engineering
your dreams

dhio
center for excellence

About DHIO Research,

DHIO Research & Engineering Pvt Ltd., is an Collaborative Engineering Services and R&D Company based in Bangalore, India.

DHIO Research has an experienced pool of expert engineers, scientists with decades of experience and expertise in applying advanced computational simulation techniques to solve real-world physics/ problems, design validation-verification requirements.

DHIO Research supports engineering simulation softwares, services, training and R&D requirements of Auto, Aero, Energy, Railway, Oil & Gas, General Engineering companies to achieve complex engineering simulation needs in Product/Process material design, redesign, re-engineering, reverse engineering, analysis and optimisation to save money, material and time.

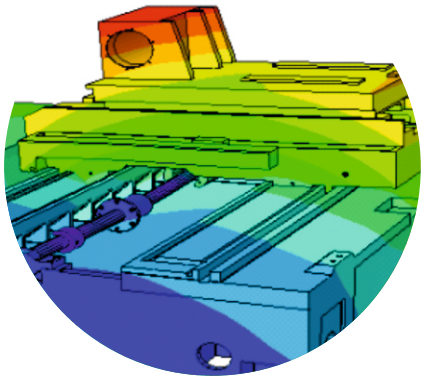
DHIO Research – technology transfer division has a wealth of knowledge in selling CAE products and supplying technical support to customers that are solving highly complex simulations. DHIO's technical knowledge and understanding of CAE domain has helped customers to achieve the best results in shortest lead time by using state of the art technology tools.

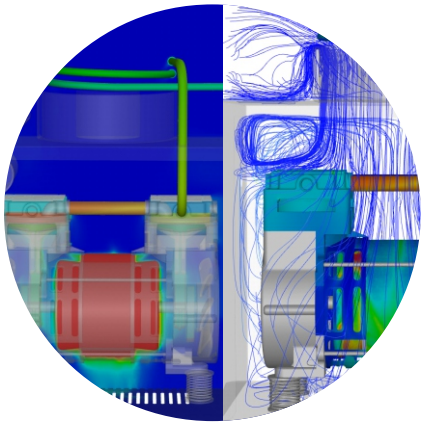
DHIO Research – training division supports working professionals, students and faculty members to adopt advanced software and technology knowledge. DHIO has unique courses designed for different level of engineers and covers theory + practical +projects and internship program to enhance the skills and experience.

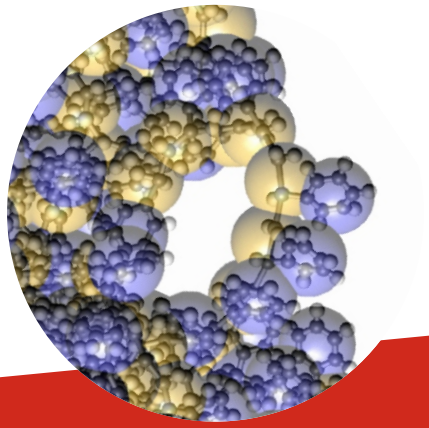
We enjoy the pleasure of working with you. We rejoice the intense technical interaction and the challenge in delivering to our customers quality work on time.

Sincerely,

Santhosh N L
Director & CEO
santhosh@dhioresearch.com







Engineering
Simulation Services

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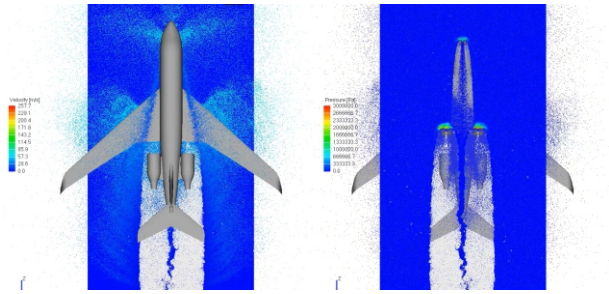
center for excellence

engineering your dreams | **your partner** for advanced simulation software, services and training

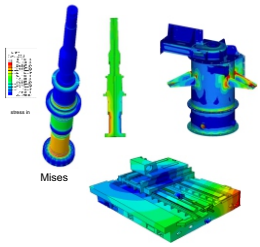


Collaborative Engineering Services and R&D Company

DHIO Research has an experienced pool of expert engineers, scientists with decades of experience and expertise in applying advanced computational simulation techniques to solve real-world physics/problems, design validation-verification requirements.

Our Service Portpolio

Structural Mechanics



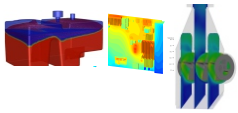
Nonlinear FEM : Static, Dynamic, Linear, Nonlinear, Thermal, Impact, Coupled, Electric, Forming, Implicit, Explicit, Drop Test, Crash, MBD, Wear, Forming, FSI Simulations

Fatigue, Durability, Fracture Mechanics : Metals, Alloys, Polymers, Load Calculations, 3D Crack Growth Simulations

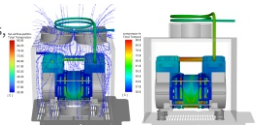
Structural Integrity Assessment : Remaining life assessment, Failure Analysis, Asset Management, Life Extension Studies

Computational Fluid Mechanics

1D Thermal Fluid Network Simulations : System, Subsystem, Component Level Thermodynamics, CFD, Heat Transfer, Steady State, Transient Simulations, Fuel Cell, Hydrogen, Sco2, Carbon Capture, Airconditioning, Refrigeration, Space Rocketry, Surge Analysis



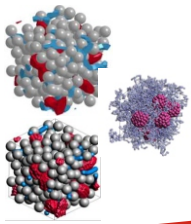
3D Computational Fluid Dynamics : Component CFD, Turbulence, Mass Transfer Heat Transfer, Phase Transfer, Combustion Aerodynamics, Multiphase Modeling Newtonian, Non-Newtonian Modeling



Mesh Free Computational Fluid Dynamics
Sloshing, Lubrications, Vehicle Wadding, Leakage Simulations, Spray, Bulk fluid simulations

Discrete Element Method (DEM) Simulations
Bulk Material Modeling, FEM, CFD, DEM Coupled Multiphase Simulations

Multiscale Material Modelling and Characterisation

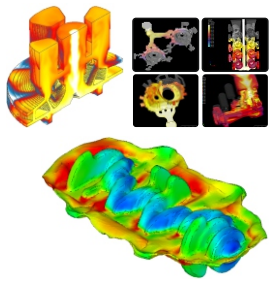


Atomistic Modelling / QM/ DFT Simulation : Catalysis, Coating, Surface Chemistry, Chemical Reactions..etc

Multiscale Molecular Dynamics prediction of thermal, optical, mechanical, interference, fluid, electrical ..etc properties using integrated multiscale modelling capabilities

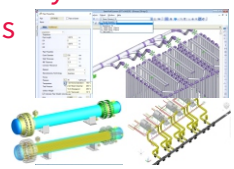
RVE Modelling prediction of linear and nonlinear thermal, optical,mechanical, interference, fluid, electrical ..etc properties for composite mateirals at meso-scale

Manufacturing Process Simulation



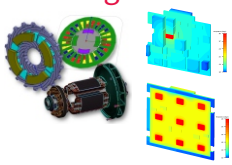
Casting – Ferrous and Non-ferrous
Bulk Forming Process Simulations
– Forging, Extrusion, Drawing, Rolling
Sheet Forming Simulations
Heat Treatment Simulations
Additive Manufacturing
Injection Molding Simulations
Composite Manufacturing
Tool and Die Design
Jigs and Fixture Design
Value Engineering Simulations

Pipe Stress, Equipment Analysis and Process Flow Simulations



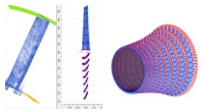
Piping Stress Analysis & Sizing
Pressure Vessel Design and Qualifications
Process Flow and Heat Transfer Analysis

Electromechanical System Design



Thermal Management of Electronics Systems
EMI/EMC Simulations
Antenna, Filter, Enclosure Designs
Low frequency electro-mechanical systems
Motors, Generators, Solenoids Design
Certification and Validation Simulations

Turbo machinery design and Analysis

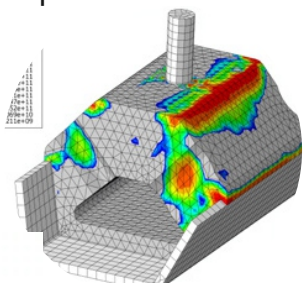
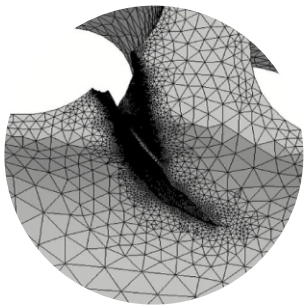


Turbo machinery Design, Analysis, Optimisation
Retrofitting Analysis
Rotor Dynamics
Pump, Compressor, Turbo charger Design Analysis
Bearing Dynamics
Heat Transfer Analysis
Life Predictions

Structural Mechanics
Simulation Softwares

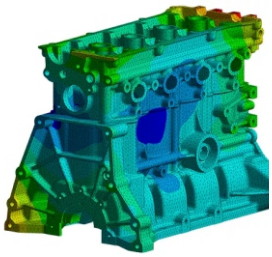
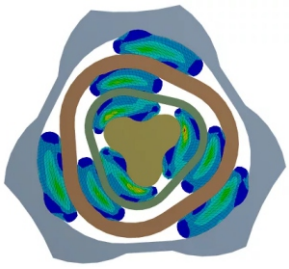
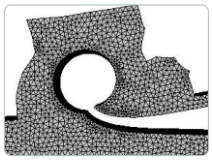
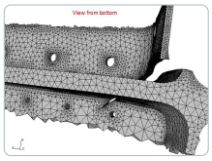
dhio center for excellence

One Stop Solution for your *FEM, Fatigue, Durability, Fracture and Failure Assessment* requirements

Ansys

Finite Element Analysis (FEA) Software for Structural Engineering

3D Crack Growth Simulation Software

FRANC3D
3D Crack Growth Simulation Software

The FRacture ANalysis Code 3D (FRANC3D) program is designed to simulate 3D crack growth in engineering structures where the component geometry, local loading conditions, and the evolutionary crack geometry can be arbitrarily complex. It is designed to be used as a companion to general purpose Finite Element (FE) solvers.

FRANC3D development started at Cornell University, USA in the late 1980's, evolving into a program that has been used worldwide in academia and industry for analyzing crack growth in complex 3D structures.

FRANC3D works on M-Integral approach for accurate prediction of SIF, It also supports Displacement Correlation Method and VCCT for computation of SIF. fretting cracks, bi-material interface cracks, SCC, Time & temperature Cycle dependent crack growth simulation is its unique strength.

more details
http://franc3d.in
http://fracanalysis.com/

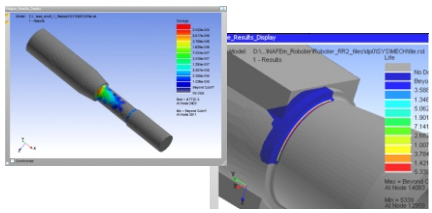
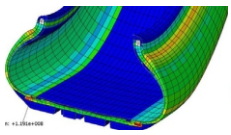
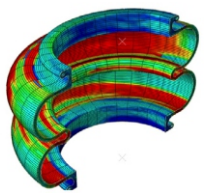
Rubber Durability Simulation Software

2020 TIBBETTS AWARD WINNER
Endurica
Get Durability Right®

Endurica is the world's first code for elastomer fatigue life simulation. We strive to make CAE-based fatigue life prediction for rubber as widely practiced and as well-understood as fatigue life prediction for other materials by empowering materials, component, and system developers with reliable methods and tools for assessing fatigue life. Our solutions help our clients understand and manage the effects on fatigue life of nonlinear material behavior, component geometry, and complex duty cycles. Endurica has served leading companies in the automotive, defense, medical device, offshore, and consumer products.

Get Durability Right through elastomer fatigue analysis education, testing equipment, materials characterization, consulting services, training, and FEA modeling. Put Endurica's patented fatigue life analysis technology to work on your project.

more details
http://endurica.com

In-situ Load Calculation & Duty Cycle Development

TRUE LOAD™
by Wolf Star Technologies

True-Load is a first to market to solution that leverages FEA models to place strain gauges on unmodified physical parts and then back calculate loading. Output directly feeds into True-QSE events, a powerful post processing tool that supports rapid virtual iteration. True-Load directly interfaces to FEA fatigue software to make FEA based fatigue with correlated loading events a natural part of the design cycle.

Create multi-channel load cells leveraging your parts and FEA models.
- Determine optimal strain gauge placement from FEA model
- Calculate Load Proportionality Matrices
- Use Measured Strains to back calculate Operating loads
- Create Quasi-Static Events to be used with True-QSE

More Details : https://wolfstartech.com/

Probabilistic Fracture Mechanics Damage Tolerance Studies

DARWIN® SwRI

DARWIN® (Design Assessment of Reliability with INspection) is fracture mechanics and reliability assessment software that supports damage tolerant design and analysis of metallic structural components. DARWIN determines fatigue crack growth lifetimes under cyclic loading histories. DARWIN can compute fracture risk values using random variables such as distributions of material inclusions that form cracks. DARWIN has been employed for nearly two decades throughout the gas turbine industry to ensure safe engine components. Southwest Research Institute (SwRI) continues to develop and maintain DARWIN to analyze complex geometries under diverse stress and temperature histories and different material conditions.

More Details : https://www.swri.org/darwin

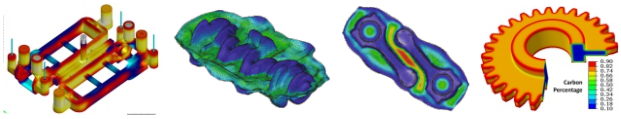
Products

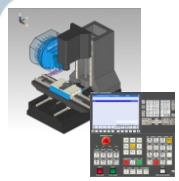
Ansys	Finite Element Simulation Software	**ANSYS Inc, India/USA**
Ansys nCode DesignLife	Metal Fatigue Analysis Software	**ANSYS Inc, India/USA**
TRUE LOAD™ by Wolf Star Technologies	In-situ Load Calculation & Duty Cycle Development	**Wolf Star Technologies, USA**
2020 Tibbetts Award Winner Endurica Get Durability Right®	Rubber Fatigue Analysis Software	**ENDURICA, USA**
FRANC3D 3D Crack Growth Simulation Software	3D Crack Growth Analysis Software	**Process Optimisation Corporation, USA**
DARWIN® SwRI	Probabilistic Fracture Mechanics Damage Tolerance Studies	**SWRI, USA**

Manufacturing Process
Simulation Softwares

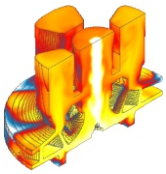
dhio center for excellence

Digital Manufacturing
end-to-end manufacturing process simulation

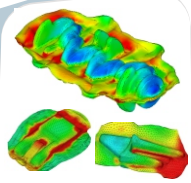




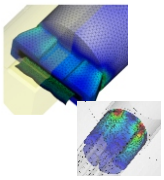
CNC
Simulation



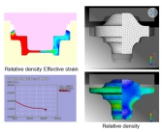
Casting
Simulation



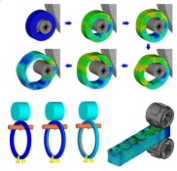
Forging
Simulation



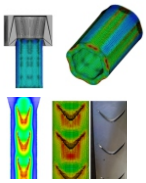
Extrusion
Simulation



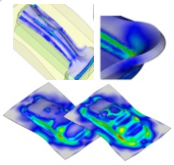
Powder Compaction
Simulation



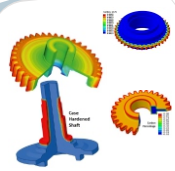
Rolling
Simulation



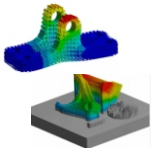
Drawing
Simulation



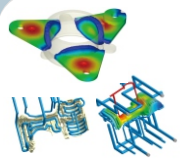
Sheet Forming
Simulation



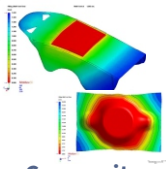
Heat Treatment
Simulation



Additive Manufacturing
Simulation



Injection Molding
Simulation



Composite Manufacturing
Simulation

Products

Z-CAST PRO Casting Simulation Software	Casting Simulation - Flow, Solidification, Heat Stress	**Cubictek, Korea**
AFDEX Intelligent Metal Forming Simulator	Bulk Metal Forming Simulation Software	**MFRC, Korea**
dante	Heat Treatment Simulation Software	**Dante Solutions, USA**
Moldex3D MOLDING INNOVATION	Injection Molding Simulation Software	**Moldex3D, Taiwan**
Moldex3D MOLDING INNOVATION	Composite Manufacturing Simulation Software	**Moldex3D, Taiwan**

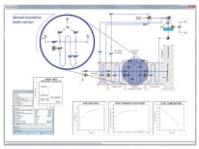
Computational Fluid Dynamics

Simulation Softwares

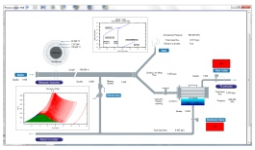
dhio center for excellence

1D System level thermal-fluid flow Simulation Software

FLOWNEX® SIMULATION ENVIRONMENT

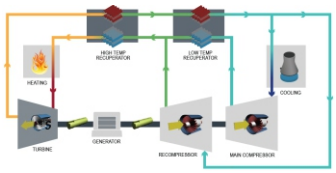


Natural Circulation Boiler Section

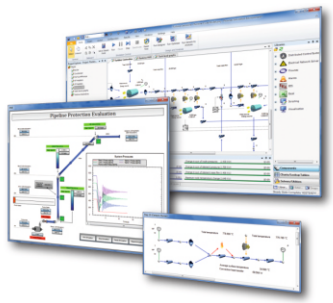


Process Flow and Heat Transfer Modelling

Super Critical Co2 Simulation

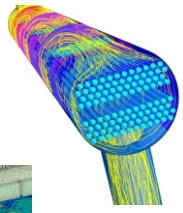


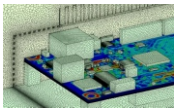
Flownex® Simulation Environment (SE) delivers technology that enables you to study how flow and heat transfer systems will behave in the real world, where fluid is the driving factor. Flownex system simulation relays the overall effect of changing specific properties on components, allowing you to examine extensively all possible variations in the design and optimization phase of systems.

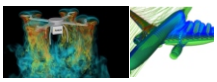


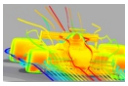
3D CFD and Multi-physics Simulation Software

Ansys Fluent





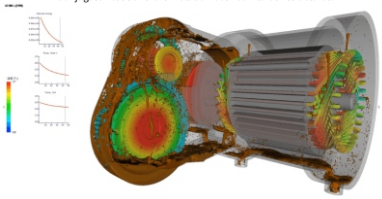


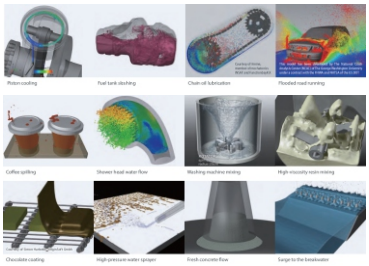


Mesh Free CFD Simulation Software

Particleworks™ Particle-based simulation software for CAE

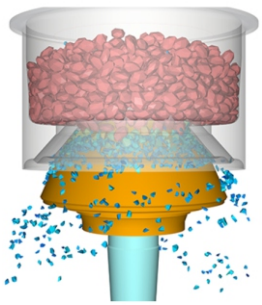
Conjugate heat transfer simulation between fluids - structures.

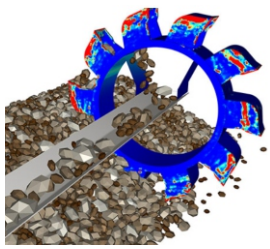




Discrete Element Method Simulation Software

Ansys / ROCKY





ROCKY

Products

FLOWNEX® SIMULATION ENVIRONMENT	1D System level thermal-fluid flow Simulation Software	**M-TECH Industrial, SA**
Particleworks™	Mesh Free CFD Simulation Software	**PROMETECH, Japan**
Ansys Fluent	Multi-physics Computational Fluid Dynamics Software	**ANSYS Inc, India/USA**
Ansys / ROCKY	DEM or Particle Simulation Software	**ANSYS Inc, India/USA**

Multi-scale Material Modeling

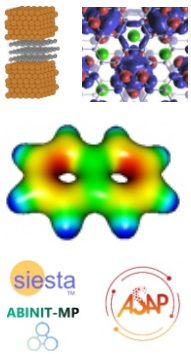
Simulation Softwares

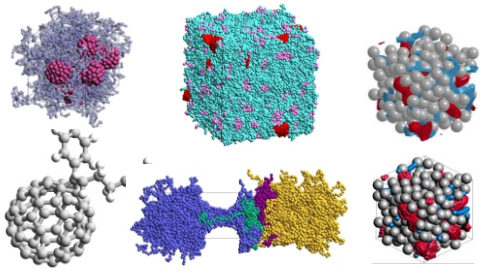
dhio center for excellence

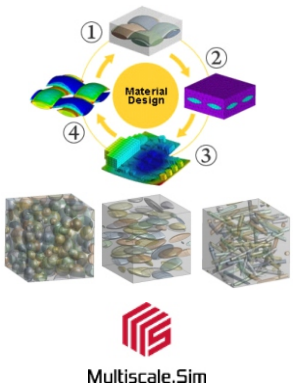
Material Science & Life Science Research

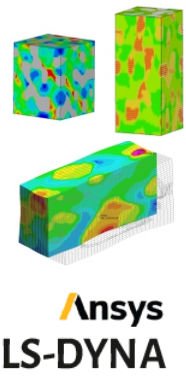
material property development and characterisation

from atomic-nano-micro-macro scale





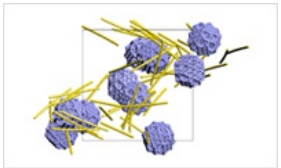




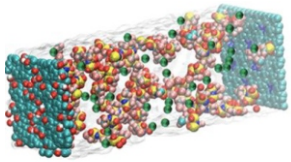
~1nm	~10nm	~100nm	~mm/m	~mm/m
QUANTUM MECHANICS	FAMD FULLY ATOMISTIC MOLECULAR DYNAMICS	CGMD COARSE GRAINED MOLECULAR DYNAMICS & DPD DISSIPATIVE PARTICLE DYNAMICS	MICRO FEA	MACRO FEA
Quantum Mechanics **Density Functional Theory** **Molecular Orbit Method**	**Full Atomistic** **Molecular Dynamics**	**Coarse Grained** **Molecular Dynamics &** **Dissipative Particle** **Dynamics**	**Continuum Mechanics** **RVE Modeling** **Multiscale Material** **Evaluation**	**Continuum Mechanics** **FEM Analysis**

GENESIS Modeler for Life Science

Coarse Grained Molecular Dynamics



Process Simulation (particulate dispersion systems, droplets, coatings)



Products

ASAP	Atomistic Simulation	**Simune Atomistics, Spain**
J-OCTA	Integrated Molecular Dynamics Simulation Software	**JSOL Corporation, Japan**
Multiscale.Sim	RVE Modelling	**Cybernet Systems, Japan**
Ansys LS-DYNA	FEM Analysis	**ANSYS Inc, India/USA**

Pipe Stress & Pressure Vessel
Simulation Softwares

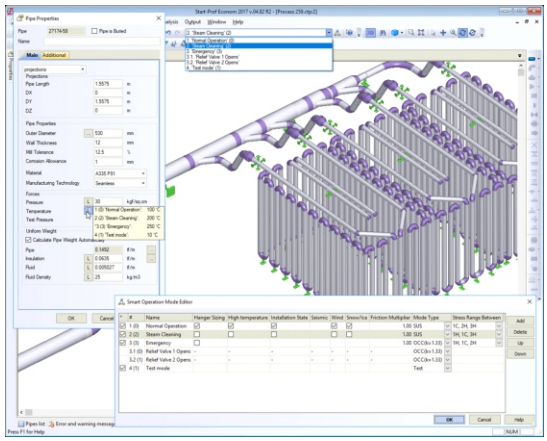
dhio center for excellence

Smart Simulation & Sizing Tools for every Piping And Equipment Engineer/Designer

PASS PIPING AND EQUIPMENT ANALYSIS & SIZING SUITE

OEM : PSRE, RUSSIA

The PASS software tools provide smart simulation and sizing tools for every piping and equipment engineer/designer that enable new users to perform piping/equipment analysis in days rather than months.



PASS APPLICATION FAMILIES

The **PASS software** is organized into product families to meet the broad range of piping systems analysis and design requirements.

> **PASS/HYDROSYSTEM** for piping hydraulic and thermal analysis & sizing.

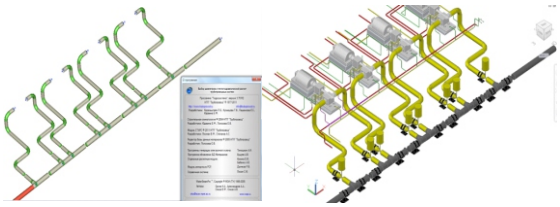
> **PASS/START-PROF** for piping stress analysis & sizing.

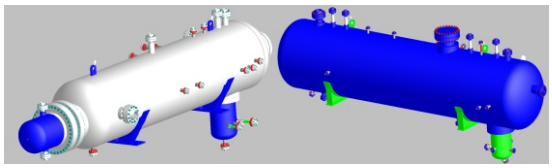
> **PASS/EQUIP** for equipment analysis (vessels, columns, heat exchangers, tanks, nozzles).

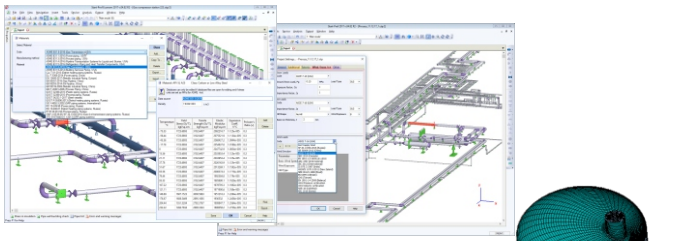
> **PASS/Integration** for easy and accurate data transferring between PASS software and CAD tools.

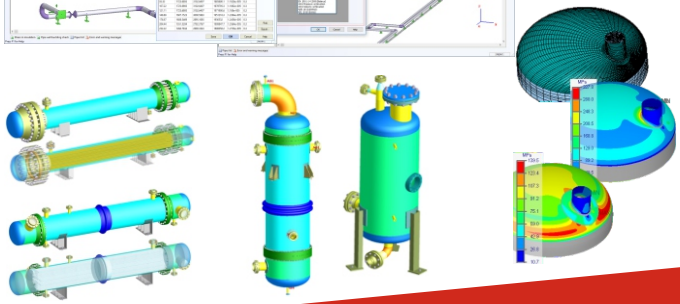
> **PASS/INDUSTRY** for industry specific piping and equipment analysis.

> **PASS/ACADEMIC** for educational institutions.









Products

PASS START-PROF	Pipe Stress Analysis & Sizing Software
PASS EQUIPMENT	Equipment analysis (vessels, columns, heat exchangers, tanks, nozzles).
PASS HYDROSYSTEM	Piping hydraulic and thermal analysis & sizing

Turbomachinary Systems

Simulation Softwares

dhio center for excellence

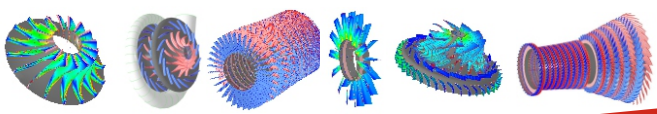
OEM : SoftInWay Inc, USA

SoftInWay Inc. delivers time and cost saving turbomachinery solutions through industry-leading consulting services, fully in-house developed software, and customizable training courses.

AxSTREAM® Software Platform

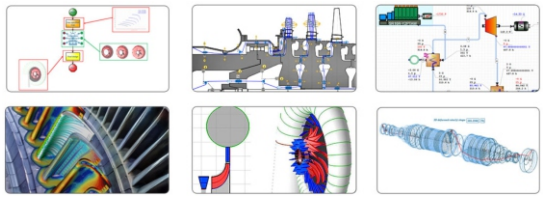
The AxSTREAM® software platform for multidisciplinary design, analysis and optimization provides an integrated and streamlined approach to turbomachinery design. This best-in-class software solution encompasses the complete process for radial, axial and mixed flow turbomachinery design. This includes gas and steam turbines, compressors, blowers, pumps, fans, rotors, bearings, secondary flows, and cooling.

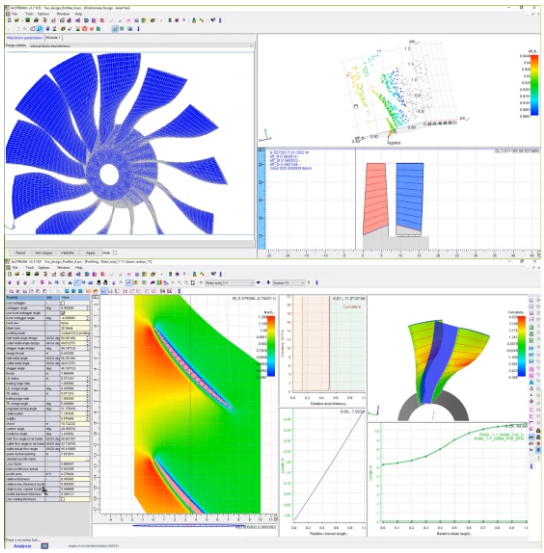
> **Preliminary Design** for single-stage, multi-stage and multi-module turbomachines.
> **Meanline/Streamline** Analysis allows users to check the performance, velocity triangles, leakages, etc. of a machine for any set of boundary conditions as well as review the streamwise and spanwise distribution of thermodynamic, kinematic and loss parameters.
> **AxMAP** for performance mapping of operational conditions and geometric variations for a given design.
> **AxPLAN** of various design tasks, utilizing fast design of experiment (DoE) study methods.
> **Profiling and 3D Blade Design** to create and edit 3D airfoils via various geometric features and interactive charts for plane sections profiling and 3D blade stacking.
> **AxCFD** for the calculation of 2D and 3D analysis in blade-to-blade channels.
> **AxSTRESS** for rapid 3D finite element analysis on blades and attachments.
> **AxSLICE** used for reverse engineering to extract the profile geometry of 3D blade models to analyze existing machines in the AxSTREAM software platform
> **Bearing Calculation and Analysis** to determine the hydrodynamic performance and mechanical characteristics of journal (radial load and axial thrust), aero, squeeze film dampers and rolling element bearings as well as annular seals.
> **RotorDynamics** used to calculate rotor trains natural frequencies (including modes shape), unbalance response and conclude on stability for both lateral and torsional analyses while accounting for accurate bearing and support characteristics.

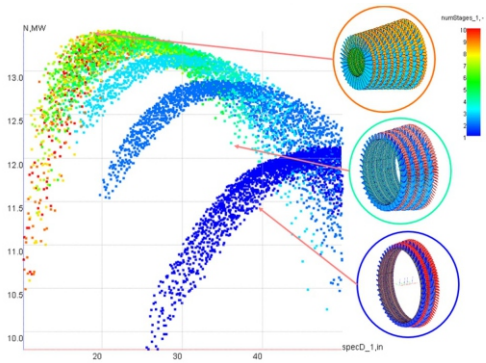


The AxSTREAM® software platform for multidisciplinary design, analysis and optimization provides an integrated and streamlined approach to turbomachinery design.

AxSTREAM™







Material Testing Services

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Physical Material Testing

to predict the accurate properties
DHIO Research Partners with Moldex3D (Taiwan)
& ENDURICA LLC (USA)

Moldex3D
MOLDING INNOVATION

Material Innovation Center

Accurate material data is essential for successful simulation and manufacturing process development. Moldex3D can help global users to gain most reliable material property for simulation. Moldex3D Material Center is an ISO 17025 CERTIFIED laboratory and has the best-in-class equipment to help customers obtain reliable material data, including thermoplastic, thermoset, composite, IC Packaging material, etc. We also offer consulting, customized services of test Items, data fitting, material file generation, customized report and more for precise simulation. All the raw data, material modeling parameter and Moldex3D material data file will be provided with the final report.

Thermoplastic

> Shear Viscosity
> PVT
> Thermal Conductivity
> Heat Capacity

Fabric

> Permeability & Porosity

Thermoset

> Chemorheology
> Curing Kinetics

List of Instruments

DHR-3 (TA)
MCR-502 (Anton Paar)
Rheograph RG-25(Gottfert)
MDR-A1 (U-CAN)
DSC-8500 (Perkin Elmar)
PVTC-A1 (U-CAN)
FOAMAT 285 (Format)
EASYPERM
DMA-Q850 (TA)
Instron 5966 (Instron)
TMA-4000 (Perkin Elmar)
PVT-6000 (GoTech)
DSA100 (KRŰSS)

https://www.moldex3d.com/products/service/material-characterization/

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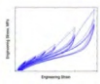
GET DURABILITY RIGHT

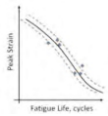
ENDURICA'S FATIGUE PROPERTY MAPPING

Hyperelastic Module



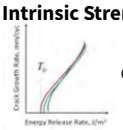
Simple, planar, equibixial tension Mullins Effect

Core Fatigue Module



Fully relaxing behavior from both nucleation and fracture mechanical perspectives

Intrinsic Strength Module

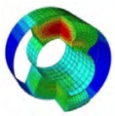


Quantify endurance limits

Extended Life Module

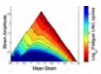
Quantify endurance limit, estimate aging rate of stiffness, intrinsic and ultimate strength

Thermal Module



Quantify dissipative properties, thermal properties, temperature dependence

Nonrelaxing Module

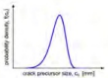


Quantify strain crystallization min and mean strain effects

Ozone Module

Quantify ozone attack critical tearing energy and rate

Reliability Module

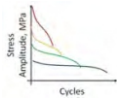


Weibull statistics for strength and crack precursor size populations

Creep Module

Quantity creep crack growth rate effects

Cyclic Softening Module



Quantify cyclic softening effects

https://endurica.com/elastomer-testing-characterization/

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Simulation Enabled
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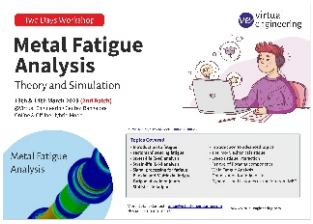
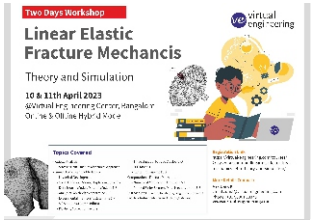
About Virtual Experiential Learning Pvt Ltd

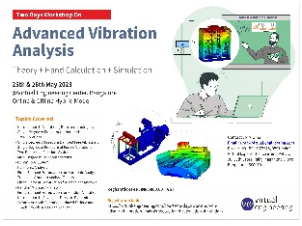
Virtual Engineering is an automated online platform for learning engineering physics and concepts through advanced computational simulation softwares and technologies.

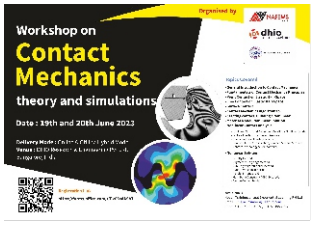
Virtual Engineering enables user to learn theoretical, analytical and computational methods by accessing cloud based simulation software's. It helps users to learn from highly experienced simulation experts and access unlimited tutorials on simulation capsule library, get customised trainings on physics, domain and tools from anytime ! and anywhere !

Our Training Programs (glimpse)









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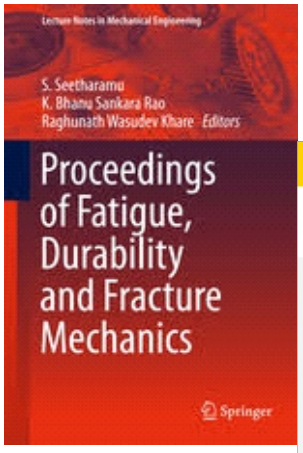

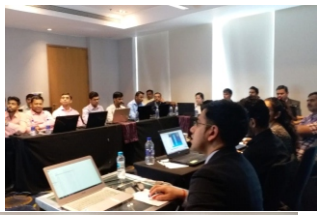

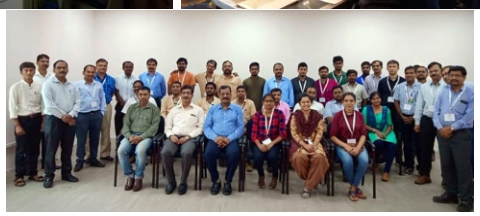

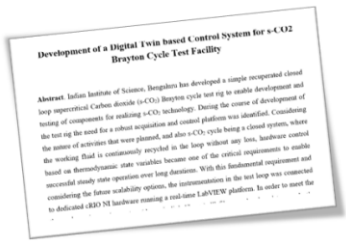

Customers

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