

COMPOSITE TECHNOLOGIES CENTER OF EXCELLENCE



KORDSA

Sabancı
Universitesi

COMPOSITE TECHNOLOGIES
CENTER OF EXCELLENCE

OVERVIEW

The Composite Technologies Center of Excellence (CTCE) brings Sabancı University and Kordsa together under the same roof dealing with basic and applied research, technology and product development, human resourcing, and manufacturing process related to composite products. Also this unique university-industry ecosystem houses designers, engineers, production process managers, doctoral students, postdoctoral researchers, faculty members, and incubators/entrepreneurs who play a vital role in the overall composite technologies. Thus, the Composite Technologies Center of Excellence serves its customers at every stage of product development life cycle starting with basic research, continuing with prototyping, and ending with mass production.

Built on 15,000 m² closed area with a 3,350 m² laboratory infrastructure, the Composite Technologies Center of Excellence hosts one of the very few research centers with a world-class manufacturing facility.

Kordsa Prepreg Production Lines

Kordsa develops innovative and unique intermediate products and applications in composite technologies for a variety of industries, notably aviation and automotive as well as sports equipment, wind turbines and marine. Producing thermoset prepregs for the aviation, automotive, sports equipment and medical industries, Kordsa boasts a wider product range and more flexible production capabilities thanks to the strength it gains from weaving its own fabric.

Kordsa Composite Reinforcement R&D Center

Kordsa's second R&D center, approved by the ministry, is located in the CTCE. Kordsa's R&D center at the CTCE enables the company not only to develop products but also to engage in the mass-production of prepregs, fabrics, and panels for the composites industry.

Sabancı University Integrated Manufacturing Technologies Research and Application Center (SU IMC)

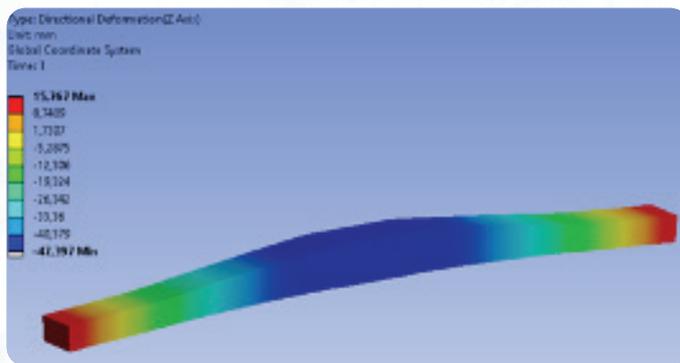
SU IMC provides facilities for both fundamental and applied research, product development, graduate and life-long education. It also acts as a center for incubation services as well as commercialization opportunities in composite manufacturing technologies and has the capacity of employing 15 faculty members, more than 90 graduate and undergraduate students, and about 40 researchers, engineers and administrative staff. SU IMC is certified with AS 9100 and accredited with TS EN ISO IEC 17025.



Composite Technologies Center of Excellence R&D Labs

Computational Mechanics Laboratory

In Computational Mechanics Laboratory, novel modelling tools for a wide variety of problems including variable stiffness design of composite structures to metal additive modelling have been developed. The lab offers simulation services to a wide variety of industrial problems including static design cases to dynamic crash simulations that could be achieved by using custom and various commercially available software based on customer needs.



Advanced Composites Manufacturing Laboratory

The Advanced Composites Manufacturing Lab aims to manufacture high quality engineered composite part utilizing both conventional and robotic based manufacturing technologies through process modelling to explain process-robot interaction, robot motion and path planning using physical models. The lab is equipped with Robotic **Automated Fiber Placement (AFP) Machine** for thermoset and thermoplastic composite manufacturing. There are also industrial-scale **Hot Press, Robotic Machining and Abrasive Waterjet Machining** of composites and metals, and **additive manufacturing** of composites.



Autoclaves are essentially heated pressure vessels usually equipped with vacuum systems into which the bagged lay-up on the mould is taken for the cure cycle. This advanced composite process produces denser, void-free mouldings due to elevated heat and pressure used for curing. It is widely used in the aerospace industry to fabricate high strength/weight ratio parts from pre-impregnated high strength fibers for aircraft, spacecraft and missiles.

At **Fiber Cutting Room**, dry fibers such as glass, carbon and aramid can be cut almost in every shape with its decagonal rotary knife. Prepregs can also be cut almost in every shape with its drag knife. With the pneumatic oscillating knife, sandwich core such as Nomex™ honeycomb and foam for the manufacturing of composite sandwich panels can be cut.



Mechanical Testing and Structural Health Monitoring Laboratory

In the Mechanical Testing and Structural Health Monitoring Laboratory, the mechanical properties of all kinds of materials are characterized and reported in accordance with international standards, accredited testing services and reports are provided, all total quality requirements are met and documented. Technical Data Sheets (TDS), Metallic and non-Metallic Materials Properties Development and Standardization (MMPDS) data, Design Allowable (DA), Fatigue and Damage Tolerance (F&DT) characteristics are provided.



Wet Chemistry Laboratory

Wet Chemistry Laboratory was equipped with several facilities for experiments from the production of newly designed monomers and nanomaterials to polymer synthesis. The facilities in the lab bring innovative solutions in the field of textiles, hygiene, household goods, automotive, aerospace and energy.



Polymer Processing Laboratory

Polymer Processing Laboratory offers the development of thermoplastic polymer compound formulations, masterbatch preparation, and improved manufacturing processes. This lab is equipped with a twin-screw extruder with the capacities of 500 g up to 20 kg, a high shear compounding machine, an injection moulding, a film blowing system and two chemical reactors.



Material Characterization Laboratory

Material Characterization Laboratory covers the thermal, thermo-mechanical, rheological and structural characterization of all composite materials and individual components used in composite manufacturing. The lab can characterize the thermal properties of materials by means of Thermo-Gravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC) and Thermal Conductivity measurements. Thermo-mechanical properties of materials are determined by means of Dynamic Mechanical Analysis (DMA) and Thermo-Mechanical Analysis (TMA) using various test modes for all materials. Other capabilities include rheological analysis, Heat Deflection Temperature (HDT), Gel Permeation Chromatography (GPC), FT-IR spectroscopy, molecular weight analysis, thermal conductivity and contact angle measurement.



Additive Manufacturing Laboratory

Additive Manufacturing Lab aims to develop novel Additive Manufacturing Technologies by improving and enhancing existing processes as well as developing new hybrid processes for manufacturing multifunctional complex parts. The lab focuses on metal, high-performance plastic, composite and hybrid additive manufacturing processes.



Flammability Testing Laboratory

Flammability lab offers test capabilities according to aerospace and railway industry standards which require detailed and sensitive handling and execution of flammability tests. Moreover, textiles, foams, construction materials, engineering plastics and polymers can be tested per related standards of each industry.

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