List of publications (Journal Papers / Conference Proceedings / Research Reports/ Presentation) of

of

Professor Dr. M. Mahbubul Alam

Published Thesis, Research works and Reports

1. **Alam, M. M. and Rauf R**, "Construction of Brine-bath to Produce Small amount of Ice", in the Department of Mechanical Engineering, Bangladesh University of Engineering & Technology, Dhaka-1000, Bangladesh from July 1982 to July 1983. Published as B.Sc. Engineering Thesis.

2. **Alam, M. M.**, "Analysis of Yaw Stability of Horizontal Axis Wind Turbines", in the Department of Mechanical Engineering, Bangladesh University of Engineering & Technology, Dhaka-1000, Bangladesh from February 1986 to July 1987. Published as M.Sc. Engineering Thesis.

3. **Alam, M. M.**,"Wind Power for Low-lift Pumps ", in the Department of Engineering, University of Reading, Whiteknights, Reading RG6 2AY, England from October 1990 to March 1991. Published as a research report as a part requirement for transfer of Higher Degree registration to Ph.D.

4. **Alam, M. M.**,"Wind-driven Rotodynamic Pumps for Low-lift Applications", in the Department of Engineering, University of Reading, Whiteknights, Reading RG6 2AY, England from March 1991 to March 1994. Published as Ph.D. Thesis.

5. **Alam, M. M.**, "Wind Energy Resource Mapping Project for Bangladesh", Final Report of 807 full color pages published by Apostrophe Engineer June 2006, funded by UNDP.

6. **A.N.M.M.I. Mukut, M.Q. Islam and M.M. Alam**, "Prospect of wind energy in the coastal belt of Bangladesh". Pacific Journal of Science and Technology Received on December 4, 2008, to be published.

Published Journal Papers, Proceedings and Presentationts

7. **Alam, M. M.**, "Effect of Yaw on Rotor Stability of Horizontal Axis Wind Turbines"- Journal of Mechanical Engineering Research & Development (Formerly Mechanical Engineering Research Bulletin) BUET, Dhaka, Bangladesh, Vol. 10. pp. 1-10, 1987.

8. **Alam, M. M.**, "Effect of Linearized Blade Shapes in Horizontal Axis Wind turbines"- Proceedings of International Energy Conference, Energex 88, Vol.-3: Wind Energy, pp. 11-15, Tripoli, Libya, November 25-30, 1988.

9. **Alam, M. M.**, "Horizontal Axis Wind Turbines Under the Influence of Yaw"- Proceedings of the First World Renewable Energy Congress, Whiteknights, England, Vol. 3, pp. 1919-1624, September 23-28, 1990.

10. **Smulders, P. T., Alam, M. M. and Burton, J. D.**, "Wind Rotors and Rotodynamic Pumps"- Journal of Wind Energy: Technology & Implementation, Elsevier Publisher, Amsterdam, The Netherlands, pp. 692-696, 1991.

11. **Alam, M. M.**, "Appropriate Matching of Positive Displacement Pumps for Wind Pumping Systems" - Proceedings of the 39th Annual Convention of IEB, Chittagong, Bangladesh, January 9-12, 1995.

12. **Alam, M. M.**, "The Scope of Wind Pumping Systems with Centrifugal Pumps in Some Windy Locations of Bangladesh" - Proceedings of the Second Annual Paper Meet, Institute of Engineers Bangladesh, Rajshahi Center, pp. 5-14, September 28-30, 1995.

13. **Alam, M. M.**,"Wind-driven Regenerative Pump: Technically the best Match for Low-lift Water Pumping, Applicable to Drain Flood Water in Bangladesh" Proceedings of the 5th Arab International Solar Energy Conference, Manama, Bahrain, November 13-16, 1995.

14. **Alam, M. M.,** "Low Lift Wind Pumping Systems for Bangladesh"-Presented at the Workshop on Wind and Solar Energy Application for Rural Development, Centre for Energy Studies, BUET, Dhaka, 4-5 March, 1997.

15. **Alam, M. M.**,"Low Lift Wind Pumping Systems for Bangladesh"-Presented at the Workshop on Wind and Solar Energy Application for Rural Development, Centre for Energy Studies, BUET, Dhaka, 4-5 March, 1997.

16. **Alam, M. M.**,"Low Lift Wind Pumping Systems for Irrigation in Bangladesh" Proceedings of NSREPA'97,. National Seminar on Renewable Energy for Poverty Alleviation, Institute of Bangladesh, Dhaka Centre, October 21-23, 1997.

17. **Alam, M. M.**, "An Overview of Regenerative Pump Theories as Applicable for Wind-driven Systems"-Proceedings of ISFMHT'97, Second International Seminar on Fluid Mechanics and Heat Transfer, Department of Mechanical Engineering, BUET, Dhaka, Bangladesh, December 17-18, 1997.

18. **Alam, M. M. and Amin, M. R.**,"Improving Performance of Parabolic Concentrator Using Vacuum Technology for Water Heating"-Proceedings of 3rd International Conference on Solar Electricity, Emirate of Sharjah, March 21-25, 1998.

19. **Alam, M. M.**, **Uddin, M. S. and Ullah, M. Z.,** "Some Results of Solar Energy Application for use in Bangladesh"- Presented at the International Conference on Role of Renewable Energy Technology for Rural Development, Kathmandu, Nepal, 12-14 October, 1998.

20. **Alam, M. M.**, **and Jinnah, M. A.,** "Wind Turbine Power Simulation for use in Developing Countries"-Presented at the International Conference on Role of Renewable Energy Technology for Rural Development, Kathmandu, Nepal, 12-14 October, 1998.

21. **Amin, M. R., Khoshru, H. K. and Alam, M. M.,** "Design and Construction of a 24 Bladed Wind Turbine for Supplying Water for Gardens of LGED Campus at Tangail", Presented at the 12th Bangladesh Science Conference, Bangladesh Association for the Advancement of Science (BAAS), Dhaka, November 28-30, 1998.

22. **Alam, M. M. and Burton, J. D.**, "The Coupling of Wind Turbines to Centrifugal Pumps: Wind Engineering, Vol. 22. No. 5. pp. 223-234,1998, UK.

23. **Alam, M. M.**, "Appropriate Wind Energy Conversion System for Bangladesh and Some Related Research" Presented at the SAARC Expert Meeting on Utilization of Wind Energy, Dhaka, December 13-15, 1998.

24. **Hussain, S. S. and Alam, M. M.**, "Fabrication of a Wind Pump and Testing of its Combined performance"-Proceedings of ISREPA-99, pp. 287-294, 2nd International Seminar on Renewable Energy for Poverty Alleviation, The Institution of Engineers, Dhaka, Bangladesh, November 26-27, 1999.

25. **Alam, M. M., Rizwan, T. and Hussain, I.**, "Generation of Electricity by a Vertical Axis Wind Turbine"-Proceedings of ISREPA-99, pp. 295-305, 2nd International Seminar on Renewable Energy for Poverty Alleviation, The Institution of Engineers, Dhaka, Bangladesh, November 26-27, 1999.

26. **Roy, R. C. and Alam, M. M.**, "Wind Resources Assessment at Chandona, Gazipur, Dhaka "-Proceedings of ISREPA-99, pp. 312-321, 2nd International Seminar on Renewable Energy for Poverty Alleviation, The Institution of Engineers, Dhaka, Bangladesh, November 26-27, 1999.

27. **Alam, M. M.**, "Development of Power Simulation Model for Wind Energy Conversion Systems" Journal of Mechanical Engineering Research and Development, Vol. 20-21. No. 5. pp. 71-80, December 1999, Dhaka, Bangladesh, ISSN 1024-1752.

28. **Alam, M. M.**, **and Sarker, M. A. R.,** "Appropriate Windpumping System for Flood Affected Regions of Bangladesh"- Presented at the International Seminar on Commercialization of Renewable Energy Technologies, Ministry of Science and Technology, Government of Bangladesh, Brac-CDM, Gazipur Dhaka, October 31- November 2, 2000.

29. **Alam, M. M.**, **and Sarker, M. A. R.,** "Wind Turbine Power Simulation Model for Use in Bangladesh" - Proceedings of International Conference on Critical Issues in Energy and Development- Challenges for the OIC Countries, pp. 253-257, November 20-23, 2000, Dhaka, Bangladesh.

30. **Roy, R. C. and Alam, M. M.**, "Analysis of Wind Energy at Chandona, Gazipur, Dhaka Based on Actual Field Data"-Proceedings of ICME 2001, pp. 101-106, 4th International Conference on Mechanical Engineering, Department of Mechanical Engineering, BUET, Dhaka, Bangladesh, December 26-28, 2001.

31. **Sarker, M. Z. A. and Alam, M. M.**, "Air Pollution due to Vehicle Exhaust in Dhaka city"-Proceedings of ICME 2001, pp. 37-42, 4th International Conference on Mechanical Engineering, Department of Mechanical Engineering, BUET, Dhaka, Bangladesh, December 26-28, 2001.

32. **Alam, M. M.**, "Performance Enhancement of Fluorescent Light for use in Bangladesh" Presented at the World Conference on Technology Advances for Sustainable Development, Cairo, Egypt, March 11-14, 2002.

33. **Alam, M. M.**, "Wind Energy Resource Mapping (WERM) Project for Bangladesh – the Enviable Approach for successful Implementing of Wind Energy Systems" Presented as an Invited Keynote Speaker at the Training workshop on Renewable Energy Technologies for Clean and Sustainable Development, Amman, Jordan, March 25-28, 2002.

34. **Alam, M. M.**, "Wind Energy Resource Mapping Project for Bangladesh: A Step Forward Towards Successful Implementation of Wind Energy Conversion Systems", Presented as an Invited Speaker at the International Workshop on Vacuum in Renewable Energy Technologies (IWVRET'03), Islamabad, Pakistan, April 15-19, 2003.

35. **Alam, M. M.**, "Performance Enhancement of Solar Water Heater by Applying Vacuum During High Humid Seasons In Bangladesh", Presented as an Invited Speaker at the International Workshop on Vacuum in Renewable Energy Technologies (IWVRET'03), Islamabad, Pakistan, April 15-19, 2003.

36. **Alam, M. M.**, **and Murtaza, M**., " Some Results of Wind Energy Resource Mapping (WERM) Project for Bangladesh and Future Prospects", Proc. of 3rd International Conference on Renewable Energy for Sustainable Development, pp. 261-270. The Institution of Engineers, Dhaka, Bangladesh, October 2-4, 2003.

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37. **Iqbal, M. , Malek A.B.M.A. and Alam, M. M.**, "Wind Data Monitoring at Shahjalal University of Science and Technology" Proc. of 3rd International Conference on Renewable Energy for Sustainable Development, pp. 235-240. The Institution of Engineers, Dhaka, Bangladesh, October 2-4, 2003.

38. **M. Zakir Hossain, Hiroyuki Hirahara, M. Mahbubul Alam, Masaaki Kawahashi and Yoshitami Nonomura**, "An Experimental Study of Wing Passage Flows of a Micro Wind Turbine System"-Proc. of 5th International Conference on Mechanical Engineering (ICME 2003), Paper No. FL-06 pp. 1-6, Department of Mechanical Engineering, BUET, Dhaka, Bangladesh, December 26-28, 2003.

39. **Muhammad Mahbubul Alam and M. Al-Emran Hussain**, "Performance Prediction by Wind Turbine Power Simulation Model for use in Developing Countries" Accepted to be present at the 8th Arab International Solar Energy Conference and the Regional World Renewable Energy Congress, to be held in Bahrain, 8-10 March 2004.

40. **A.N.M.M.I. Mukut, M.Q. Islam and M.M. Alam**, "Estimation of wind energy potential in coastal areas of Bangladesh by using Weibull distribution" Proceedings of the 4th BSME-ASME International conference on Thermal Engineering-Renewable Energy and Environmental Information Network. December 2008, Dhaka-Bangladesh, pp 725-730.

41. **K.A. Rahman & Alam, M.M.**, "Pioneering of a prediction method for wind speed and validation for local site records". Proceedings of the 7th International Conference on Mechanical Engineering, ICME2007, 29-31 December 2007, Dhaka.

Research Background
of
Professor Dr. M. Mahbubul Alam

Background of my wind energy research*:*

The geographic location of Bangladesh combined with its climate, give rise to the occurrence of severe windstorm and / or flood in almost every year. Due to extreme population density, lack of opportunity and the disastrous situation of the country encouraged me (being a graduate from BUET) to look for new and renewable sources of energy and perform research in this field of study.

The **Department of Mechanical Engineering** at BUET, where I have been working, is one of its kind, which has been serving as the center of excellence for renewable energies for long time. With the present situation of world-wide energy situation, **wind energy** became one of the top priority subjects in the curricula both in undergraduate and post graduate levels of teaching here at BUET. Therefore, I am engaged in teaching and research related to various **wind energy** applications after having relevant academic achievements in this field. During my Master's degree program, I studied and analyzed various forces that are involved in horizontal axis wind turbines and in my Ph.D program, I completed the research on various types of water pumps operated by wind energy for low-lift applications theoretically and experimentally. The **University of Reading** in England, one of the leading universities in the field of renewable energy provided excellent facilities for my Ph.D program. During that time I had opportunities to attend International conferences where I discussed some of our problems with distinguished researchers and scientists. In addition, I have published some research papers, one of which is published with co-authors P. T. Smulders and J. D. Burton, presented at the **European Wind Energy Conference**, Amsterdam, October 14-18, 1991. Moreover, along with other courses, I am teaching the Introduction to Mechanical Engineering course for more than 10 years. This is the basic Mechanical Engineering Course in which main emphasis is given to (i) Internal Combustion Engines including 4 & 2 stroke Petrol & Diesel Engines and Gas Turbines (ii) Pumps & Compressors (iii) Refrigeration & Air Conditioning. Based on this course, a completely fresh student of Mechanical Engineering discipline could make a choice of his/her target in which field he/she would become an expert in future.

Some of completed and on going researches
Of
Professor Muhammad Mahbubul Alam

1. Became the **Chief Investigator & Project Coordinator** of "Wind Energy Resource Mapping (**WERM**) Project for Bangladesh", a 4 year project (during 2000-2004) based on some specified locations of Bangladesh; to be jointly carried out by LGED and funded by UNDP. (Under this project, Nebula Techno-Solutions Ltd completed 20 Installations of Towers and Data-loggers throughout the country.)

2. **Patent** of wind-energy operated water pump named as "**Windpump**" from The Patent Office, Dhaka, under the Patent Act 1940, by the Government of the People's Republic of Bangladesh (No. 184/99).
3. **Trade Marks** of wind-energy operated water pump named as "Alam Amin Hawai-Pump", from The Trade Marks Office, Dhaka, under the Trade Marks Act 1940, by the Government of the People's Republic of Bangladesh (No. 62233).

4. **Alam, M. M.**, "Wind Energy Resource Mapping Project for Bangladesh", Final Report of 807 full color pages published by Apostrophe Engineer June 2006, funded by UNDP.

5. Recently applied for British Council Funded UK Higher Education Partnership Program at www.britishcouncil.org/bangladesh-higher-education-inspire.htm.

The Wind Energy Resource Mapping (WERM) project for Bangladesh:
After completing my higher studies in the relevant field of wind energy, I started to find out the problems associated with the failure of the wind energy projects in our country, Bangladesh. I found that the most common reason for failure of those earlier wind energy projects was that they were installed without appropriate wind energy resource survey. It was a common practice to design such wind energy conversion systems (WECS) based on average **wind speed available from meteorological or other departments** and used a wind turbine directly imported from a foreign country.

With a view to improve the situation, I initiated a project as a part of a post-Graduate research study for wind speed measurement at a place near Dhaka, the Capital of Bangladesh. Continuous wind speed data were recorded for a period of two years using a data-logger in which several statistical programs were set. From the available data, different wind speed distribution pattern and Weibull parameters (which are normally used to characterize the wind regime) were determined. The results of this research were found most suitable for designing appropriate WECS (regarding selection of stand-alone or hybrid system and choosing the type and size of the wind turbine).
In a forum of different research organizations and government authorities, I explained the need for further study on proper assessment of the wind energy resources and submitted a detail technical and financial proposal. Finally, all concerned authorities accepted my proposal, titled as "**Wind Energy Resource Mapping (WERM) project for Bangladesh**" and made me the **Chief Investigator and Project Coordinator.** For other detail visit website: www.reein.org/wind/werm.htm

DETAILED TASKS ASSIGNED	WORK UNDERTAKEN
Project planning and highlighting the importance of the project – (Completed) Recruitment of different staffs and assigning respective jobs and scheduling - (Completed) Designing hand held portable apparatus for preliminary survey towards selection of most resourceful sites - (Completed) Preliminary site surveying using portable equipment - (Completed) Selection of Equipments/Machinery for automated Logging of Wind Data and floating of Tender (Completed) Coordinating and conducting meetings with different relevant groups – (Continuing) Supervising Installation of Wind Speed Monitoring Stations throughout the selected sites and administering the overall situation including Data Recording and Transferring - (to be started after equipment procurement)	**Project Name:** Wind Energy Resource Mapping (WERM) for Bangladesh **Position held:** Chief Investigator & Project Coordinator **Brief Note:** It is the first of its kind in Bangladesh, jointly undertaken by the Local Government Engineering Department (LGED) of Bangladesh, BUET and another Institute situated at the coastal region. One of the objectives of the project is to build a reliable wind energy database for the whole country, based on which future wind energy conversion system projects would be carried out sucessfully. **Funding:** About ¼ million US Dollars financed by UNDP. **Location:** Some specified selected sites distributed throughout the country. **Duration:** July 2000 to June 2004 in its 1st phase **For details** visit the website: http://www.reein.org/wind/werm.htm
Preparation of detailed specification for buying educational equipment for schools and Colleges, Comparing various companies for their Responsiveness Verifying the Equipments/Machinery with some administrative works	**Project Name**: Higher Secondary Education Project **Position held:** Expert for Technical Committee **Funding:** Ministry of Education, Govt. of Bangladesh **Location:** Throughout the country **Duration:** July 1997 to date