WELCOME

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(A Dynamic JV of NTPC Ltd. & SAIL)

BHILAI
Making of In-Motion Weigh Bridge - An Engineering Feat

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Areas covered

Introduction

Pre-Installation
• Base slab Installation
  ➢ Casting of base slab
  ➢ Placement of base slab under Rails
• Equipments Installation

Post-installation Scenario
• Addressing Software problem
• Remote operation from control room
Introduction

- In-Motion Weigh Bridge (IMWB) overcomes the limitation of the static weighing machine by automatically detecting and weighing wagons as they crossover the weigh bridge.

- After receipt of imported coal at NSPCL-BHILAI the requirement of Weighbridge assumed significance and urgency.

- In Sept 2011, C&I dept. took the responsibility for execution of the project and awarded the contract.
Two rail lines dedicated for

- Incoming (Load Rake)
- Out going (Empty rake).

Hence requirement of Two weigh-bridges for two rail lines.
Installation of In-Motion Weighbridge

- Removal of existing rail lines
- Making of Base Slab
- Placement of Weigh Rails with sensors
- Installation of proximity switches and control equipment
Challenges for making base slab

Base Slab – 8m x 3.2m x 0.45m (30 Tons weight)

- Party demanded 28 days shutdown of railway lines for construction of base slab, *not accepted by NSPCL*.
- We suggested to cast the required base slab outside and place it underneath the rail tracks, *Not accepted by the party*.
- We decided to do on its own.

Location of weigh bridge is outside the plant premises.
Soil Embankment for Base Slab Casting

2 No. of soil Embankment of (10m X 4.5m X 6m) was prepared on each side of line.
Making Sliding Platform

6 No. of rails fixed for moving of base slab
Some notable Achievements

- Both the base slabs were placed without changing any rake schedule.
- Within 36 hours railway track made ready for rake movement.
Installation of Equipments

5.5 Meter sensor rails

- 1 rail has two strain gauge transducers
- Works on principle of shear force
Installation of equipment

Proximity switches

Four pairs of inductive switches to

- sense wagon wheel
- wagon separation
- speed measurement
- Direction detection
DA100 & PC installation

- DA 100 is CPU of the machine.
- Processes I/P signals from weigh sensors and proximity switches.
- Provides O/P data to PC for storage.
Post installation scenario

- Separate weighbridges for load and for empty.
- Merging of weighment data was not possible with the original software.

Modification of software at site for merging of load and empty data for knowing net coal weight.
Remote Operation of IMWB

Why remote operation?

- Weighbridge operation required manual intervention for every START and END.

- Deployment of 4 operators for 24X7 manning with uncertainty of rake-movement involved cost.
Challenges of making Weigh Bridge operation from remote

- Manufacturer demanded Rs. 5 lakh & 2 months time period to make it remote-operated.

We took up the challenge to execute it without OEM support.
Execution of remote operation

- Sending RS 232 data from weigh bridge to CHP control room (distance 4 K.M.).

- Operating the “End weigh Button” of DA100 which is not accessible through software.
RS-232 To Optical Converter

Converts RS-232 data into optical form and vice versa.
Data Trans-Reception

IMWB ↔ 4 KM ↔ CONTROL ROOM

DA100 O/P → RS232 → RS232 – OPTICAL CONVERTER → OPTICAL - RS232 CONVERTER → PC
Operating “END WEIGH BUTTON” from Remote

- This button needs to be pressed every time after weighment is complete.
“End Weigh Button” Incorporation

Control Room → 4 KM → IMWB site

- **PUSH BUTTON**
- **DCS ANALOG Channel (4 - 20 mA)**
- **TELEPHONE LINE**
- **Controller**
- **Contact**
- **End Weigh Button**
Installation of 30X IP PTZ camera

- Tracking rake movement for weighing from remote.
- Ensuring emptiness of wagons dispatched.

A snap taken
Remote operation commissioned
THANK YOU

TEAM NSPCL, BHILAI