

Chapter 4

Restructuring

4 Restructuring

Restructuring exercises have been started among key persons of each group prior to presentation to employees in the organization and prior to collecting questionnaire. A brain-storming session was conducted to select an appropriate structure model. It is very important to have key persons in the organization understand the situation, share all concerns, join decision-making process, and commonly agree to the strategies formulated. Those key people will, then clearly communicate the situation and objective to get feedback from people within the organization to fine-tune the restructuring process.

4.1 Trend Analysis

A trend of key contributors to organization workload has been reviewed and the analysis indicates that:

- Number of testers is becoming saturated due to facility's space limitation while headcount increase rate is minimal to maintain Indirect-labor to Direct-labor ratio, which is one of the key measures for operation. Tools to leverage capability and productivity have been implemented in each period to balance test engineering capability and efficiency against the requirements as shown in figure 4.1.
- Number of tester conversion exercises keep increasing to support flexible manufacturing (figure 4.2).
- Data transfer rate (Megabit per second) and Areal density (Megabit per square inch) of magnetic recording keep increasing to accommodate computer market while the design margin is sacrificed to improve time-to-market. It results in poor product capability, including test process, at production start-up. Of course, increasing in engineering changes and process changes during mass volume production is foreseen due to time-to-market driven force. (see figure 4.3)

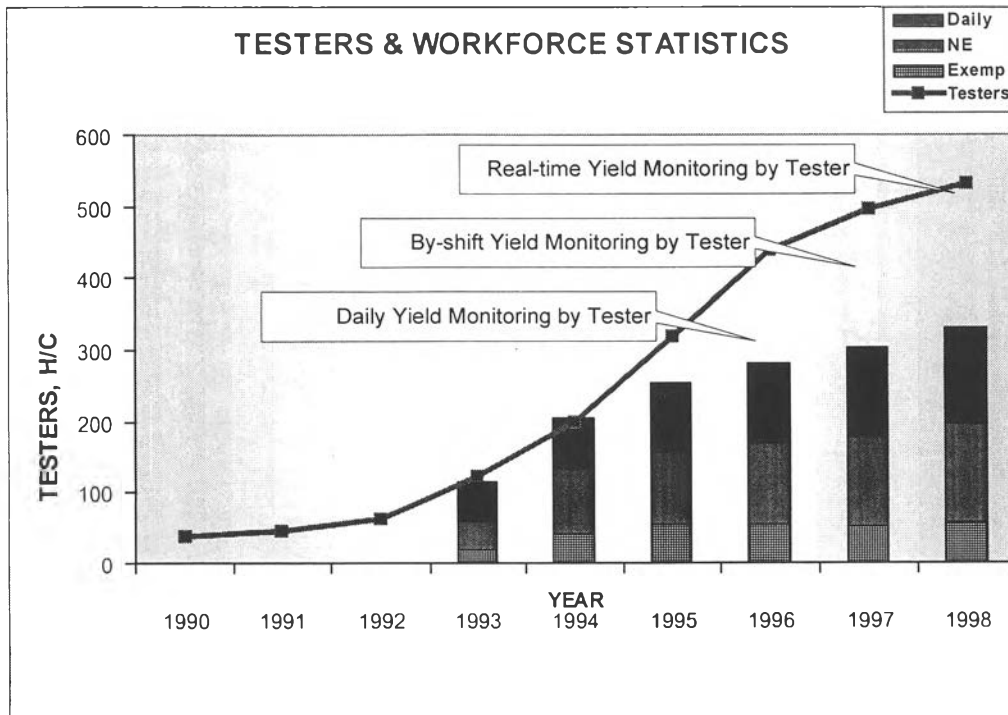


Figure 4.1 Trend of Testers & Workforce Statistics with 1998 Forecast, leverage tools have been added during 1995-1998

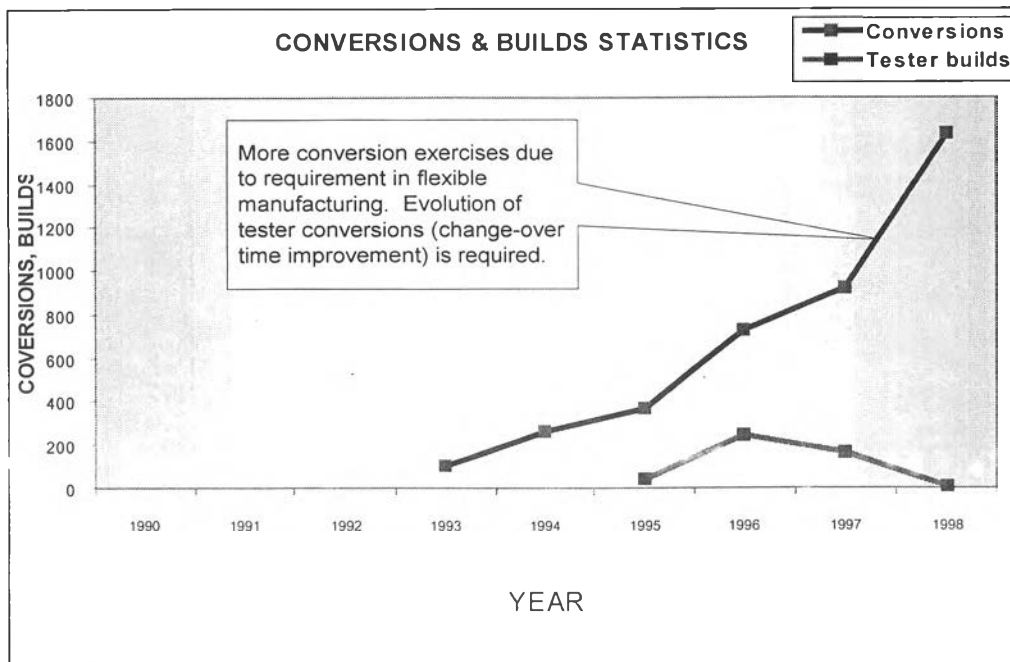


Figure 4.2 Trend of Tester Conversions & Tester Builds with 1998 Forecast

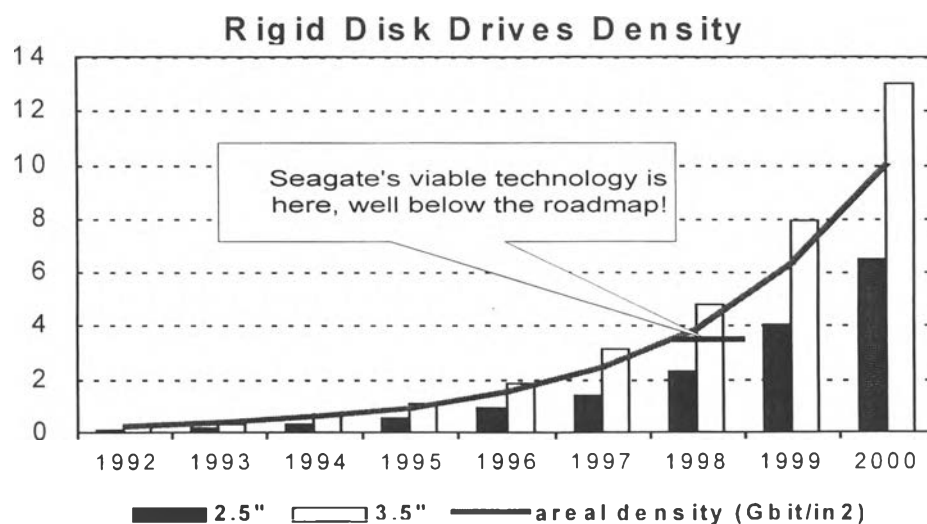


Figure 4.3 Trend of Areal Density (Gb/in²)

4.2 Communication and Employee Involvement

Employee communication session was conducted to provide exempt employees, total of 50 employees, the current situation and management perspective, and also to receive feedback from all exempt employees. Questionnaires have been distributed to the employees and collected at the end of the session. The perception of exempts employee in three major areas, i.e. difficulties within the organization, learning curve, and expected improvement have been summarized.

Today's difficulties within the organization have been ranked with 5 points scoring as shown in figure 4.4:

- Number one: "Too many focus" score 4.3
- Number two: "Poor communication" score 3.5
- Number three: "Inadequate systematic tools" score 3.4
- Number four: "Inadequate training/coaching" score 3.2
- Number five: "Teamwork and others" minimal score 0.5

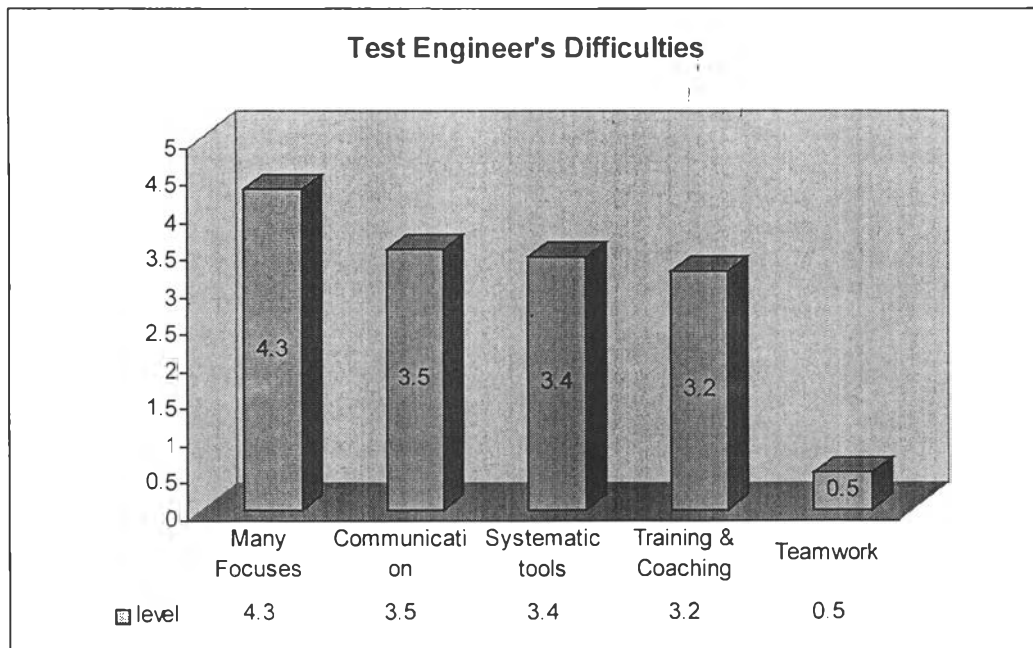


Figure 4.4 Test Engineer's Difficulties, 5 level scoring Pareto, data gathered from 50 exempt employees

Learning curve on new structure, with less focus, 80% of exempt employee believed that they would be confident with their responsible area with less than a year learning curve while they needed two years or more to be at the same level with current organization.

With proposed structure employees expected improvement in quality of their work life and jobs accomplishment with the score above 3.5, the reason was that less focus allows them to spend more time on specific issue including self-development in technical area which is very important to such technical organization.

4.3 Re-shuffling and Re-grouping

After managers understood the situation and agreed to make change, a blank sheet of paper is obtained for this exercise. It was not meant to make a radical change in the organization, but it is a need in establishing a bottom line for the transition.

Key activities of the entire organization have been listed out, as described in figure 3.8, and broken down into pieces of paper. Regrouping those on the blank sheet of paper has been executed by managers within test engineering and a neighbor manager, based on relevant functions and technical skills. A big time debate has

been through and came out with the proposed structure as shown in figure 3.11.

Good and bad points have been debated and structure scoring is benchmarked, based on 6 major aspects.

- **Focusing:** There is a correlation between what managers thought and the feedback collected from employees. They all agreed that "too many focus" in their responsibility is a number one difficulty leading to quality and capability issue of Test Engineering.
- **Front-line Contact:** It is a key leverage to resource's capability in the organization where frontline employees are majority and significantly impact to quality support of test engineering organization. It is very important for organization to create an environment that develops better communication, technical capability, and skill to frontline employees.
- **Customer-Focused:** This is a key aspect to the restructuring since customer-focused alignment of the organization does not mainly against products anymore. For example, interface with capacity planning in tester build; conversion; and re-layout activities, interface with others within engineering on application developments, interface with manufacturing on frontline support, and interface with overseas in new implementations. It is more likely to against other functional groups within Teparuk operation where the amount of inter-department activities kept increasing.
- **Product Interfacing:** This is one aspect that needs to be considered beside customer-focused to make a smooth transition. The proposed organization had a weak point on this aspect, but the resolution to this problem can be provided. This was a controversial among management between customer-focused and products alignment, which has trade-in/trade-off effect.
- **Coaching:** This is very important for employee in senior ranks (i.e. Managers, Senior Engineers, Lead Engineers) to have a structure that allows them to provide proper coaching to their subordinates (i.e. Engineers, Technicians, Technical Operators), this will allow the organization to improve its communication as well.
- **Learning Curve:** It was in the top 4 of organization difficulties. This is not only a learning curve of 50 exempt employees but also front-line people within the organization accounting for more than 250 employees which rely on technical capability of their engineers.

People have argued on the proposed structure when new organization is initiated and looked similar to "functional oriented structure", but in reality it is a customer-focused realignment. It is very important that how the term of customer-focused is defined. The area of customer-focused

alignment should be an area that has lots of interaction and should be where the organization possesses its value, then the focused-groups can be started defining from there.

A benchmarking on current organization vs. proposed organization has been established and scored by manager committee as shown in table 4.1.

Table 4.1 Benchmarking on Current vs. Proposed Structure, 5 Levels Scoring on 6 key Aspects

Evaluated Aspects	Weight (1-3)	Current Struct.		Propose Struct.	
		5 pts.	Score	5 pts.	Score
Focusing	3	2	6	4	12
Front-line Contact	3	2	6	4	12
Customer-Focused	3	2	6	4	12
Product Interfacing	3	4	12	1	3
Coaching	2	2	4	4	8
Learning Curve	2	2	4	4	8
Overall Score	80		38		55

The proposed structure has 45% better than current structure after scoring, and all managers agreed to continue working on proposed structure which will need refining process and tremendous efforts during the transition.

4.4 Understanding Product and Customer

Teparuk facility operates as a cost center, next customer is internal customer, the value of the product consists of quality, delivery, and cost. What test engineering organization does, to facilitate the operation to deliver goals achievement, is to provide a product of "high quality test at low cost" to HGA manufacturing.

Customers: Besides end-customers like computer users and drive manufacturing, HGA manufacturing is a direct customer while data analyst is an indirect customer to the organization.

What are required by drive manufacturing?

- Comprehensive test to identify good heads for disc drive manufacture.

What are required by HGA manufacturing?

- High repeatability and reliability (less variation)
- High flexibility for product conversion and upgrade

- Ergonomics test system at the right location and the right time
- User friendly and fast test

What are required by data analysts?

- Adequate amount of valid test data to investigate and improve recording head performance
- Real time data acquisition system for timely reaction

Product: High Quality Test at Low Cost**What are contributing to Test Quality?**

- Tester repeatability and correlation
- Tester variation
- Comprehensive and effective test algorithm

What are contributing test related cost?

- Tester capacity (test time, test yield, utilization)
- Tester supplies
- In-commonality of test requirement (hardware, software, firmware)
- Test related supporting cost (development, upgrades)

The product of test engineering can be described in figure 4.5 as a form of "Three level of a product" which consist of 1) Core Product, 2) Tangible Product, 3) Augmented Product, at this point product is understood.

Mission statement and functional goals can be formulated properly once measurement links are comprehended after product, customer, and organization have been clearly defined.

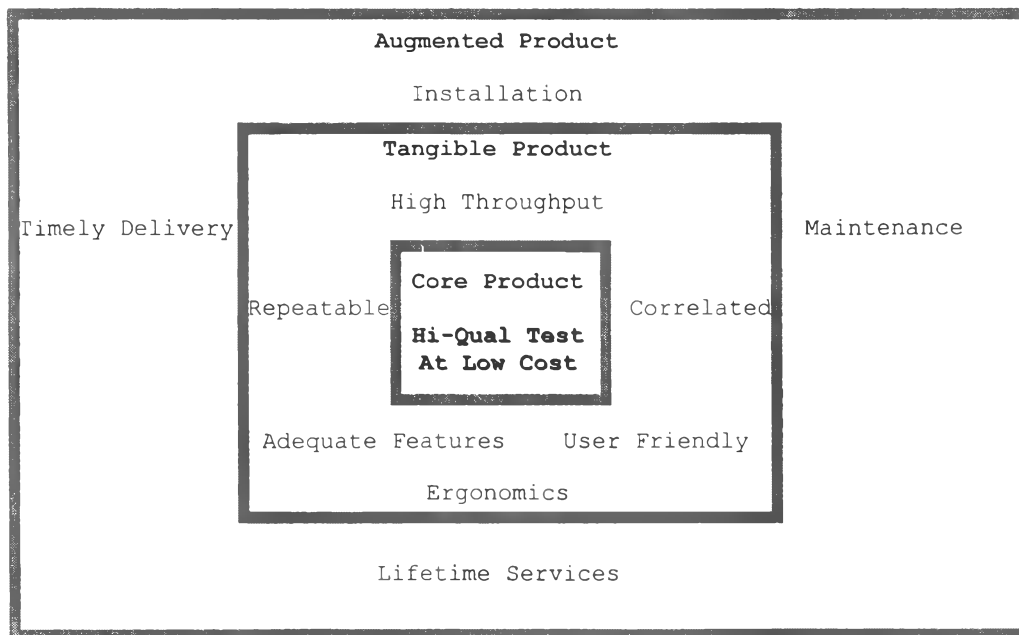


Figure 4.5 Three Levels of Test Engineering Product

4.5 Establishing a Framework

In parallel of other exercises, a framework of test engineering has been established to provide a brief test engineering responsibilities and interactions with other organizations, which include organizations within Teparuk operation and its counterparts overseas.

Test Engineering framework is a basic supporting functional structure of the organization. It provides a big picture of links within test engineering, including multiple functional groups, to its partners as shown in figure 4.6.

Gray shaded area is the whole test engineering organization which interacts with its counterparts overseas, other functional groups within Teparuk, and other sites which require similar supports.

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Title:	TE Frame Work
Rev:	CSW/090298

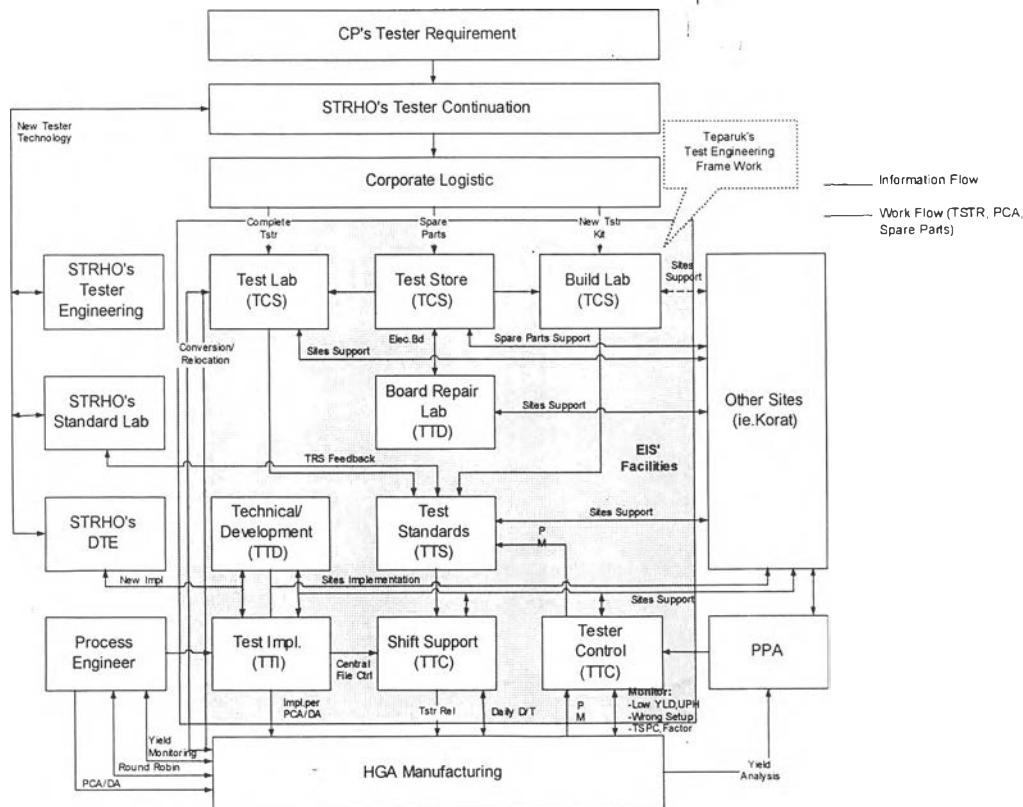


Figure 4.6 Test Engineering Framework, Recent Revision

Capacity Support (TCS) plays a significant role to the first level of test capacity support, it interfaces and reacts to corporate build requirement via Capacity Planning Department (CP) and Tester Continuation Group at Recording Head Operation (RHO) in the US.

Tester hardware including complete tester, spare parts, or tester build kits as well as conversions from one product to another will be handled by TCS. Test Standards (TTS) handles standards generation for tester calibration and tester acceptance test process including repeatability, correlation exercises of HGA tester prior to release to HGA manufacturing. Tester Control (TTC) will then resume control and maintenance responsibilities.

Within the support organization, internal support on test related technical improvement, test related qualifications & implementations, and engineering applications development are handled by internal supporting organizations, i.e. Technical Development (TTD), Test Implementations (TTI), and Engineering Information System (EIS) respectively.

Parametric Yield Analysis or Parametric Performance Analysis (PPA), which is split out to create a center of excellence, will take care of analytical activities as well as its enhancement. Test Engineering sacrificed 8% of its exempt employee to form up this focused-group in order to support focus reduction on Product Test Engineers. A transition of parametric performance analysis responsibility taken lots of effort to setup infrastructure of analytical tools and applications.

With the framework which is shown in figure 4.6, people in and out the organization will be able to understand how this organization is operated and who are its customers and counterparts, and it is a base for establishing appropriate work-flows. It is believable that more than 90% of exempt employees does not know how the exact overall organization's framework looks like and they learn from practices and verbal instructions by their managers and colleagues. It might be workable for small organization but it does not work well with complex organization like today's test engineering. A significant improvement in understanding the organization's framework has been assessed after it is published.

4.6 Establishing Workflow for Key Activities

Nine major activities have been selected to establish cross-functional workflow based on customer-focused organization and its framework, which can refer to figure 3.8 for its structure & functions, and figure 4.6 for its framework respectively.

This set of workflow will definitely help the organization to clearly communicate to others or to be contacted for cross-functional work more effectively. Standard Operating Procedure (SOP) and Work Instruction (WI) can be developed or modified based on the workflow. In addition, an activity based management and improvement can not be conducted without workflow (sometimes called process map).

Three examples of workflow are shown in figure 4.7 (a) to (c), they are four out of 9 major workflow selected.

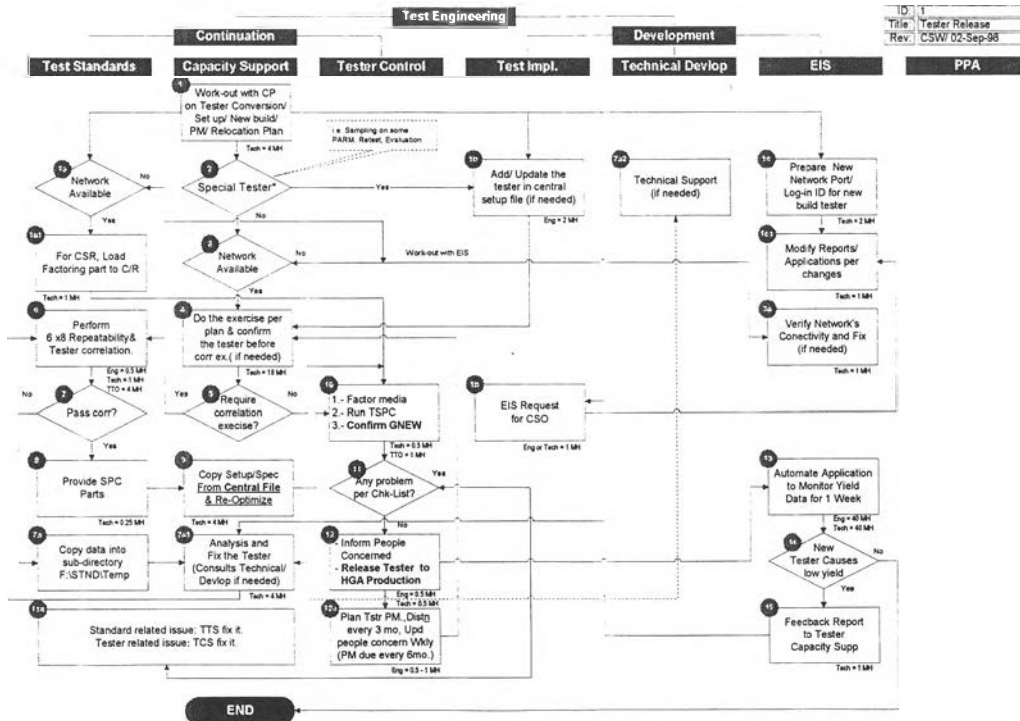


Figure 4.7(a) Tester Release workflow, one of workflow on key activities in Test Engineering, recent revision

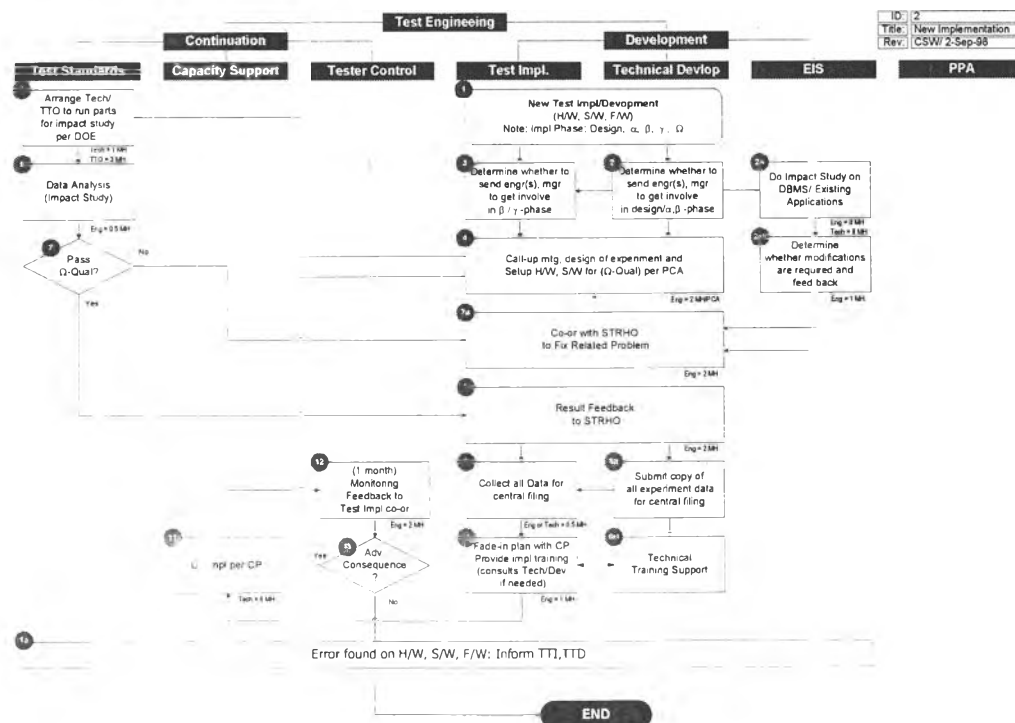


Figure 4.7 (b) Test-related Implementation workflow, one of workflow on key activities in Test Engineering, recent revision

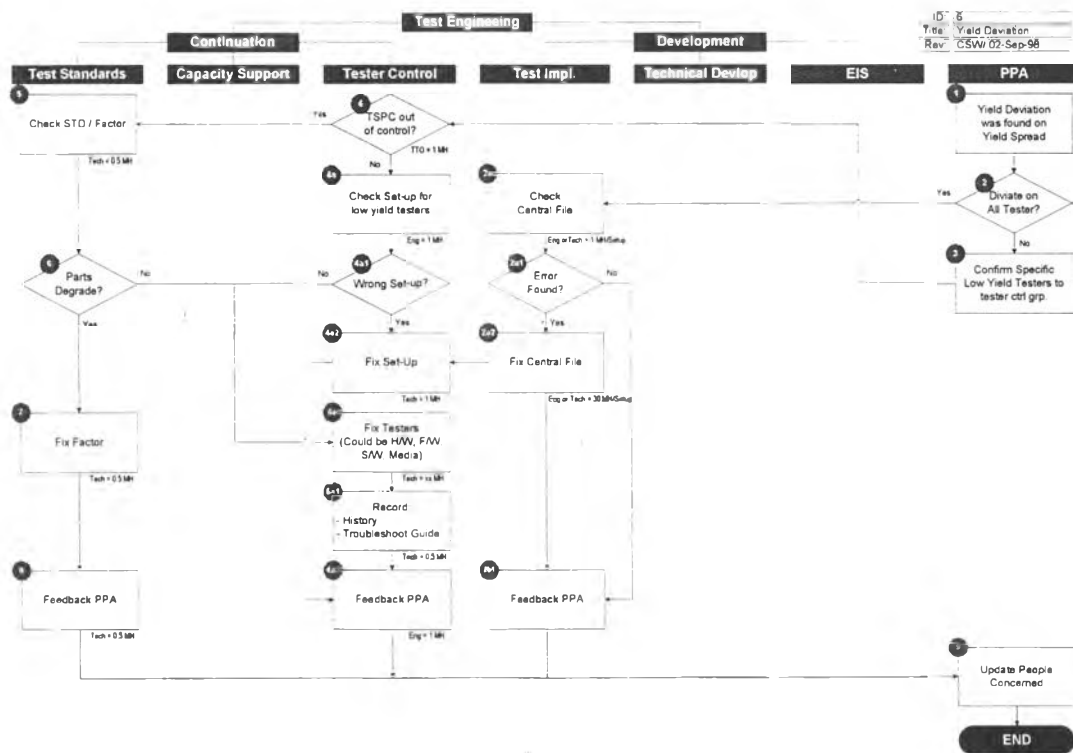


Figure 4.7 (c) Yield Analysis workflow, one of workflow on key activities in Test Engineering, recent revision

After TE's functional workflow was launched, 94% of exempt employees understand more about their role and their neighbor's roles. Additional workflow has to be added once the needs are identified. Analysis of selected workflow will be highlighted in chapter 5, "Process Analysis and Organization Metrics."

4.7 Mission and Objective Goals Formulating

Without proper mission statement and objective goals setting, it is virtually impossible for one large organization with multi-function to execute its functions effectively. Direction conflicts within organization or duplicating of efforts will cause management difficulties, if there is no clear mission statement and no synchronized objective goals have been formulated.

Prior to start working on mission and objective goals setting for the organization, corporate vision and its objectives have to be considered to ensure links to organizational objective goals are established as shown in figure 4.8.

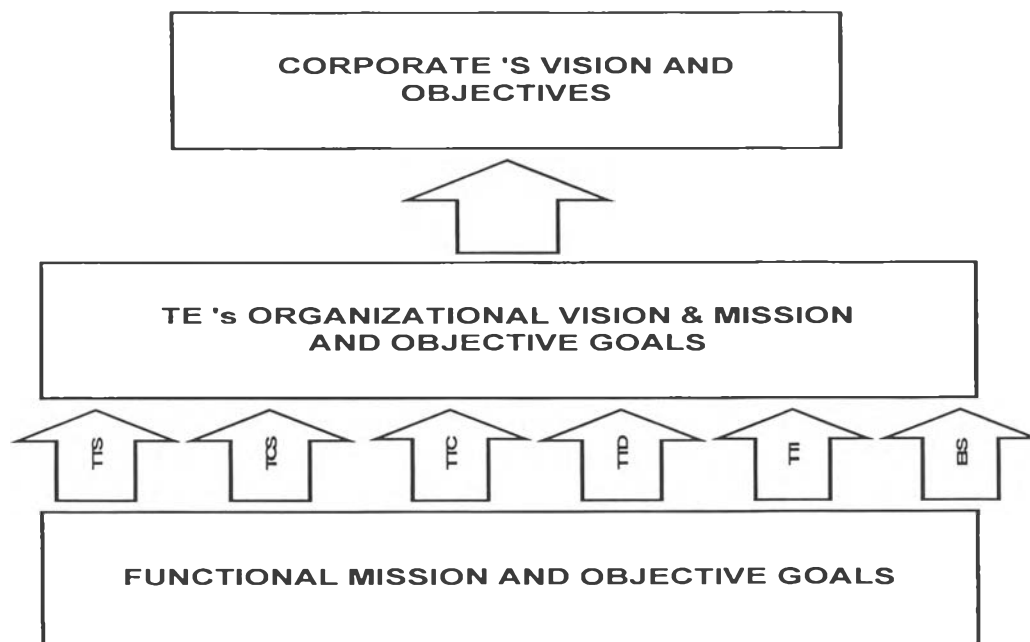


Figure 4.8 A Diagram of Vision and Objectives Supporting by Functional Objective Goals.

Test Engineering has been operating without official mission statement for the past several years and always ties its functional goals to Teeparuk's operational goals. It has never been a problem when organization was small, but it is not a good practice when organization has grown and became one of the largest organizations in engineering with multi-function responsibilities.

Seagate's Vision Statement

Seagate will be the leading high quality provider of technology based products that enable computer users to access the information they want anywhere in the world.

Corporate Objectives

- Improve Time to Market for All Products
- Partner with Key Customers
- Provide Best-in-Class Product and Process Quality
- Create World-class Manufacturing Processes
- Improve Materials Management and Vendor Relationships
- Technology Leadership
- Employer of Choice

Figure 4.9 Corporate Vision Statement and Its Objectives

Figure 4.9 demonstrates corporate vision and objectives while Test Engineering's vision, mission, and its strategy are shown in figure 4.10.

Test Engineering Vision

Before year 2000, we will be a strong technical organization providing high-quality support to manufacturing.

Test Engineering Mission

To deliver high-quality test at low-cost to support drive requirements.

Strategy

- Focus on test yield and UPH opportunities and align ourselves to effective test to drive requirements.
- Leverage tester control capability by improving technical resources to be more proficient.
- Develop tools to support systematic control, analysis, and alert to be more proactive.
- Develop technical knowledge base within the organization.
- Reduce focus and improve learning curve of engineer.

Figure 4.10 Test Engineering's Vision and Mission, and its Strategy

Once the mission and strategy are clear, organizational objective goals have to be set and align with corporate objectives. To avoid conflicts on direction and priority among focused-groups within the organization, a clear functional mission and common goals have to be determined as shown in figure 4.11 and in appendix II.

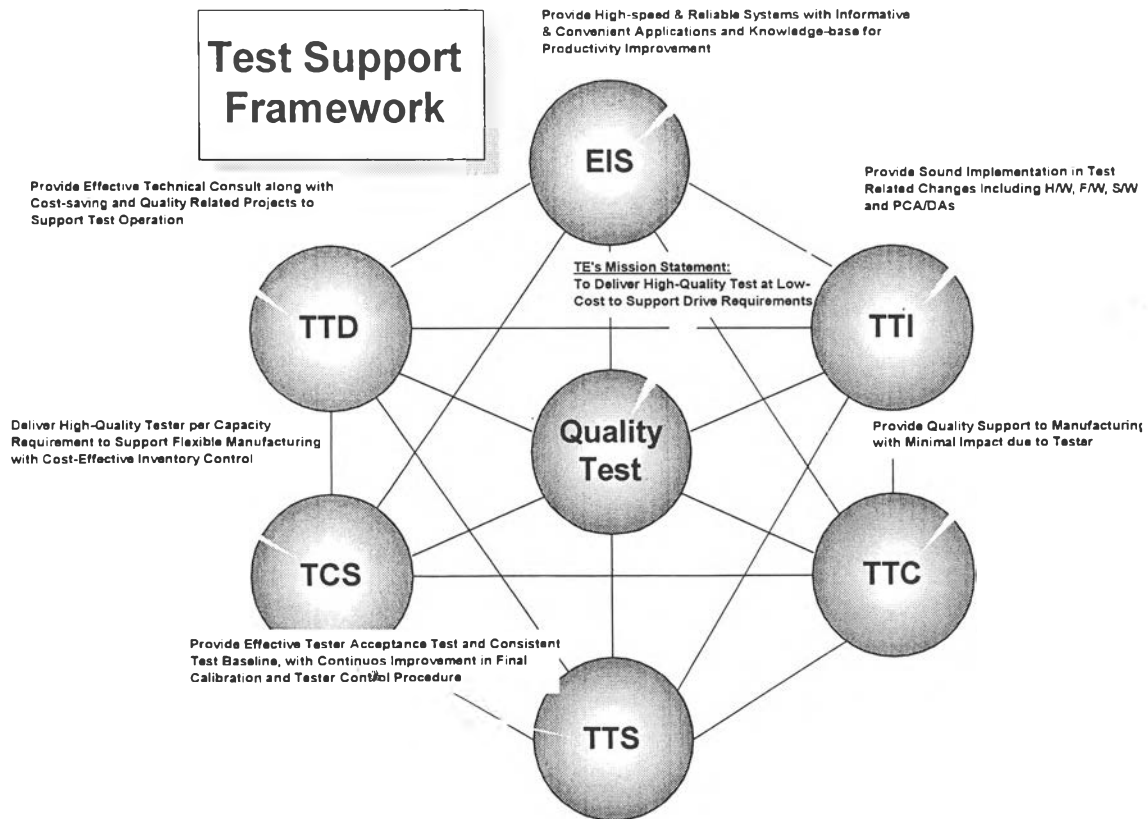


Figure 4.11 Test Support Framework with Functional Mission Statement Against TE's Mission Statement

Organizational goals have been roughly laid out for each focused-group, then the supporting goals can be formulated based on their mission on new structure, which is demonstrated in appendix II. Employee formulates objective goals while iterations of that goal review process are carried out together by employees and managers.

Objective goals for each organization have to state quantitative target and specific time for each organization. There are some common goals for multiple organizations instead of splitting it into partial responsibility. The reasons of putting some common goals are to create teamwork environment and to ensure final goals could be delivered. Self-balancing within multiple functional teamwork that holds a common goal will react to compensate a missing part in order to maintain achievement of the common goal. For example if organization divide it into partial goal for each organization, at the end of the quarter manager may see only partial result is delivered because of one organization had some difficulties and could not deliver the part where it could be balanced by another organization. Otherwise, management has to closely monitor and keep allocating the focus to the problem area while it could be self-balanced by setting a common goal for multiple organizations.