Karunya
DEEMED UNIVERSITY
SOLVING HUMAN PROBLEMS

Department of **Mechanical Engineering**

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Centre for Research in **Metallurgy (CRM)** has the facilities to prepare specimens for the material testing as per **ASTM** standard

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Centre for Research in

METALLURGY (CRM) CONSULTANCY & TESTING

- INNOVATIONS ON MATERIALS
- RESEARCH ON MATERIALS
- DEVELOPMENT OF MATERIALS
- CONSULTANCY ON MATERIALS
- TESTING ON MATERIALS

Dr. Paul Dhinakaran, M.B.A., Ph.D., the Chancellor of Karunya Institute of Technology and Sciences spearheads the University. He is an academician and educationalist in his own right. Apart from this he is an evangelist who comforts millions through his ministry of hope and love. He heads Jesus Calls International Ministry with its outreach program all over the world. Dr. Paul Dhinakaran has a vital role to play in the cause of education in India as Member of National Monitoring Committee for Minority Education, Government of India and as member of the Governing Council of National Mission for Sarva Shiksha Abhiyan, Government of India.

Karunya Founders

The late **Dr. D.G.S. Dhinakaran, C.A.I.I.B., Ph.D.,** the Founder Chancellor Emeritus of Karunya Institute of Technology and Sciences, was a world renowned spiritual leader, accepted by people of all faiths and leaders of many nations. He is the founder of the global Jesus Calls Ministry of which Karunya is just an offshoot. Millions of people all over the world receive hope and solace through his ministry. His vision for Karunya is that of a Technological University founded on faith that will produce teachers, engineers and managers possessing the right combinations of academic excellence, exemplary character and total humanism. The aim is to serve the motherland and fellow men and help raise the quality of life to global standards.

Centre for Research in METALLURGY (CRM) CONSULTANCY & TESTING

The Centre for Research in Metallurgy was established in the year 2012 with a four faceted objective. Its vision is to impart knowledge on material science and engineering to the student community, carryout quality and ethical research in the field of materials and material processing engineering, help the industries in solving problems that they face in metallurgy and related areas through consultancy services and lend a helping hand for students across the country in completing their project related to materials and materials processing.

The centre is equipped with modern materials testing and materials characterizing equipment'q such as Metallurgical microscope with Image analyser, Pin-on-disk wear monitor and tester, Microhardness tester, Ultrasonic flaw detector, Tensile testing machine, Four ball tester, Fatigue Strength Tester, Creep Tester, Oil Extractor, Wire cut EDM, specimen preparation facilities, stir casting furnace and Induction furnace. The centre also encourages collaborative research work with other Institutions, Universities and Industries.

Vision

- To impart knowledge on Material Science and Engineering to the student community
- To carryout quality and ethical research in the field of materials and material processing engineering
- To help the industries in solving problems that they face in metallurgy and related areas through consultancy services
- To lend a helping hand for Students, Research Scholars, Faculty members across the country in completing their project related to materials, materials processing and testing

Testing Facilities

- Stir Casting
- Induction Furnace
- UTM
- Wire cut EDM
- Wear
- Fatigue
- Creep
- Polishing
- Microhardness
- Four ball Tester
- Microstructure Studies I Impact

Stir Casting & Induction Furnace

- Stir casting is widely used for liquid method of processing to Fabricate Aluminium Matrix Composites and other materials.
- The set up consist of stirrer which can be used for mixing the reinforcements with the matrix/base material and its speed can be varied.
- Induction furnace - Induction heating and melting - Aluminium and other high temperature material
- **Maximum Temperature: 1100°C, Crucible Size: 4 & 6**

Pin-On-Disc (Wear Testing Machine)

- A Pin-On-Disc machine (Tribometer) is an instrument that measures tribological quantities, such as coefficient of friction, friction force, and wear volume, between two surfaces in contact.
- Dry sliding wear, high temperature dry sliding wear and lubricating sliding wear test can be conducted.
- **Make: DUCOM, Disc Diameter: 150 mm**

Ultrasonic Flaw Detector

- The Ultrasonic Flaw Detector propagate the sound waves through solid materials have been used to detect hidden cracks, voids, porosity, and other internal discontinuities in metals, composites, plastics, and ceramics.
- **Output Amps: 1A, Output Watts: 7W**

Four Ball Tester

- Four Ball Tester is an excellent development and quality check instrument for developers and users of lubricants and additives.
- Four Ball Tester can be used to determine Wear Preventive properties (WP), Extreme Pressure properties (EP) and friction behavior of lubricants.
- To Determine Wear Preventive properties (WP), Extreme Pressure properties (EP) and friction behavior of lubricants, load carrying capacity of lubricant or grease, coefficient of friction of lubricant, anti-wear properties of lubricating oils & grease.
- The wide acceptance of test results of the Four Ball Tester makes it an excellent choice to benchmark products.
- **Make: DUCOM, Load: Pneumatics**

Metallurgical Microscope

- The function of the metallurgical Microscope to create a magnified image of a specimen consists of three basic functions of "obtaining a clear, sharp image", "changing a magnification", and "bringing into focus".
- An optical system for implementing these functions is referred to as an observation optical system.
- **Maximum Magnification: 400x**

Twin Disc Polishing Machine

- The Metallography Lab deals with the metallographic preparation of metallic, ceramic and polymeric materials for microstructural examination.
- These range from the cutting, grinding and polishing equipment necessary for preparing samples for the optical and electron microscopes used to observe sample microstructure.
- **Maximum Speed: 1200 rpm**

Creep Tester

- A creep test measures the progressive rate of deformation of a given material at high temperatures.
- It is performed by subjecting a tensile specimen to a constant load at a fixed temperature and recording the corresponding amount of strain.
- **Maximum Load: 1 Ton, Maximum Temperature: 800^{0}C**

Cold Oil Press - Oil Extractor

- Oil can be extracted from the seeds etc.., Suitable for most oil-bearing crops, Oil yield can reach 45% (depends on the oil seed).
- The extractor operation is simple, made of 304 food grade stainless steel, safety and non-toxic.
- **Maximum Temperature: 250^{0}C**

Fatigue Strength Testing

- A fatigue test helps determine a material's ability to withstand cyclic fatigue loading conditions.
- Cyclic fatigue tests produce repeated loading and unloading in tension, compression, bending, torsion or combinations of these stresses.
- Fatigue tests are commonly loaded in tension - tension, compression - compression and tension into compression and reverse.
- To perform a fatigue test a sample is loaded into fatigue test machine and loaded using the pre-determined test stress, then unloaded to either zero load or an opposite load.
- This cycle of loading and unloading is then repeated until the end of the test is reached.
- **Cyclic Load: 30 – 40 cycles/min, Maximum Load: 1 Ton**

Abrasive Cutting Machine

- Abrasive cutting machine can be used for precision cutting of metals and specimen.
- Abrasive cutting process parameters can be studied on various materials.
- **Maximum Cutting Speed: 3400 rpm, Frequency: 64 Hz**

Induction Furnace

- Induction furnaces are ideal for melting and alloying a wide variety of metals with minimum melt losses, however, little refining of the metal is possible.
- Metals which are melted in an induction furnace include iron and steel, copper, aluminium and precious metals because it is a clean non-contact process, it can be used in a vaccum or inert atmosphere.
- **Maximum Temperature: 3000^{0}C, Load: 3 Kg**

Wire Cut Electrical Discharge Machine (EDM)

- Computerized fully automatic wire EDM machine. Highly accurate Specimens for material testing can be prepared with minimum time and cost.
- Wire cut process parameters can be studied on various materials.
- **Work Table Size: 600mm x 800mm**

Computerized Universal Tensile Testing Machine

- Tensile test machines, also known as tension test machines or universal testing machines specially configured to evaluate the tensile strength of specimens.
- Tensile specimens are subjected to tensile loading condition where parameters such as ultimate strength, yield strength, elongation, and modulus.
- **Maximum Load: 50kN**

Charpy Impact Test

- Charpy impact test is performed to evaluate the resistance of the metal to breakage by flexural shock or impact load according to standard test method.
- Charpy V notch test is a high strain rate test that helps to measure the amount of energy absorbed by the specimen during fracture.
- **Energy: 300J**

Vickers Microhardness Tester

- Vickers Microhardness testing machines provide the simplest and most economical testing methods and they play a vital role in metals.
- It can be used to monitor hardness during development of materials, fabrication and heat treatment.
- **Make: Mitutoyo, Japan**