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## **Materials Management**

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### **Introduction**

No construction project can proceed satisfactorily without a supply of materials. With medium or large contractors the purchasing of materials is usually handled by head office staff. However, the site manager could be given this responsibility on smaller contracts. Considerations in relation to materials management include :

- quality control
- scheduling
- ordering
- handling and storage
- waste control
- security

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### **Quality control**

Prior to the start of work on site, the Architect or Engineer may require samples of materials to be provided for their approval. It is the contractors' responsibility to ensure that the materials used for the works comply with these approved samples.

Even if samples are not used, the contractor must still use materials and components which comply with the requirements of the contract documents, i.e. the Bill of Quantities, contract drawings and specification.

It is important, therefore, that the contractor has some means of checking the quality of the materials and components which are delivered to the site. These should include :

- When materials are delivered to the site, they should be checked, ideally before unloading. This is to ensure that the type and quality are :
  - (a) as detailed on the contractors order
  - (b) as specified in the contract documents

In addition, any damage caused during transportation must be checked.

- Unsatisfactory materials and components should be rejected immediately and returned to the supplier.
- Testing of some materials, on site, is often called for in the contract documents. For example, aggregates, concrete, bricks and timber.
- If the material test results show them to be substandard they should be rejected immediately.

If these procedures are not followed and subsequently the Clerk of Works, Resident Engineer or Architect see that the materials do not comply with the contract requirements, s/he can reject the materials, even if they are built into the works.

This will obviously lead to costs being incurred by the contractor, both in terms of additional costs and wasted time.

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## **Ordering of materials**

The procurement of materials begins at the estimating and tender stage. Quantities are extracted from the Bill of Quantities and / or drawings and prices are obtained from suppliers. In this way the builder's estimator will work up the costs to be inserted in the tender documents. These quotations from suppliers must be realistic and competitive in order to win the contract.

Once the contract has been won, it is important that the information extracted from the specification in relation to the type and quality of materials and components is checked very carefully. It is equally important to check the extraction of quantities from the BOQ / drawings and to make realistic allowances for wastage of materials.

Once this has been done the purchase orders can be completed. Most building companies will be working on more than one contract at any particular time and, in all but the smallest company, there will be a buyer who is responsible for co-ordinating the purchase of materials for the various contracts.

Even if individual site agents have been given the responsibility for scheduling and ordering materials, it is advisable that they consult with the buyer to get advice on suppliers. In this way, the company will be able to obtain the best prices from suppliers because co-ordinating the requirements of several contracts will mean bulk purchases can be made.

There are three basic elements involved in purchasing materials and components:

1. **Quality** - even though the specification can be quite detailed, a good buyer will be able to obtain the cheapest price across a range of products of equal quality.
2. **Price** - prices from suppliers vary from time to time depending on the current demand for their products.
3. **Availability** - even though materials of the required quality may be quoted at a good price the delivery time may be too long to be acceptable to achieve the planned programme of work.

When the site agent has the responsibility for ordering materials, s/he can simply call up materials, as necessary, which have been ordered in bulk by the buying office. It is the site managers responsibility to ensure that :

- enough materials are kept on site to supply operational needs enough storage space is available to accommodate these materials
- materials are not called up too soon, as the longer they are stored on site the more likely they are to get stolen or damaged

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## **Handling and Storage of materials**

Careless off-loading of materials, when they arrive on site, can cause waste. Equally important is having the correct plant available for handling materials if damage and wastage of time is to be avoided.

For example, nowadays most bricks and blocks are delivered on pallets. If the delivery lorry does not have its own lifting arm to off-load the pallets then a forklift truck should be available on site. If there is no forklift then the bricks may have to be off-loaded by hand which is much slower and wastes time.

Ideally, when a component or material is delivered to site it should be off-loaded directly to its point of use in order to minimise handling. This is often not possible and the materials are off-loaded to a suitable storage area until they are required.

The storage of materials and components is as important as their handling.

Problems include :

- Incorrectly stacked materials and components may become damaged  
E.g. Materials stacked to high - lowest layer gets crushed
- Materials and components stored in an unsuitable environment may deteriorate or become contaminated E.g. Damp surroundings can cause cement to harden and become unusable
- Materials and components kept in an unsecure area may be pilfered, stolen or vandalised . E.g. Small items such as electrical goods get pilfered.

As can be seen from the above, the correct storage and handling of materials is important to minimise waste, reduce pilfering and theft, and prevent vandalism.

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## **Waste control**

Approximately 35 to 45% of the cost of construction work is spent on materials. It is , therefore, important that they are used efficiently. Two common causes of waste include excess materials being left unused and damaged materials being unusable.

In order to control waste on site it is important that supervisors are suitable trained and are vigilant at all times. In addition, the site operatives should be trained in the correct handling, storage and use of materials.

It is important that trades operatives not only understand these requirements in relation to their own work but also of all the other trades who work alongside them.

Construction companies who are able to reduce site wastage by being well organised and providing adequate and appropriate training and supervision can produce more competitive tenders and thus win more contracts.

## **Loss prevention**

Theft and vandalism cause problems on many building sites. The losses incurred must be added to the value of materials when allowing for waste. It is important that systems of materials control are set up on sites to keep track of wastage rates as the job proceeds.

In addition, small hand tools, and even large items of plant, are also stolen and their loss causes delays to production and an increase in insurance costs.

It is difficult to define a set of rules which would prevent problems of theft and vandalism as sites vary so much in size and location. The problems involved differ widely and loss prevention measures take a variety of forms including :

➤ **Checking deliveries**

Suppliers, or their drivers, do not always deliver the specified quantity as given on the delivery note. It is, therefore, very important that materials are checked thoroughly when they arrive on site.

➤ **Prevention of pilfering**

Site operatives, administration staff and subcontractors remove items from the site or office. The company must have a loss prevention programme which makes it clear to all employees and subcontractors that such behaviour is not acceptable and that removal of any items will be treated as theft.

➤ **Control of vandalism**

Measures must be taken to control vandalism of plant and materials. Vandalism is not only caused by children and adolescents but can also be performed by organisations or individuals who object to a particular project being built.

➤ **Vigilance against theft**

This often takes place where amateur thieves see an opportunity present itself to them. Site operatives and staff must always be vigilant in relation to this.

➤ **Crime prevention**

Professional criminals remove items from building site. This is more difficult to prevent as determined criminals will go to great lengths to steal materials and plant.

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## **Security**

Some form of security system will be required on most building sites these include :

➤ **Perimeter fencing**

This is usually chain link fencing or close boarded hoardings. The gates and locks provided should be suited to the general type of fencing used.

➤ **Fenced compounds**

These are smaller fenced areas located within the general site boundary. They are used to protect valuable plant, materials and components.

➤ **Locked storage huts**

These are buildings, usually placed within a fenced compound, which should have a robust construction and suitable locks on doors and windows (if any). They are used for storing smaller valuable items.

➤ **Locked cabinets**

Locked cabinets, usually metal, can be located in various places within the site accommodation. They can be used for storage of small valuable items.

➤ **Safes**

Any money which is kept on site should be stored in a safe within a locked site office.

➤ **Security guards**

The use of security guards is another option which will usually act as a deterrent to opportunistic thieves and vandals but will not necessarily deter professional criminals.

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## Assessment

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**Questions 1 to 5 - Select the correct response for the following questions :**

1. Which of the following does **not** relate to materials management?
  - A quality control
  - B ordering
  - C handling and storage
  - D time keeping
  
2. When does the process of procurement of materials begin?
  - A the contractor always has a stock of materials
  - B at the estimating and tender stage
  - C after the contractor has won a contract but before start on site
  - D when the contractor has started on site
  
3. Which of the following is **not** one of the three basic elements involved in purchasing materials and components ?
  - A the quality
  - B the price
  - C the country of origin
  - D the availability
  
4. What percentage of a typical construction project is spent on materials?
  - A 15 to 25%
  - B 25 to 35%
  - C 35 to 45%
  - D 45 to 55%
  
5. Which of the following is **not** part of loss prevention?
  - A keeping the site tidy
  - B checking deliveries
  - C prevention of pilfering
  - D control of vandalism

**Questions 6 to 10 - Decide whether each statement is True (T) or False (F).**

6. i) When materials are delivered to the site, they should be checked, ideally before unloading.  
ii) Unsatisfactory materials and components should be rejected immediately and returned to the supplier.

Which option best describes the two statements?

- A i) T      ii) T  
B i) T      ii) F  
C ii) F      ii) T  
D ii) F      ii) F

7. i) If materials do not comply with the contract requirements, the Clerk of Works, Architect or Resident Engineer can reject them, even if they have been built into the works.  
ii) When estimating the quantities of materials required for a job, wastage does not need to be considered.

Which option best describes the two statements?

- A i) T      ii) T  
B i) T      ii) F  
C i) F      ii) T  
D i) F      ii) F

8. i) Professional criminals do not steal from building sites.  
ii) Materials should not be brought on to site too soon, as the longer they are stored on site the more likely they are to get stolen or damaged.

Which option best describes the two statements?

- A i) T      ii) T  
B i) T      ii) F  
C i) F      ii) T  
D i) F      ii) F

9. i) Theft and vandalism rarely cause problems on building sites.  
ii) Trades operatives only need to be aware of problems relating to their own particular materials.

Which option best describes the two statements?

- A i) T      ii) T  
B i) T      ii) F  
C i) F      ii) T  
D i) F      ii) F

10. i) Construction companies who are able to reduce site wastage can produce more competitive tenders and thus win more contracts.  
ii) Any money kept on site should be stored in a safe within a locked site office.

Which option best describes the two statements?

- A i) T      ii) T  
B i) T      ii) F  
C i) F      ii) T  
D i) F      ii) F