

Chapter 1

Introduction



1 Introduction

Test engineering organization is a multi-function technical support organization, which requires multi-skill resources to support flexible manufacturing of high-precision component for rigid disk drive. The industry is one of the world's most dynamic industries utilizing an amazing combination of sciences and engineering resources.

1.1 Background

At early stage, the organization was accommodated by multi-skill resource, which was capable in handling multiple focus of all test-related activities, since the degree of the complexity and frequency of issues at that time were low and gradually developed.

At middle stage and present, the organization was restructured to handle increased responsibility, handle multiple functions with higher degree of complexity and frequency of the issues. The organization was oriented to product alignment where all the concerns of a specific product went through one channel with a significant growth in term of size and focus of responsibility.

Test Engineering has been restructured several times during the past 8 years, and the change was very significant for the past 4 years, from single manager to 7 managers according to expansion of responsibility and increasing in activities. What has been changed in test engineering responsible areas during the past 4 years? Number of testers and relevant activities were increased 4 times, number of product variety was doubled, database management system was expanded 5 times, tester/robot assembly capability has been established and continued producing 5 systems per week. Moreover, newer and more complicated technology of product and its requirements kept coming into test related areas.

Organization growth was significant, more capable people were required in every area while average years of experience of the people in organization was getting less due to its growth rate. This resulted in quality issues when the requirements became more and more complicated and required highly capable engineers to deal with the changes. Where have capable engineers gone? Some of

them got promoted to be managers, some of them left company, some of them were allocated to support new facility in Northeast, some of them needed to catch up new technology transfer. This left challenges for management to relief the situation.

Organizational restructuring was considered to optimize focus and to establish organizational awareness to employee incorporated with deploying of appropriate tools and measures. Measures of key aspects would be assessed to reflect positive and negative impacts of the organizational restructuring. Some subjective measures had to be based on questionnaire to engineers, managers, and internal customers.

1.2 Problem Areas

Engineer Learning Curve and Coaching: Though the company provided technical training to engineers (i.e. employee orientation, SPC, TQM, Gage R&R, DOE, K&T, and etc.), a specific knowledge base was required for test engineering people to understand and to be able to catch up a dynamic technology which nobody else can provide but test engineering. Frequently, skilled and experienced people, are assigned to handle upcoming technologies and have inadequate time for effective coaching. According to recent survey, engineers spent less than 50% of working hours on primary responsibility and less than 10% each day on formal study in relevant fields. Engineer's focus allocation need to be optimized to allow a proper window for studying in relevant fields, 10-15% of work hours was expected.

Technical self-training aids development was needed to handle training for newly hired engineers, as well as management support in focus allocation.

Effectiveness of organizational communication: Size and frequency of day-to-day issues were overwhelming engineer's responsibility. For example, yield analysis tasks were becoming a daily requirement as well as the activities on relevant tester control issues. Those were excessively time consuming tasks for an engineer to handle in parallel with other responsibilities, such as tester control improvement, contacting with front-line people, developing technical capability of front-line resources. This resulted in loopholes and errors in communication and changes implementation. Documentation within test engineering had relatively poor tracibility especially in product yield analysis and test related changes because it was handled by overwhelmed resources. Most of the information were kept by individual with more than 10 different formats, which gave management hard time when a digest of information was required.

Associated with refocusing, a standard analysis flow and automated tools had to be developed to assist engineer to perform their tasks systematically.

Quality of Tester Control: Tester was the most dynamic operation in term of technology changes, number of testers required, and tester conversions to support flexible manufacturing. This caused additional loopholes in tester control besides technical support, which was always in learning curve to catch up the technology. New technology that suited product test requirement brought more complexity and sensitivity to test system. Parametric tests have been added to accommodate requirement of Magneto-resistive (MR) HGA, from 5-6 parameters to more than 20 test parameters. This was a nightmare of test engineers to control such multiple parameters which were all sensitive to noise level and system vibration.

Effective measure and appropriate tools have to be deployed to leverage capability and improve this area.

1.3 Objective of Study

To restructure test engineering organization, and to develop appropriate tools and workflow to improve organization capability to suit current situation (1997-1998).

1.4 Scope of Study

1. Engineer's focus allocation and their difficulties in current situation were assessed, as well as a potential influence due to future technology requirements, then management could define a proper structure for test engineering and develop framework for restructuring.
2. Appropriate cross-functional workflow for focused-groups were established to accommodate the restructuring. Mission and objective goals of focused-group were formulated.
3. Appropriate information system and information technology (IS/IT) applications were defined as a leverage tool to provide engineering information in order to improve communications and speed of reactions.

1.5 Procedure

1. Understand the organization development
2. Analyze activities and technology trend
4. Assess organization difficulties

5. Regroup organizational functions and restructure the organization to cope with manufacturing requirements.
6. Define product and customers
7. Define vision and mission
8. Define metrics and assess them as a baseline
9. Analyze key processes and shorten them
10. Deploy IS/IT as a strategic tool to leverage the restructuring
11. Measure results and benchmark with the baseline

1.6 Assumptions

1. Appropriate organizational structure would allow optimum focus allocation of employee in the organization.
2. Organizational awareness to employee could be improved by formulating framework, workflow, mission, and objective goals.
3. Capability and quality improvement could be achieved with appropriate measures setting associated with leverage tools, IS/IT.

1.7 Expected Benefits

1. Being a guide for further engineering organizational development incorporated with effective Information System and Information Technology (IS/IT).
2. Reducing in organizational difficulties of multi-skill and rapid growth technical organization.
3. Improving in organizational awareness of employee in test engineering.