

I.2: Installation and commissioning of 50 MT EOT crane

A 50 MT Electric Overhead Travelling (EOT) Crane (Class III, double girder) has been successfully installed and commissioned for handling of large size electro-magnets at Magnet Technology Lab (MTL), Accelerator Magnet Technology Division (AMTD). This is the highest capacity of EOT crane installed in RRCAT till to date. Fig. I.2.1 shows the installed 50 MT crane at MTL and the details of the crane are given in Table I.2.1. The crane was designed, manufactured and successfully installed & commissioned at RRCAT site by an Indian company as per the IS standards (IS: 3177, IS: 807 & IS: 13834).



Fig.I.2.1: 50 MT EOT Crane installation at MTL Lab.

Table I.2.1: Details of 50 MT EOT Crane

Span	11.50 meters.
Longitudinal travel	50 meters.
Hoist (Max. lifting height)	8.5 meters
Hook details	Ram shorn type with swiveling.
Hoist speed (Main /Creep)	2 / 0.2 meter /min
Long travel (LT)	15 /1.5 meter /min
Cross travel (CT)	10 / 1.0 meter /min
Operating modes with pendant	Trailing type & Wireless remote.

Design and manufacturing of crane:

The design calculations of the crane for all motions, structural elements, selection of standard components and quality assurance plan (QAP) have been reviewed with the manufacturer prior to its manufacturing. The stage-wise inspections (various materials of crane construction, girder fabrication), testing of the standard equipment (motors, gear boxes etc.) have been carried out during manufacturing of the crane. The crane is provided with variable voltage, variable frequency control drives (VVFD) for hoisting, CT and LT operations and having the facility to operate at rated full and creep speeds with a remote control pendant as well as trailing

type push button pendent. This crane is also incorporated with several safety features such as limit switches, fail-safe D.C. Disc /EHT brakes, alarms, emergency stop push buttons, electrical circuit protections, safety latches etc. The crane was initially tested at manufacturer's premises with the central rated load of 50 MT under stationary condition and measured the deflection which was within the acceptable limits. The whole crane has been made in several assembly modules (girders, crab, gear box assembly etc.) so that it can be easily erected & commissioned at RRCAT site within short period.

Erection & Commissioning of crane at MTL:

To mount double girder crane, initially the LT rails were fixed on the existing support girders of MTL high-bay for LT of the crane and their alignment was checked before girder erection. Then, the double girder of the crane was mounted on these LT rails and assembled the various crane modules. After successful installation of the crane modules, fixing of DSL and electrical wirings, the initial trial runs of the crane operations (CT, LT & Hoist motions) have been checked with no-load and later with rated load conditions. Initially, it was observed that the crane is not running smoothly on the LT rails, giving more jerks & and noise in the crane operations. This problem was later rectified by increasing the number of LT rail clamps and further rectification on the alignment of LT rails.

Load testing of the crane:

The crane was tested under safe working load (SWL) of 50 MT load and found working satisfactorily in LT & CT motions without jerks & noise. The measured central deflection under 50 MT load was 5 mm. Also, the crane was tested under overload of 62 MT (125% of SWL) and the measured central deflection was 7 mm which is within the acceptable limit as per IS 807-2006. The maximum current (A) drawn by the crane motors at main & creep speeds during hoisting, LT & CT and their combinations was measured with no load and 50 MT load conditions and shown in Table I.2.2.

Table I.2.2: Current drawn during crane motions

	Hoisting (Up & Down)	LT (F & Rev)	CT (L & R)	Hoist + LT (Up)	Hoist + CT (Up)
No Load Condition at main speed (M) of 900 rpm & creep speed (C) of 200 rpm					
M	18.4 A	8.6 A	4.1 A	26.6 A	22.4 A
C	16.6A	5.4 A	1.5 A	21.2 A	17.5A
With 50 MT Load Condition at main speed (M) of 900 rpm & creep speed (C) of 200 rpm					
M	35.6 A	12.7 A	6.1 A	46.7 A	39.1 A
C	30.9 A	6.4 A	2.3 A	37.2A	31.9 A

The crane is operating reliably and smoothly running in all the travels (CT, LT & Hoisting).

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