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Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Ltd (RUDSICO)

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Sub: Construction Management System: Circular – 13

Ref: Guidelines for storage of materials and equipment at stockyard.

The efficient handling and storing of materials are vital to any infrastructure project. The improper handling and storing of materials may results in reduction of efficiency and other properties. Therefore, following guidelines are being issued for proper storage of materials and equipment at stockyard:

1. Storage of DWC Pipes/ PE Pipes / Un-Plasticized PVC Pipes and RCC pipes

- i. Pipes shall be stored on a reasonably flat surface free from stones and sharp projections so that the pipe is supported throughout its length. For storage, pipe racks shall be avoided. For avoiding collapse of stacks use wooden posts or blocks.
- ii. Stacking height shall not exceed for different pipes, as follows:

a) DWC Pipes	-	2.5 m
b) PVC Pipes	-	1.5 m
c) Concrete pipes	-	2.0 m
d) CI/DI/GI pipes	-	1.5 m
- iii. It is recommended not to store pipe inside another pipe.
- iv. Socket and spigot pipes shall be stacked in layers with sockets placed at alternate ends of the stacks to avoid lopsided stacks.
- v. Pipes shall not be stored in a stressed or bent condition or near the sources of heat.
- vi. Pipes of different sizes and classes shall be stacked separately.
- vii. The ends of pipe shall be protected from abrasion particularly those specially prepared for jointing either spigot or socket solvent welded joints or shouldered for use with couplings.
- viii. In tropical conditions, pipes shall be stored in shade. In very cold weather, the impact strength of pipe is reduced making it brittle and more care in handling shall be exercised in wintry conditions.
- ix. If due to unsatisfactory storage or handling a pipe becomes kinked, the damaged portion shall be cut out completely.
- x. For RCC pipes where stacking is necessary, this must be on level ground and the bottom layer of pipes securely placed to prevent pipes from rolling or stack from collapsing.
- xi. RCC Pipes shall be supported under the barrel of the pipe so that the sockets are free from load, they shall preferably be stacked barrel to barrel with sockets overhanging alternative sides.
- xii. Rubber rings shall be kept clean, away from grease, oil, heat and light.

2. Stacking and Storage of Construction Materials and Components at Site/Storage Yard: General Considerations for Stacking and Storage-

2.1 Steel:

- i. For each classification of steel, separate areas shall be earmarked. It is desirable that ends of bars and sections of each class be painted in distinct separate colours.
- ii. Steel reinforcement shall ordinarily be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. It is desirable to coat reinforcement with cement wash before stacking to prevent scaling and rusting.
- iii. Bars of different classification, sizes and lengths shall be stored separately to facilitate issues in such sizes and lengths so as to minimize wastage in cutting from standard lengths.
- iv. In case of long storage, reinforcement bars shall be stacked above ground level by at least 150 mm. In case of long storage, a coat of cement wash shall be given to prevent scaling and rusting.

2.2 Cement

- i. Cement shall be stored at the work site in a building or a shed which is dry, leak proof and as moisture-proof as possible. The building or shed for storage shall have minimum number of windows and close fitting doors and these shall be kept closed as far as possible.
- ii. Cement shall be stored and stacked in bags and shall be kept free from the possibility of any dampness or moisture coming in contact with them. Cement bags shall be stacked off the floor on wooden planks in such a way as to keep about 150 mm to 200 mm clear above the floor. The floor may comprise of lean cement concrete or two layers of dry bricks laid on well consolidated earth. A space of 600 mm minimum shall be left all-round between the exterior walls and the stacks.
- iii. In the stacks the cement bags shall be kept close together to reduce circulation of air as much as possible. Bowing to pressure on the bottom layer of bags sometimes 'warehouse pack' is developed in these bags. This can be removed easily by rolling the bags when the cement is taken out for use. Lumbered bags, if any shall be removed and disposed off.
- iv. The height of stack shall not be more than 10 bags to prevent the possibility of lumping up under pressure. The width of the stack shall be not more than four bags length or 3 meters. In stacks more than 8 bags high, the cement bags shall be arranged alternately length-wise and cross-wise so as to tie the stacks together and minimize the danger of toppling over. Cement bags shall be stacked in a manner to facilitate their removal and use in the order in which they are received; a label showing date of receipt of cement shall be put on each stack to know the age of cement.
- v. For extra safety during the monsoon, or when it is expected to store for an unusually long period, the stack shall be completely enclosed by a waterproofing membrane such as polyethylene, which shall close on the top of the stack. Care shall be taken to see that the waterproofing membrane is not damaged any time during use.
- vi. Cement in gunny bags, paper bags and polyethylene bags shall be stored separately.
- vii. Different types of cements shall be stacked and stored separately.

2.3 Bricks

- i. Bricks shall be stacked in regular tiers as and when they are unloaded to minimize breakage and defacement. These shall not be dumped at site.
- ii. Brick stacks shall be placed close to the site of work so that least effort is required to unload and transport the bricks again by loading on pallets or in barrows. Building bricks shall be loaded or unloaded a pair at a time unless palletised. Unloading of building bricks or handling in any other way likely to damage the corners or edges or other parts of bricks shall not be permitted.
- iii. Bricks shall be stacked on dry firm ground. For proper inspection of quality and ease in counting, the stacks shall be 50 bricks long, 10 bricks high and not

more than 4 bricks in width, the bricks being placed on edge, two at a time along the width of the stack. Clear distance between adjacent stacks shall not be less than 0.8 m. Bricks of each truck load shall be put in one stack.

- iv. Bricks of different classifications from strength consideration and size consideration (such as, conventional and modular) shall be stacked separately. Also bricks of different types, such as, solid, hollow and perforated shall be stacked separately.

2.4 Electrical & Mechanical equipment's

- i. All appliances/equipment's shall be carefully stored under cover to prevent damage.
- ii. Storage shall be done on firm, level and clear ground and wedges shall be provided at the bottom layer to keep the stack stable.
- iii. When accepting and storing appliances, advance planning shall be made regarding the sequence of removal from the store to the assembly positions.

3. Fire Hazards:

3.1 Causes of fire hazards at construction sites /store yards: At any construction workplace fire hazards may take place due to the following:

- i. Electrical short circuiting / Poorly installed temporary wiring,
- ii. Gas cutting and welding,
- iii. Defective heating appliances,
- iv. Careless storage and handling of flammables,
- v. Loose gunny bags, plastic bags, organic debris etc. and
- vi. Careless smoking.

3.2 Protection against Fire:

- i. A site engineer shall be assigned with the specific responsibilities of ensuring compliance with fire safety provisions by contractors and also of coordinating with fire services and other agencies concerned with fire safety.
- ii. The storage yard shall be clear of any vegetation and debris prior to the storage of material and shall be cleaned regularly.
- iii. A canteen building or any other unit being source of fuel shall be located sufficiently away from stack yard.
- iv. Materials, like timber, coal, paints, plastic pipes etc. shall be stored in such a way that there may not be any possibility of fire hazards.
- v. Inflammable materials like kerosene, diesel and petrol, shall be stored in accordance with the relevant rules and regulations so as to ensure the desired safety during storage. Stacks shall not be piled so high as to make them unstable under fire fighting conditions and in general they shall not be more than 4.5 m in height.
- vi. Open flames, welding and cutting operations, wherever necessary, shall be carried out with stringent precautions and under proper supervision. All combustible materials lying around shall be removed or covered with wet gunny bags, tin sheets, etc. as welding sparks can fly up to 10 m. After completion of such work the area shall be inspected.
- vii. Electrical wirings shall be either PVC sheathed conductors or vulcanized rubber cables. All joints shall be made in porcelain insulated conductors and the wiring shall not be permitted to trail on the floor.
- viii. Materials which are likely to be affected by subsidence of soil like precast beams, slabs and timber of sizes shall be stored by adopting suitable measures to ensure unyielding supports.
- ix. Materials liable to be affected by floods shall be suitably stored to prevent their being washed away or damaged due to floods.

- x. Stairways, passageways and corridors shall not become obstructed by storage of building materials, tools or accumulated rubbish.
- xi. Adequate number of appropriate type fire extinguishers shall be placed near vulnerable places which are easily accessible. The extinguishers shall be available for immediate use at all times. Extinguishers shall be sited in such a way that the user may not have to travel more than 15 m from the site of the fire to reach the extinguishers.
- xii. Recharging of fire extinguishers and their proper maintenance shall be ensured at prescribed time.
- xiii. Watch and ward services shall also be provided at storage sites during holidays and nights.

4. Apart from above following codes may be referred for further detailed specifications and reference:

IS 4082: Stacking and storage of Construction materials and Components at site
- Recommendations

IS 7634: Plastics pipes selection, handling, storage and installation for potable water Supplies — code of practice

IS 2190: Selection, installation and maintenance of first-aid fire extinguishers — code of practice

IS 13416: Preventive measures against Hazards at work places- recommendations (Part-5: Fire Protection)

This circular shall be strictly abided by all the members of PMU, PIU, PMDSC, PSC & Contractor.

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Project Director
Date: 18.05.2018

Copy to following for information and necessary action:

1. PA to PD/Addl. PD/ FA/ CE/ ACE/SE-I/SE-II/SE-III/ POs/APOs, PMU, RUIDP, Jaipur
2. SE, PIU, Pali/Tonk/Sriganaganagar/Jhunjhunu/Bhilwara/Hanumangarh/Kota
3. EE, PIU, Sawai Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
4. Team Leader/ Project Coordinator/CM/ Dy. CM/ACM, PMDSC/ PSC, Jaipur, Pali/ Tonk/ Sriganaganagar/ Jhunjhunu/ Bhilwara/ Hanumangarh/ Kota/ Sawai Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
5. ACP, RUIDP, Jaipur to send by e-mail and put up the Guidelines on the website.


Addl. Chief Engineer