

Railway Group

Africa India Science and Technology Initiative with ACEs

Date: 12-13 March, 2019

Venue: Conference Room, Department of Hydrology, IIT Roorkee

Participants:

1. Prof Abraham Gebre, Railway Education and Research, Addis Ababa University, Ethiopia
2. Prof Manoranjan Parida, IIT Roorkee
3. Prof Arghya Deb, IIT Kharagpur
4. Prof Yogendra Singh, IIT Roorkee
5. Prof Avinash Agarwal, IIT Kanpur (Via video conferencing)
6. Prof Aditya Saurabh, IIT Kanpur

Following points were discussed in meetings

1. Participants have shared the details of facilities available (experiments, software) at their respective institutes in the area of railway.
2. It was informed by Prof. Manoranjan Parida that an MTech program in railway engineering will start next year in IIT Roorkee.
3. Dr. Abraham Gebre has proposed 17 different PhD proposals where the joint research may be carried out.
4. Prof. Avinash Agarwal (IIT Kanpur, IITK) has expressed their desire to work in the area of “integration of alternative and renewable energy sources for traction application”.
5. Prof, Arghya Deb (IIT Kharagpur, IIT Kgp) has suggested the possibility of joint research in the area of
 - a. Developing a cost effective framework for infrastructure maintenance decision making of Ethiopian railway networks .
 - b. A study on fastening system optimization for heavy hauls and high speed track mechanistic behavior.
 - c. Studies on control of AC motors and design of a safe and reliable drive control for traction applications
 - d. Determination and simulation of wheel - rail profile evolution due to wear.
 - e. Rolling contact fatigue failure analysis of railway wheels under cyclic load.

Visits

6. It is proposed to conduct the exploratory visits of African faculties (to IITK and IIT Kgp) to see the lab facilities and explore the tentative research areas and to identify research topics to start the collaboration. It is proposed that the faculty visiting lay the ground work (research projects) for subsequent visits by the PhD students. The faculty visiting will also discuss and plan the workshop proposed for 2020.
7. It is proposed that faculty visiting from India take courses as identified during the workshop (11--13 March 2019) and mentioned below. In addition, faculty from India would be involved in evaluating and revising the present curriculum at ARCE, AAiT; as well as discussions concerning research activities, including (not limited to) preparation and submission of joint research proposals.

Courses

The courses to be offered would be 30 hour courses (3 hrs/day) within the span of 15 days proposed for Indian faculty visits.

- Seven potential courses have been identified by IIT Kgp in agreement with ARCE, AAiT (REGM6102, 6301, 6004, 6302, 6007; CENG6502). IITK has identified that a course in line with the area “Renewable energy and alternative fuels for railway applications” can be offered at ARCE, AAiT. ARCE, AAiT must discuss the possibility of developing such a course internally.
- ACE representative Dr. Abrham will discuss with other ACEs concerning the possibility of developing online/live course framework for AAiT.
- Given the possibility of developing online/live course infrastructure at ARCE, AAiT, IITK and IIT Kgp will propose which of the courses among the listed by ARCE, AAiT may be offered as an online/live course.

Year-wise plan:

Visits by Ethiopian faculty

2019: Two visits to India (one each to IITK and IIT Kgp.; tentative July-August)

2020: Two visits to India (one each to IITK and IIT Kgp.; tentative July-August)

Visits by Indian faculty

2019: None

2020: Two visits to Ethiopia (it is tentatively proposed that two faculty visit Ethiopia at the same time, with the condition that the courses offered are in different streams)

Visits by PhD students from Ethiopia to India:

2019: None

2020: 4 student visit, tentatively 2 each in IIT K and IIT Kgp. It is expected that the PhD students are being supervised by the faculty from ARCE, AAiT visiting India.

Visits by MSc students from Ethiopia to India: Visits by students from ARCE, AAiT to India are to be considered as part of their internships (4--8 weeks in August/September).

2019: 2 students

2020: 2 students

In all cases, efforts will be made such that research articles emerge out of the collaboration. For MSc students, this is feasible only if their thesis projects have been discussed by the concerned Indian and Ethiopian faculties in advance; and the internship projects are aligned with the thesis.

Workshops

It is proposed to conduct one workshop/symposium in Ethiopia/India with association of Indian faculty related to the focus area “Railway technology”. Such a workshop is planned for 2020.