

N.F. Railway

Items for Technical Workshop at NF Railway office by IIT/Guwahati

Date: 05.03.2021

Session Chair: Prof. T.G. Sitharam, Director, IIT Guwahati

1. Civil Engineering Items :

(a) Geotechnical assistance in Hill section.

Slope failure in cutting as well on embankment during monsoon in hill section of Lumding –Silchar section, Cost effective solution for slope stabilization in the section is required.

Expert Faculty from IIT Guwahati

- 1) Dr. Arindam Dey (Civil Engineering)
- 2) Dr. Tadikonda Venkata Bharat (Civil Engineering)

(b) Bridges.

Audit inspection and remedial measure for super structure and sub-structure like negative camber in girder bridges, exposed pile, exposed reinforcement in pile and tilt of pile.

Expert Faculty from IIT Guwahati

- 1) Prof. Sudip Talukdar (Civil Engineering)

2. Mechanical engineering items:

(a) Wheel shelling in LHB coaches :

The problem: This problem manifests as the formation of cracks in wheel tread in the LHB coaches. The cracks are developed primarily due to fatigue. This leads to unsafe running of trains. Moreover, considerable material has to be removed from the wheel treads thereby leading to shortening of wheel life.

The solution required: This problem should be studied and solutions provided for minimizing the incidences of wheel shelling. It is also necessary that the preventive maintenance schedules of the Brake System and other related areas be examined and modifications be suggested for optimizing the wheel life.

Expert Faculty from IIT Guwahati

- 1) Dr. Deepak Sharma (Mechanical Engineering)
- 2) Prof. Uday S. Dixit (Mechanical Engineering)

(b) Breakage of coil springs in LHB coaches:

The problem: There are frequent breakages of flexicoil springs (both Primary & Secondary) in LHB coaches. This results in running of trains at restricted speeds and also sometimes the coaches have to be detached from the trains.

The solution required: The problem should be studied and measures suggested for preventing the breakage of coil springs in LHB coaches.

Expert Faculty from IIT Guwahati

- 1) Dr. Satyajit Panda (Mechanical Engineering)

3. Electrical engineering items:

a) Use of AI in Electrical systems :

- i. Use of AI to predict failure of any composite insulator.
- ii. Use of AI to measure the height of contact wire, stagger, take off point, take on point, clearance between contact and catenary wire at turnout/crossover.
- iii. Use of AI to identify high sparking location from electric loco.
- iv. Use of AI to analyse performance of high mast, power generation from solar system and healthiness of solar system from one location.

Expert Faculty from IIT Guwahati

- 1) Dr. Prithwijit Guha (Electronics & Electrical Engineering)

4. Signaling and telecommunication Engineering items:

(a) Analyses of data from Data Loggers to provide Synopsis of Signalling Failures:

Analysis of Signal failures is done by manually scrutinizing the data logger reports which is cumbersome and time consuming & may lead to wrong analysis.

It is proposed to develop the use of AI in analysing data logger reports and thereby identifying the actual cause of failures. The system should also generate alarms.

Expert Faculty from IIT Guwahati

- 1) Dr. Amit Awekar (Computer Science & Engineering)

(b) Design of Smart Yard:

Introduction of IoT in various signalling gears like Point Machines, Track Circuit, LED lamps, Block Instruments, L.C. Gates, cables etc. and monitoring their parameters, and through application of AI, potential failures can be predicted. Irregularities such as loose packing of points can be monitored and physical verification of proper housing of switch-rail can also be achieved and unsafe situations avoided.

Expert Faculty from IIT Guwahati

- 1) Dr. Gaurav Trivedi (Electronics & Electrical Engineering)

(c) Throughput analysis of traffic in Big yards & Junction stations:

Section capacity is limited by the throughput at Big Yards and Junction Stations. By use of AI in analysing the throughput of traffic in Big Yards & Junction stations assessment of the maximum no. of trains that can be handled in a particular station can be done and sequence of operations predicted for optimizing the movements.

Expert Faculty from IIT Guwahati

- 1) Prof. Akhilesh Kumar Maurya (Civil Engineering)

(d) Signalling Safety Assessment:

Designing of Signalling Safety Assessment system for accelerating the Safety Integrity level certification of new systems.

Expert Faculty from IIT Guwahati

- 1) Dr. Ramesh Kumar Sonkar (Electronics & Electrical Engineering)
- 2) Dr. Mahima Arrawatia (Electronics & Electrical Engineering)
- 3) Prof. Akhilesh Kumar Maurya (Civil Engineering)
- 4) Dr. Rishikesh Dilip Kulkarni (Electronics & Electrical Engineering)