2X660 MW ENNORE SEZ STPP, AT ASH DYKE OF NCTPS, CHENNAI

COVERED SHED

FOR COAL STOCK YARD

VOLUME – II B

SPECIFIC TECHNICAL SPECIFICATION

COVER SHED

FOR COAL STOCK YARD

SPECIFICATION NO.
IS-4-TS-688-108-C280A

SECTION – C1
SPECIFIC TECHNICAL REQUIREMENT

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1.0 General

This document covers the general description of structural framing system, applicable design codes and standards, specific design criteria, design loads and combinations, design methodology and characteristics of construction materials to be adopted for the Covered Shed for Coal Stock Pile for Coal handling system.

2.0 Civil Design Criteria

2.1 Codes and standards

The engineering and execution of all the civil works shall be based on the latest editions and revisions of the applicable codes as mentioned in this document.

Design codes IS 456 & IS 800shall be followed for concrete and steel structures respectively. The codes for loads, load combinations and other systems are provided in respective clauses.

The steel structures using tubular sections shall be designed and fabricated as per IS:806 – "Code of practice for use of steel tubes in general building construction.".

2.2 Design loads

The following design loads shall be considered for the design of buildings and structures:

- **Dead load**
  Dead load is defined as the weight of all permanent construction including walls, foundations, floors, roofs, ceilings, partitions, stairways, and fixed service equipment and shall be calculated according to IS: 875 (Part-I)

  The gravity weight of soil overburden if any shall be considered as dead load.

- **Live load**

  Live load is defined as the weight superimposed by the use and occupancy of the building or other structure, but not permanently attached to it. For industrial design, live load can be defined as the load produced by personnel, moveable equipment, tools, and other items placed on the structure, but not permanently attached to it. Design shall be done for the actual plant live loads or the live loads specified in according to IS:875 (Part-2).

  Dust load for design of shed shall be as 50kg/m^2

  Unless specified otherwise, or required due to erection, operation and maintenance the minimum live load values for floors and roofs given in Table below shall be considered
  Areas designated for different loadings on the same floor shall be clearly and permanently marked.

- **Test load**
  The test load shall be defined as the gravity load imposed by any method necessary to test vessels, tanks, cranes, equipment or piping.

- **Thermal load**

  For temperature loading, the total temperature variation shall be considered as 2/3 of the average maximum annual variation in temperature. The average maximum annual variation in temperature for this purpose shall be taken as the difference between the mean of the daily minimum ambient temperature during the coldest month of the year and mean of daily maximum ambient temperature during the hottest month of the year. The structure shall be designed to withstand stresses due to 50% of the total temperature variation.

  Suitable expansion joints shall be provided in the longitudinal direction wherever necessary with provision of twin columns. The maximum distance of the expansion joint shall be as per the provisions of IS:800 and IS:456 for steel and concrete structures respectively.

- Systems and system component design criteria which require ambient temperature extremes shall use the range from 22C to 40C for dry-bulb temperatures.
  Average maximum annual variation in temperature shall be considered as 18 dec to calculate thermal loads.

- **Truck load/ DOZER Load**
  Structures accessible to trucks shall be designed to withstand the gravity, lateral and impact effects of truck loading. Truck loading shall be SLW 60 or equivalent as per relevant standards or codes.

- **Soil load**
  Soil loads shall consist of lateral earth pressures. Active and passive and at rest coefficients for lateral pressures shall be obtained from the project soils report. The weight of soil shall be considered as dead load.

- **Hydrostatic load and buoyancy**
  Hydrostatic load is the load due to water pressure. The design of structures shall include hydrostatic loads when applicable. The buoyancy load is equal to the weight of the volume of displaced water.

- **Wind load**
  The wind load calculation for the buildings and structures shall be as As per IS:875. Basic wind speed shall be considered as 50 m/s.

- **Earthquake load**
  All buildings, structures and foundations shall be designed and adopt necessary earthquake design criteria.

  For design purpose the values for Seismic Zone – III as per IS:1893 shall be considered. Importance factors for all buildings shall be considered as 1.75. In addition, provision contained in IS:4326 & 13920 shall also be considered.

- **Dynamic loads**
  Each structure shall be designed to withstand the effects of vibration and impact to which it may be subjected. In the case of a tall and slender structure, there may be a need to investigate the dynamic effects of wind gusts.

2.3 Deflections

The maximum allowable deflections under the serviceability loads shall be as given below, if not other requirements due to functionality of the structures shall be followed:

a) Structural steel

Vertical Deflection
For roofing and cladding components: Span / 325

b) Concrete structures

Vertical Deflection
For beams supporting floors / masonry: Span / 325

Provisions of IS: 800, IS 456 and relevant IS Code shall be followed for limiting deflections of structural elements not listed above

2.4 Drainage systems

General
The drainage systems will consist of provision of gutter and rain water down comer at appropriate location in shed.

The following parameter shall be considered for calculations:

Runoff co-efficient = 1.0
Max Velocity 2.4 m/s (as per Tech specs Vol VI, Cl 17.03.00 e)
Maximum hourly rainfall 80 mm/hr
Gradient: 1:1000

(Refer tender doc "Hydrological flood protection and drainage studies" where a rainfall intensity of 60mm has been considered (suggested by IMD , for maximum hourly rainfall map). However, a higher rainfall intensity of 80 mm/hr has been considered for design

2.5 Load Combinations

Basic Loads

SL NO	LOAD SYMBOL	LOAD DESCRIPTION
1	LOAD 1	LOADTYPE Dead TITLE DL
2	LOAD 2	LOADTYPE Live TITLE LL
3	LOAD 3	LOADTYPE Wind TITLE WL +X (+0.55)
4	LOAD 4	LOADTYPE Wind TITLE WL +X (-0.55)
5	LOAD 5	LOADTYPE Wind TITLE WL -X (+0.55)

6	LOAD 6	LOADTYPE Wind TITLE WL -X (-0.55)
7	LOAD 7	LOADTYPE Wind TITLE WL +Z (+0.55)
8	LOAD 8	LOADTYPE Wind TITLE WL +Z (-0.55)
9	LOAD 9	LOADTYPE Wind TITLE WL -Z (+0.55)
10	LOAD 10	LOADTYPE Wind TITLE WL -Z (-0.55)
11	LOAD 11	LOADTYPE Seismic TITLE SLX
12	LOAD 12	LOADTYPE Seismic TITLE SLZ
13	LOAD 13	LOADTYPE Temperature TITLE TEMP

The different load combinations shall be taken as per IS:875 (Part-5) and other relevant IS Codes.

2.3 SYSTEM / BUILDING:

2.3.1: Covered coal yard

The coal sheds shall be of structural steel columns and roof trusses with a metal roof and metal sheet siding. Foundations with piled foundations for the steel columns is envisaged, according to the geotechnical investigation.

The profile of the roof shall follow the profile of the handling equipment with clearances mentioned in the drawing. Each coal stock pile shall be covered separately. Clear spacing of shed supporting columns shall not be less than considered from 8M to 9M. For distance between the steel columns, the height of the roof and width of the shed refer furnished tender drawings. The two cantilevers connected with a joint at the highest point need not be symmetrically depending on the size of coal handling equipment used.

Any collision of the stacking and reclaiming machines with the shed must be safely avoided in any operational case.

The cover shall be suitable to protect the environment from dust pollution from the coal yard during dry season and to protect the coal from heavy rainfalls during monsoon. The coal yard coverage may in no way inhibit the normal operation of the coal yard.

Dozer entries in the transverse side of the shed is envisaged. Opening of minimum size 5 meter in width and 8 meter in height for dozer entry shall be provided. Location of dozer entry mentioned in drg is indicative and exact location will be provided during detail engineering.

Roof sheeting on shed shall be extended till 1M from F.G.L.

Poly carbonate sheet of matching profile of 10% of covered area shall be provided for natural light as per the relevant intdian standards**.**

3.0 Materials:

3.1 Structural steel:

All ferrous materials, their dimensions, forms, weights, tolerances, chemical and mechanical properties, shall be the best of their kind, complying with relevant Indian Standards.

All steel materials required for the work shall be supplied by the contractor.
All steel materials shall comply with the following IS: -

i) IS:801 - Cold formed light gauge steel structural member.

ii) IS:2062 - Grade – A, Structural Steel for plate thickness upto 20mm
iii) IS:2062 - Grade – B (Killed), Structural Steel for plate thickness above 20mm
iv) IS:806 - Steel tubes in general building construction.

The tubular steel sections shall be of circular/ rectangular/ square shape. The circular steel tube shall conform to IS:1161 and rectangular/ square steel sections shall confirm to IS:4923.

In the case of structural steel work, care shall be taken that all parts in the assembly fit accurately together and corresponding parts shall preferably be interchangeable.

The structural steelwork and testing shall comply with the relevant clauses of Indian standard codes.

3.2 Cladding Sheet: Roof and Wall Cladding:

Metal cladding

Troughed zinc-aluminum alloy coated not less than 275 gm/sqm M.S. sheet having 0.8mm minimum thickness (or high tensile steel sheet of 0.5 mm minimum thickness) shall be used for cladding system. The outer side (exposed face) shall be permanently colour coated with with PVF2 paint of minimum DFT 20 microns over primer and the inner side (internal face shall be coated with same paint of minimum DFT 12 microns over primer. These shall be fixed directly to runners. The sheets shall meet the general requirements of IS: 14246 and shall conform to class 3 for the durability.

3.3 PAINTING:

This specification shall be used for the corrosion protection of steel structures, components, pipings and equipment in general which are installed in confined areas (indoors) or outdoors.
Surface preparation, as well as protective coatings and coating systems are based on this specification in order to assure that structural parts of different suppliers will get a corrosion protection of similar.

a) All steel structures shall receive two primer coats and two finish coats of painting. First coat of primer shall be given in shop after fabrication before dispatch to erection site after surface preparation as described below. The second coat of primer shall be applied after erection and final alignment of the erected structures. Two finish coats shall also be applied after erection.

b) Steel surface which is to painted shall be cleaned of dust and grease and the heavier layers of rust shall be removed by chipping prior to actual surface preparation. The surface shall be abrasive blasted to Sa-2½ finish as per SIS05-5900. Primer paint shall be zinc silicate of approved brand . Dry film thickness of each primer coat shall be 50 microns.

c) Finish paint shall be 2 coats of High built epoxy finish of approved brand. Dry film thickness of each finish coat shall be 90 microns. The undercoat and finish coat shall be of different tint to distinguish the same from finish paint. The total dry film thickness shall be 300 microns. All paints shall be of approved brand and shade as per the OWNER's requirement.

d) Joints to be site welded shall have no paint applied within 100 mm of welding zone. Similarly, where Friction grip fasteners are to be used no painting shall be provided. On completion of the joint the surfaces shall receive the paint as specified.

e) Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly. Surfaces inaccessible after erection including top surfaces of floor beams supporting gratings or chequered plate shall receive one additional coat of finish paint over and above number of coats specified before erection. Portion of steel member embedded / to be encased in concrete shall not be painted.