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NCB FIELD GUIDE

**STACKING  
AND  
STORING  
OF CEMENT**



National Council for Cement and Building Materials





A circular purple stamp from the National Library and Building Materials. The text inside the stamp includes 'LIBRARY', 'Accession No', and 'Date...'. The words 'NATIONAL LIBRARY AND BUILDING MATERIALS' are written around the perimeter of the stamp.

## STACKING AND STORAGE OF CEMENT

### 1 IMPORTANCE OF PROPER STORAGE OF CEMENT

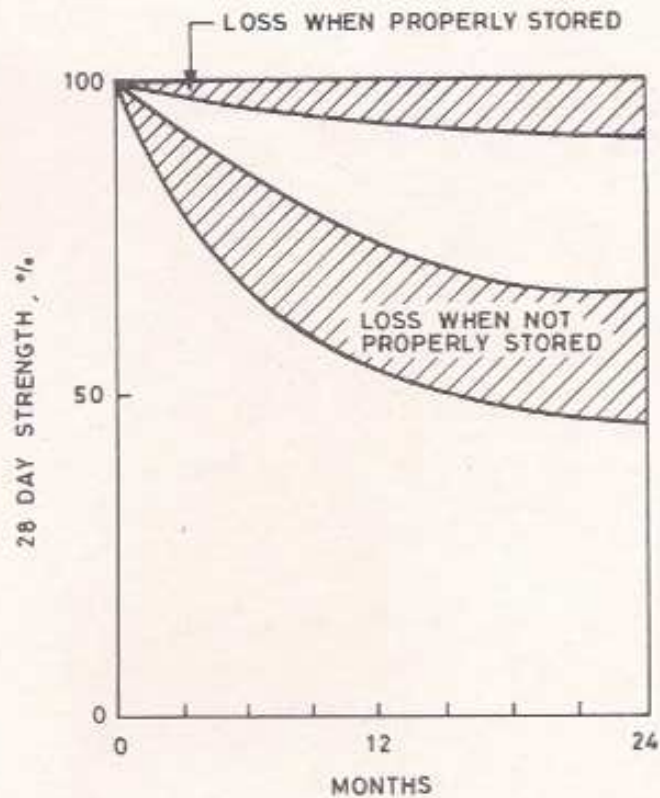
**1.1** The binding property and strength of cement depend upon its capacity for chemical reaction which can take place in the presence of water. Cement tends to absorb moisture, and react with it chemically. The strength of cement when used would show adverse effect to the extent such reaction would have taken place (Fig 1).

**1.2** For protection of cement against deterioration and retaining its freshness its storage should be such that no dampness or moisture is allowed to reach cement either from the ground, walls or from the environment. This becomes particularly important during the humid season and in coastal regions.

### 2 CEMENT GODOWN AT SITE

**2.1** In most construction projects, godowns are constructed at site for storage of a few days requirement of cement. Even though such godowns are temporary in nature, they must conform to the following requirements :

- i) The walls must be plastered and made damp proof.
- ii) The roof must be given an appropriate water proofing treatment.
- iii) The floor must be raised by at least 30 cm above the ground level to prevent any inflow of water. The flooring may consist of a 15 cm thick layer of dry bricks laid in two courses over a layer of earth consolidated to a thickness of 15 cm above the ground level.
- iv) For further protection, cement bags should be stacked at least 10-20 cm clear above the floor by providing wooden battens and planking arrangement (Fig 2). For saving timber, concrete may be used.



TYPICAL LOSS OF STRENGTH OF CEMENT WITH STORAGE

AMBIENT CONDITIONS:  
 AVERAGE RH: 70%  
 AVERAGE TEMP: 27°C

FIG. 1

- v) If any windows are provided, these should be few and small and normally kept tightly closed to prevent entry of atmospheric moisture from outside.
- vi) A newly constructed godown should not be used for storage of cement unless its interior is thoroughly dry.



### **3 PROPER METHOD FOR STACKING OF CEMENT BAGS**

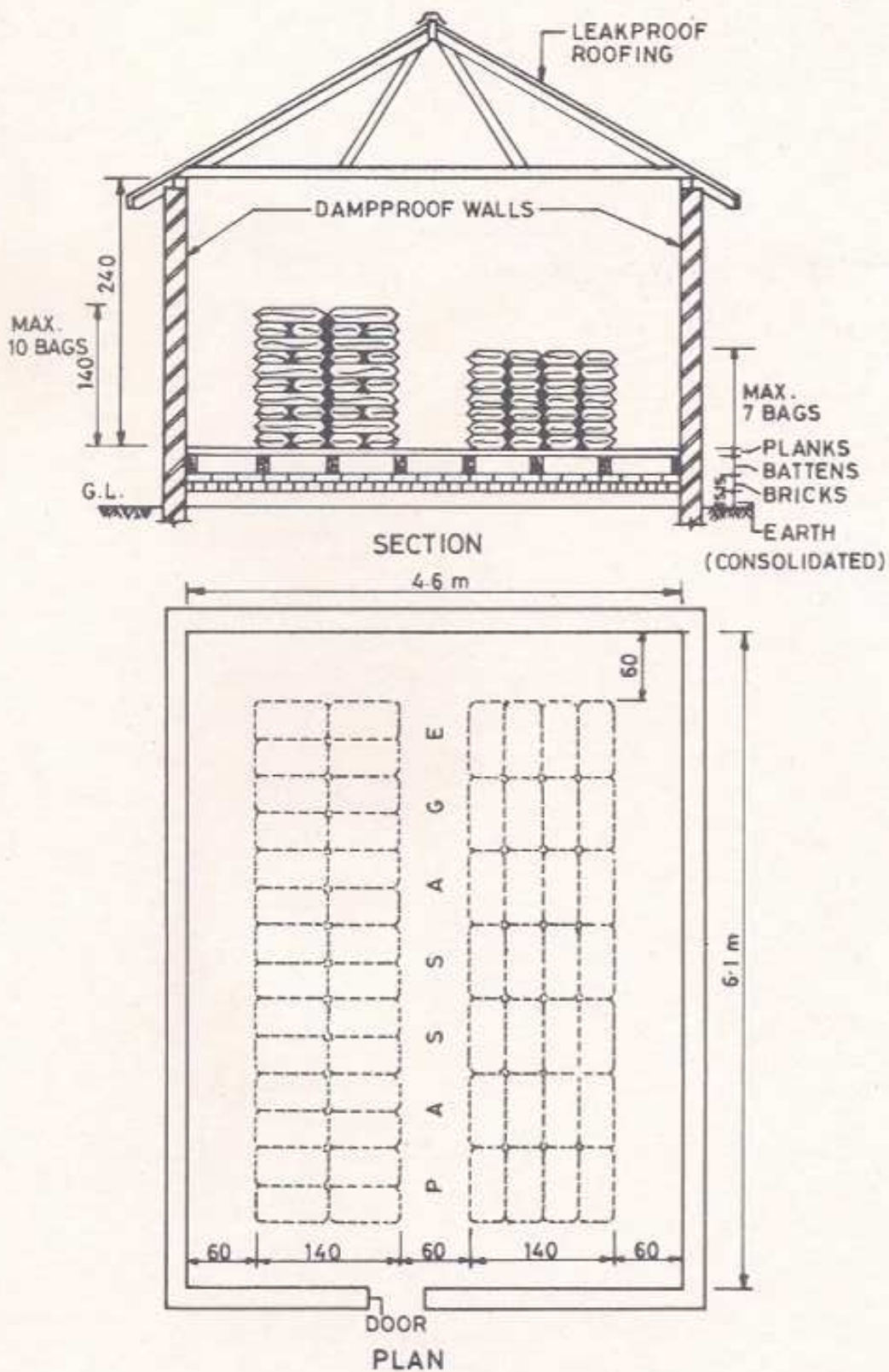
**3.1** The arrangement should be such that it is convenient both for stacking and removal of cement bags and it also leaves adequate space for movement and inspection of bags for counting purposes, etc.

**3.2** No cement bags should be stacked in contact with an external wall. A clear space of at least 60 cm should be left between the exterior wall and the stacks.

**3.3** Cement bags should be placed closely together in the stack to reduce circulation of air as much as possible.

**3.4** Cement bags should not be stacked more than ten bags high to avoid lumping or "warehouse pack" under pressure. If the stack is more than seven bags high, arrange the bags in header and stretcher fashion, i.e., alternately length-wise and cross-wise, to achieve interlocking between them and lessening the danger of toppling over. The arrangement of two stacks with a height of seven bags and ten bags respectively is shown in Fig 2.

**3.5** For extra safety during rainy season, the stacks of cement bags should be enclosed completely in polythene sheets (atleast 700 gauge thick) or similar material if it is anticipated that cement would not be required for a prolonged period. This can be achieved by making a large loose sack of the polythene sheet and arranging cement bags within it with flaps of the sheet closing on the top of the pile. Care should be taken to ensure that the polythene sheet is not damaged any time while in use.



ALL DIMENSIONS IN CENTIMETERS

FIG. 2



## **4 TEMPORARY STORAGE AT SITE**

**4.1** Sometimes cement requirement of a day or two may have to be stored at site in the open. In such cases cement bags should be laid on a dry platform made of wooden planks resting over brick-masonry, concrete, dry sand or aggregates raised about 15 cms above the ground level.

**4.2** The stack must be kept fully covered with tarpaulin or polythene sheet and protected against atmospheric moisture. The covering sheets must overlap each other properly.

**4.3** Temporary storage in the open should not be adopted in wet weather.

## **5 INFORMATION AVAILABLE ON A STANDARD CEMENT BAG**

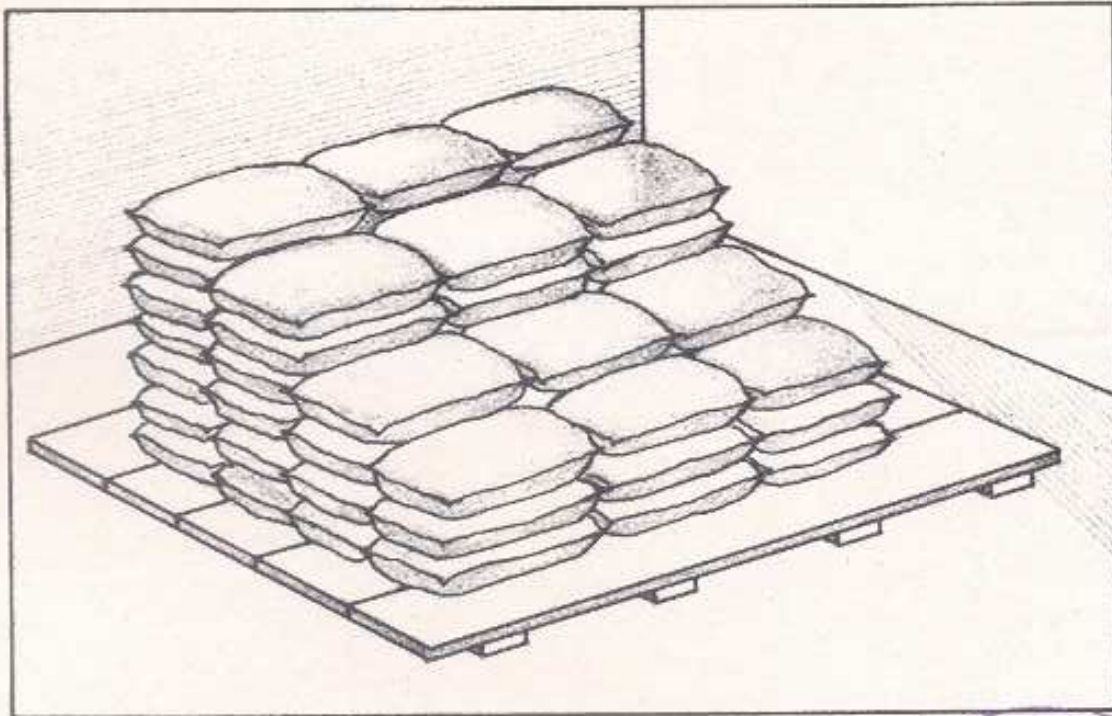
**5.1** The following information is normally printed on a standard cement bag which may be taken note of at the time of receiving cement bags:

- i) Type of cement.
- ii) IS Certification Mark.
- iii) Approximate net weight of cement.
- iv) Week, month and year of manufacture.
- v) Manufacturer's name and registered Trade Mark, if any.

## **6 PROPER METHOD FOR REMOVAL OF CEMENT BAGS**

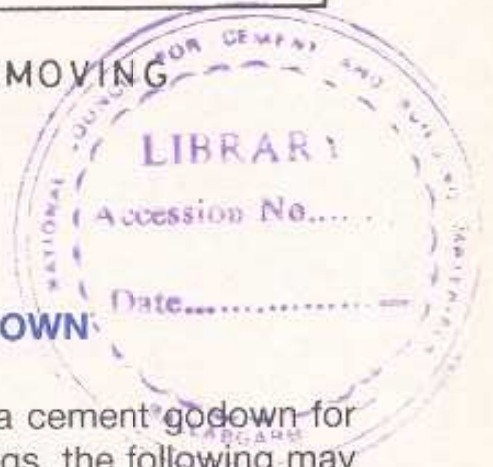
**6.1** When removing bags from storage, cement bags should be removed from upto two or three tiers on the back side rather than only from one tier on the front (Fig 3). If the rows are thus stepped back, there is less chance of over-turning of bags.

**6.2** When removing bags for use, apply the "First in, first out" principle, i.e., take out the oldest cement first. Each consignment of cement should be stacked separately in the godown so as to permit easy access for inspection and to facilitate removal in a proper sequence. It would be desirable to pin a placard on each pile of cement indicating the date of its arrival in the godown.



STEPPING OF TIERS WHILE REMOVING  
CEMENT BAGS

FIG.3



## 7 STORAGE CAPACITY OF A CEMENT GODOWN

7.1 For working out the inside dimensions of a cement godown for storage of specified quantity of cement-filled bags, the following may be adopted :

Length of cement bags	:	70 cm (Average)
Width	:	35 cm "
Thickness	:	14 cm "
Clearance and passages	:	60 cm "

7.2 On the basis of the above figures, the inside width of the cement godown as shown in the sketch works out to 4.6 m whereas the length works out to 6.1 m. The capacity of this godown is 476 bags, i e, about 80 bags per meter length of the godown. If 50 tonnes of cement or 1000 cement bags are to be stored, the length of the godown will have to be increased to 12.5 m nearly, assuming that the stacking arrangement as shown in the sketch would be adopted.



## INDIAN STANDARDS ON DIFFERENT TYPES OF CEMENTS

IS:12269-1987	53 Grade Ordinary Portland Cement
IS:269-1976	Ordinary and Low Heat Portland Cement
IS:8041-1978	Rapid Hardening Portland Cement
IS:8112-1976	Ordinary Portland Cement
IS:455-1976	Portland Slag Cement
IS:1489-1976	Portland Pozzolana Cement
IS:8042-1978	White Portland Cement
IS:3466-1967	Masonry Cement
IS:6452-1972	High Alumina Cement
IS:6909-1973	Super Sulphated Cement
IS:3709-1976	Mastic Cement
IS:8043-1978	Hydrophobic Portland Cement
IS:8229-1976	Oil Well Cement

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