I.4: Design and erection of sand bed for safe storage of oils in industrial oil drums

Design and Manufacturing Technology Division (DMTD) of the centre, has more than 50 nos. of machine tools, which require different types of oils, like hydraulic oil, slide way oil, spindle oil, compressor oil and also different types of greases, some of which are highly combustible. For catering to the requirements of the various users, oil stock is maintained centrally. Oil is stored in drums, of 200 litres capacity each and kept in the oil room which is located outside the main building. A view of the oil room is shown in Figure I.4.1. Erection of sand bed is an easy and one of the safest ways for storing oil and inflammable liquid material. With this in view, a sand bed is designed and erected in DMTD.

Fig. I.4.1: View of oil room with sand bed and oil drums.

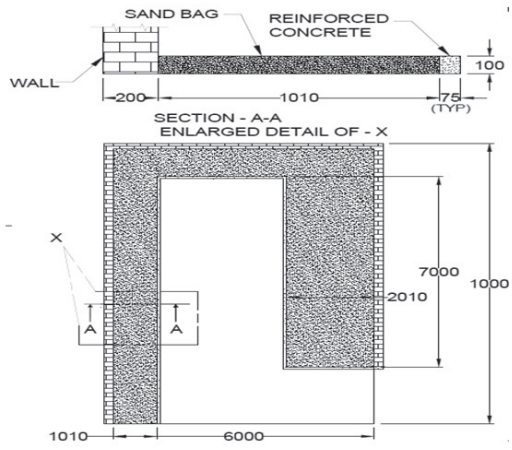

Fig. I.4.2: Plan and sectional view of sand bed.

Figure I.4.2 shows the plan and sectional view of the sand bed. The floor size of the oil room is 10 meters (length) X 6 meters (width). Skirting of the reinforced concrete is provided on the sides of the walls with one meter width on one side and two meters width on the other side. In between space of three meters is kept open for handling of oil drums. To avoid fire due to electrical short circuits, the oil room is designed without electrical connections and fittings. For maintaining light and ventilation inside the room, large windows are provided. At the top of the roof of the main building, a light source is also fixed at a safe distance for providing sufficient light inside the oil room during night hours.

Reinforced concrete skirting has a rectangular cross section of size 75 mm (width) X 100 mm (height). Inside the reinforced concrete bay, sand is filled. Since sand has got a low bearing strength, oil drums cannot be kept directly over the sand as it is difficult in handling and shifting. For solving this problem, square tube platforms of different sizes are developed and kept inside the sand bay. One such platform is shown in Figure I.4.3. Oil drums are kept on top of the square tube structure for storage. Appropriate slope is provided in the square tube structure for easy handling of oil drums. When oil drums are to be shifted, forks of the pallet truck are placed before the drum kept over square tube structure. The base of the fork and the oil drum are at same height. Slope in the square tube structure helps in easy sliding of the drum to the fork. Pallet truck loaded with oil drum can easily be shifted to the required place.

Fig. I.4.3: Actual photograph of a square tube platform.

In the construction of the bed, sand has been used for extinguishing fire. Sand completely envelops the fire due to oil and cuts the oxygen supply. As a result, fire is extinguished. Sand is in the form of silicon dioxide, which is inert. It does not break into silicon and oxygen molecules during the outbreak of fire. This also helps in fire prevention.

As per the design, oil drums are kept over the sand bed. In case of oil spillages from the drum, the sand bed shall absorb the oil and prevent it from spreading on the floor, keeping the floor clean.

The entire work has been executed under the support and guidance of C&S Division, Internal Safety Inspection of Buildings and Facilities under Accelerators Committee, and, Fire & Safety Cell.

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