

SUPPLIER RELATIONSHIP MANAGEMENT IN INSPECTING ELECTRONICS PARTS OF HARD DISK DRIVE MANUFACTURER

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ABSTRACT

This research aims to study a system of self source inspection (SSI) used in an incoming quality assurance (IQA) unit of a hard disk drive manufacturer. SSI is a way in doing supplier relationship management (SRM) of this company with their suppliers for inspection component parts in particular. The effect of this system is studied by using questionnaire and some performances are measured such as inspection time, part storage area and inspection cost. Conclusions and future direction are also included in this study.

KEYWORDS: Supply Chain, Supplier Relationship Management, Self Source Inspection, Hard Disk Drive, Electronics Part

1. ELECTRONICS INDUSTRY (CASE STUDY: HARD DISK DRIVE)

Electronics industry plays an important role to economic system of Thailand due to being topmost industry in earning profit and having capability growth. Studying supply chain in electronics industry in Thailand, hard disk drive is utilized as a case study since this product consists of several parts that supply from many suppliers inside and outside country besides Thailand is a top base in hard disk drive production of the world. A manufacturer, as a case study, is the second largest company of the world in computer production under ISO9001:2000, ISO 14001, and TIS/OHSAS 18001 qualification. The main product of this company in Thailand is hard disk drive (HDD) which all parts are wholly supplied from suppliers and do assembly in process. There are five models of HDD for notebook; V40, Z40, M60, M120, J100. In this research V40 is a model in concern due to high demand. Figure 1 show picture of HDD and its components. All mechanic parts separating in rank A, B and C are shown in figure 2.

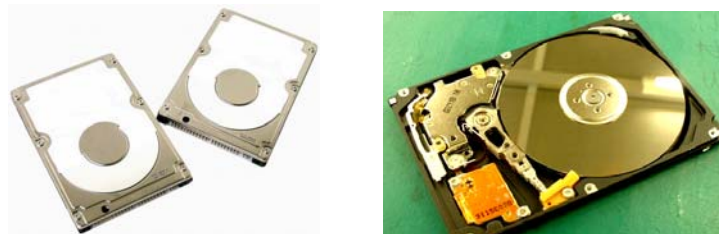


Figure 1 Hard disk drive and its components

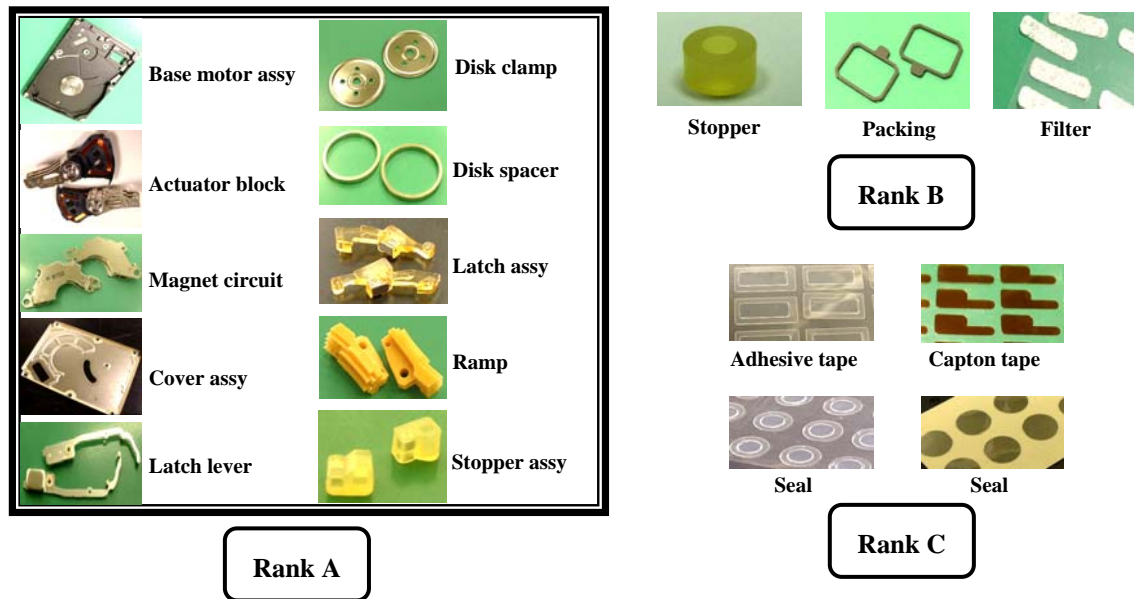


Figure 2 Mechanic parts of HDD separating in rank A, B and C

Ranking Criteria determines from price, level of damage to product, and waste time to change/fix product. Rank A is considered in our research due to most important parts for HDD product (expensive, high level of damage and excessive waste time to chain/fix). In Rank A, mostly in each part, there are two suppliers (see figure 3) to supply parts with different purchasing rate; for example, actuator block assy, supplier C ships 76% and supplier D ships 24% to company. There are 13 local suppliers and 3 overseas suppliers (for base motor assy, latch assy and disk clamp).

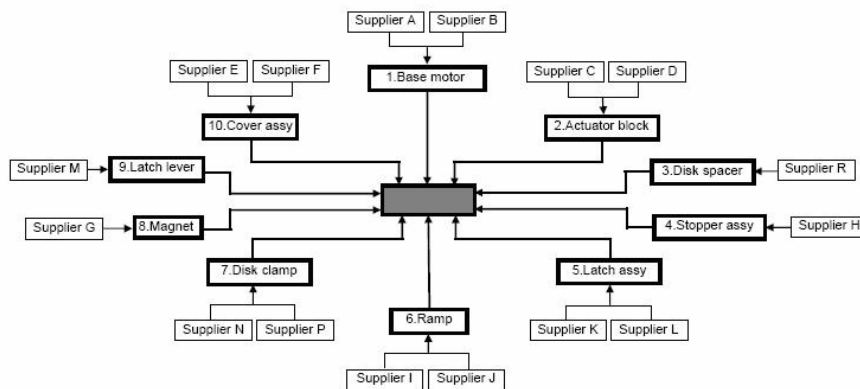


Figure 3 Suppliers in each part of rank A

Before doing part assembly to be HDD product, all parts shipped from suppliers must be inspected by Incoming Quality Assurance (IQA) unit of the company. Due to higher demand, difficulties are revealed in this unit with insufficient in inspection operators, part storage area and inspection cost. For inspection procedure, good parts are shipped to warehouse unit waiting for assembly process while reject parts are returned to suppliers. Reject parts' procedure shows time and cost loss both for company and for its

suppliers. Collaborative among them is a way in relationship management leading to better improvement. Therefore the objective of this research is to study an example of relationship management used in an IQA unit of a hard disk drive manufacturer.

2. SUPPLIER RELATIONSHIP MANAGEMENT IN ELECTRONICS SUPPLY CHAIN

Scope of supply chain management deals with management, purchasing, material requirements, manufacturing management, facilities planning, customer service and information flow. The aim of managing the supply chain is to achieve a balance between the goals of high customer service, while keeping low inventory investment and low unit cost, which are often viewed as conflicting (Stevens (1989)(1990), Balsmeier and Voisin (1996)). To achieve this balance, the organization should integrate supply chain management from the external customers' viewpoint and then manage all horizontal processes that are needed to provide the customer with added value. One way to develop supply chain performance is supplier relationship management (SRM). There are many surveys show relationship management between buyers and suppliers in electronics industry.

McIvor *et al.* (2001) determined whether the principles of lean supply are currently present between an OEM and its key suppliers in the electronics industry. In particular, the research focuses on supplier involvement in customer design activities and joint buyer–supplier cost reduction. Fynes *et al.* (2005) developed a conceptual framework incorporating dimensions of SC relationships (such as trust, commitment, adaptation, communication and collaboration) and quality performance. The model was tested with data collected from 200 suppliers in the electronics sector in the Republic of Ireland. Kumar and Krob (2005) reviewed various organizational challenges faced and overcome by the Solid State Electronics Center, a division of Honeywell, in successfully managing and establishing a near optimal supply chain framework. McIvor *et al.* (2006) determined the degree of early supplier involvement (ESI) that exists between a multinational electronics company and its key suppliers, in terms of depth of integration, information exchange and buyer–supplier relationships. Krause *et al.* (2007) investigated the relationships between U.S. buying firms' supplier development efforts, commitment, social capital accumulation with key suppliers, and buying firm performance.

In this research, supplier relationship management is shown in quality inspection of material (electronics parts) as a supplier certification. Lambert *et al.* (1998) said one way that companies might ensure quality is through inspection of incoming materials parts. Inspection requires human resources, space, and test equipment. In addition, incoming inventory is tied up or delayed awaiting inspection. For these reason, purchasing managers have turned to “supplier certification”. In the certification process, the supplier's quality levels and processes are closely evaluated by members of the buying company. If they “pass”, the buying organization no longer inspects that supplier's incoming material.

3. SELF SOURCE INSPECTION SYSTEM

Self source inspection (SSI) is a system that this company arranges for building collaborative with suppliers in part inspection. After processing part and quality inspection by Out Quality Assurance (OQA) unit of suppliers, a final inspection is done at supplier site under company's same inspection procedure instead of shipping parts directly to a

customer (this company). Then source inspection report is done by supplier and is attached with part shipped to company's assembly line. The advantage of SSI system is useful both for the company (reduction in inspection time, operator and cost, and increment in space for product improvement) and for suppliers (cost reduction and product development via customer's inspection procedure) besides leading to strong relationship and involvement. Figure 4 presents inspection procedure before and after doing SSI system.

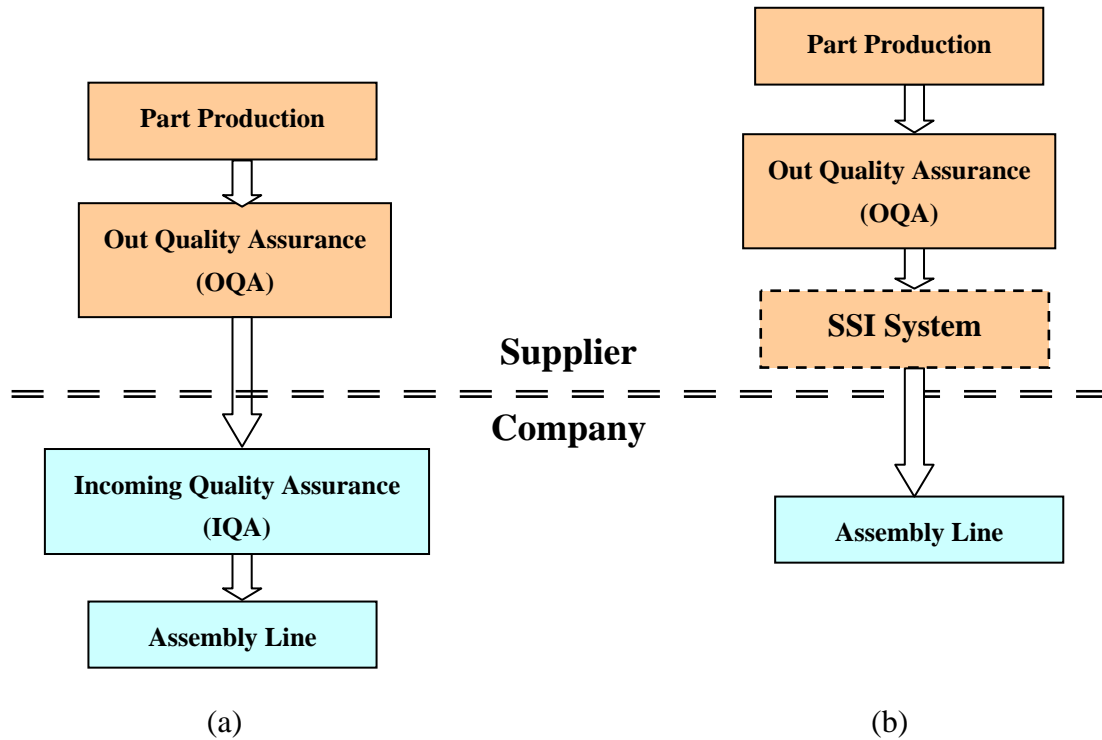


Figure 4 Inspection procedures (a) before doing SSI system (b) after doing SSI system

The company starts SSI system since mid 2006 with 13 local suppliers of part rank A. Three conditions are used in selecting suppliers: defect part per million (DPPM) less than or equal to 120 DPPM, lot reject rate (LRR) less than or equal to 1 % and no return HDD products from company's customer. The results show that all suppliers pass those conditions and can enter in SSI system. Therefore 3-day training program is begun at the company by IQA trainer. Participants from suppliers consist of 3 inspection operators and 1 supervisor who attend in this workshop as a SSI team. After training end, three lots shipped from this supplier will be observed final inspection's result. If there is no any error, this supplier will get certification as a proof of inspection standard similar to the company does.

4. RESULTS AND SYSTEM EVALUATION

Due to difficulties found in IQA unit, some performance measurements are observed; inspection time per unit, inspection space, and inspection cost. Note that 3 overseas suppliers (supplier B, L and N) do not participate in SSI system at this time due to limitation in time and readiness. Figure 5 shows better improvement in inspection time per unit part separating by supplier in comparison with before and after doing SSI system.

For example, in part of base motor assy from supplier A, inspection time per unit decreases from 144.2 minute to be 34.6 minute as a result of moving main inspection procedure to do at supplier site.

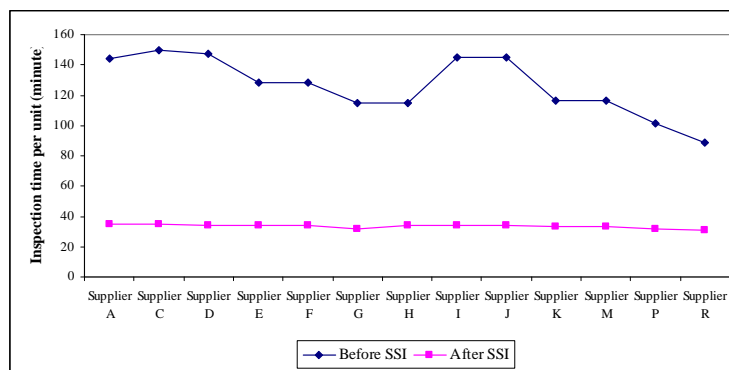


Figure 5 Comparison in inspection time per unit part separating by supplier

Inspection cost per month at IQA unit is decreased after SSI system is utilized between the company and its suppliers. Saving cost in inspection is recorded from April to December 2005 as shown in Table 1.

Table 1 Inspection cost saving

Inspection cost saving (baht per month)								
Apr 2005	May 2005	Jun 2005	Jul 2005	Aug 2005	Sep 2005	Oct 2005	Nov 2005	Dec 2005
75,742.3	66,536.1	69,175.7	80,810.5	74,793.6	68,531.4	83,265.5	83,628.0	86,505.0

Storage area for incoming materials is increased to be 2100 m³ after SSI system is done. Therefore, this company has free space to do product development, instead of paying rent 3,780,000 baht a year for that area. In present this area is utilized in packing empty box for product packaging which is cut off a 60 percent of amount from a supplier. Saving cost in packaging is also derived 154,166 baht per month in average.

After doing SSI system for 9 months, a questionnaire is created and distributed to 5 suppliers (15 staffs) for getting their opinion/suggestion about SSI system. The questionnaire includes 14 questions related to training program (trainer, document, procedure, equipment, time etc.) and each answer is coded using a-five-point Likert Scale. '1' means strongly disagree, whereas '5' means strongly agree. The result shows that all suppliers are satisfied in this system (average = 4.10) but still have difficulty in contacting company or making decision in defects.

5. CONCLUSIONS AND FUTURE DIRECTION

Bringing SSI system to work with supplier involvement in quality inspection shows a better chain performance for the company. At IQA unit, inspection time per unit of each supplier decrease about 73.1% meanwhile inspection cost per month is in the same way, 75.3% reduction in average. Also storage area is utilized in product development. Besides SSI system evaluation is done via questionnaire. Suppliers have strong agreement in most aspects of program with some difficulty in contacting and making decision. Following up constantly and training replication are suggested from suppliers for enhanced system. Future directions are to measure other chain performances both in

company side and in supplier side, and to motivate other suppliers both in rank B and C part and in overseas for program participation.

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