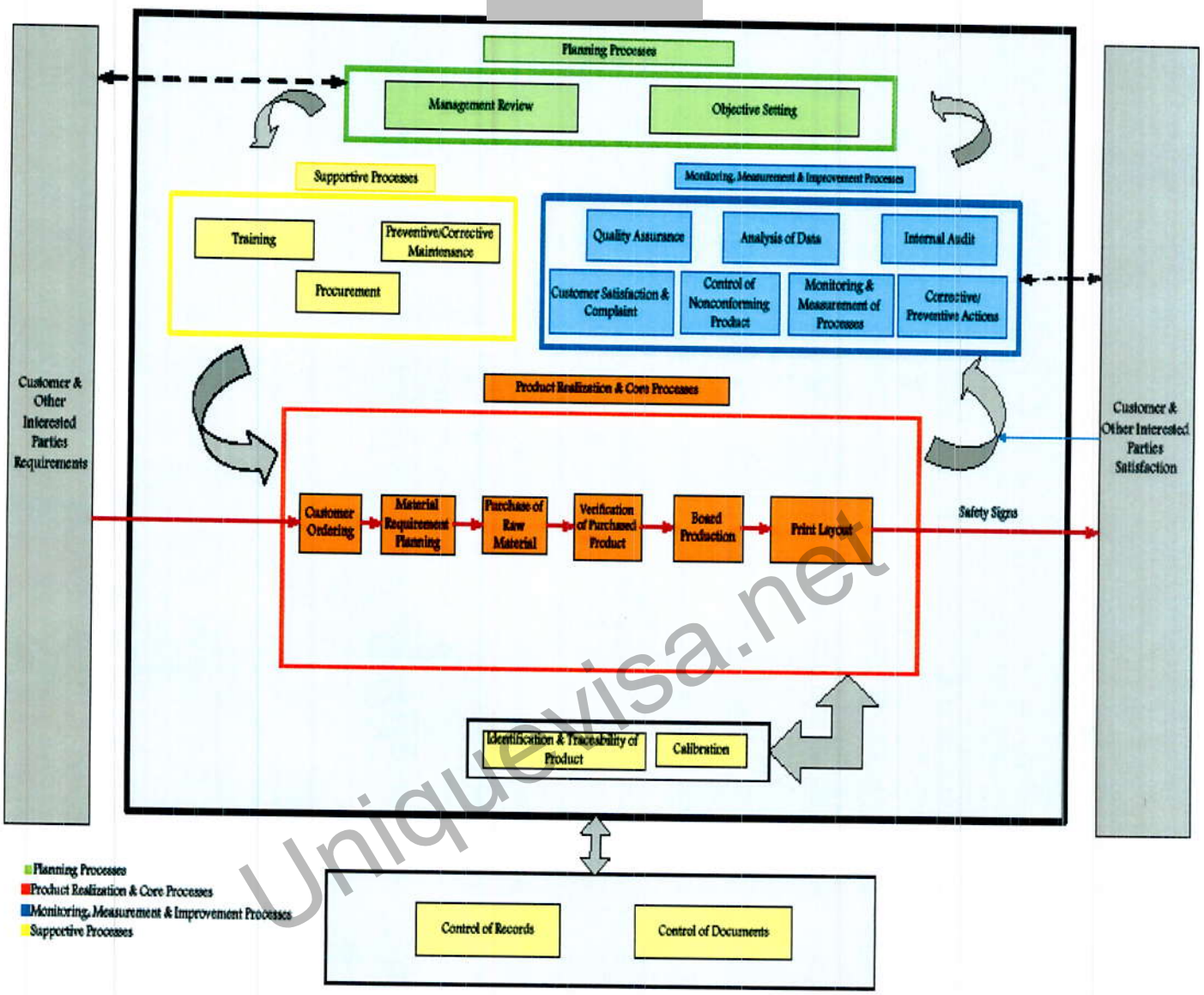
CE2-8 The second problem was how to measure photo luminescent lightening. I studied a lot of books and tried to find best standards for this purpose. Finally, I formed a new test instruction which determined the areas on board that should be tested and the criteria for values, according to NS 75500(one of the best standards in this field). Moreover, my studies showed that the centre of each board is the most import area that must included in measurement.

CE2-9 Same as other tests, thickness, width and length test instruction were formulated, as well. The last step was tenacity test plan which was one of the most important specifications. Because it was a destructive test I used various options to manage it. One of them was using needle and ruler to scratch the surface of experimental printed board, using same color as it will be applied for whole batch before starting production, then use scotch tape to take off the printed area. The condition of acceptance or rejection of colors was defined in the tenacity test plan.

CE2-10 After establishment and implementation of quality control system, the second phase which was quality management system establishment began. ISO 9001:2008 (QMS) promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements.

CE2-11 This phase included three steps. First step was gap analysis. Therefore, I held several meetings with [redacted]employees and my colleague. The purpose of these meetings was not only gap analysis, but also understanding their frame work in order to document required procedures. Site visit was the other approach that I applied to make every process clear. I divided processes into four categories: management processes, product realization & core processes, monitoring, measurement & improvement processes and provision of resources processes. Consequently, I finalized the "Process Map" by Visio Software in order to determine the sequence and interaction of them.

ISO 9001:2008 Process Map



CE2-12 The second step was documenting procedures and conducting two courses for [redacted] employees in order to familiarize them with ISO9001:2008 and its requirement. The second course was about auditing ISO 9001:2008 based on ISO 19011. I handled the first course.

CE2-13 I documented some of the procedures such as Production (product realization) procedures and all of the procedures related to clause 8. Measurement, analysis and improvement. Also, I applied "Plan-Do-Check-Act" (PDCA) to establish procedures. Furthermore, I developed Process Identifications based on Turtle Model and allocate meaningful indicators to them. Quality Policy and Manual were established by me, as well. I should mention that clause 7.3 and 7.5.2 were excluded for [redacted]

CE2-14 The last step of this project was deployment and auditing the QMS. For this purpose all of the controlled procedures and working instructions were handed out to related departments. After two months, I conducted an internal audit to realize whether the Quality Management System confirmed to the planned arrangements and requirements of this standard. All the corrections and corrective actions were taken in order to eliminate detected nonconformities and their causes. At the end of this phases [redacted] was ready for CB (Certificate Body) audit.

CE2-15 I should mention, in addition to those meetings with [redacted] employees, I held various meetings with my colleague in order to share our evidences and prioritize the measures that should be taken.

Summary:

CE2-16 All in all, it was an excellent experience for me. The hardest part of the project was searching different resources to obtain updated information about how to document quality control instructions which suited [redacted] Based on time scheduled by Microsoft Project software which I created, the project finished on time and met all the requirements, successfully. The most significant objective of this project which was establishment and deployment of systematic quality control were achieved through this project. Finally, the company was ready to conduct third party audit.

CAREER EPISODE

NO# 3

A project I have worked on:

Performance Evaluation Based on

EFQM (2010) Excellence Model

&

Submission formulation (Committed to Excellence)

In

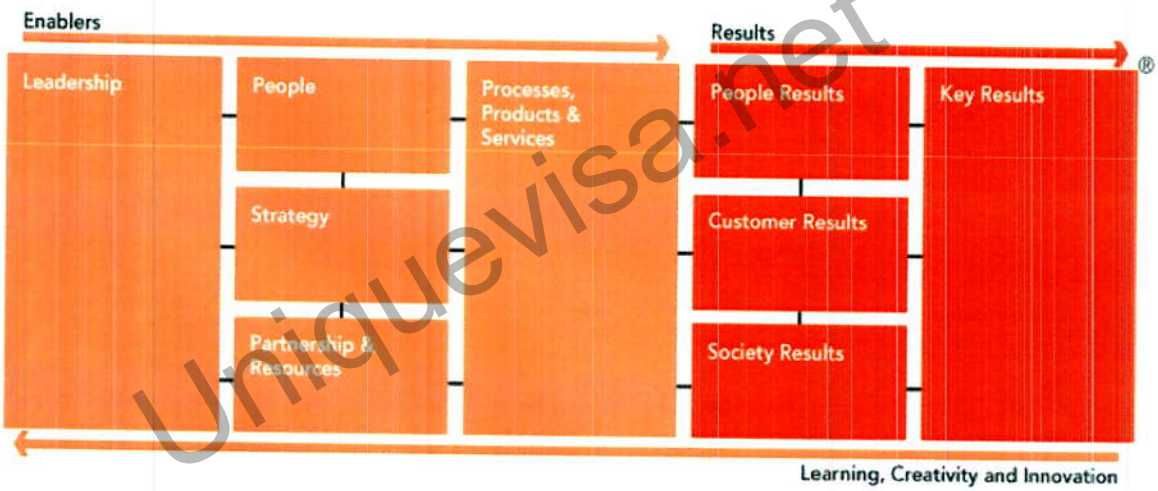
[redacted]

Introduction:

CE3-1 This project is about implementing self-assessment based on EFQM(2010) and formulating submission in the level of Committed to Excellence in [redacted] which is located in [redacted] Iran.This project started in Oct. 2010 and finished in Feb.2011. [redacted] which I work for) as a consultant was selected by [redacted] mplementing the project. I involved in this project as an excellence expert.

Background:

CE3-2 This project was defined because [redacted] as implemented IMS(Integrated Management System) successfully, which is one the requirements of getting on the path to excellence. In order to continue the excellence path, EFQM Excellence Model (that has 9 criterions) was selected to help A[redacted]nderstand their key strengths and potential gaps in relation to their stated Vision and Mission. The other objective of this project was participating in Petrochemical Award in the level of Committed to Excellence based on EFQM(2010) Excellence Model.

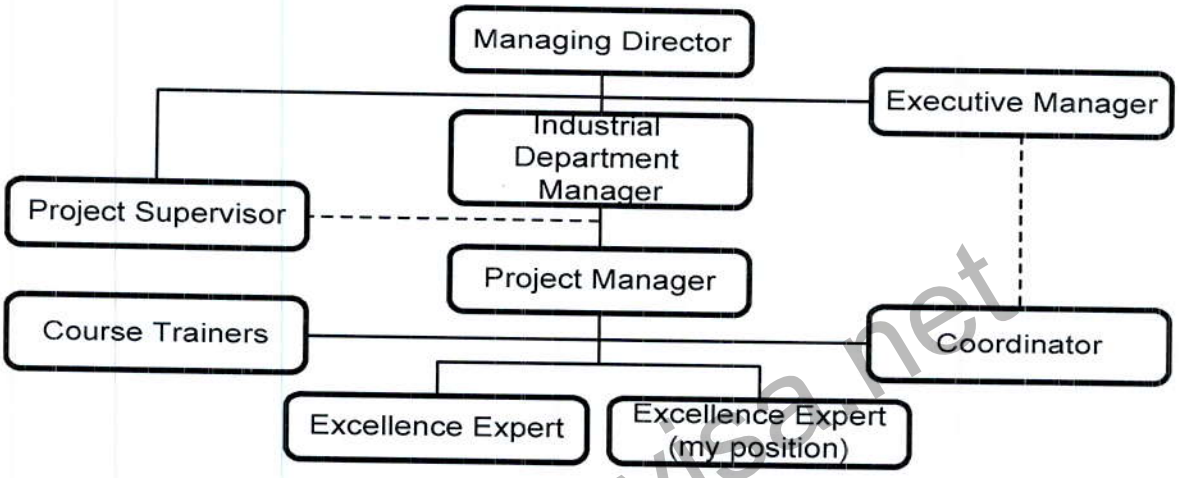


CE3-3 To make a clear image about the project I have to mention that through self-assessment based on any Excellence Model, appropriate approach (questionnaire, workshop and etc.) should be chosen according to corporate level of excellence.

Self-assessment team building is next step. Several teams are built based on criterions of Model. Output of Self-assessment is strength points and areas for improvement which help company to provide its Road Map.

CE3-4 Although [redacted] located in [redacted] its negative points, but work environment was perfect. People [redacted] were working closely to achieve their objectives. Therefore, team working was the prominent point in the project.

CE3-5 The chart of this project is illustrated bellow:



I worked as an excellence expert. Most important responsibilities under taken by me were as follows:

-Designing and documenting best approach (questionnaire and work shop) for self-assessing all criterions in [redacted]

-Training RADAR Logic to members of self-assessment teams.

-Conducting self-assessment using questionnaire and work shop approaches for criterions 5, 6 & 9.

-Submission formulation for three improvement projects.

-Establishment of Self-assessment procedure and link it to [redacted]

-Prioritizing AFIs (Areas for Improvement detected through self-assessment)

-Providing Road Map of the corporate align to prioritized AFIs

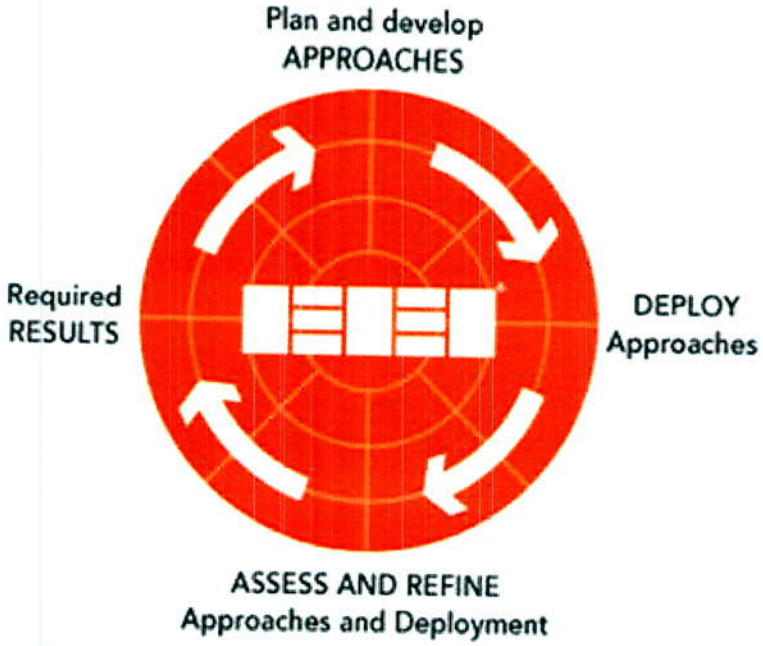
Personal work place Activity:

CE3-6 Three phases were defined for this project. Planning and taking required primary actions were its first phase. Thus, I provided time schedule of the project by Microsoft office Project and allocated resources to each task. I should mention that I updated it every two weeks as a project controller and submitted reports to project manager.

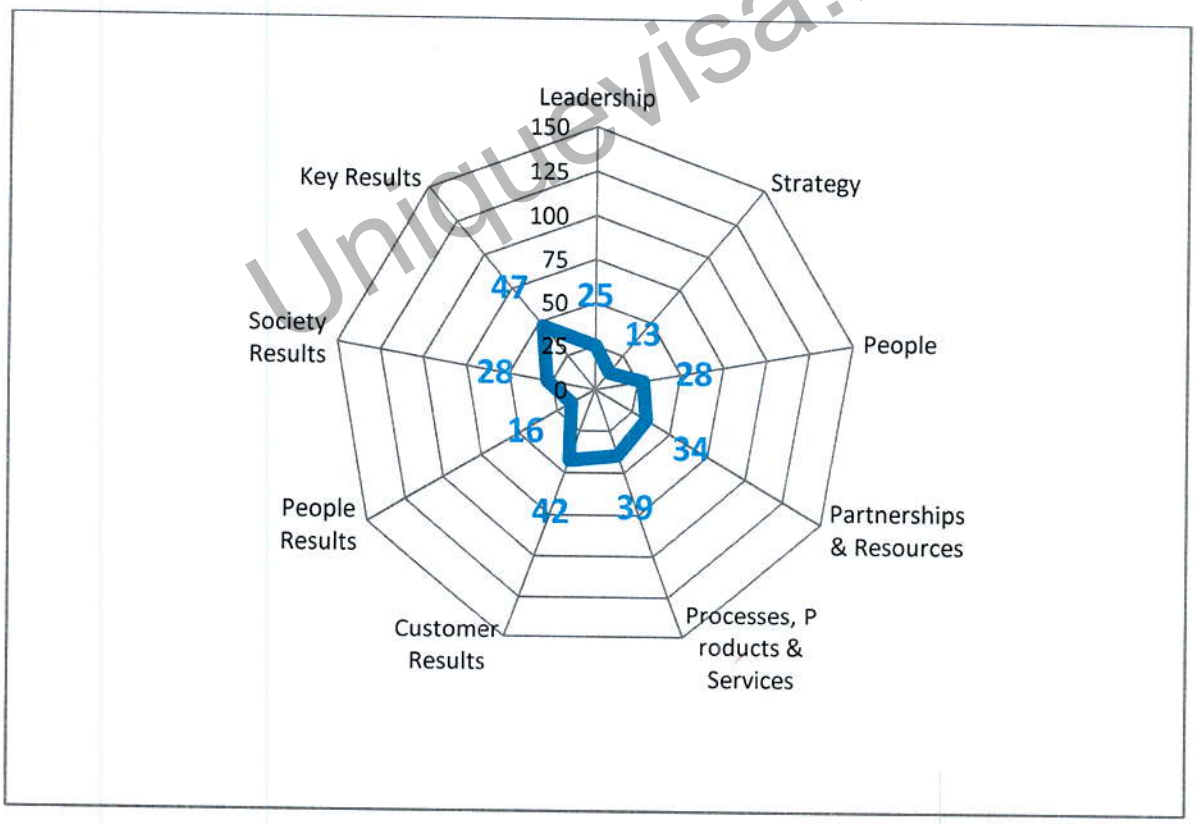
CE3-7 In order to familiarize people with EFQM, one-day general seminar was conducted. Next step was selecting consensus of Self-assessment team which were required to carry out Self-assessment in [redacted]. This selection was based on each criterion of EFQM. I built four teams. For instance, one team was built for criterions 5 and 6 both, because criterions should be linked to each other. I should take the responsibilities of two teams and trained them RADAR Logic which EFQM is based on.

CE3-8 One of the most important operations in this phase was designing and documenting self-assessment approach which was my duty. After studying various approaches, I decided to integrate questionnaire and workshop approaches that suited [redacted] best. In this way, the weak points of each approach could be covered by the other one. For this purpose, I established a questionnaire which included all 9 criterions and at the end of each criterion, I considered a place to write strength points and areas for improvement. In this phase different training courses were conducted.

CE3-9 The second phase of this project was implementing self-assessment by questionnaire and workshop approach. I was a leader of team which had to cover criterions 5 and 6. I conducted self-assessment with cooperation of [redacted] Therefore, strength points and [redacted] ected and scoring based on organization maturity in various criterions was carried out. I was chosen to lead this team because, I am specialist in processes, products and services (criterion 5) and customer result (Criterion 6) . I have done different customer survey projects based on Servqual Methodology, so I was competent enough to handle these criterions. In addition, inputs of self-assessment are RADAR Logic and EFQM Excellence Model. Thus, I was qualified in these fields, as well.



In order to make [redacted]nderstand where they are on Excellence path, I designed an Excel sheet (benchmarked from EFQM website), aligned to the questionnaire I had documented, which draw RADAR chart showed the score of each criterion (Fig. 4).



CE3-10 Next step was submission formulation for the level of committed to excellence. In order to achieve this aim four improvement projects that were executed in [redacted] should be defined in RADAR logic. I handled three of them which were ISO/IEC 17025:2005, ERP (Enterprise Resource Planning) and IMS (Integrated Management System) .I attended several meetings with [redacted] to gather information and wrote these improvement projects in RADAR logic.

CE3-11 The last phase was improvement planning and determining the Excellence Path of [redacted] To provide and compile the Excellence Path, improvement projects, which were detected through self-assessment should be prioritized. According to their attributes, I applied TOPSIS Methodology to prioritize them. After defining estimated start and finish date for each project, the Excellence path was compiled. For each project, Improvement Project Identification was established [redacted] Map was provided in line with their Strategic Planning.

CE3-12 I established and documented self-assessment procedure and continual improvement procedure in order to conduct it systematically from no [redacted] I defined continual improvement procedure in IMS and linked self-assessment procedure to it in order to adopt process approach.

Summary:

CE3-13 In my opinion it was a great project because, I could measure my know ledge in different areas as EFQM considers every aspect of organization's activity. The most important goal of the project, which was assessing where [redacted] is on the path to excellence, was achieved. [redacted] accomplished to receive Committed to Excellence Certificate, as well.

Professional Engineer- Units and Elements of Competency			
Competency elements		**How and where demonstrated**	**Paragraph reference in career Episode**
PE1	**Knowledge Base**		
PE1.1	Knowledge of science and engineering fundamentals	I prepared GANT Chart with Microsoft Project. Not only I redefined the main process with details by using operation process chart (OPC), but also I defined management, monitoring, measurement & improvement and provision of resources processes in the Process Map through Visio software.	CE3-6, CE1-17, CE2-11
		I applied stop watch method for time study, line balancing through FLL software and simulating by ARENA software.	CE1-7, CE1-10, CE1-14, CE1-15
		I used SPC (Statistical Process control) tools. I prepared necessary technical documents such procedures, used PDCA (**P**lan **D**o **C**heck **A**ction), and control sheet.	CE2-5, CE2-13
		I am expert in RADAR Logic and EFQM.I used TOPSIS method to prioritize AFIs.	CE3-9, CE3-11
PE1.2	In-depth technical competence in at least one engineering discipline	By using industrial engineering tools and techniques I am able to simulate production lines in order to optimize them.	CE1-7, CE1-10, CE1-14, CE1-15
		I am able to define processes of the company and use SPC to control them. I established ISO 9001:2008(QMS) and conducted internal audit. I used various standards to create sampling procedure which suited the company.	CE2-5, CE2-10, CE2-14, CE2-7
		I can evaluate performance based on Excellence Model and apply RADAR Logic for this purpose.	CE3-9