

Chapter 3 : Research Methodology

In order to get data for this research certain aspects of familiarization on TNB existing system are required.

3.1 Stores Catalogue - Coding Structure

All stock or inventory items are to be placed in identified area. All inventory items are kept in store in a district or Power Station set up. Access to store is confined to individual who has to carry any inventory transaction. Security of store is essential in TNB in view there are goods worth millions of RM in such store. Accountability of items is made easier by placing items in safe place. All identical or similar item is identified by its own catalogue number. Item catalogue number had been used in TNB for many years since the beginning of this organization in the government sector. A revision of new catalogue number was carried out in August 1971 (see appendix 1 - LLN Financial Instruction No. 17(s)). Each item will be identified by its own catalogue number and catalogue number consists of nine digit of numbers. All catalogue numbers are controlled by a single department which overseas the procurement activities of TNB.

There are two format of catalogue numbers :

- 1. As appear in sheet 1 of Appendix A of Financial Instruction No. 17(5)*

and
- 2. As appear in sheet 2 of Appendix A of similar Instruction*



The sheet 1 of catalogue coding system refers to items that are “universally” used in the organization. Therefore for item with similar catalogue number found in Johor Bahru and Kangar, they are identical and transferrable in their usage.

For sheet 2 of catalogue coding system, the item is designated to specific location. The specific location is normally the name of a particular power station. For SSAA Power Station, all spares are identified with the first two digit number of 68 and follow by remaining 7 digit of numbers. Therefore power stations spares or inventory items are unique to that station only and the spares could not be used at other power station.

Above is due to the fact that a different type of equipment, manufacturers and country of origin are being installed. There is no standardization of equipment as the projects of power station construction are opened to international tenderers. Therefore each station maintains its own set of catalogue number for every item. This identification of items catalogue number by respective station number has drawback as some items are identical if they originate from same manufacturer. The tenderers could source same type of equipment from single source of manufacturer. This problem still exist to this day.



3.2 Computerised System For Transaction Of Items

Majority of TNB districts or power stations have been installed with computerised systems to monitor the daily transaction of stock or inventory items. All data are fed centrally to computer system located in Headquarters in Kuala Lumpur. The system, material management information system or MMIS, was commissioned in early 1994. The system is still at infant stage and the full potential of the system has not been fully implemented. The system allows all transaction, e.g. item withdrawal and receiving, to be processed through computer terminals with minimal paper work. Key-in activities are carried out at respective district or power station stores. Data is electronically transmitted to HQ computer for processing. Local computer terminals are for viewing and transaction only with specific security access. Summary or reporting of transaction at district or power station could not be carried out. Such summary or reports on activities could only be obtained through Information Department in Headquarters. The system or MMIS main objectives are :-

1. to assist station in achieving service level of 89% machine availability through proper utilization of inventory.
2. to reduce present stock level
3. to increase turnover-rate of stores inventory
4. to ensure materials to be present when they are needed.
5. to produce summary of reports of various kind for effective inventory control. Such report could be in that form of present stock level, tracking slow moving items, identified rate of usage and etc.



As mentioned earlier, MMIS is not fully operationalised. Therefore the benefit of such system is not at district or station level.

3.3 Data Collection

Necessary data for this research were requested through the Information Department (formerly Electronic Data Processing Department) of TNB in Kuala Lumpur. Data in the form of hardcopies were requested to be printed out and data were manually analysed with respect to inventory management. Data that were requested were :-

- 1. Summary of existing value in RM for items with catalogue series block 01 to 97 that are kept at SSAA Power Station.*

This summary prints out the total inventory value of all items stock at the power station. It provides the global view of various group of items in RM - Refer Table II.

The catalogue series block 01 to 97 can be categorized into three(3) groups ,

- i) 68/ series : station spare*
- ii) 21 series : fuel (oil coal and distillate. Distillate is the higher quality grade of diesel oil*
- iii) the rest of 01 to 97 series : common spares.*

- 2. Summary of existing value in RM and detail listing of spare parts that are essentially for SSAA Power Station. This is the 68/ series catalogue items.*

The station spare is identified as XX / XXXXXX / X

The first two digit number - station number , 68

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The third digit number - unit no. Number 1 or 2 is assigned for equipment supplied under phase I project. Number 3 or 4 for phase II equipment.

The fourth digit number -Main section - 0 - turbine equipment
1 - boiler equipment
2 - gas turbine equipment
3- electrical equipment
4- electrical equipment
5- fuel equipment
6- cooling water / feed water pumps
7- control and instrument equipment
8- auxiliary equipment
9- miscellaneous equipment

The fifth and sixth digit number -:the sub-section of main section. Number run from 00 to 99

The seventh and eighth digit number - item number

The ninth digit number- check digit assigns by HQ

This summary provides the detail listing of items which are identified with first two digit numbers of 68 and follow by additional two digit numbers to represent equipment in association with specific plant area and section involved. The plant or equipment in the power station is divided into 7 major categories as below :-

- 1) Turbine plant*
- 2) Boiler plant*
- 3) Electrical plant*
- 4) Control and Instrumentation plant*
- 5) Coal Handling plant*

- 6) Gas Turbine plant
- 7) The rest as balance of plant

For each plant there is respective maintenance section or group of staff that are specialized in their respective technology (for the balance of plant there is more than one section involved.) Therefore each section maintained their respective inventory stock. Each section is headed by Senior Maintenance Engineer who is responsible to ensure that plant spares are maintained accordingly so that plant maintenance is carried out at highest level. This is to ensure TNB equipment are at highest reliability and availability - Refer Table III.

- 3. *Inventory that are considered slow moving items for the last 5 years are reviewed. As equipment in power station are inspected in details during major overhaul every 4-5 years, the 5 years period should give certain inventory movement so that forecasting can be predicted accurately.*

3.4 Short Interview

Short interviews were conducted with staff and engineers to gauge their awareness and understanding on current station inventory issues.

