

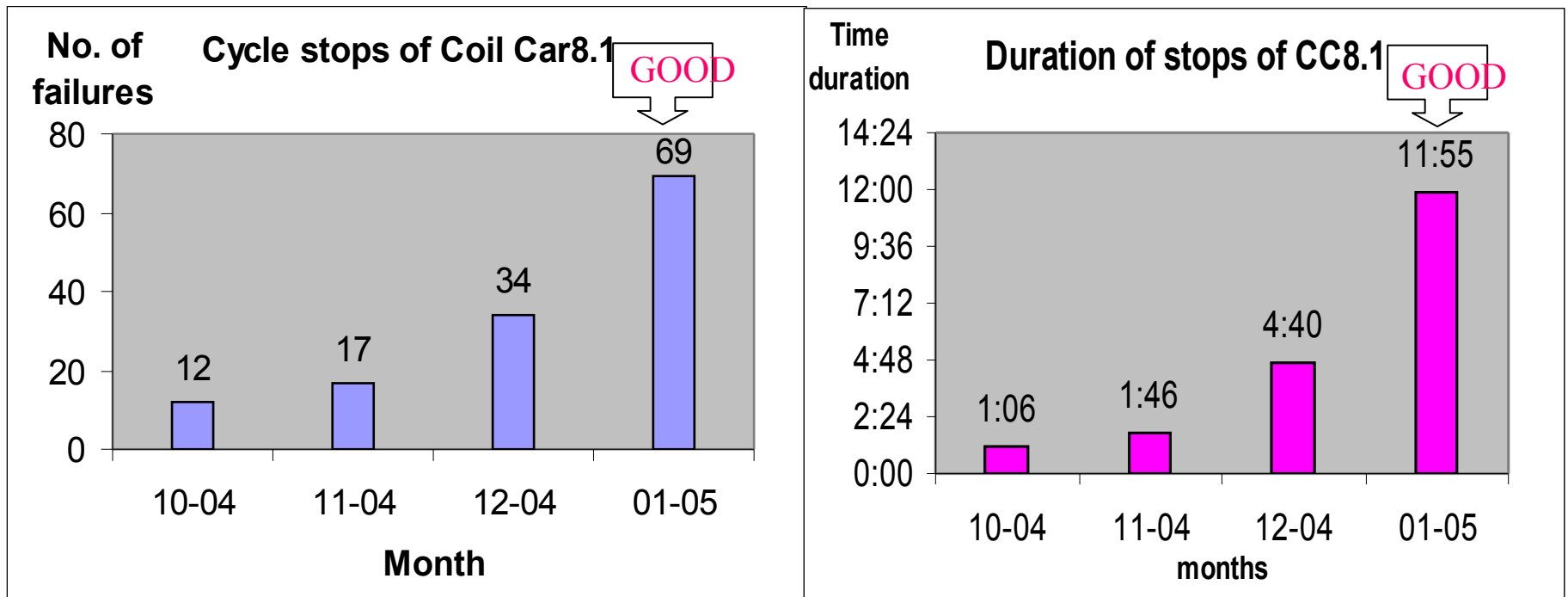
FAILURE ANALYSIS OF COIL CAR 8.1

Cold Rolling Mill

PROBLEM STATEMENT:

Frequent cycle stops of Coil Car 8.1 at Coil Packaging Line , CRM during the transfer of coils from entry to delivery side .

FAILURE HISTORY



PROBLEM TYPE --- CMNT .

This problem was effecting the production in CPL -

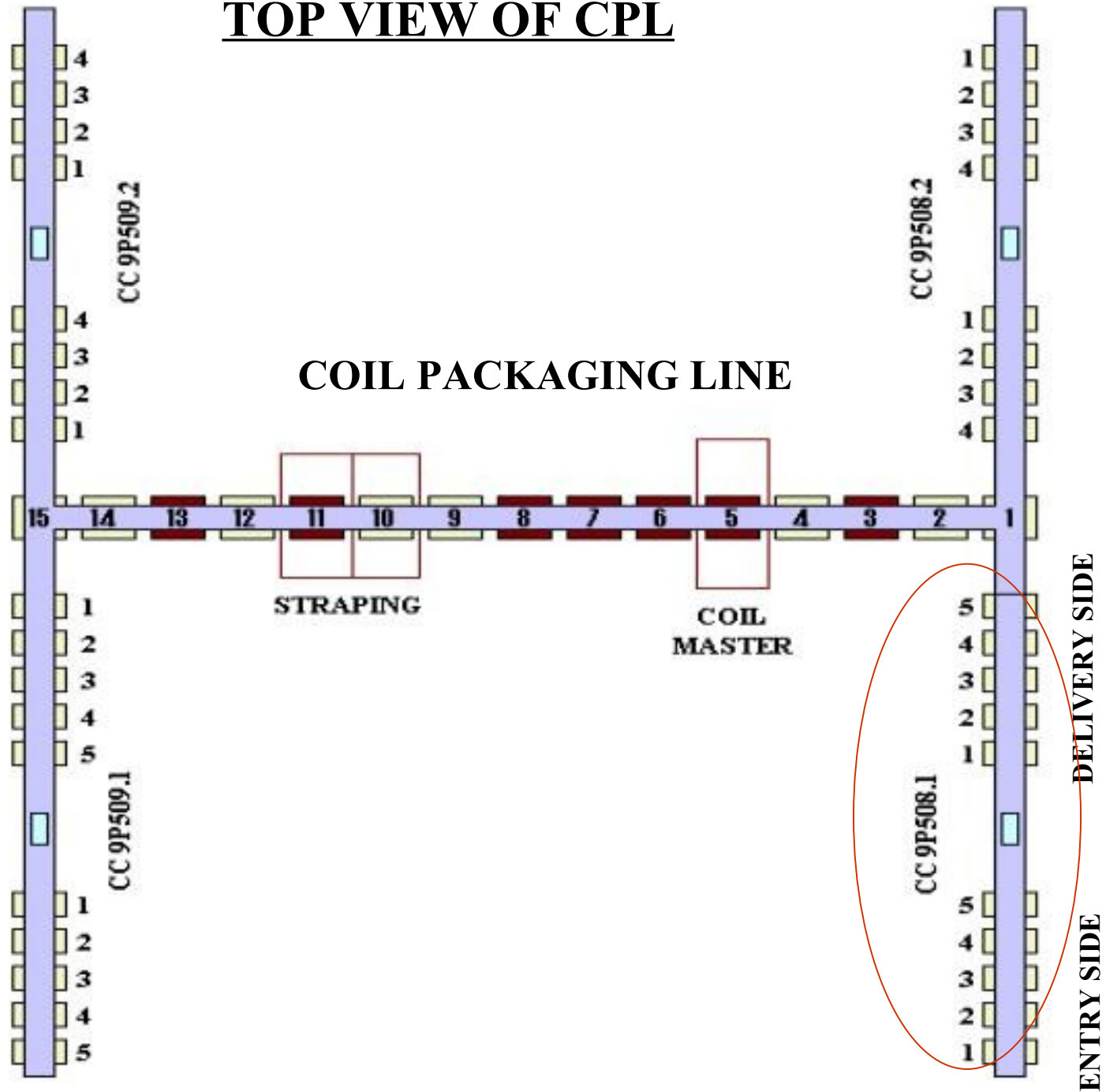
In the month of Jan'05 only , We had lost the opportunity to pack 180(approx) coils

FUNCTION OF COIL CAR

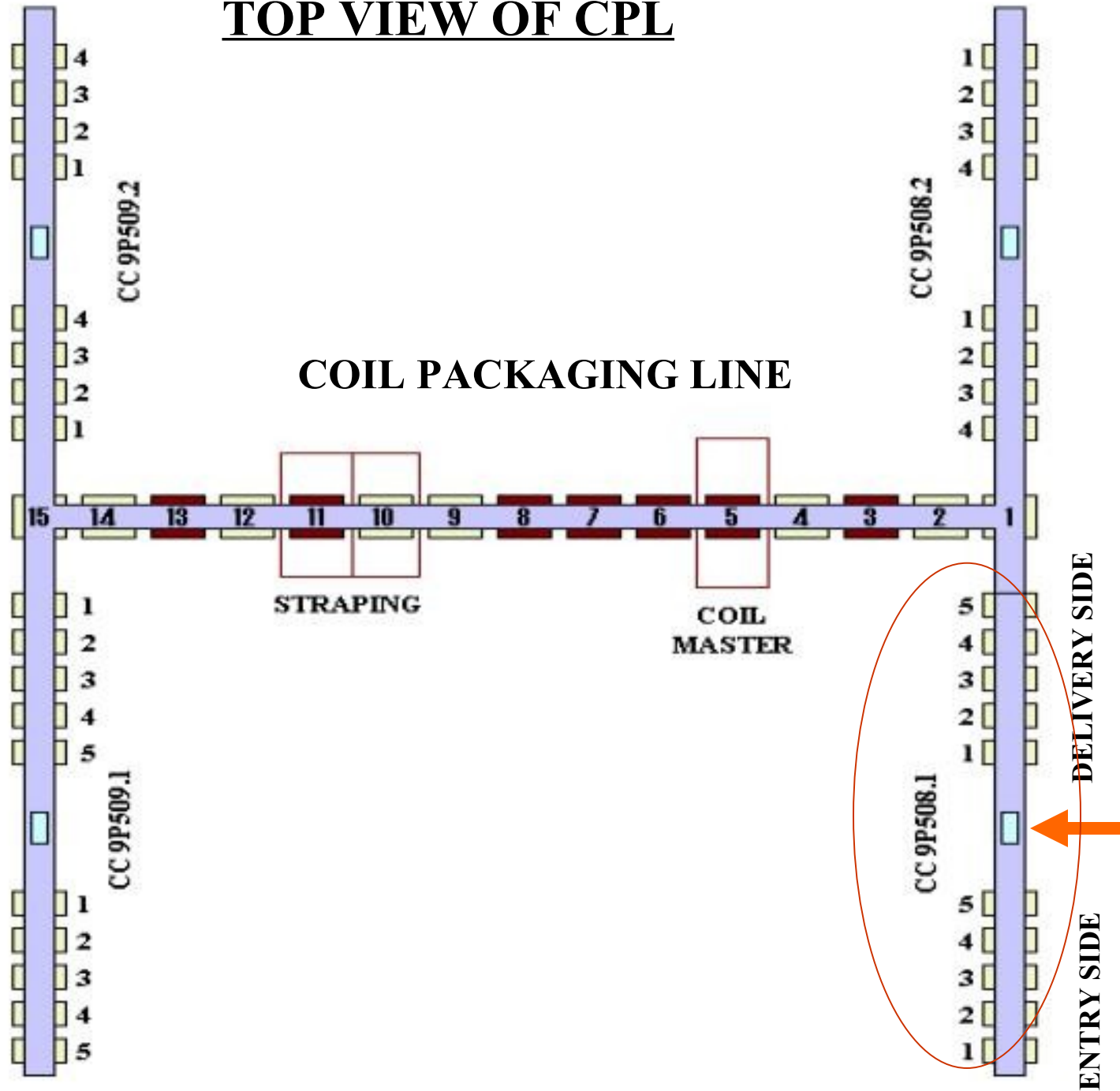
Coil car 8.1 is working in the Coil Packaging line(CPL). In CPL, there are 15 Nos. of working stations. There is a Walking Beam to transfer the coils from one station to another. Coil car 8.1 and 8.2 are used to feed the coils to the station#1 of CPL. Coil cars 9.1 and 9.2 are used to evacuate the coils at station#15.

Coil Car 8.1 is not only feeding the coils to CPL, but also transferring the coils from Entry side(RS bay) to Delivery side(ST bay).

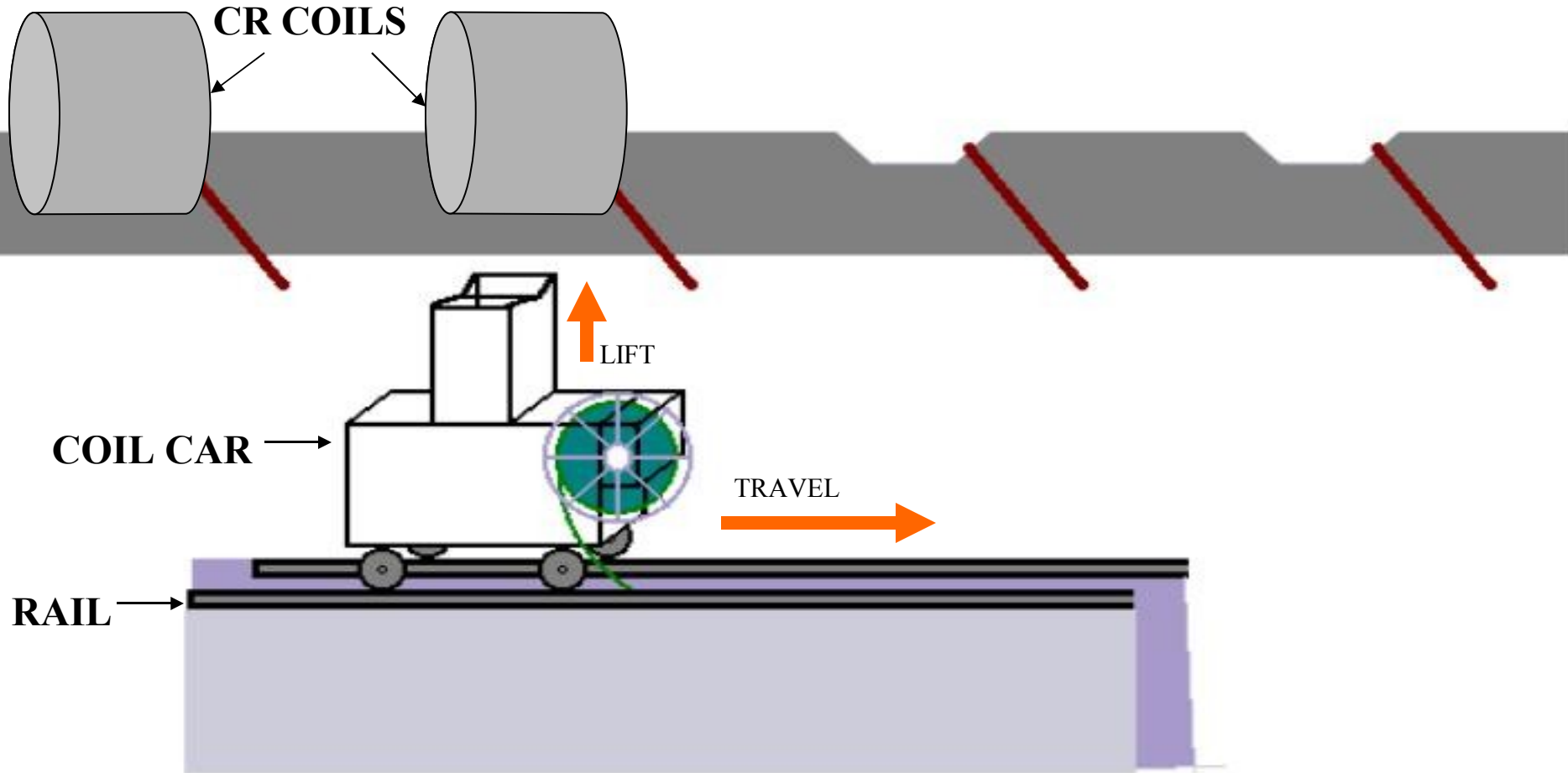
TOP VIEW OF CPL



TOP VIEW OF CPL



FUNCTION OF COIL CAR



PHENOMENA OBSERVATION

It is evident from the delay data that 90% of the cycle stops are at the entry side Saddles. These cycle stops were coming intermittently and was difficult to found The root cause.

So, whole analysis was concentrated on the coil car operation at entry side.

ANALYSIS

List of probable causes for cycle stops of Coil car :

EEI

3. Anticollision system malfunction
4. Auto sequence failure
5. Drive not healthy
6. Auto spot positioning problem
7. Centre line position missing
8. Both coil cars in CPL zone
9. Encoder monitoring time out
10. Home encoder backup error

MECH.

9. Hydraulic power pack prob.
10. Rail line leveling problem
11. Coil car saddle liners prob.

Detail Observation has been done to identify the **Root cause**.

- Testing of probable Mechanical Causes:

- 1.Hydraulic power pack checked and found o.k.
- 2.Rail line leveling checked and found o.k.
- 3.Coil car saddle adjusted and liners checked and found o.k.
4. Rail line surface finished at the joints.

- Testing of probable EEI Causes

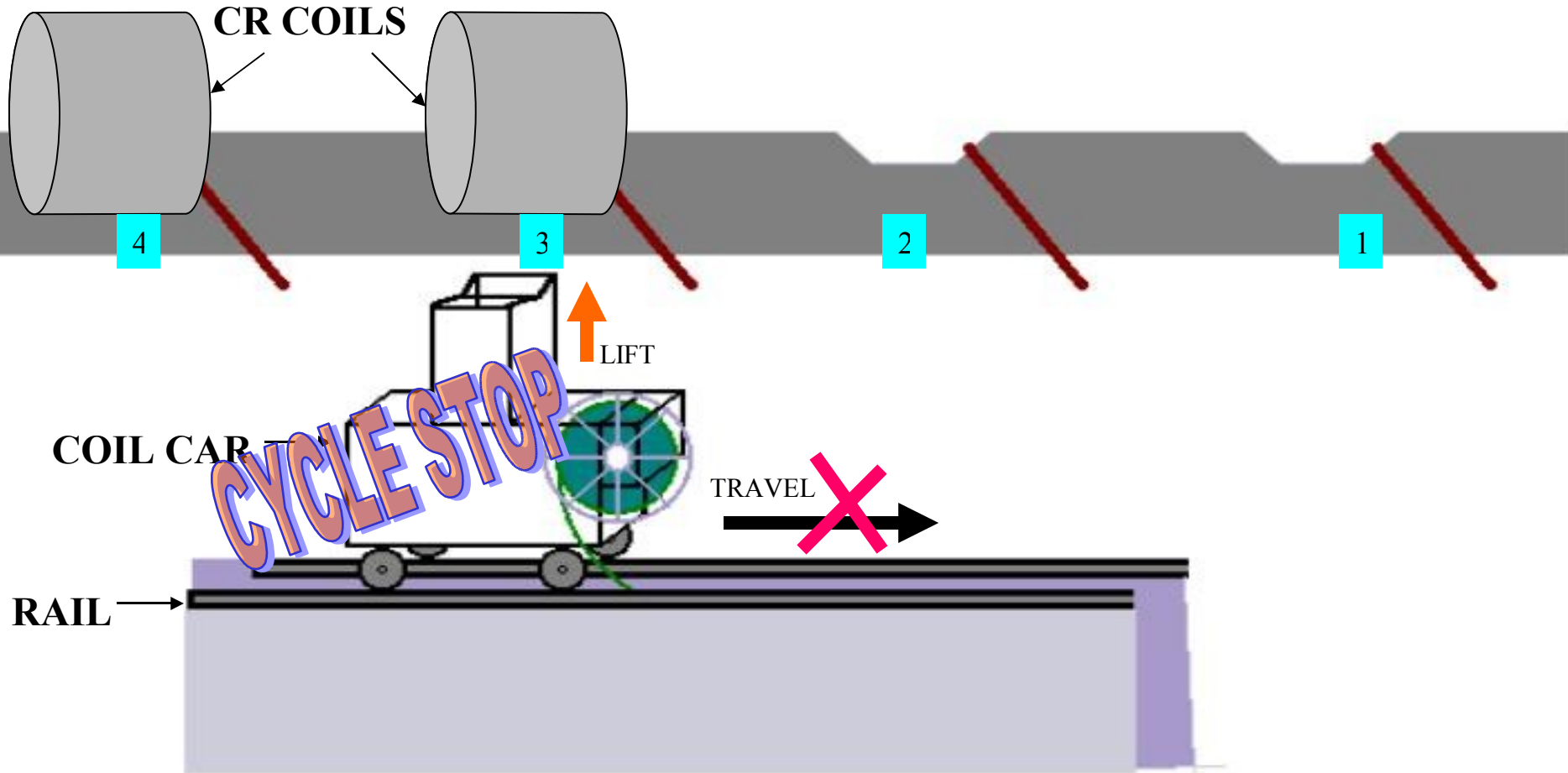
1. We had written a program to trap the probable causes due to EEI problems---

With the help of trap program, we found Encoder monitoring time out is coming frequently.

PHENOMENA OBSERVATION FINDING

Encoder monitor timeout comes only at Entry saddle#3 after lifting the coil and the coil weight >12T.

FUNCTION OF COIL CAR



FURTHER ANALYSIS

WHY ENCODER MONITORING TIMEOUT



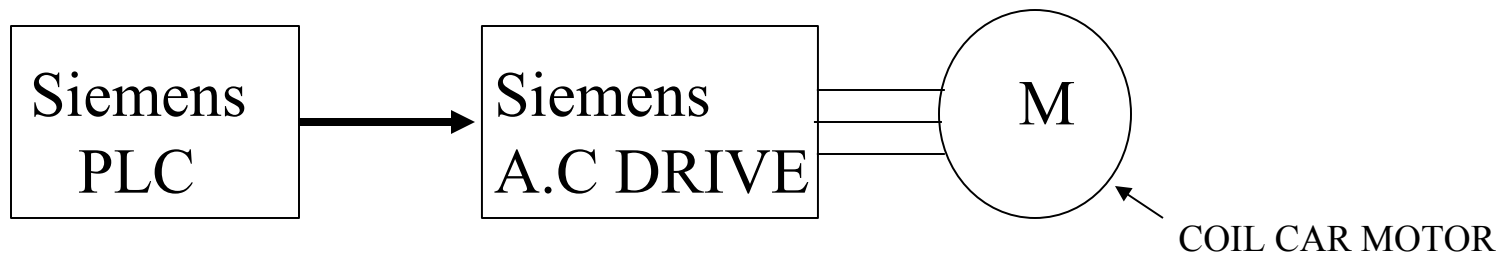
**COIL CAR NOT ABLE TO TRAVEL FORWARD
AFTER GETTING THE REFERENCE**

(It was observed that with a slight manual push , the car used to travel)

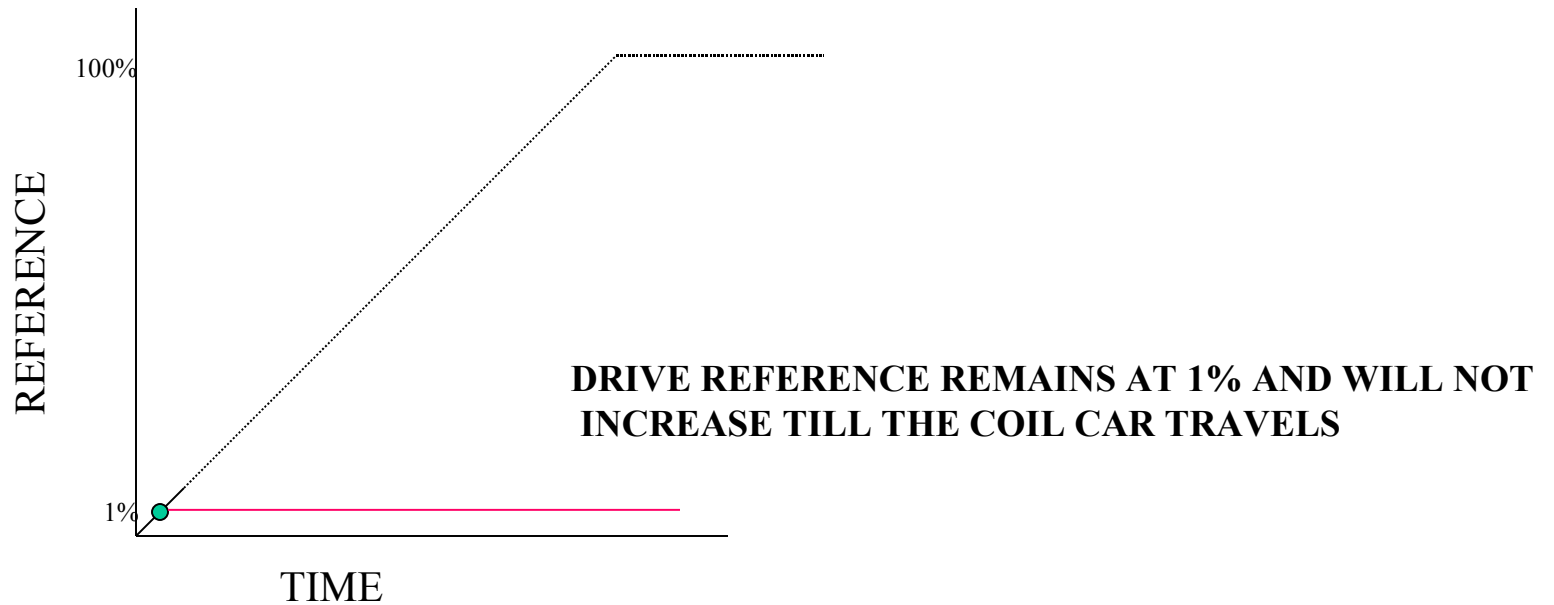


**DRIVE UNABLE TO PRODUCE THE
STARTING TORQUE**

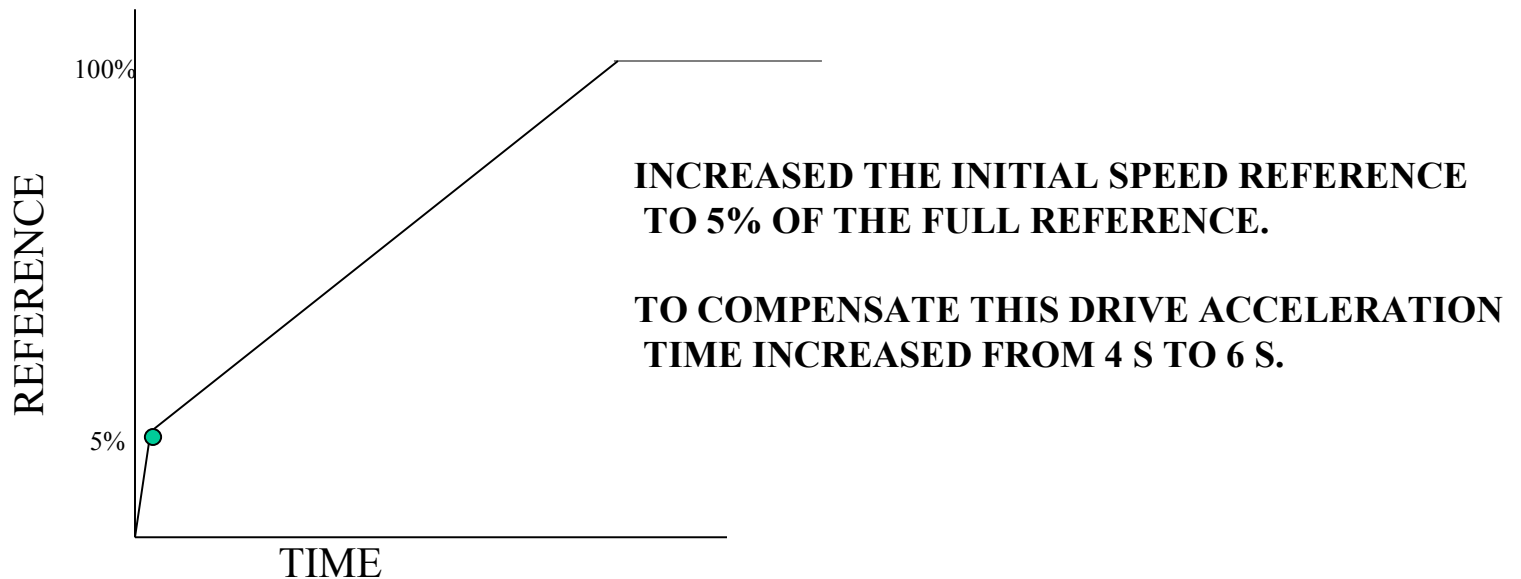
PLAN	DO	CHECK	ACT
Tune the drive parameters to increase the starting torque	Increased the current limit of the drive and varied the proportional & integral constants	cycle stops are still coming	Revert to normal drive settings
Check various monitoring parameters of the drive	Monitored all the Current and Speed parameters of the Drive	Observed that sometimes the drive reference was very less	Check the drive reference coming from PLC.
Check the drive reference generating program.	studied the refernce generation program in PLC	Found some times drive reference is 1% of the full reference. This much reference is not able to drive the coil car at saddle#3 due to a small curvature on the Rail. (This reference is a close loop function of distance travelled by the car)	As it is very tidious job to replace the Rails, we planned to increase the reference during starting of the drive



ANALYSIS FOR THE REFERENCE PROGRAM OF PLC



SOLUTION IMPLEMENTATION (on 24th Jan'05)



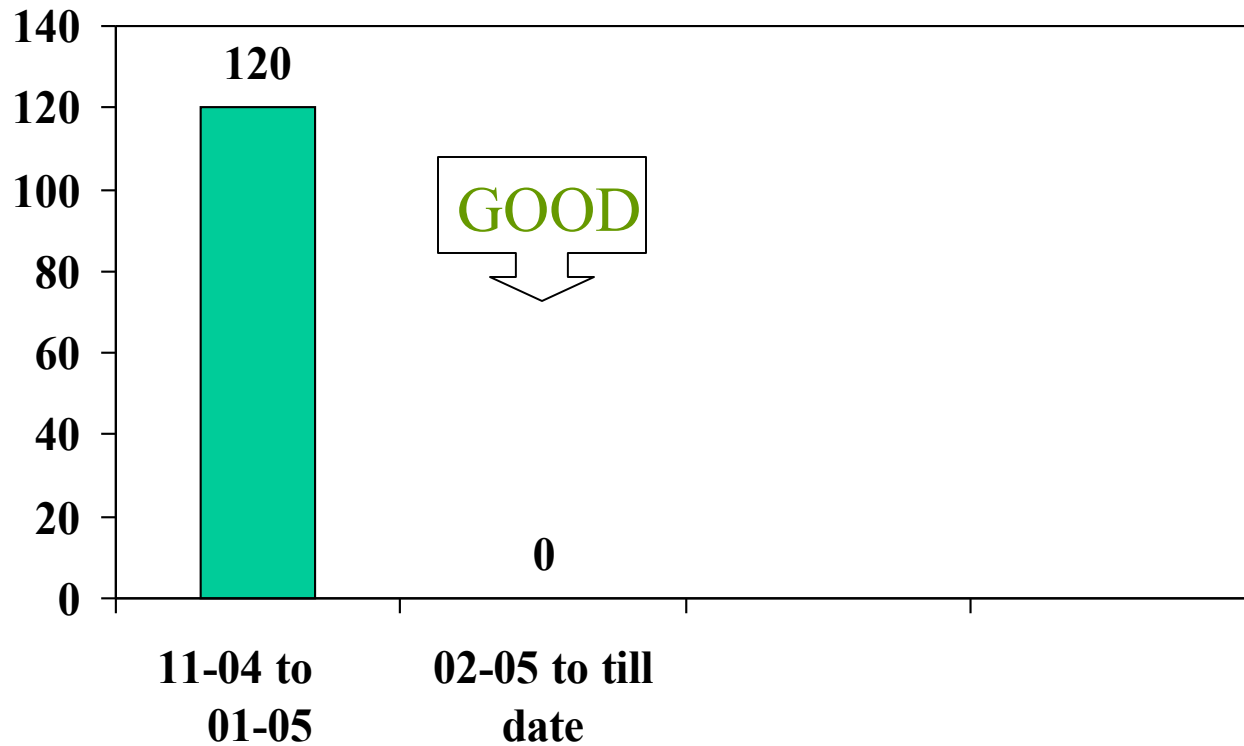
RESULTS

CYCLE STOPS OF CC8.1 AT SADDLE#3

BEFORE IMPL.

AFTER IMPL.

Frequency



THANK YOU