Chapter 4

Site Resources Management

Concept and Implementation

4.1 Introduction

This chapter contains a collection of systems design and establishment for improving site resources management that encompasses the principles, concepts, and techniques guideline for implementation in order to attain the objective proposed in chapter one. Systems design covers a broad spectrum of topics directly affecting site resource as relate to

Resources planning
Stores management
Legal aspects relating to site resource
Site organizing for site resources management
Procedure development

The objective is to not only come up with an efficient system design but to design one that is economically justifiable.

4.2 Resources planning

4.2.1 Project plan and scheduling

A project plan is like a time budget. We allocate time to various tasks and use this as a model against which we compare the actual use of time. If something takes longer than we think, we try to find a quicker way of doing something later on.

Projects never ever go according to plan. There are always deviations, hesitations, and interruptions. We cannot control the way things go wrong. We do not attempt to accurately predict the future. We model the future and use the model as a basis against which to ***measure progress.***

How do we project plan?

Project planning is a modeling process. Project managers create a model of the project and experiment with the model to find neat, efficient, and cheap ways of proceeding through the ***activities*** or ***tasks*** which make up the project.

Simple projects can be adequately modeled by a barchart this shows the activities which make up the projects and their timing. More complex projects often are helped by the use of a more complex model.

This more complex modeling technique allows the analysis of what is going on in the project and also allows the project manager a convenient way of telling other people what the plan look like. The model is called a ***network***. These models are the input side of the process; they define the activities and how they relate to each other.

The output side is the ***when***. When should activities start and finish? A barchart is one of the reports produced most frequently. It shows the activities represented as bars drawn against a time scale. Barcharts (or Gantt charts) communicate the plan very clearly.

Additionally, project managers calculate how many resources will be needed day by day. A graph showing the amount of a resource that we think we will need is called a ***histogram***.

If the resources are not available., the system delays the task until the required resources are available. Delaying a task until resources are available may cause other tasks to become delayed and past their earliest possible starting dates. If a task is delayed until resources become available, other tasks that depend on it must also be delayed. The end result may be a much prolonged project.

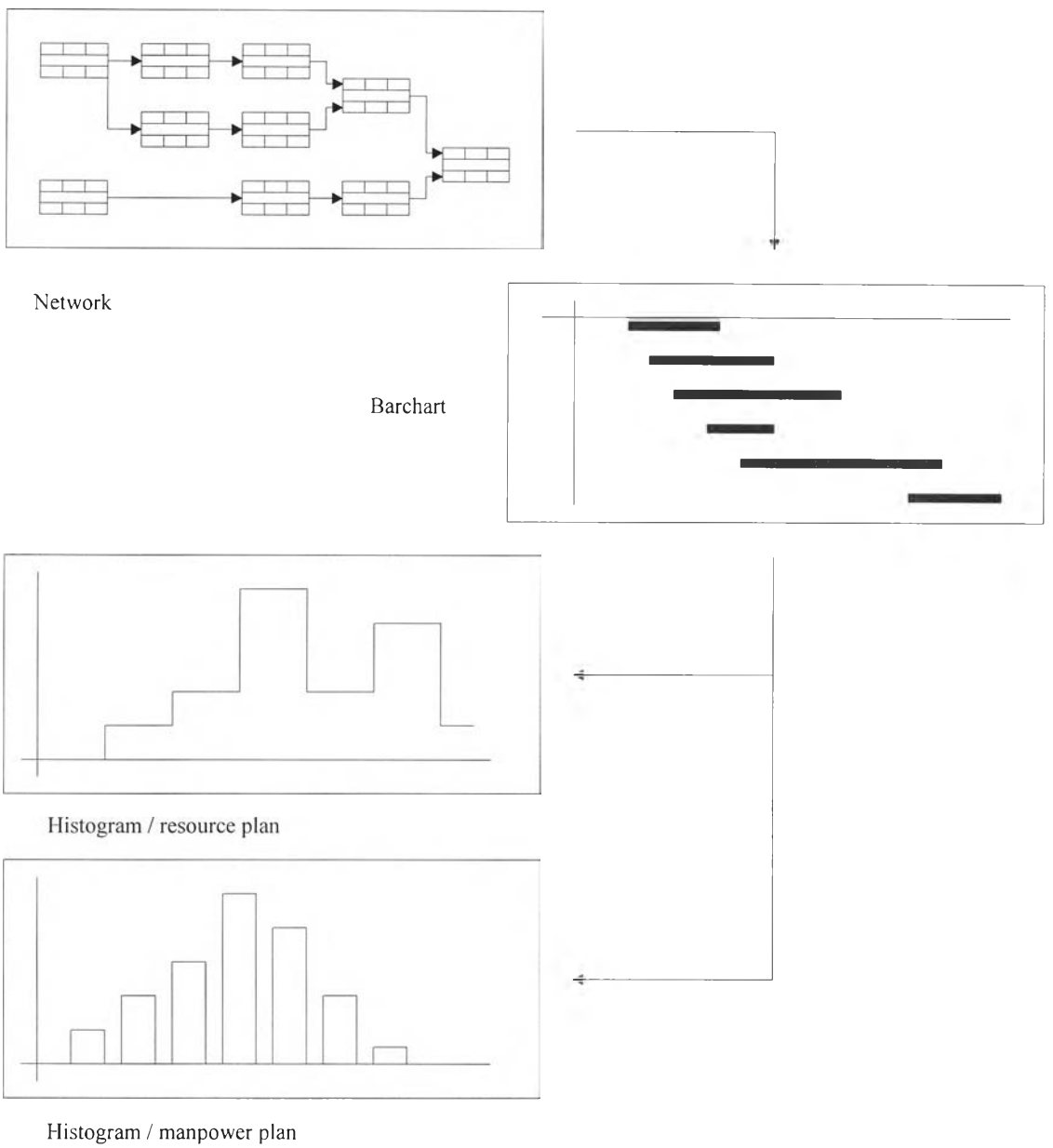


Figure 4-1 : Project planning process

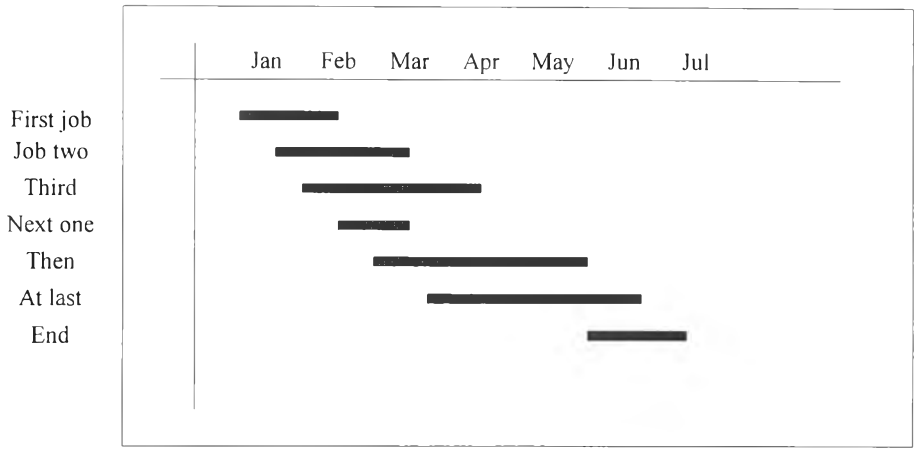


Figure 4-2 : Project plan

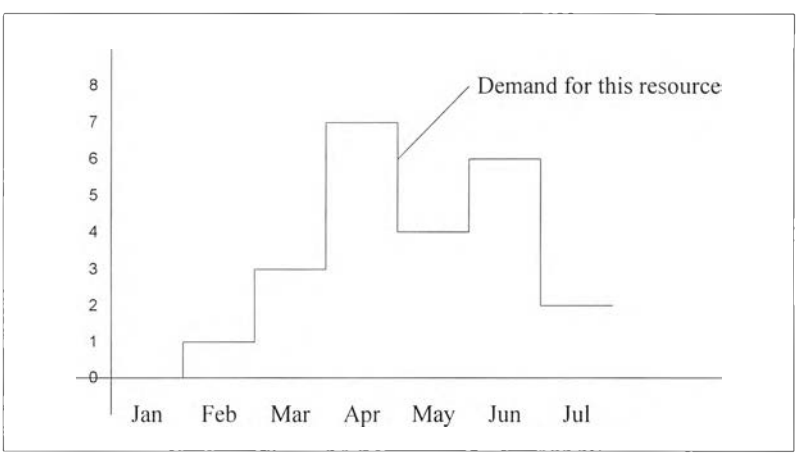


Figure 4-3 : Resource plan

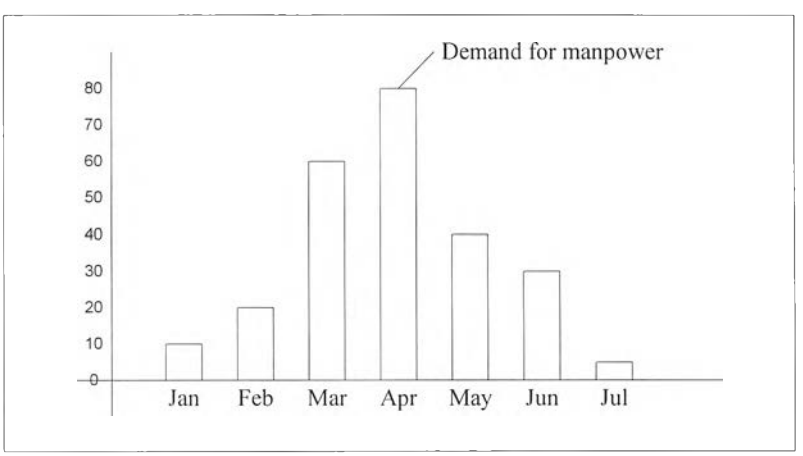


Figure 4-4 : Manpower plan

4.2.2 Delivery management in project work

When site plans on project execution plan, it may use a network or barchart for preparatory work to show the timing, activity time-scales and sequencing of all activities. Consider the stages shown below, which could apply to a purchase order placed with a supplier :

Stage	Activity
1	Design work/Quantity take off
2	Enquiry issue
3	Quotation/supplier evaluation
4	Negotiation/supplier selection
5	Requisition raised
6	Purchase order placed
7	Manufacturing (by supplier)
8	Transport to stores/site

Assume the materials are required on site by week 50. It is necessary to work back from this date to establish planned start and completion dates for each activity. The supplier might have quoted 20 weeks delivery, but this information would normally be given when he submits his quotation. On major project where preparatory work is carefully planned, details are required of the manufacturing lead time for key materials. This information should be obtained.

A further service can be provided by the expediter with knowledge of supplier's previous delivery performance. He can comment on the extent of probable delays against times being quoted. More realistic estimates of material supply time-scales can then be included in plans, which should then be capable of being met.

Gantt charts and networks for resources plan

The use of updated Gantt charts and networks enables the expediter involved in project work to see how material priority sequences are affected. For example, a site activity is delayed and so material required for that activity is not required by the planned date. This delay could affect related items in the plan. If so, they also will not be required by the original planned dates, and progress action on these items can be relaxed and efforts directed more productively elsewhere.

In addition to the above documents being used for site work, they are also used by suppliers for planning manufacture.

Reasons for extended material deliveries

Contractor fail to meet promised delivery dates for many reasons, and staff responsible for progressing orders need to be aware of these. Effort can then be directed to anticipating delivery problems and to taking corrective action. Some of the main reasons for extended deliveries are now outlined.

Unachievable promises

A supplier gives a promised delivery date he knows to be impossible to meet. To win business, he agree to meet a customer's delivery requirement, achievable or otherwise. Subsequently his interest in meeting his obligations is related to the degree of pressure being brought to bear on him to improve delivery.

Choice of supplier

Where choice of an unreliable supplier is outside the buyer's control, the customer or other nominator should be notified of probable extended delivery. A change of supplier might result.

Attractive price

The supplier is known to be unreliable but is selected on price. Tight budget constraints may compel the buyer to give price top priority in supplier selection.

Genuine mistake

A supplier could make a genuine mistake in setting a delivery date from capacity shortfall, an under-estimate of work content or an incorrect assumption of material availability from stock or from his suppliers. A knowledgeable buyer might identify an error on work content assessment and be aware of current or anticipated delivery periods for particular materials. Where he doubts the supplier's ability to meet a specified date and it is not possible to change the supplier, progressing would be given higher priority.

Buyer's undue pressure

The buyer exerts undue pressure on a preferred supplier, requiring him to meet an unachievable delivery date. The supplier considers it prudent not to displease the buyer and so agrees, reluctantly, to meet an impossible date. He hopes there will be slippage in the buyer's program which will accommodate late delivery and is prepared to take this risk.

Delay in placing purchase order

Delay occurs for various reasons, e.g. the authorizing signature cannot be obtained. However, the delivery date originally requested is still demanded by the buyer, under pressure from the requisitioner. The supplier accepts this demand, hoping that extended delivery will ultimately be accommodated.

Quotations converted into purchase orders

Suppliers forecast the percentage of quotations that should be converted into orders. For example, a supplier estimates that, for every 10 quotations submitted, he will win five orders. Results can exceed expectations and he could win too many orders to handle. In this situation he has two options : (1) be selective, decide orders to reject and notify the buyer, and (2) accept all orders and not lose secured business. The sensible supplier would explain his dilemma to the buyer, as specified delivery dates are sometimes adjustable and extensions might be acceptable.

Staff responsible for buying and expediting need to identify at the earliest possible stage if any of the above situations exist. Knowledge of job content and process sequences and times assists in assessing if a given delivery date is realistic. Late release of purchase orders is outside a supplier's control and, where such a situation arises, weight of progress action might need to be increased. Efforts should also be directed to avoiding delayed release of future orders, including the ***education*** of requisitioning and user staff. Buyer and supplier relationships are important and it is not in the best interests of the two parties that the supplier becomes overloaded. The buyer should counsel his key suppliers accordingly. Successful expediting is based on knowledge of suppliers, their capabilities, limitations and probable intentions.

The economics of late and early deliveries

As specify on the above various reasons why delivery dates are no met. Additionally, delays occur through plant breakdown, scrapping of materials and failure of a supplier to meet his promised deliveries. Delays also result from shortcomings in the client's own organization, e.g. delay in release of information, late release of free-issue material (materials supplied by client) or incorrect materials dispatched. Realistic and economically viable delivery dates should be the target at which to aim, as consequential loss can be incurred through late and early deliveries as follows.

Loss resulting from late deliveries

A number of loss-making situations can result from late deliveries of materials, the main ones being :

1. Field work stoppage i.e. materials not available on-site for installation
2. Replanning work, working overtime to minimize the effect of delays to schedule
3. Payment of liquidated damage to the client because of late completion of his order.

Loss incurred in the above situations can be measured directly, financially. In the following cases, it cannot readily be measured :

4. Loss of customer goodwill, which jeopardizes prospects for future business

Delay to material delivery does not always result in a loss as above. Where material is to replenish maximum-minimum stocks, delay could result in stocks falling to a set buffer level, without causing a stock-out. The setting of maximum-minimum stock levels is dependent on many factors, not only estimating of probable fluctuations in delivery periods.

Loss resulting from early deliveries

High loss result from early deliveries and there is increasing pressure on materials control. The main reasons for loss are :

1. Loss of investment earning opportunities through capital being tied up in stock.
2. Deterioration through materials being held in storage for extended periods, particularly items with a limited shelf life.
3. Increased probability of loss or damage related to additional time during which material is held in storage.
4. Double handling is required because storage, handling facilities and manning requirements have not been planned. With large or high-volume items this could be costly.
5. Creation of heavy demand on limited storage space, reducing efficiency, and hence delaying subsequent location and identification of items.
6. Creation of unnecessary hazards through overcrowding stores.
7. Expiry or reduced life of a component's material guarantee. This applies where the supplier's guarantee is effective from date of receipt of materials into stores.

The longer an item is held in stock, the greater is the possibility of misplacement, loss (including theft), damage, deterioration and obsolescence.

Target dates are not always realistically set. They are often subject to frequent revision and hence need to be under constant review, being advanced or retarded as necessary.

During economic recessions, a supplier may win fewer orders and hence have fewer commitments to meet. He will aim to complete orders quickly to obtain payment. The buyer should counter this, stating on his orders ***early delivery will not be accepted***. Consignments delivered too early would be returned, or accepted and payment deferred until the due date, as considered to be appropriate at the time. The expediter's objective should be to achieve delivers on time.

Ideally, the buyer requires all requisitioners to give realistic delivery target dates. Frequently, they do not because of bad planning, work overload or an unawareness of what are realistic dates. In the latter case, this occurs through poor communications from purchasing to requisitioning staff, i.e. a failure to inform on updates of manufacturing lead time. So, many examples of late deliveries of materials occur, incurring heavy loss, and yet inventories are excessively high against budgets.

Financial accounts and expediting staff need to be aware of this aspect when a supplier defaults on delivery.

4.3 Stores Management

One reason the need for Stores Management is, frequently, quantities of an item are bought which cannot be put into immediate use or processing (installation), e.g. bulk buying for discounts, economic manufacturing quantities and economic transport loads. Stores is also the repository for items returned to stock or held in safe custody, e.g. tooling and defective or surplus material awaiting return to suppliers or disposal action.

One of the particular responsibilities of Stores Management is to minimize differences between recorded and actual stock. They must also ensure that materials are available for issue against authorized demand in good condition within the times specified against the required degree of notice. However, issuing procedures must be flexible to cater for genuine emergency situations that arise.

4.3.1 Stores function

The total store function, including physical storekeeping and inventory control, may be illustrated as shown in figure

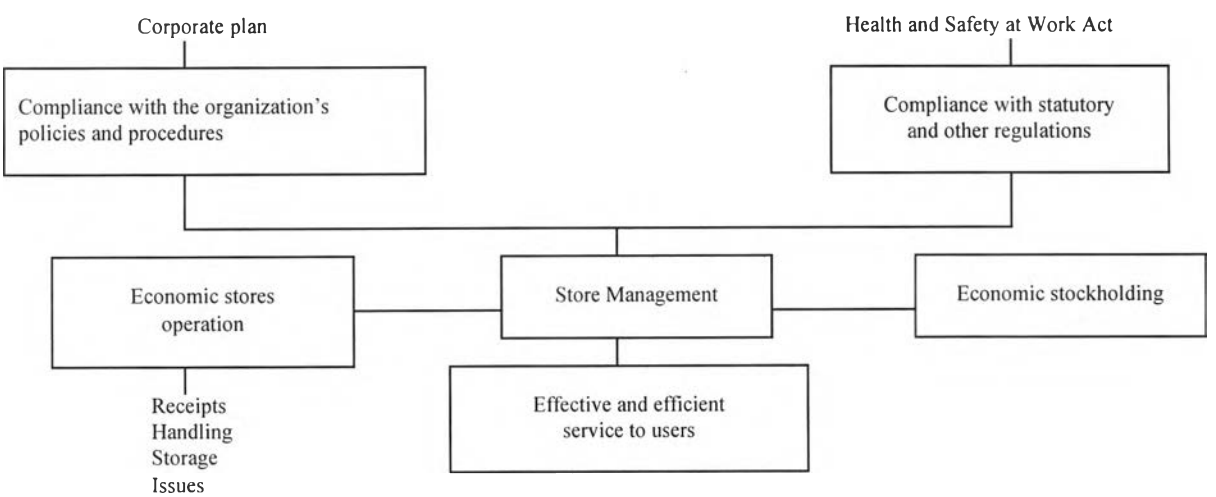


Figure 4-5 : Stores function

4.3.2 Types of stores

There are many different types of stores for site operation, the main ones in general use being as follows.

Main Materials stores

These stock main materials held in safe custody items awaiting installation or putting into use.

Tools stores

These stock tools, equipment and consumable materials required to support installation.

Special stores

These stock a wide range of materials which by their nature might require segregation or to be located apart from other main materials. Such materials include solvents, petroleum, radioactive materials and, in special cases, explosives. Applicable safety regulations must be strictly observed.

4.3.3 Categories of materials

Materials may be classified in a number of ways relating to their nature or end use.

Installation materials

These items include the diverse range of materials required in the installation work. Such materials are generally bought-out against capital accounts and held in safe custody in stores until required for use.

Client materials (free-issue materials)

These items supplied by client are received and placed in stores in safe custody awaiting the field issuing.

Scrap and redundant materials

There is generally a range of scrap and redundant materials awaiting disposal. Stores would normally be responsible for storage pending completion of disposal action.

4.3.4 Material coding

A good coding system must be capable of being understood and applied by all staff required to use it, down to the lowest clerical grades. There should be no possibilities of misinterpretation or duplication. Each item must be specifically identified with its own unique code reference. All codes within the system would comprise the same number of symbols.

Range of coding systems

A very wide range of items held in stock are broken down into distinct separate family groupings, with further division into subgroups. Each item will bear its own individual classification, which could include type, shape, size and dimension. Units of quantity, the inadequacy of which is the source of many problems in stores, and accounting reference can also be included.

Types of codes

These are three types in general use, which are alphabetical, alphanumerical and numerical. The latter coding is the most flexible of the three, being ideally suitable to computer application.

Coding classification

The main classifications could distinguish by nature of item as various type of main materials for installation (e.g. cable tray/ladder, cable, steel etc.), type of consumable materials, tools and equipments. For example, using the numerical code :

01	Cable	05	Tools
02	Cable tray	06	Consumable and Accessories
03	Steel	07	
04	Lighting fixtures	08	

The above main classifications can be divided into sub-categories. Take code 03 for **Steel** as an example. The first subdivision could relate to shape :

03.01	Square bar
03.02	Round bar
03.03	Flat bar
03.04	Sheet

Further subdivisions would identify specific qualities, sizes and finish. Taking **Round bar steel** as an example :

03.02.01 Steel, Round bar, 12 mm. square, Hot dip galvanize

Advantages of a good coding system

A good coding system provides many benefits, which will assist all staff, e.g. materials controller, requisitioners, users and accounts. These benefits are as follows.

Identification of item

A good coding system facilitates easier physical identification of items in stock. Lengthy, descriptive titles are avoided as they do not always readily assist in identification, particularly on slower-moving items.

Recording

This is simplified for both mechanical or computerized applications.

Centralized control

A good coding system ensures efficient interfacing communication between all purchasing, storage and user units.

Standardization and variety reduction

Such policies would be difficult to pursue without a good coding system that facilitates ready identification of item with possible common application.

4.3.5 Security

Need for secures stores

Efforts made by inventory control and physical storekeeping staff to provide an efficient, economical and effective service to users is nullified unless such efforts are supported by adequate security. Without such security, items may not be available for issue against demand. Secondly, cost of replacement and rectification could be high. The main aims of security of stores are:

1. Avoidance of loss, particularly through theft
2. Avoidance of damage
3. Avoidance of deterioration

Internal stores security

This aspect covers both physical procedures and systems/documentation. Access to stores must be strictly controlled. Very high-value attractive items should be stored within secure internal compounds, cabinets or safes, depending on their nature. The number of key-holders must be strictly limited.

Storage conditions

Different types of items require different storage conditions. For example, instrument should be stored in dry conditions to avoid ingress of moisture. This may be achieved by the use of sachets of silica gel crystals. Timber needs to be stored and supported in such a way to allow the free of air to prevent warping and cracking. Temperature control may be required.

Security checks

Administrative security is an important element within total security. This includes random checking of stocks. Frequent but random spot-checking also assists in minimizing discrepancies and giving earlier warnings to facilitate investigation. Weaknesses in systems are then identified and security procedures strengthed.

Security of attractive items

The incidence of theft will be highest for high-value items and lower-value items in general domestic use. Copper valves, fittings and pipes may be of a type not readily usable in the home, but could command good prices in the market. Items such as gloves, light bulbs, torch batteries and the wide range of bolts, screws, nuts and washers have several use. These are attractive items. Where items are issued from stores on a one-for-one basis (i.e. a new item supplied against the returned of a faulty or worn one), it may be necessary to destroy or effectively dispose of the returned item. Failure to do this could result in the old item being again handed in to stores in exchange for a new one, with the cycle being repeated. Where a usage rate is, exceptionally high, special measures may be required, as there could be collusion between stores and user staff.

A good way to deal with low-value but attractive items is to identify them, record details of usage and take preventive measures to avoid theft. Theft can be prevented in a number of ways, e.g. increasing security or reducing the attractiveness of an item (for example, by replace with a costlier non-standard items)

Managerial responsibilities

Effective security is not achieved unless the store effectively plans, organizes, delegated authority, motivates staff and introduces effective means of controlling and measuring. Regular audits are required to ensure full compliance with security policies and procedures. Good communication with all interfacing functions is essential, as they too must support such policies and procedures. Key points for consideration and implementation are :

- Issue of stores security policies and procedures
- Selection of staff
- Delegation of work
- Training of staff
- Use of appropriate methods and procedures
- Application on effective controls

4.3.6 Surplus, scrap and redundant stock

Responsibility for disposals of surplus, scrap and redundant materials does not generally lie with stores. However, stores will be responsible for holding and safeguarding much of the material awaiting disposal. This material has to be adequately labeled or marked and segregated from usable stock. Where special disposal procedures apply, these must be adhered to, including necessary highlighting of hazardous materials and instructions on their handling.

4.3.7 Relationships with other functions

The purchasing and stores functions provide the essential links between suppliers and users. Stores has a dynamic role to play. It needs constantly to be in close communication with purchasing and users to ensure that it anticipates problems rather than just reacting to them. There are many points for consideration which come within the responsibility of physical storekeeping such as storage conditions, accessibility, item deterioration and protection. Where special loads are scheduled for delivery, there might be need to consult with users on cranege, handling and storage requirements. Stores may hold tools and equipment in safe custody on behalf of users.

4.3.8 Stores efficiency

Stores efficiency can be measured in a number of ways in conjunction with inventory control (and purchasing) such as :

- Percentage of issue requisitions honoured
- Level of field work delays resulting from non-availability of material

4.4 Legal aspects relating to site resources

Contractual clauses relating to material quality and specification, delivery, and price as the clients generally specifies in contract agreement include the following :

(quality and specification)

Contractual clauses relating to quality and specification include the following

- *Approval of sub-suppliers / placing of major sub-orders*

This enables necessary contractor appraisal to be carried out down the supply chain. An appropriate clause would require the contractor to submit his list of intended sub-suppliers for approval and copies of major orders placed for information.

- *Approval of design and drawings*

This gives scope to find discrepancies between the two at the earliest stage. An appropriate clause would require the contractor, on finding discrepancies, to refer immediately to the client before proceeding with that portion of the work.

- *Submission of samples*

Where applicable, samples are to be submitted for approval before allowing the contractor to proceed further with the order.

- *Inspection / test procedures*

The nature, timing and documentation requirements are to be defined to ensure both parties operate to one fully comprehensive procedure.

- *Rejection of substandard material*

The appropriate clause gives the client the right to reject, by reference to the applicable standard against which decisions will be made. It will include material returned for rectification or replacement, or rectification work to be undertaken by the client at the contractor's expense.

- *Material guarantees*

Materials or components can fail for various reasons within the prescribed 6, 12, 18 or 24 months' guarantee period through :

- Fair wear and tear (useful life expired)
- Design fault

- Substandard material
- Faulty assembly (in the case of a component)
- Incorrect application
- Abuse or misuse
- Failure of a subcontracted part (component)

Many aspects are covered by material guarantees. Normally a supplier states that his material is guaranteed for 12 months (or lesser or greater period) against failure under fair wear and tear conditions. What are the main limitations to guarantee cover which some suppliers apply ? Buyers need to aware of these when negotiating this clause for inclusion in a contract. The main points for consideration are :

- Timing of the guarantee, i.e. does it operate from date of receipt, putting into use or processing ? For example, a component may be in storage for 12 months before issue. It's period of guarantee may then have expired.
- Replacement or rectification, i.e. some suppliers state that they ***reserve the right to rectify or replace defective material***. Rectification of substandard materials may not be acceptable to the buyer and an appropriate clause should specify this.

- *Visits for inspection/test*

These may be essential to ensure that manufacture or assembly proceeds correctly and hence minimizes the probability of defects arising later. This requires that the purchaser, giving reasonable notice, should be given right of inspection or to witness tests. The clause should clearly state, however, that final responsibility and liability for meeting specified requirements still rests with the supplier.

- *Material assurance and test certificates*

These are of particular importance where such certification is required. Where material source documentation is an essential requirement , this should be clearly stated.

(delivery)

Contractual clauses relating to delivery include the following

- *Liquidated damages*

The client could incur consequential loss through production delays if material deliveries are extended. These clauses normally require defaulting contractors to make sliding-scale payments for each day, week or month (as specified) of delay. Liquidated damages are defined as a realistic pre-estimated cost of consequential loss which would stem from extended delivery, but they are now normally expressed as a percentage of the contract price for each day, week or month of delay (both the percentage and the period being specified).

- *Force majeure*

Extended deliveries result from many causes, which are not always within a contractor's reasonable control. Consider the following :

- Inadequate control by contractor (e.g. bad planning or late release of sub-orders)
- Client's deficiencies (e.g. late release of information or *client supply* material)
- Failure of the contractor's sub-supplier(s) to deliver to time
- Failure of other third parties
- Industrial, political and other factors (e.g. war) which are outside the control of the two contracting parties
- Act of God such as storms

When liquidated damages are being applied, a satisfactory, complementary ***force majeure*** clause must also be negotiated. Failure to do this could negate a valid claim for liquidated damages. Contractors should be denied scope to avoid meeting their commitments. They must accept liability for extended deliveries which result through failure to exercise reasonable control over a contract.

- *Approval of sub-suppliers*

This requires the contractor to submit the name of his proposed major sub-suppliers for approval before releasing his orders. The use of capable sub-suppliers greatly assists in achieving deliveries on time.

- *Copies of major sub-orders placed*

This requires the contractor to provide copies of major sub-orders placed. The client thus has information of what sub-orders have been placed, with whom, when and on what basis.

- *Submission of progress reports*

The submission of regular updated progress reports also assists the achievement of improved deliveries. Some problems that arise are disclosed before they become critical, giving more scope to take corrective action.

(Price)

Contractual clauses relating to price include the following

- *Price fixed for duration*

Where this has been negotiated, the price is fixed for the duration of the contract and is not subject to increase unless the client amends order requirements which incur additional cost.

- *Variations to contract*

This is required to deal with price increases or decreases that result from agreed variations requested by the client. Such variations include specification, quality, method and timing of delivery, client supply materials, tooling or storage requirements.

- *Currency*

Applicable when payment in a foreign currency has been negotiated for the contract. The basis for calculation must be stated to cater for possible fluctuating rates of exchange, where this is not fixed.

Client supply (free issue) material

The client sometimes provides materials. The client could have surplus material available for use on the contract. Sometimes he can obtain the materials at better prices and on shorter delivery times than can the contractor.

The clause would state that material so provided is to remain the client's property while off his premises. The contractor is to undertake to safeguard the material and not to make it available for use by third parties. Ownership of any scrap produced is to be stated. If the contractor finds, on receipt, that material does not correspond with

specification, he is required to contact the client promptly for instructions to work or return for replacement. Material is to be adequately insured while it is off the client's premises. Normally, the client covers this requirement within his overall insurance policy. Liability for cost resulting from spoilage by the contractor needs to be stated. Subsequent spoilage by the contractor might reduce the value of material to scrap value or incur costly corrective work and consequential loss through delay.

Where material is to be supplied by the client for the contract, the following safeguards are to apply :

- *Ownership*

The items are to remain the property of the client and the contractor must adequately protect them at all times and allow access for inspection (with reasonable notice) to him.

- *Insurance*

Normally the client will have taken out an insurance policy, which should provide cover for all his materials wherever they may be located. However, the contractor needs to establish that contracts which include "client supply" items are adequately covered by his organization's insurance policy. Where liability for such insurance cover is to be placed with the contractor, this is to be stated in the contract, with the amount of cover required. The insurance covers loss, deterioration and damage not resulting from normal fair wear and tear usage.

- *Use for or by third parties*

The client's materials are not to be used for or by third parties without the client's prior approval.

- *Refurbishment and replacement*

Liability for maintaining the items in a satisfactory usable condition needs to be established for the contract, including cost liability for refurbishment or replacement.

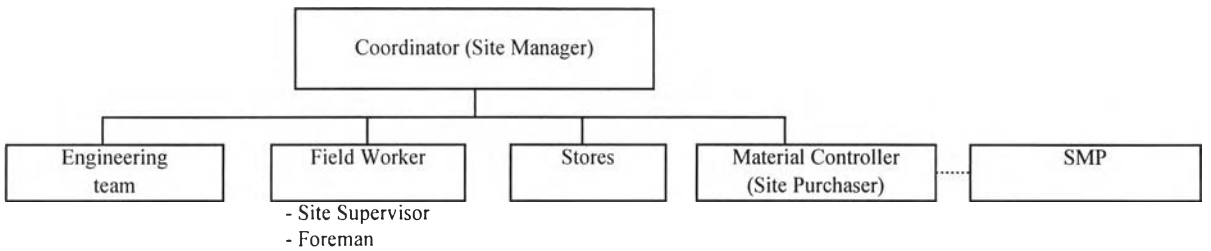
Contractual commitments to customers/clients

When an organization undertakes a customer contract, purchasing needs to be aware of the contractual obligations to that customer. The contractor can then ensure that similar obligations are passed down the supply chain. For example, it has been agreed to pay liquidated damages to a customer of 1 percent of the total contract price for each week of delay. The contractor, therefore, may wish to negotiate a liquidated damages clause with the main suppliers. Where there is a commitment to give a customer a 12 months materials guarantee, major suppliers should be asked to give a similar guarantee for the materials they are providing.

Purchasing must therefore work closely with the customer contracts function from an early stage and be mindful of what clauses have to be included in enquiry and tender documentation being prepared for issue to suppliers.

4.5 Site organizing for site resource management

The general organization which concerns with the site resource management is shown as follows :



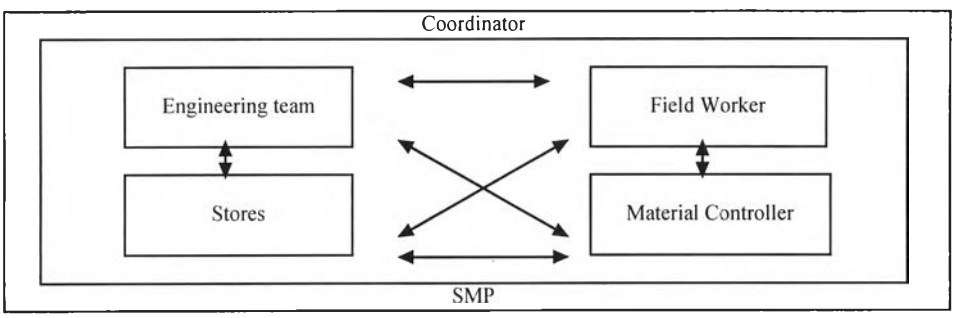


Figure 4-6 : Site organizing for site resource management

Responsibility of Engineering team

- takes off, specifies technical requirement of materials, tools/equipments for installation work and requests Materials Controller to order
- checks scope of supply or installation, compares with the Breakdown of Quantity (BOQ) as specified in contract, and comments on scope of work (supply), budget cost, quantity and technical requirement
- inspects the received materials, tools/equipments on-site

Responsibility of Field Worker

- prepares plan of materials/tools use by their work experience, combines with the master project schedule planning and clarifies with relevant working details, and requests Material Controller to order
- re-checks available stock of materials/tools in store and comments on reordering

Responsibility of Material Controller

- receives the order requisition, prepares Material Plan and decides in arrangement
  - forwards to SMP for arrangement
  - contact directly to supplier and handle on purchasing process in case of Site need to direct purchase order
- processes on invoice supplier clearing for payment

Responsibility of Stores

- performs store activities : stocks recording and updating, controlling on any transaction ; ordering or reordering, receiving , issuing, returning, balancing, reporting.
- performs the maintenance or repairing work for the defective tools/equipments

Responsibility of Coordinator (Site Manager)

- coordinates all site functions and controls their operation
- coordinates with SMP and various sites for resource sharing
- considers on supplier's proposal, price and budget comparing, or other conditions, then approve on purchasing

4.6 Procedure development

4.6.1 Concept of procedure development

This part is to develop procedures, the exact methods to be used by all personnel in site resource management in order to accomplish certain operations. A procedure is a guide to action, an established sequence of required actions. The best way to obtain the good control and ensure efficiency in routine activities and operations is to define required actions thoroughly.

The usual procedure in preparing a manual is to determine what is being done and then to describe each operation in writing. After existing procedures are analyzed critically, we try to put down in writing what we would like to have done, as regards both policies and procedures. Existing procedures are then modified to fit these goals and drafts are submitted to all interested department heads for approval.

Manuals for materials policies and procedures promote good interdepartmental relations, make supervision easier, encourage standard practices, improve procedures, and aid in training.

Clarify interdepartmental relations

Departmental responsibilities overlap. Each department must work with the others if the overall job is to be done. Written policies and procedures define interdepartmental relationships. Thus they prevent many unnecessary jurisdictional disputes and also can prevent duplication of effort.

Make supervision easier

With written policies and procedures, a supervisor need not develop original solutions to routine problems. Nor need we even explain routine procedures to the subordinates (although we may wish to do so to make certain they understand them.) The answers are in the manual. In most cases, the manual need not be referred to because workforces already know what is in it. But were there no manual as a basic record, workforces would gradually forget certain details of little used procedures, and the load on supervisors would be correspondingly greater.

Develop standard practices

Without written policies and procedures, each supervisor would devise his own procedures to fit the superior's not-always-consistent instructions. As a result, eventually the same job would be performed in many different ways. Operations would be less efficient, communication slower, and supervision poorer. With written policies and procedures (called ***standard practices***, because that is what they are designed to promote), supervisors still deviate from routing when necessary, but they have basic guides to make them aware that they are deviating. These in themselves tend to prevent unnecessary changes in routine.

Improve procedures

When a manual is prepared, procedures are subjected to closer scrutiny than they may have received before. Improvements are almost inevitable. Unnecessary paperwork can be eliminated, and righted controls can be instituted if necessary. Periodic review and revision of the manual can prevent sloppy practices from creeping back into the system.

Aid in training

Although new workforces are often lazy readers and prefer to get their training to watching and talking with fellow workforces, the manual is helpful for reference. It is also useful to workforces in other departments.

4.6.2 Documentation

Successful execution of procedures can be dependent on there being a clearly stated policy relating to documentation procedures.

Documentation requirements

These are to be clearly specified, including such details as format, size, type of paper and references. This caters for identifying, handling, filing and reproducing.

Routing or distribution

The numbers of copies of required documents to be stated and their distribution e.g., one copy of Material Requisition to the supplier with other copies to SMP as appropriate.

4.6.3 Procedure Development

Procedures that are developed for site resource management in the scope of this thesis list as below :

- *Procedure of Materials/Equipments Purchasing* (detail refers appendix B-1)
- *Procedure of Materials Ordered by Project (Site)* (detail refers appendix B-2)
- *Procedure of Materials Handling at Central Warehouse*
  (detail refers appendix B-3)
- *Tools/Equipments Handling and Renting System/ Site Operation Procedure*
  (detail refers appendix B-4)
- *Procedure of Materials Receiving, Issuing, and Returning*
  (detail refers appendix B-5)

Procedure of Materials/Equipments Purchasing

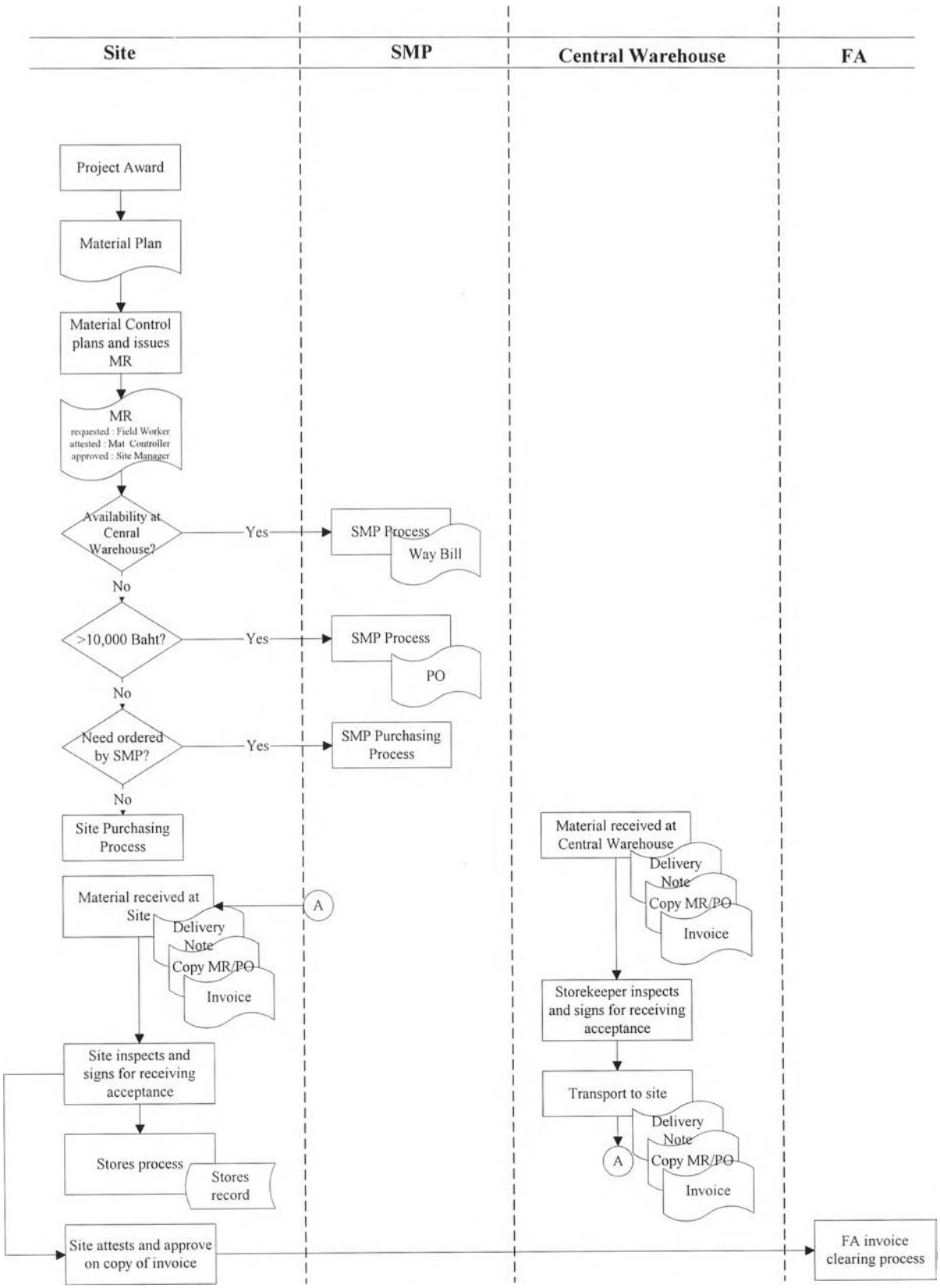


Figure 4-7 : Materials/Equipments Purchasing Flowchart

Procedure of Material Ordered by Project (Site)

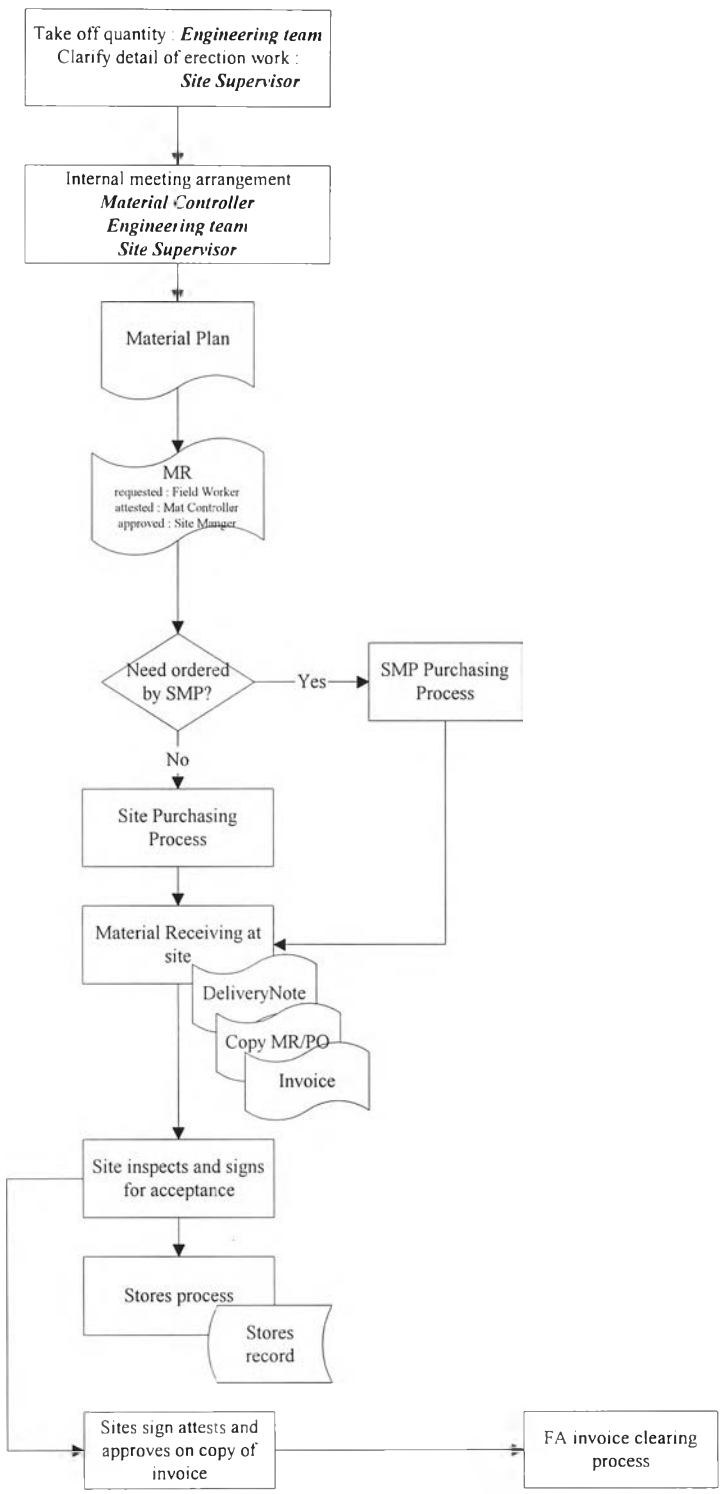


Figure 4-8 : Material Ordered by Project (Site) Flowchart

Procedure of Material Handling at Central Warehouse

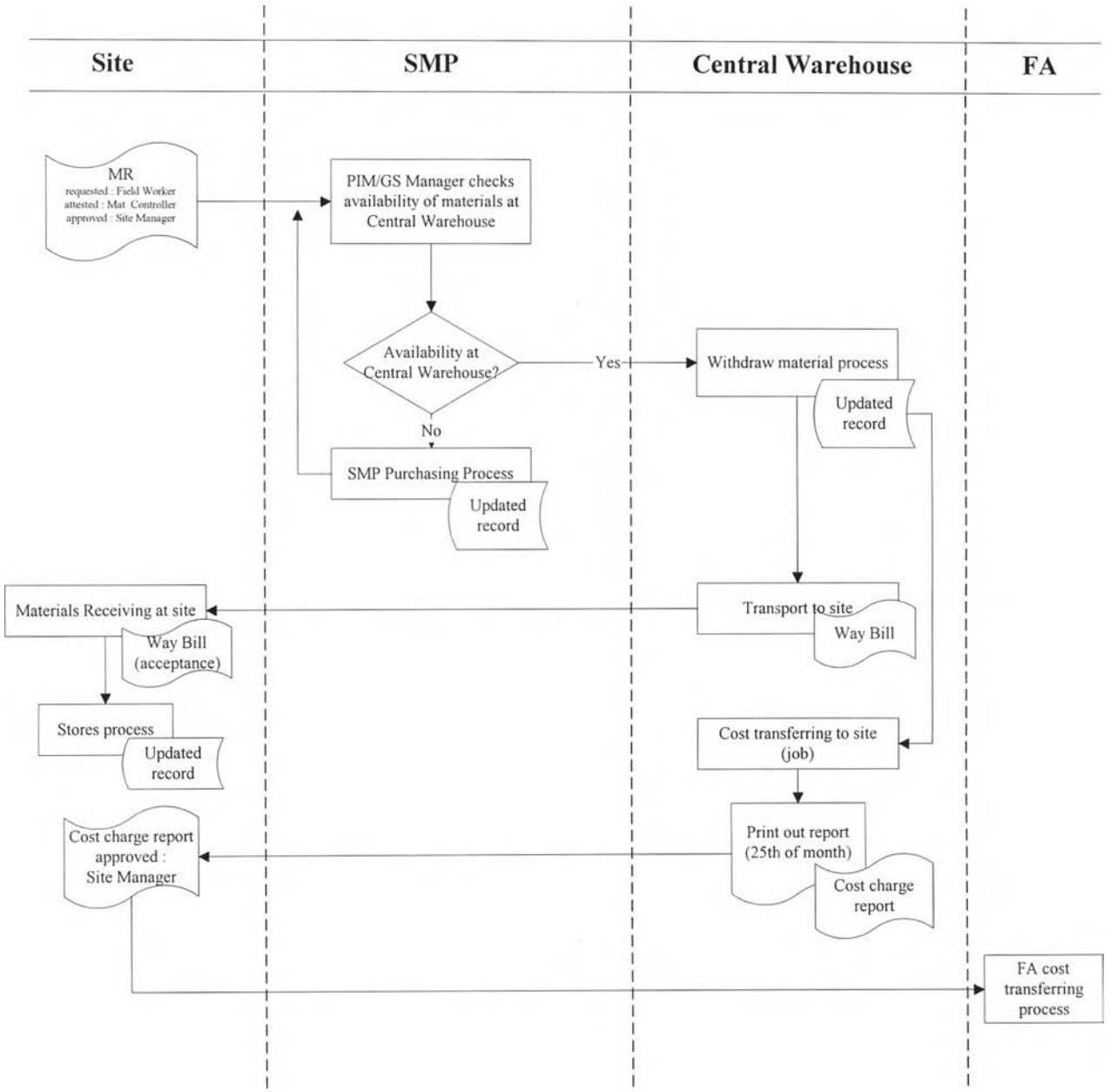


Figure 4-9 : Material Handling at Central Warehouse Flowchart

Tools/Equipments Handling and Renting System

Site Operation Procedure

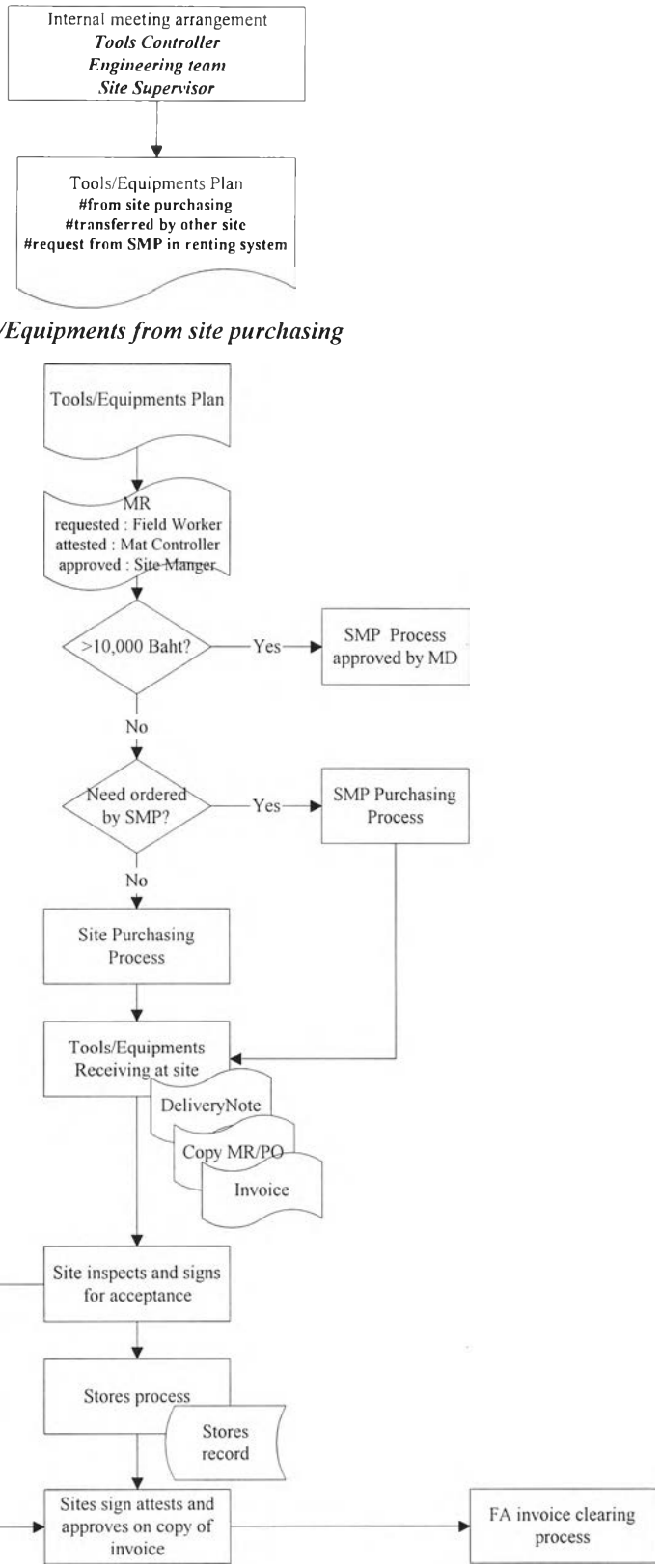


Figure 4-10 : Tools/Equipments Handling and Renting System / Site Operation Flowchart (I)

Tools/Equipments transferred by other sites

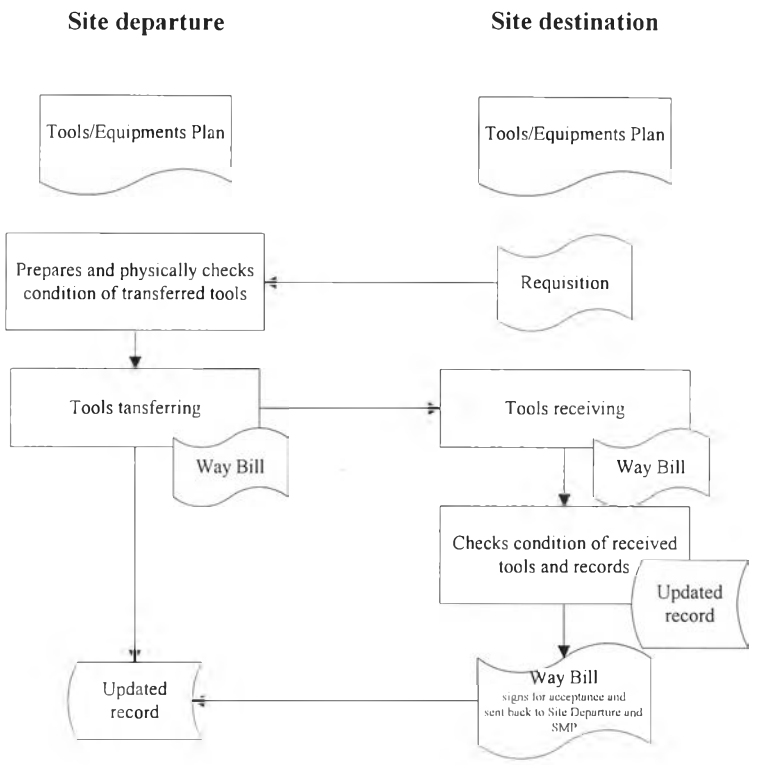


Figure 4-11 : Tools/Equipment Handling and Renting System/ Site Operation Flowchart (II)

Tools/Equipments request from SMP in the renting system

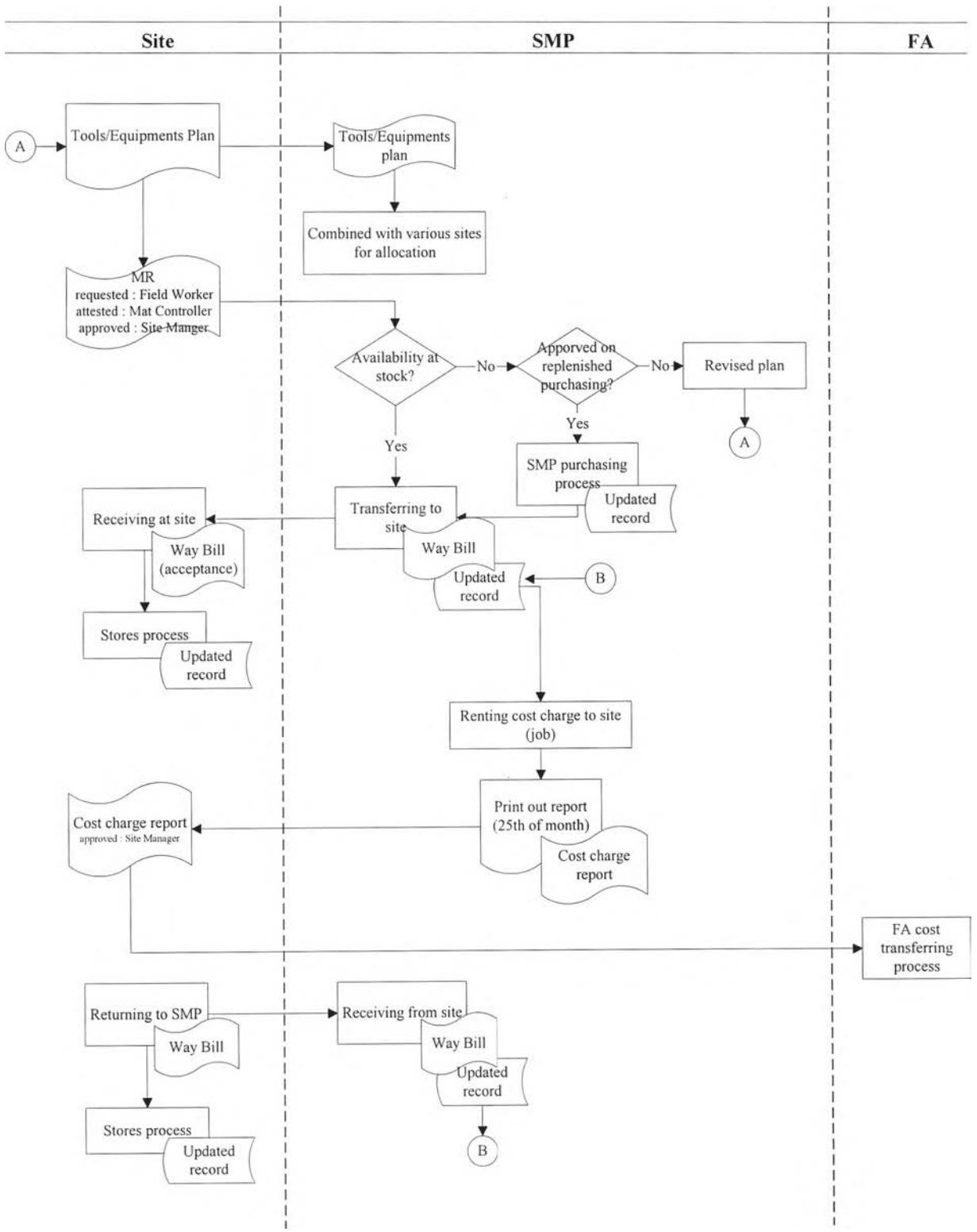


Figure 4-12 : Tools/Equipments Handling and Renting System/ Site Operation Flowchart (III)

Procedure of Materials Receiving, Issuing and Returning

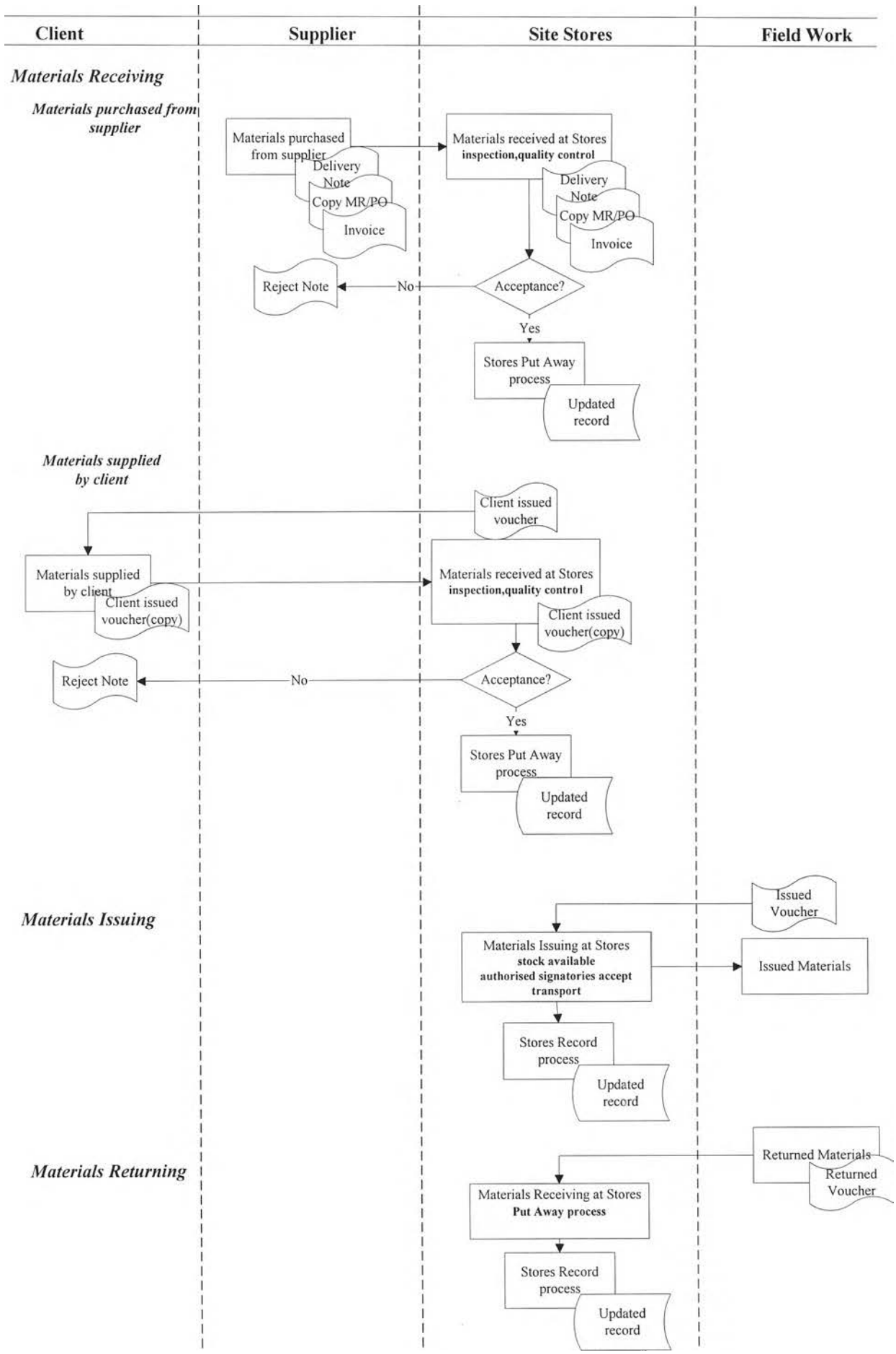


Figure 4-13 : Materials Receiving, Issuing, and Returning Flowchart