Bio-data

of

Dr. Som N. Mahendra

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Bio-data Contents

BIODATA

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5. **Date of Birth:** 10-07-1949

6. **Qualification & Affiliation:**

Ph.D. in Electrical Engineering, London, 1976	
M.Sc. (Engg.) in Electrical Engineering, BHU, Varanasi 1972	FIRST
B.Sc. (Engg.) in Electrical Engineering, BHU, Varanasi 1970	FIRST
Intermediate, UP Board, 1966	FIRST
High School, UP Board, 1964	FIRST

7. **Membership of Learned Bodies**

   Fellow Institution of Electrical Engineers (FIEE) U.K.
   Senior Member Institute of Electrical & Electronics Engineers (SMIEEE) U.S.A.
   Life Member Institution of Engineers, (LMIE) India
   Life Member Indian Society for Technical Education, (LMISTE) India
   Life Member Indian Society for Transport Development in India, (LMATDI) India

8. **Professional Career**

   Director, National Institute of Technology, Kurukshetra, 11-11-2003 to 25-3-2005
   Professor, Dept. of Electrical Engineering, I.T. - B.H.U., 1993-continuing
   Reader, Dept. of Electrical Engineering, I.T.-B.H.U., 1979-93
   Lecturer (Temp) Dept. of Electrical Engg., I.T.-B.H.U., 1977-79
   Govt. of India's National Scholar. Research under Prof. A. J. Ellison, London, 1973-77.
   Lecturer (Temp), Dept. of Electrical Engineering, I.T.-B.H.U., 1973

9. Sponsored/Consultancy Projects Completed

a. ***'Computer Simulation of 25kV 50Hz a.c. Traction System',*** RDSO, Lucknow. 1989-91. **Rs. 1.94 Lacs**
b. ***'Effective Control Mechanism for Visually Handicapped Handloom'*****.** Textiles Min., 1989-91. **Rs. 1.9 Lacs**
c. ***'Linear Electric Motor Propulsion Project', 1994-1999 Rs.21.5 Lacs***
(i) 'High Speed Transportation with Linear Electric Motor Propulsion', MHRD Project 1994-96. **Rs.10 Lacs**
(ii) 'Malaviya Center for Development of Low Cost Metro Rail System Propelled by Linear Induction Motor', with partial Financial & Technical Support from BHU and SIRI 1996-97. **Rs.1.5 Lacs**
(iii) 'Development & Evaluation of Low Cost Linear Induction Motor Propelled Rail Metro System', AICTE Project 1997-99. **Rs.10 Lacs**

10. Countries Visited

Year	Place & country	Purpose	Supervisor
1973 to 1977	The City Univ., London, U.K.	Research on linear induction motors (LIM)	Prof. A. J. Ellison
1974	GEC Traction Ltd., Manchester, U.K.	Practical Training on designing of linear induction motors	Mr. S. C. Rimmer, Company Training Officer
1976	Swiss Federal Inst. of Tech., Lausanne, Switzerland	Meeting on feasibility of LIM based high speed ground transport	Prof. M. Juefer & his team
1976	Compagnie d'Energetique Lineaire, Lyon, France	Discussion on variable reluctance linear motors	Mr. M. Jean Guy & his team
1977	Linear Motors - Lintrol, Loughborough, U. K.	Discussion on linear motor manufacturing	Mr. A. W. Davey
1977	Brush Electrical Machines, Loughborough, U. K.	Manufacturing practices/techniques	Mr. J. S.. Chahal

11. Awards

a. ISTE 1997 'Rajaram Bapu Patil National Award for Promising Engineering Teacher'

b. ISTE–L&T 1996 Award for guiding Second Best M.Tech. Thesis
c. NRDC Republic Day 1993 Award for the Invention of 'Effective Control Mechanism to be attached to the Handloom for the Visually Handicapped'
d. IEE (U.K.) Premium Award 1977 for Best Technical Paper entitled ***"Revival of Transverse Flux Machines for High Speed Ground Transport",*** presented & published in the Journal of IEE Electronics & Power.

12. Scholarships Won

- J.R. Board Travelling Award of the IEE (U.K.) (1975)
- Student Travelling Scholarship of the IEEE (U.S.A.) (1975)
- National Scholarship for study Abroad of Government of India for Ph.D. in Electrical
- Engineering. Specilisation: Linear Electric Machines (1973-77)
- U.G.C. (India) Scholarship for M.Sc. (Engg.) 1970-72)
- Merit-cum-Means Scholarship for graduation course (1966)
- Merit Scholarship on the basis of High School Exam. Marks (1964-66)

13. Special Positions Held

- **Chairman**, Telephone Service Committee, BHU, since 2001
- **Chairman JEE-97, 2006 & 2007** IT-BHU
- **Vice Chairman JEE-96** IT-BHU
- **Course Coordinator** for Linear Induction Motor Based Traction Special Courses **for Officers of** various units of **Indian Railways** organized at Indian Railway Institute of Electrical Engineering (IRIEEN), Nasik.

Sr. No.	Period	Course Title	Faculty
1	24-01-2000 to 28-01-2000	Linear Induction Motor Applications for Indian Railways	Dr. S. N. Mahendra, Professor & Course Coordinator Dr. T. Srinivasan, Professor in Elect. Engg. Shri A. K. Tiwari, Lecturer in Elect. Engg. Dr. M. Bhattacharrya, V.C., Assam Univ., Silchar
2	20-11-2000 to 24-11-2000	Linear Induction Motor Based Traction	Dr. S. N. Mahendra, Professor & Course Coordinator Dr. R. K. Srivastava, Lecturer in Elect. Engg. Shri A. K. Tiwari, Lecturer in Elect. Engg. Dr. M. Bhattacharrya, V.C., W. B. Tech. Univ., Calcutta
3	18-12-2001 to 21-12-2001	Linear Induction Motor & Metro Railways	Dr. S. N. Mahendra, Professor & Course Coordinator Shri A. K. Tiwari, Lecturer in Elect. Engg.
4	25-11-2002 to 29-11-2002	Linear Induction Motor & Metro Railways	Dr. S. N. Mahendra, Professor & Course Coordinator Shri A. K. Tiwari, Lecturer in Elect. Engg.

- **Organisation Secretary/Coordinator**

  a. **International Workshop on LIM Propelled Rail Metro System,** Dept. of Elect. Engg., IT, BHU., Jan. 8-9, 1999.
  b. **Lecture Series entitled (i) 'Engineering Applications of Electrostatic Fields' & (ii).'Electric Field Breakdown of Insulating Media'**, by Dr. K. Natrajan, Dy. G.M., BHEL R&D, Hyderabad. Dept. of Elect. Engg., IT, March 15-16, 1996.
  c. **IEEE Workshop on Parameter Identification for Condition Monitoring of Electrical Equipment - PICMES**, Dept. of Elect. Engg., IT, BHU, Dec. 11-12, 1995.
  d. **Lecture Series entitled 'Modern Railway Transportation & Rapid Transit Systems'** by Jagdish Upadhyay, Visiting Professor & Former Member Electrical Railway Board. Dept. of Elect. Engg., IT, BHU, March 24 & April 1, 1995.
  e. **IEEE Workshop on Condition Monitoring of Electrical Equipment,** Dept. of Elect. Engg., IT, BHU, April 8-9, 1994.

- **Executive Committee Member** (a) IEEE (USA) U.P.-Section, (b) Institution of Engineers (India) Varanasi Chapter, (c) Association for Transport Development in India (ATDI).
- **Vice Chairman IEEE** (USA) U.P.-Section

14. Recent Publications

(a). Papers in Referred Journals

1. Srivastav, R.K. and Mahendra, S.N.
Operating Characteristics of Double Gap SLIM, IE (I) Journal-EL, V 81, March 2001, pp.166-169.
2. Nik Nejad A.H., Mahendra S.N. and Mola Nejad M.
Motion Control of Force Producer in Spherical System, IEEE International Conference on
Industrial Technology, (ICIT-2000), Goa (INDIA), Jan. 2000, Vol. 2, pp. 694-698.
3. Srivastav, R.K. and Mahendra, S.N.
Drag Plate-Single Sided Linear Induction Motor, IEEE International Conf. on Industrial
Technology (ICIT-2000), Goa (India), 18-22 Jan 2000, Vol. 2, pp. 699-702.
4. Srivastava, R.K. & Mahendra, S.N
Analysis of Drag Plate Single-Sided Linear Induction Motor Using FEM Software Ansys 5.0: Modeling & Computational Details, Published in Conference Proceedings (CD) of 9th International Conf. 'Simulation: Leading Design into the New Millennium', Pittsburgh. Aug 28-30, 2000 (appeared in index at www/Ansys.Com/ Conf_2000)
5. Mahendra, S.N. and Upadhyay, J.
R&D Project at IT-BHU for Development of LIM Propelled Rail Metro for Medium Size Indian Cities, 8th World Conference on Transport Research (WCTR-98),

Antwerp, Belgium, July 12-17, 1998. *Special Interest Group (SIG-1): Urban Development Problems.*

6. Sarkar, B.P., Mahendra, S.N. and Prasad, M.
   Innovated Handloom for Visually Handicapped Weavers, *Awarded Invention* published in NRDC Journal Invention Intelligence, May 1994, p265-270.
7. Srivastava, R.K. & Mahendra, S.N.
   Operating Characteristics of Double Gap Linear Induction Motor, presented in Paper Meeting of Institution of Engineers (India). Jaipur 26th Nov. 2000 & Communicated for publication in the Journal of Electrical engineering, Institution of Engineers (India).
8. Tiwari A.K. & Mahendra, S.N.
   Condition Monitoring of Electrical Equipment's: Why? When? How? Proc. of All India Seminar on Condition Based Monitoring, Bhubneshwar, July 25, 1999.

(b). <u>Papers Published in Conference Proceedings</u>

1. Mahendra, S.N. (2001):
On Integration of National Expertise for Development & Adoption of Lim Based Traction for Urban Transportation, All India Seminar on ELECTRIC TRACTION –The Challenges & Development in Indian Context, Organised by Electrical Engineering Division, West bengal State Center, The Institution of Engineetrs, India, Calcutta, Aug. 24-25, 2001, pp 128-137.

2. Mahendra, S.N. (2001):
Linear Induction Motor Propelled Rail Metro System, International Seminar on Electric Energy Management in Rail Sector, Organised by Institution of Railway Electric Engineers, Vigyan Bhavan, New
Delhi, February 2-3, 2001, p III-24 to III-35.

3. Mahendra, S.N. (1999):
LIM Based Traction: Philosophy, Selection, Design-aspects & Application to Transport Sector, International Workshop on 'LIM Propelled Rail Metro System' Department of Electrical Engineering, IT-BHU, January 8-9, 1999, pA-1 to A21.

5. **Mahendra, S.N. and Upadhyay, J.**
R&D Project at IT-BHU for Development of LIM Propelled Rail Metro for Medium Size Indian Cities. 8th World Conference on Transport Research (WCTR-98), Antwerp, Belgium, July 12-17, 1998. *Special Interest Group (SIG-1): Urban Development Problems.*

6. **Srivastav, R.K. and Mahendra, S.N.**
Modeling of End-Effects in Linear Induction Motor Using Finite Element Method. International Conference on Computer Applications in Electrical Engineering – Recent Advances (CERA'97), Roorkee, India, Sept. 8-11, 1997, pp 168-171.

7. **Mahendra S.N. and Goel A.K.**
R&D Plan for Embedding Transducers during manufacturing stage for Condition Monitoring of Electrical Machines, Proc. Of IEEE Workshop on Parameter Identification for Condition Monitoring of Electrical Systems Dec. 11-12, 1995, p v 10-v 12.

(c). Books, Thesis, Reports & Articles

1. Mahendra, S.N. & Upadhyay, J. (1999):
Low-Cost LIM Propelled Metro System for Indian Cities, Urban Railways, v 2, Issue II, Nov. 1999, p 15-21.

2. Mahendra, S.N. (Editor) (1999):
Proceedings of Workshop on "LIM Propelled Rail Metro System", Organised by Department of Electrical engineering, IT-BHU, Varanasi, January 8-9, 1999, (Book).

3. Upadhyay, J. & Mahendra, S.N. (2000):
Electric Traction, Allied Publishers Ltd., New Delhi, 2000, (Book).

4. Mahendra, S.N. and Upadhyay, J.
LIM Propelled Rail Metro – best alternative for urban transportation in medium size Indian cities. IRT Journal, Indian Railways.

5. Mahendra S.N. (Editor) (1995):
Proceedings of IEEE Workshop on Parameter Identification for Condition Monitoring of Electrical Equipment - PICMES, Dept. of Electrical Engg., IT,BHU, Varanasi, December 11-12, 1995.

6. Mahendra, S.N. (Editor) (1994):
Proceedings of IEEE Workshop on Condition Monitoring of Electrical Equipment, held on April 8-9, 1994 at Dept. of Electrical Engg., IT,BHU, Varanasi, published by C.B.I.P., New Delhi.

7. Subba Rao, V.S., Raju, G.S. and Mahendra, S.N. (1991):
Computer Simulation of 25 kV A.C. Traction System
Vol. I : Methodology and Programme Development
Vol. II : User's Manual
Project Reports submitted to Traction Installation Directorate, Research Design & Standards Organisation, Ministry of Indian Railways, Lucknow. Sept. 1991.

8. Sarkar, B.P., Mahendra, S.N. and Prasad, M. (1990)
To design Effective Control Mechanism to be attached to the Handloom for Visually Handicapped People. Final Project Report submitted to the Development Commissioner for Handlooms, Ministry of Textiles, Govt. of India. Aug. 1990.

15. Current Area of Research

Three decades of R&D in the field of linear induction motor propulsion systems has resulted in expertise and confidence in this area. The expertise thus developed has been tested during the creation of **Malaviya Center for Development of Low Cost LIM Propelled Rail Metro** in IT-BHU. The complete system was designed in IT-BHU as per desired specifications. This was later manufactured in Varanasi by integrating the developed techniques and expertise with the manufacturing facilities locally available. During trial runs and tests the performance satisfactorily matched with the desired performance.

This complete exercise has finally resulted in the indigenization of this technology in India. Apart from solving the urban transportation problem of Indian cities, the developed technology has tremendous export potential, as the

urban transport problem all over the world is no different than that of Indian cities.

Current R&D activities include following:

- Development of methodology for solving (with public participation) the urban transport problem of Indian cities with population level exceeding 10 Lakhs. This is possible now because with LIM based traction the most economical transport system suitable for a particularly city can be conveniently tailored.
- Conduct of short-term courses/lectures for officers of Indian Railways, non-technical people, users, manufactures etc. to reduce the perception gap between the technology and decision makers. This exercise is primarily required to develop confidence in the minds of decision makers in this new cost effective technology.
- Train specialized manpower through B.Tech./M.Tech. projects/dissertations and research programmes. Training includes design, analysis, fabrication, testing, instrumentation, control, etc. aspects. This exercise will create manpower that will be capable of effectively implementing and adopting this new technology in the modern transport systems.

Currently efforts are in progress to reduce the **specific energy consumption** during run between two stopping stations by employing an indigenously developed control and operation algorithms.

16. Details of Commercialization of Technologies developed

Efforts are in process for commercial exploitation of the following two technologies developed during the years:

1. **Handloom for the visually handicapped** that enables a visually handicapped weaver to weave fault-free multi-colour fabric without the assistance of a supervisor. This has two main advantages:
   - The fabric is fault-free and thus the visually handicapped weaver gets full return of the efforts put by him.
   - The weaver is not dependent upon the assistance of his supervisor and thus he develops and enjoys self-confidence and independence.

2. **LIM Based propulsion systems** in which the moving member moves without relying upon adhesion between the driving wheel and the stationary track. Adoption of this technology has following distinct advantages:
   - Maintenance is virtually zero as the wheels (moving on bearings) are the only moving parts. Even the axle is no-rotating.
   - Manufacturing & maintenance is minimum and greatly simplified.
   - Diameter of underground tunnel is reduced with LIM based traction and this results in 30-40% cost reduction which amounts to a saving of about Rs.400 to 600 million per Km.

- Noise level is minimal.

Various components of LIM based traction have been identified and discussed at various forums. It has been demonstrated that expertise is available at national level and it only requires a consortium approach to realize the adoption of this technology in a cost effective manner.

17. Research & Development Activities Profile summary of Dr. Som Nath Mahendra, Professor in Electrical Engineering, IT-BHU, Varanasi

Dr. Som Nath Mahendra, Professor in Electrical Engineering at Institute of Technology, Banaras Hindu University, Varanasi, India, has been working on Linear Induction Motors (LIM) since 1971. Between 1971 and 1973 he fabricated three LIM's for shuttle propulsion in power looms. His significant contribution was the development and fabrication of a novel *Double-sided sandwiched primary LIM* that combines advantages of longitudinal-flux and transverse-flux LIM's and would be particularly useful for overhead transport system.

Between 1973 and 1977 Dr. Mahendra worked on '*three-dimensional finite-difference electromagnetic-field analysis of LIM*' at The City University, London, under Govt. of India's National Scholarship for Study Abroad. His Ph.D. thesis topic was '*Current & Flux Densities, Forces & Stiffness in Linear Induction Machines*'. He developed yet another novel geometry of induction motor viz. *Basic Transverse Flux Circular Motor (BTFCM)* for experimental validation of the developed three-dimensional mathematical model and the related software for electromagnetic field analysis of LIM. This BTFCM was exhibited in the IEEE exhibition during INTERMAG-75 at the Imperial College of Science & Technology, London. Paper based on this was awarded *IEE Student Premium Award 1977 for Best Paper entitled 'Revival of Transverse Flux Induction Machines for High Speed Ground Transport'*. During this period he visited LIM related R&D establishments in Switzerland, France and the U.K.

Since 1977 he has been instrumental in the development of working models to demonstrate feasibility of LIM for *overhead transportation*; *people-mover system* for closed-loop circular-track (for places like Counaught Place, New Delhi); *belt and bucket conveyors* for material handling; *ore-sieving* for mining industry etc. He has guided more than 30 B.Tech. Projects, 15 M.Tech. Projects & Dissertations and two Ph.D. thesis related to design, analysis, fabrication and testing aspects of LIM. Dr. Mahendra has co-authored a book entitled '*Electric Traction'* with Late Shri Jagdish Upadhyay, Former Member (Electrical) Railway Board; Visiting Professor & Technical Expert-cum-advisor to LIM Metro project at IT-BHU.

As Principal Investigator of MHRD/AICTE projects at IT-BHU Dr. Mahendra has been responsible for creating a unique facility for design, analysis, testing and evaluation of LIM. This facility has been named after the illustrious founder of BHU and is called "*Malaviya Center for Development & Evaluation of Low Cost LIM Propelled Rail Metro System"*. To bridge the perception-gap between LIM based traction technology and the industry he organised an *International Workshop on "LIM Propelled Rail Metro System"* in January 1999 in which 38-organisations participated and deliberated on the subject. The Workshop was sponsored by Indian Railways and M/s ADtranz (ABB Daimler-Benz Transportation (India) Ltd.

To promote awareness and appreciation of LIM technology, Dr. Mahendra has also organised four '*One-week Special Course on LIM Based Traction'* for the Railway officers in January 2000, November 2000, December 2001 & November 2002 at IRIEEN, Nasik.

Dr. Mahendra has been recipient of number of awards like (a) *'National Research Development Corporation (NRDC) Republic Day Award – 1993'* for invention of *an attachment for handloom for visually handicapped so that they can weave fault-free fabric without supervisory assistance*. (b) *'ISTE–L&T 1997 National Award as Guide of Second Best M. Tech. Thesis'* entitled 'Three Dimensional Field Analysis of Linear Stepper Motor Using Finite Element Method' (c) *'ISTE (Indian Society for Technical Education) Rajaram Bapu National Award for Promising College Teacher – 1997'*.

Dr. Mahendra is a Fellow of IEE (UK) and a Senior Member of IEEE (USA). He is also in the executive committees of these professional bodies. Marquis Who's Who have decided to include his biography in the *18th Edition of Who's Who in the World – 2001*.

18. Activities as Director National Institute of Technology, Kurukshetra [11-11-2003 to 25-3-2005]

As Director National Institute of Technology, Kurukshetra, for a period less than 18 months [11-11-2003 to 25-3-2005] the **activities undertaken and accomplished have been reported in the three NEWS LETTERS published by the Institute** with a view to disseminate the progress of the Institute during the period. Each of the three NEWS LETTERS richly report he progress made by the Institute during six-month blocks. Few **major achievements have been:**

- Four Departments of the Institute (viz. Electronics & Communication, Mechanical, Electrical and Civil) received Accreditation for 5 years.
- Long awaited CAS for faculty members implemented partially.
- National Level Exhibition of Scientific & Technical Books and Learning Resources organized in collaboration with the National Project Implementation Unit (NPIU) of Govt. of India on Sept. 23-25, 2004. The exhibition, the first of its kind in India, was organized under Technical Education Quality Programme (TEQIP).
- MOU's have been signed with eight networking institutions under TEQIP. Thus NITK has largest network under TEQIP in the country.
- NITK has been identified as one of the host institution for Early Faculty Induction Programme (EFIP) of AICTE.

Since January 2005, after the third NEWS LETTER, following activities have been initiated/accomplished:

- Chaired National conference on Electric Vehicles in New Delhi on February 2, 2005.
- Senate meeting on February 5, 2005.
- Inauguration of IPR awareness programme at C. R. State College of Engineering, Murthal, organized under TEQIP on February 15, 2005.
- Inauguration of the Senate Hall on February 19, 2005
- Meeting of the Board of Governors on February 19, 2005
- Chief Guest on Science Day at Kurukshetra University on February 28, 2005
- Delivered 37th Convocation IGNOU Address at Karanal Regional Center on March 5, 2005
- Realizing an urgent necessity in the present social set-up wherein the students are increasingly falling prey to tension, **One-Day Workshop on Student Counseling** was organized on March 12, 2005.
- Second Convocation of the Institute organized on March 19, 2005 with Shri E. Sreedharan, Managing Director, Delhi Metro Rail Corporation, New Delhi, as the Chief Guest.
- Networking of the entire academic area with 2Mbps Internet line initiated.
- Process initiated for providing PCs to the staff and improving their office infrastructure.
- Process initiated for Automation of the Institute Activities through a Decision Support System for computerization of academic, administrative, accounts, stores etc. processes for increasing the Institute efficiency.

- Process initiated for Creation of QIP center for effective utilization of expertise and equipment in the Institute to upgrade the knowledge of technical manpower in the region.
- Process initiated for identifying and organizing joint activities with the networked institutions under TEQIP.
- Process initiated for starting professional competency certification programme for the graduates interested in taking-up a career in construction sector. The Construction Industry Development Council (CIDC), established by the Planning Commission, Govt. of India, and the Construction Industry, has taken initiative in collaboration with Glasgow Caledonian University, U.K.
- Process initiated for to promote cooperation and mobility in the field of technology and science between France and India. French delegation scheduled to visit on April 2, 2005, for discussion.
- Process initiated for establishing connectivity recently launched EDUSAT for interactive distance teaching/learning programme of Government of India.

With a view to improve interaction of the Institute with other organizations following discussion meetings were attended:

- DIT Ministry meeting for starting **Information Security Programme** at graduate/post-graduate level in NIT, Kurukshetra. January 13, 2005.
- UGC programme on **"Autonomy of Higher Education Institutions"** at Golden Jubilee Seminar Complex, Punjab University, Chandigrah. January 19-20, 2005.
- CII Workshop on **Building Competitiveness in Higher Education: '*The Quality Lever*'**, February 22-23, 2005.

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