TESTING AND CONSULTANCY SERVICES

DEPARTMENT OF MECHANICAL ENGINEERING

Credibility
Reliability
Quality

January 2014

Bangladesh University of Engineering and Technology (BUET)
Dhaka-1000, Bangladesh

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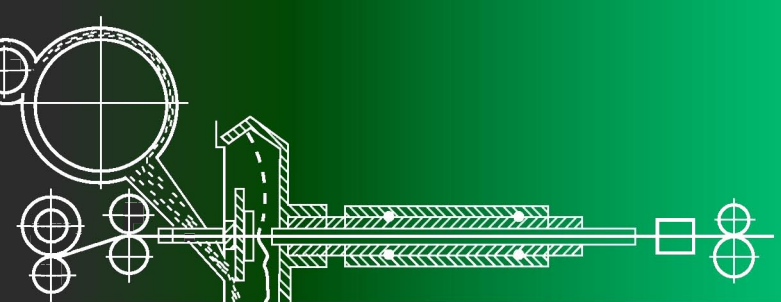

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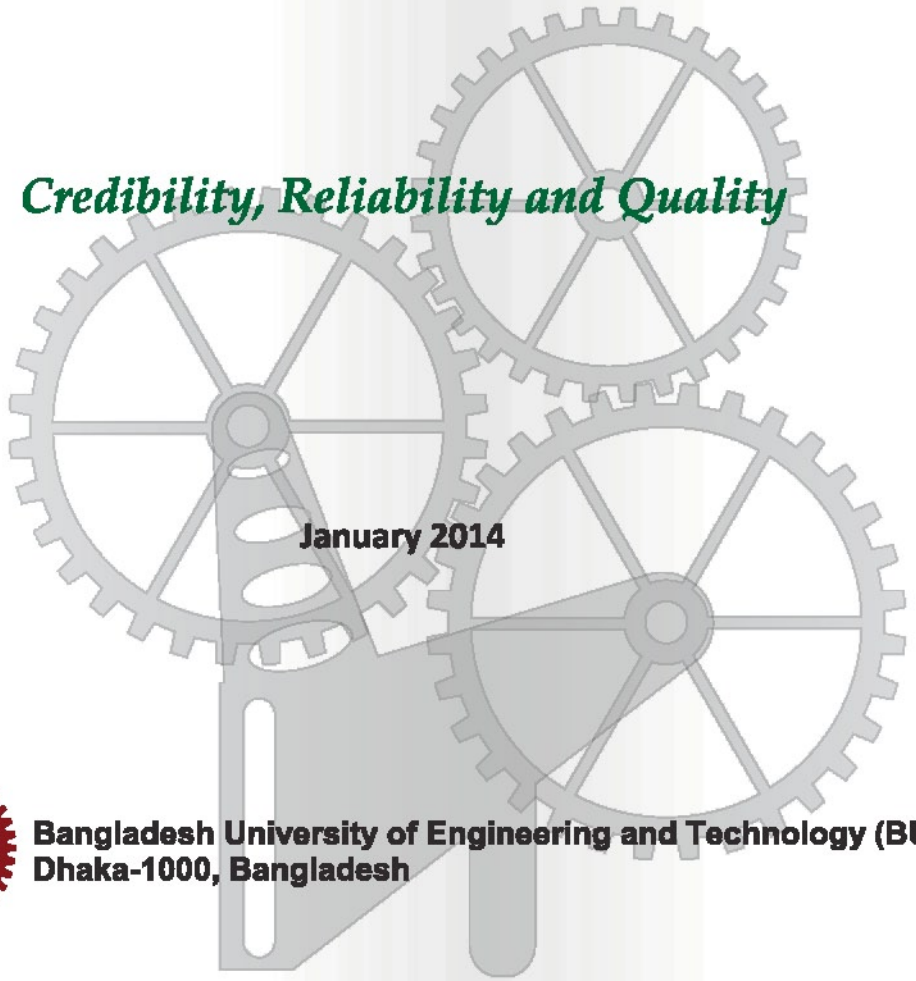
DEPARTMENT
OF
MECHANICAL ENGINEERING

Credibility, Reliability and Quality



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Bangladesh University of Engineering and Technology (BUET)
Dhaka-1000, Bangladesh

TESTING AND CONSULTANCY SERVICES

Department of Mechanical Engineering, BUET

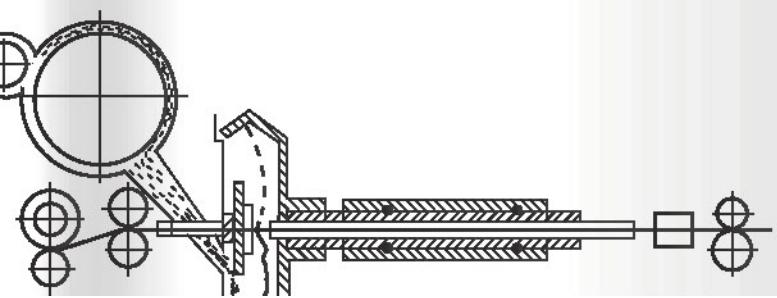
MISSION

To provide knowledge-based world class technical services to satisfy the needs of individuals, industry and society. Our strengths lie on providing testing and consultancy services as per requirements with the highest level of technical confidence, honesty and sincerity.

VISION

To excel in providing research, investigation and development-based intellectual and technical services to meet the demand of the fast changing technological needs of the society and the nation.

Department of Mechanical Engineering
Bangladesh University of Engineering and Technology (BUET)
Dhaka-1000, Bangladesh



MESSAGE FROM THE HEAD OF THE DEPARTMENT

Department of Mechanical Engineering is one of the largest departments of BUET with a long heritage. It is the center of excellence for the study of mechanical engineering in Bangladesh. The department has highly qualified and dedicated teachers with excellent technical background and offers some of the best laboratory facilities available in the country. The education offered by this department is up-to-date and comparable to those of the best institutions in the world and justifiably appropriate to the needs of the country. Besides providing education, the department is also persistent in its effort to provide technical assistance to interested clients through testing and consultation services. We look into this endeavor as a part of our commitment to the industry, the society, and the nation as a whole. We believe it also develops our expertise for meeting the technical challenges of the twenty first century, both at home and abroad.

Dr. Md. Ehsan

Professor and Head
Department of Mechanical Engineering
BUET, Dhaka-1000

January, 2014

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Website: www.buet.ac.bd/me

TESTING AND CONSULTANCY SERVICES

Bureau of Research, Testing and Consultation (BRTC), a central body of BUET, regulates all testing and consultancy services and is responsible for organizing such technical services for clients. Department of Mechanical Engineering provides all such services related to Mechanical Engineering discipline.

For more than three decades, Department of Mechanical Engineering is providing testing services for a large number of items, regarding their quality, performance, and characteristics. Test results from the department are widely accepted at both national and international levels. The department also provides technical consultation services to clients through BRTC as per their requirement. Such activities also bridge the relation between the University and the industry, which is important for technical development as a whole.

As a technical center of excellence, BUET is not only active as the focal point for the development and dissemination of engineering and technological know-how within the country, but also involved in solving various practical problems of national importance faced by the engineers and technologists of the country. The university being the home of highly trained manpower provides expert services through BRTC, allowing benefits to individuals, society and the country. The department undertakes research, testing and consultation works in the field of mechanical engineering as entrusted by government, autonomous bodies and private parties in order to achieve the following objectives:

- To develop closer relation between the university and the industry.
- To assist various departments of the government and other organizations in getting technical consultation in the field of mechanical engineering.
- To allow appropriate use of the research equipment available in the university.
- To advance the professional expertise of the faculty and the staff outside the regular field of academics.

For testing services, it is the responsibility of the client to ensure the representative nature of the test samples brought to the department for testing purpose. The client is required to interpret the test results with technically competent personnel.

For consultancy services, the designs, drawing, and reports furnished by the consultants of the department are expected to be implemented by qualified professionals. Two faculty members are responsible for coordinating the testing and consultancy services of the department. The coordinators and/or the head of the department can be contacted to avail the services in this regard.

RESOURCE PERSONNEL
IN THE DEPARTMENT OF MECHANICAL ENGINEERING

The faculty is diverse in educational background, professional experience and interest. The faculty members are committed to teaching, research and technical services. Most of the faculty members hold doctoral degrees in a variety of related fields. The faculty is enriched every year by the return of members after completing higher education and research abroad, as well as recruitment of new ones. This infusion of new teaching and scholarly talents add freshness and vitality to the department of Mechanical Engineering.

Faculty	Qualification	Field of Expertise	Photo
Dr. Md. Quamrul Islam *Professor*	Ph.D. (Belgium) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Renewable Energy Fluid Mechanics Hydraulic Machines	
Dr. M. A. Rashid Sarkar *Professor*	Ph.D. (USSR) Post Graduation (Energy Management) M.Sc. Engg. (Mech.)	Thermal Engineering Renewable Energy & Environment	
Dr. Maglub Al Nur *Professor*	Ph.D. (UK) M. Engg. (Thailand) B.Sc. Engg. (BUET)	Energy Systems Modeling Energy Economics & Management Energy & Environment Automobile Engineering	
Dr. Maksud Helali *Professor*	Ph.D. (Ireland) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Materials Fracture Mechanics Sound Attenuation Fire Safety	
Dr. Muhammad Mahbubul Alam *Professor*	Ph.D. (UK) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Wind Engineering, WECS, Wind Turbine Yaw, Renewable Energy, Vertical Transportation, Bio-fuel, Refrigeration & A/C	
Dr. Abu Rayhan Md. Ali *Professor*	Ph.D. (Ireland) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Applied Mechanics, Elastic- Plastic Stress Analysis Plastic Yielding Mechanical Design	
Dr. Md. Ehsan *Professor*	Ph.D. (UK) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Alternative Fuels for IC Engines, Automobiles Dynamic System Modeling Thermal Engineering & CAD	

Faculty	Qualification	Field of Expertise	Photo
Dr. Md. Zahurul Haq *Professor*	Ph.D. (UK) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Combustion, Alt. Fuels Instrumentation & Control Mechatronics & Robotics Refrigeration & A/C Building Mech. Systems	
Dr. Mohammad Ali *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Turbulence Gas Dynamics Fluid Mechanics	
Dr. Md. Ashraful Islam *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Phase Change Heat Transfer Thermal Engineering Renewable Energy	
Dr. S. Reaz Ahmed *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	NDT of Materials Computational Mechanics Composite Structures	
Dr. M. Ashiqur Rahman *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Noise & Vibration Smart Materials Structural Stability	
Dr. Md. Afsar Ali *Professor*	Ph.D. (Japan) M.Sc. Engg. (Japan) B.Sc. Engg. (BUET)	Composite Materials Functionally Graded Materials (FGMs) Fracture Mechanics	
Dr. Muhammed Mahbubur Razzaque *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Tribology Fluid Film Lubrication Fluids Engineering Noise Control	
Dr. Mohammad Arif Hasan Mamun *Professor*	Ph.D. (Canada) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Thermal Engineering HVAC CFD Renewable Energy	
Dr. Md. Abdus Salam Akanda *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Applied Mechanics Micro/Nano Mechanics NDT	
Dr. Mohammad Mamun *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Aerodynamics CFD Automobiles Renewable Energy	

Faculty	Qualification	Field of Expertise	Photo
Dr. Aloke Kumar Mozumder *Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Phase Change Heat Transfer Inverse Solution Fuel and Energy	
Dr. Md. Abdul Azim *Associate Professor*	Ph.D. (BUET) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Turbulence CFD	
Dr. Noor Al Quddus *Associate Professor*	Ph.D. (Canada) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Complex ans Biofluids Thermo-Fluid System Numerical Methods Sustainable System	
Dr. A. B. M. Toufique Hasan *Associate Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Aerothermodynamics Biofluid Dynamics Micro Fluids	
Dr. Md. Motaleb *Assistant Professor*	Ph.D. (USA) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Stress and Failure Analysis of Micro-Electronic Components, Electronic Packaging, FEM	
Dr. Md. Tanvir Rahman Faisal *Assistant Professor*	Ph.D. (Canada) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Biomechanics Cellular Solids Finite Element Analysis	
Dr. A. K. M. Monjur Morshed *Assistant Professor*	Ph.D. (USA) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Electronics Cooling Renewable Energy Boiling Heat Transfer	
Dr. Mohammad Nasim Hasan *Assistant Professor*	Ph.D. (Japan) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Thermal Engineering Phase Change Heat Transfer	
Dr. Monon Mahbub *Assistant Professor*	Ph.D. (USA) M.Sc. Engg. (Canada) B.Sc. Engg. (BUET)	Nanocomposite Materials Fire Engineering	
Ms. Sanchita Amin *Assistant Professor*	M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Thermal Engineering Fluid Mechanics	
Dr. Md. Ashiqur Rahman *Lecturer*	Ph.D. (USA) M.Sc. Engg. (BUET) B.Sc. Engg. (BUET)	Thermal Sciences Condensation and Frosting/Defrosting of HX Micro-electronics Cooling	

HOW TO AVAIL TECHNICAL SERVICES
FROM THE DEPARTMENT OF MECHANICAL ENGINEERING, BUET

Testing Services

Department of Mechanical Engineering is well-equipped with modern laboratories and test facilities. The department conducts a wide range of tests to help the clients to check the properties of supplied materials and to ensure product quality. The testing services are performed typically in accordance with Bangladesh Standards or International standards like - ASTM, JIS, BS, ISO, DIN, ASHRAE, NFPA, ASME etc. Testing services are also provided according to the supplier's required specification. Tests are typically carried out in first-come-first-serve basis, but the department also has a provision of conducting tests on an urgent basis. For convenience and quick turnaround, testing specimens may be prepared using workshop facilities of BUET, if needed.

A list of typical items for which testing facilities are available in the department is enclosed at the end of this booklet. However, new test facilities are being developed on a regular basis. Test facilities can also be designed and implemented as per client's requirement. For convenience of clients, there is a BRTC desk in the departmental office located at the 1st floor of Mechanical Building. A map of BUET campus with relevant locations is shown in the last page of this booklet.

Steps to Follow for Availing Testing Services

- Write a letter preferably on your organization pad or on a plain sheet addressing "Director, BRTC, BUET" or "Head, Department of Mechanical Engineering, BUET" describing the necessary tests and bring or mail it to the BRTC office, BUET. Collect an identification number (BRTC No.) and obtain a primary assessment (PA) form from BRTC, BUET office for your job. Alternately, come to the department office and the officer in the BRTC desk will guide you through the process.
- Upon getting the BRTC No., come to the office of the department of Mechanical Engineering. The officer in the BRTC desk will inform you the necessary amount of testing fees and charges to be deposited in the Sonali Bank, BUET Branch, at Palashi crossing. The money deposit slip is available at the BRTC desk of the department. For your convenience, deliver the testing samples to the respective laboratories for tests.
- Upon depositing the money, submit a photocopy of the deposit slip to the BRTC desk at the department. The officer will inform you about the tentative delivery date of the test report. Usually, the test report is delivered within 7-10 working days after the deposition of money. However, in urgent cases, reports can be delivered within 3 working days (conditions apply).The test report is usually delivered by courier service. However, authorized persons may collect it from the BRTC desk of the department directly.

Consultancy Services

Department of Mechanical Engineering, BUET is one of the largest and most diversified consulting groups in this field in Bangladesh. Our commitment to provide value-driven solutions for our clients makes us one of the most innovative contributors in this sector.

The department provides services for a range of clients with professional consulting advice and troubleshooting solutions in mechanical engineering. Typically the services include conceptual design, system design, design checking, prototype manufacturing, performance testing and quality evaluation, failure analysis, alternative energy solutions, etc. Our tools and expertise endow with confidence and assurance of the service provided as a complete package.

Our principles are characterized by developing long term relationships with our clients to provide direct and appropriate professional and independent engineering assessments, analysis and solutions. While our staffs have many years of experience, we retain fresh, up-to-date approaches to technology by remaining on the leading edge of mechanical engineering solutions.

Innovation is at the forefront of our capabilities. Strong and diverse foundations of our personnel as well as engineering expertise with an excellent safety track record - all provide for promising future prospects. Our services are based on academic excellence and extensive experience to provide a comprehensive solution - starting from need analysis to implementation and follow-up.

Steps to Follow for Availing Consultancy Services

- Write a letter preferably on your organization pad addressing "Director, BRTC, BUET" or "Head, Department of Mechanical Engineering, BUET" describing the necessary consultancy services needed. You may bring or mail the letter to the BRTC office, BUET. Alternately, come to the department office and the officer in the BRTC desk will guide you through the process.
- Looking on to your requirements, the department will let you know regarding the possibility of providing the service with probable fees and tentative time frame. A pre-inspection visit may need to be arranged on payment for getting a first hand idea of the nature and extent of the involvement. However, the pre-inspection/job-enrolment fees are generally adjusted with the total fees. You can always contact the head of the department to discuss related issues, if needed.
- The fees and charges need to be deposited in Sonali Bank, BUET Branch as instructed by the department. Upon depositing the amount, a photocopy of the deposit slip will have to be submitted to the BRTC desk at the department. The officer will inform you about the documents and/or materials necessary for the job, as well as an estimated time frame for the final report.

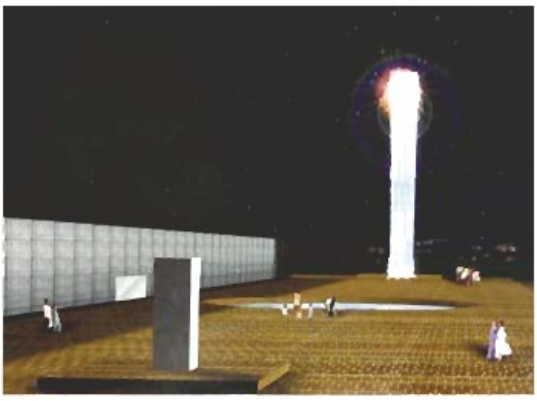
Some Consultancy Services Provided by the Department

Inspection of HVAC System

Dual Fuel Conversion of Diesel Generator

Verification of Industrial Equipment

Design and Fabrication of SIP



Shadhinota Stambha, Dhaka

Novo Theater, Dhaka

Some Testing Facilities in the Department

Road Test of Vehicles

Engine Performance Test Bed

Pump Test Bed

Analysis of Fuels and Oils

Desktop UTM (5 kN) for Rubber, Plastics and Soft Materials

Railway Slipper Test Bed

Universal Testing Machine (100 ton)

The department of Mechanical Engineering is engaged in providing testing and consultancy services to a variety of clients for the last three decades. The involvement includes both public and private organizations, as well as some international agencies. We have been involved with international organizations like – UNICEF, CIDA, ILO and MI. Major clients at national level includes government organizations like Bangladesh Railway, Bangladesh Biman, BADC, BDP, BMDA, BPDB, BWDB, DPHE, BSEC, BCIC, BISCIC, LGED, NBR, WASA, etc. and private organizations like – MPL, RFL, WALTON, SQUARE, BEXIMCO, Sanofi-Aventis, SK+F etc. Brief outline of some recent projects is given below.

Design, Fabrication and Installation of 267 Salt Iodation Plants (SIP) all over Bangladesh (1995): Mixing iodine with edible salt has great health value. Under the funding from UNICEF, the department of Mechanical Engineering designed, fabricated and installed 267 numbers of Salt Iodation Plants all over Bangladesh. Prototypes were designed and developed in BUET for mass production in some selected factories.

Feasibility Study of Floating Pumps In GK (Ganges-Kobadak) Project (1996): GK (Ganges-Kobadak) irrigation project located on the South-Western region of Bangladesh. A feasibility study was jointly carried out by Dept. of Mechanical Engineering, Dept. of Water Resources Engineering, Institute of Water and Flood Management of BUET and Bangladesh Agricultural University arranged under the auspices of Bangladesh Water Development Board. Mechanical Engineering Department performed in-situ tests to determine the capacity and specifications of floating pumps.

HVAC design of Titas Gas Transmission and Distribution Company Ltd. (TGTDCL) Head Office Building (1999): The central HVAC system for the 10 storied TGTDCL head office building at Kawran Bazar, Dhaka was designed by the department of Mechanical Engineering, BUET. The work involved cooling load calculation and detailed design and drawing of HVAC ducting and piping systems along with the preparation of tender specification and top supervision of commissioning of the system.

Evaluation of the Use of Salt Iodation Plants (SIP) all over Bangladesh (2001): This project was funded by UNICEF where the Department of Mechanical Engineering arranged a nation-wide survey and technical evaluation of 267 Salt Iodation Plants installed under an earlier program with UNICEF in 1995. The outcome of the survey was helpful in modifying and improving the design of SIP that was carried out later.

Water Fountain for National 'Shadhinota Stambha' at Suhrawardi Udyan (2002): The department of Mechanical Engineering, BUET was involved in the design and top supervision of the water fountain of the national monument 'Shadhinota Stambha' located at the historical Suhrawardi Udyan. Initially a prototype was designed and fabricated at BUET, which was later replicated in real scale in the monument complex providing a spectacular water fountain.

Top Supervision of HVAC System of the National Observatory Building 'Bangabandhu Sheikh Mujibur Rahman Novo Theater' (2003): The department of Mechanical Engineering, BUET was involved in a national level team for the preparation of tender specification, system selection, tender evaluation and top supervision of the HVAC system of 'Bangabandhu Sheikh Mujibur Rahman Novo Theater' located at Bijoy Sarani, Dhaka.

Top Supervision of Urgent Rehabilitation Works of Pumping Facilities of GK (Ganges-Kobadak) Irrigation Project for Sustaining Rural Economic Development (2005): The department of mechanical Engineering was a consultant for the installation of pumping facilities. The main pump station consists of 3 pumps each having average discharge capacity of about 28 cumec. The subsidiary pump station housed 12 pumps, each having a capacity of 3.5 cumec. The department of Mechanical Engineering, BUET was involved in review of design, drawing, specifications and methodology, supervision of installation, commissioning and performance test of the pumps, motors and associated equipment.

Upgradation of SIP in Narayanganj Zone (2005): Under a contract with Micronutrient Initiative (MI) Canada and in conjunction with Bangladesh Small and Cottage Industries Corporation (BSCIC), the department of Mechanical Engineering improved the design of existing SIP in terms of efficacy, mixing quality and enhanced throughput quantity. Improved prototypes were developed by the department of mechanical Engineering and BUET fabricated 47 sets of new equipment which were installed with existing SIP in Narayanganj.

Wind Energy Resource Mapping (WERM) Project for Bangladesh (2007): The WERM project was the first of its kind in Bangladesh, the main objective of which was to build a resourceful wind velocity database. Twenty wind velocity monitoring stations with data loggers calibrated by the Department of Mechanical Engineering, BUET were installed throughout the country for this purpose. The results and experiences obtained from this project revealed a new perspective in wind energy research in Bangladesh and the reasons were identified why most of the earlier wind energy installations could not be operated effectively.

Investigation of Failure of 1000 kVA Gas Engine Generator (2009): A gas engine generator exploded in the factory premises of Finley Tea Garden, Sreemangal, Sylhet. The department of Mechanical Engineering, BUET investigated this explosion to find out the causes behind the explosion/accident. The department has performed several other investigations of fire, explosion and accidents of this nature.

Feasibility Study of Adding Sugar Refinery and Co-generation Power Generation to Existing Sugar Mills (2009): The department of Mechanical Engineering, BUET carried out a thorough technical and financial analysis in five existing sugar mills under Bangladesh Sugar and Food Industries Corporation (BSFIC). In this study, the requirements of modernizing a sugar mill were identified by addition of sugar refining and power co-generation.

Dual Fuel Conversion of Diesel Engines for Running on Natural Gas (2010): The department of Mechanical Engineering, BUET provided technical consultation for the conversion of a number of diesel engine generators ranging from 200 kW to 1 MW capacity in several factories all over Bangladesh. Such converted diesel engines could be used in dual-fuel mode with natural gas supply. This provided a highly cost effective solution for power generation in industries with approved gas supply. For example 3 MAN engines with 640 kVA each were converted for dual fuel operation in Alhaj Jute Mills in Sarisa Bari, Jamalpur.

Cooling System for CNG Compressor (2010): The department of Mechanical Engineering, BUET designed, fabricated and commissioned a novel cooling system in Moni CNG station, Mirpur, Dhaka, which helped to overcome the inadequate cooling of the compressor in that CNG station due to its adverse surrounding environment. The department of Mechanical Engineering, BUET is committed for robust, appropriate and cost-effective solutions for the local industry.

Upgradation of Jute Mills of Bangladesh (2010): The department of Mechanical Engineering, BUET provided consultancy services to 'Catalyst', a non government organization, for a detailed study and development of a renovation plan for typical Jute mills of Bangladesh (both in government and private sectors) to maintain their competitiveness and productivity. The survey was conducted in 15 Jute mills and a suitable renovation strategy was recommended.

Technical Evaluation of Power Generation from Rice Husk for AKW Agro & Food Industries Ltd. (2011): The aim of the project was to evaluate the feasibility of producing steam and power from rice husk in cogeneration process. Based on the capacity of the rice milling plant owned and operated by AKW Agro & Food Industries Ltd., it was estimated that 1 MW of electricity can be generated from the rice husk in an extraction-condensing turbine using the proposed design. The development of such cogeneration power can help mitigate the electricity crisis in Bangladesh by establishing off-grid industry located at remote region.

Environmental Impact Assessment (EIA) of CEMCOR Inland River Port (2011): An environmental impact assessment of a proposed river port at Mukhtarport, Munshigong was jointly carried out by the department of Mechanical Engineering and the department of Civil Engineering, BUET. The assessment involved investigation regarding probable emissions, sounds and traffic congestion due to the port. The project also looked in the effect on soil, water and ecology as well as the impact on the livelihood of the local population. In addition, some mitigation measures were also suggested.

Installation and Commissioning of Falling Weight Test Set Up for Bangladesh Railway (2012): A new test setup has been designed and developed in the department of Mechanical Engineering in 2012. This is a typical impact/braking test of rail with a large weight (about 1 ton) with free (guided) fall from a height of more than 5 meter. Since then this facility has been used for providing test results for Bangladesh Railway.

Installation of Noise Attenuation System in Two 1000 KVA Generators and Airconditioning Units of BRAC Bank Head Office (2012): Severe noise pollution caused by two gensets and air conditioner outdoor units of the 12 storied building located at Anik Tower, Tejgaon I/A, Dhaka was successfully reduced to comply with the noise pollution (control) act, 2006. The noise attenuation system for both were designed, fabricated and installed by the department of Mechanical Engineering and the department of Civil Engineering. The department provided similar service also to Muscat Plaza at Uttara to reduce environmental noise pollution caused by three generators.

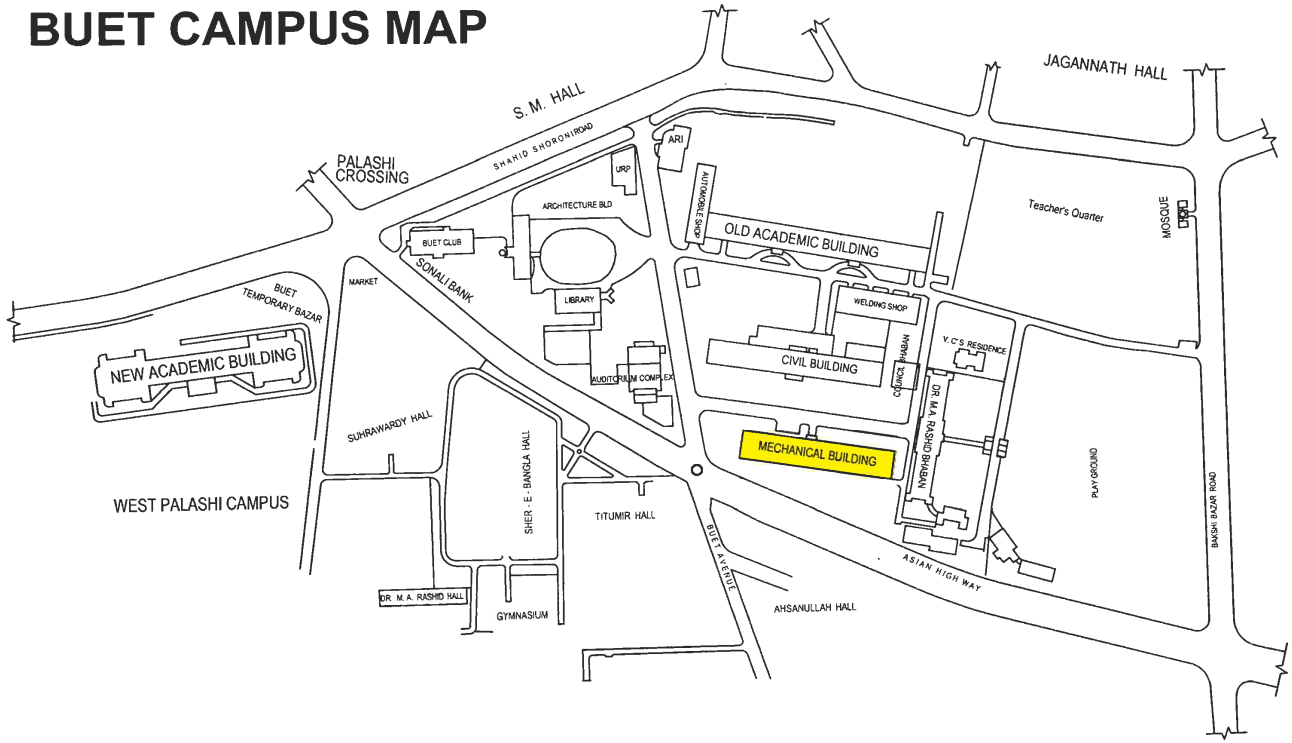
LIST OF TYPICAL TESTS

A list of typical items for which testing facilities are available in the department of Mechanical Engineering is given below. However, new test facilities can also be designed and performed as per client`s requirements.

Items	Type of Tests	
Metallic Materials	Dimension Tensile/Compression Strength Yield Strength Modulus of Elasticity Dynamic Load	Charpy Impact % Elongation Hardness Relaxation Welding
Plastic Materials	Dimension Hydrostatic Pressure Resistance to Acetone Heat Reversion Resistance to Sulfuric Acid Impact Strength Tensile/Compression Strength Percentage Elongation Modulus of Elasticity Flattening	Specific Gravity Compression Hardness End Condition Water Absorption Static Load Pre/Post Boiling Test Aging Brittleness
Fuels, Lubricants and Chemicals	Calorific Value Proximate Analysis Water Content Viscosity of Oils Flash Point Fire Point of Liquid Fuels Density / Specific Gravity Ash Content of Oil/Carbon	Residue Viscosity Grade of Oil Acidity Sulphated ash Total acid/base No Rust Inhibitor Swelling index Moisture content Cu-corrosion
Pumps, Compressors and Fans	Dimension Weight Pump Performance with Variable Head/ Voltage Multistage Centrifugal Pump	Fire Pump Hand Pump Submersible pump, Star-delta Starter, Main Switch Axial Pump/Compressor
Engines, Motors and Vehicles	Single or Multi-Cylinder Local Made Spare Parts (Destructive Test) Motor for Vertical Hollow Shaft Mechanical Properties of Locally Manufactured and Original vehicle Components.	Three and Four Wheeler Pickup /Van/ Car/ Minibus Motor cycle /Bus/ Truck/Lorry Gear Box Motor Performance Test

Items	Type of Tests		
Calibration of Equipment	Wobble Meter Air/ Water Flow meter Slide Caliper Anemometer Measuring Scale Micrometer Micro Pipette Pyrometer Furnace Calibration Height Gauge Level Meter Platform Scale Proving Ring Dead Weight Sound Meter	Viscometer Torque wrench / meter Electronic Balance Dial Gauge Range Thermometer Tachometer Pressure Gauge Various Gauges Measuring Steel Ruler Conductivity Meter Heat/Temperature Controller Flange Angle Meter Temperature Indicator Hygrometer LUX Meter	
Elastomaric Materials	Minimum Tensile Strength Shear Modulus Minimum Elongation Max. Compression set Accelerated Aging Maximum Change in Hardness Peel Strength / Vulcanized Bond Physical and Chemical Test of Steel Laminates Heat Persistence Test Brittleness Grade Evaluation Test	Elastomer Content Liquid Test Breaking Load 0.2% Proof Load Adhesion Strength Tensile Strength Abrasion Tear Strength Ultimate Elongation Creep Deflection Short term Compression Compressive Strain Aging	
Hydraulic Equipment	Hydraulic Jack Pressure Gauge	Hose Pipe Valves	
Type of Tests	**Individual Items/Components**		
Various Relevant Tests	Solvent Cement Railway Components (Slipper, Clip, Fish Plate etc.), A/C & Refrigeration Equipment Pipes, Tubes, Sheets	Nuts-Bolts Cotton Threads Glass Fiber Bearing Bush Fumigation Sheet H. T. Wire & Strand Fire Doors	Conveyor Belt Particle Boards FRP,Cylinder, Container, Insulation

BUET CAMPUS MAP



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