



NEXTGEN ENGINEERING SOLUTIONS

DESIGN | ENGINEERING | SERVICES

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About Us •••

At **NextGen Engineering Solutions**, we specialize in providing innovative and customized engineering services to businesses seeking practical, sustainable, and cost-effective solutions. Whether you're a start-up or an established enterprise, our goal is to help you navigate complex engineering challenges and optimize your operations.

Founded in 2025, **NextGen** was created with a vision to blend cutting-edge technology with expert engineering to deliver solutions that not only meet today's demands but also anticipate future needs. Our team consists of seasoned professionals from diverse engineering disciplines, including mechanical, electrical, civil, and Metallurgical, who work collaboratively to create tailor-made solutions that drive efficiency and productivity.

Our core values include innovation, collaboration and integrity - guide everything we do, and we are committed to maintaining the highest standards of quality in all of our projects.

As we continue to grow, **NextGen** aims to expand its services to new industries, providing engineering solutions that are both practical and forward-thinking.

Ready to solve your engineering challenges!.

Contact us today to learn how **NextGen Engineering Solutions** can support your business.



Core Capabilities

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& Services

- Mechanical and Piping Engineering & Design.
- Civil and Structural Engineering & Design.
- PE Seal & Stamping for Tank, Structural and etc..
- METALLURGY Consultation - Material selection, Root Cause failure analysis of Boiler Pressure Parts failures.
- Troubleshooting of Thermal Power Boilers site issues.
- Thermal Boiler fatigue life calculations as per EN 12952-3 code for flexible operation of thermal power plant.
- Thermal spray coatings for Boiler application.
- ELECTRIC VEHICLE - Design, Prototype Development & Homologation Consultation
- Mechanical Equipment & Piping Detailing and Shop Drawings.
- Structural Detailing and Shop Drawings.



What We Do

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Mechanical and Piping Engineering & Design

Mechanical and piping engineering form the backbone of industrial infrastructure, where design precision, system reliability, and compliance with international codes are crucial for project success. At **NextGen Engineering Solutions**, we specialize in providing end-to-end engineering solutions in mechanical and piping design, supporting industries such as power generation, oil & gas, process plants, and infrastructure development.

In this, **NextGen's** core discipline, we can offer a high value service in the following areas:

Mechanical Design

Equipment Design: Expertise in boilers, heat exchangers, pressure vessels, and tanks using international codes (ASME, IS, API, etc.).

Valve Specification: we provide detailed valve specifications tailored to project requirements, service conditions, and applicable standards. Our valve selection process considers key factors such as pressure rating, temperature limits, fluid properties, operation mode, and installation environment.

Structural Design: Layouts and fabrication drawings for steel structures, platforms, and pipe racks.

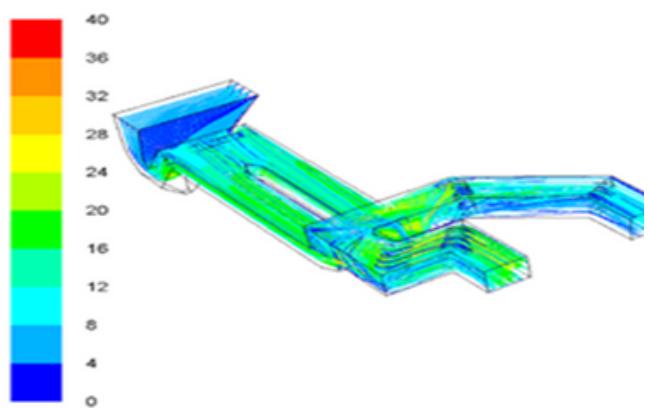
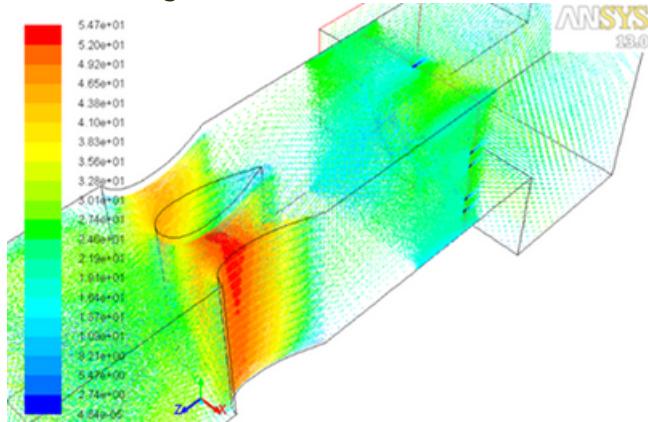
Stress & FEA Analysis: Simulation-based validation for components under pressure, load, and thermal conditions. Static & dynamic (vibration) structural analysis by using ANSYS. Steady state & Transient thermal analysis by using ANSYS.

Acoustic analysis: Optimized acoustic insulation material for boiler cold air system.

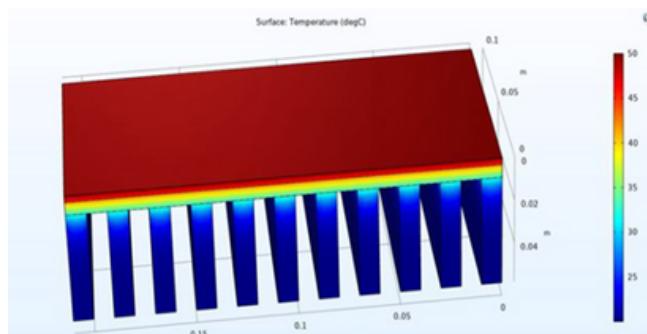
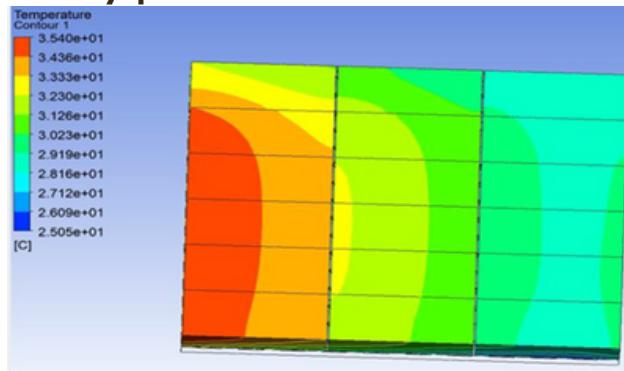
Material Engineering: Optimized material selection based on mechanical properties, corrosion resistance, and cost-effectiveness.

CFD Analysis: CFD (Computational Fluid Dynamics) Analysis is a powerful tool used to simulate and analyse fluid flow behaviour, heat transfer, and other physical phenomena within a given system. It plays a crucial role in engineering design, process optimization, and troubleshooting by using ANSYS Fluent.

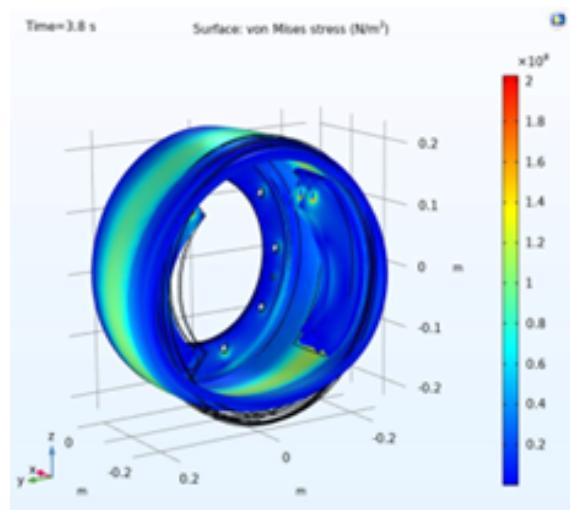
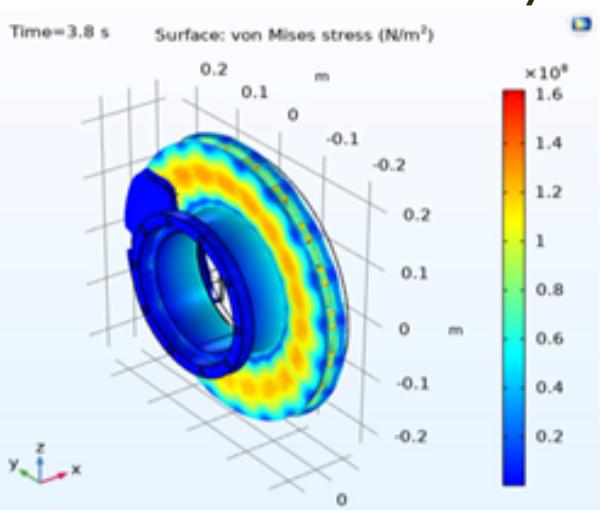
Multi-Port Square Pitot tube airflow Effects of Baffle Plates in Boiler Flue Gas Duct



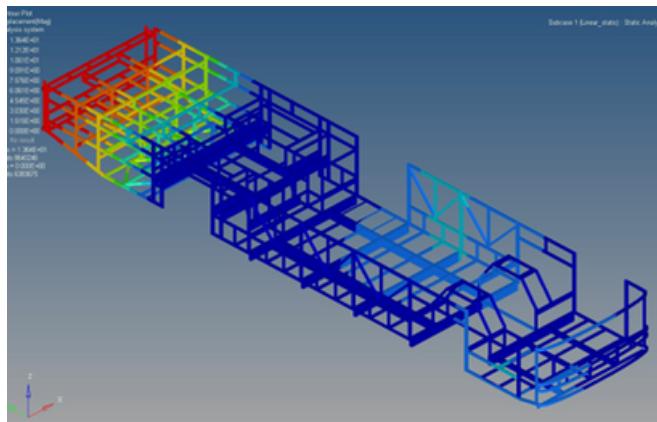
Thermal management system of Li ion Effect of thermal interface in Heat battery pack



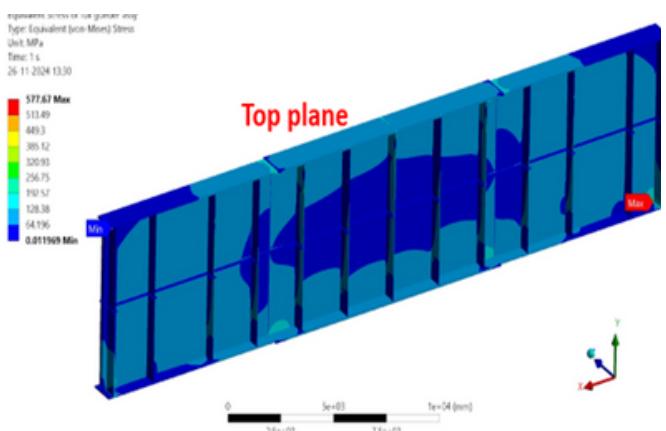
Transient Thermal Analysis - Disc and Drum Brake Foundation



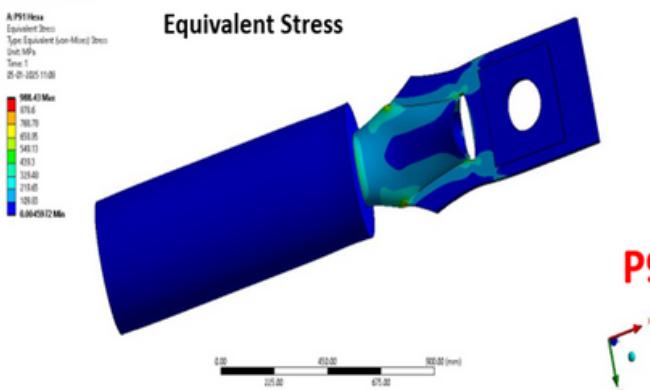
Multi-Port Square Pitot tube airflow Measuring device



Boiler Ceiling Girder



Vertical Buckstay Attachment

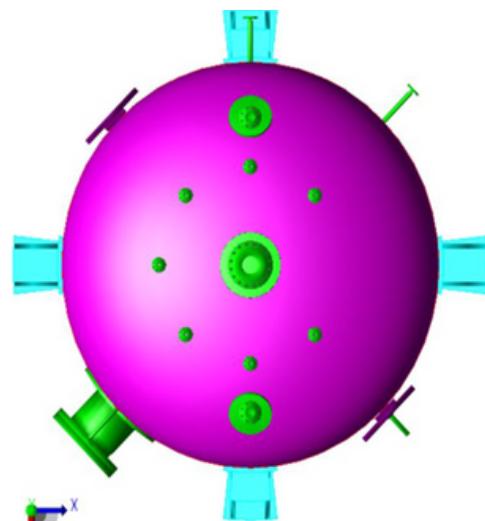
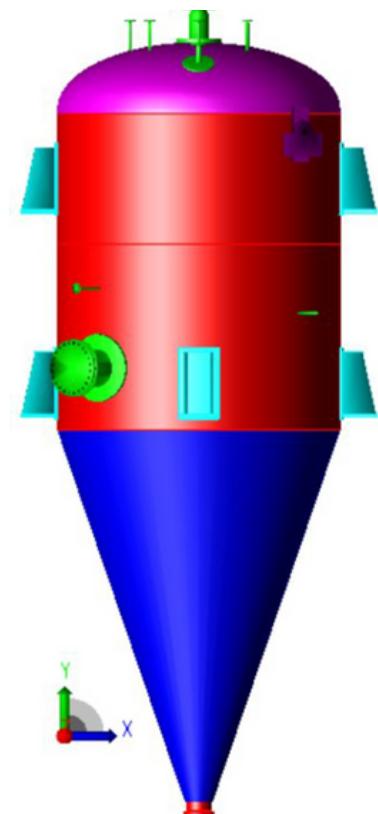




Pressure Vessel

PV Elite

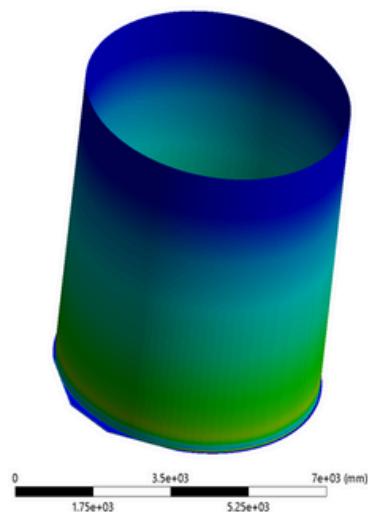
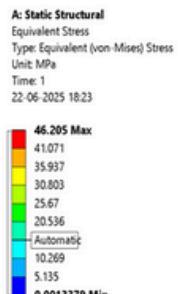
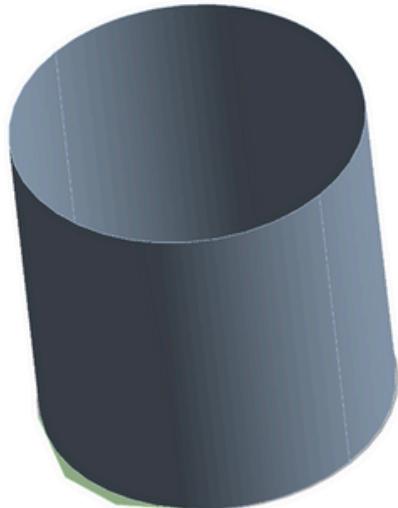
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Storage
Tank

Tank

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Piping Design & Engineering

Plant and Piping Layout & Routing: Development of efficient piping systems with clash-free 3D layouts.

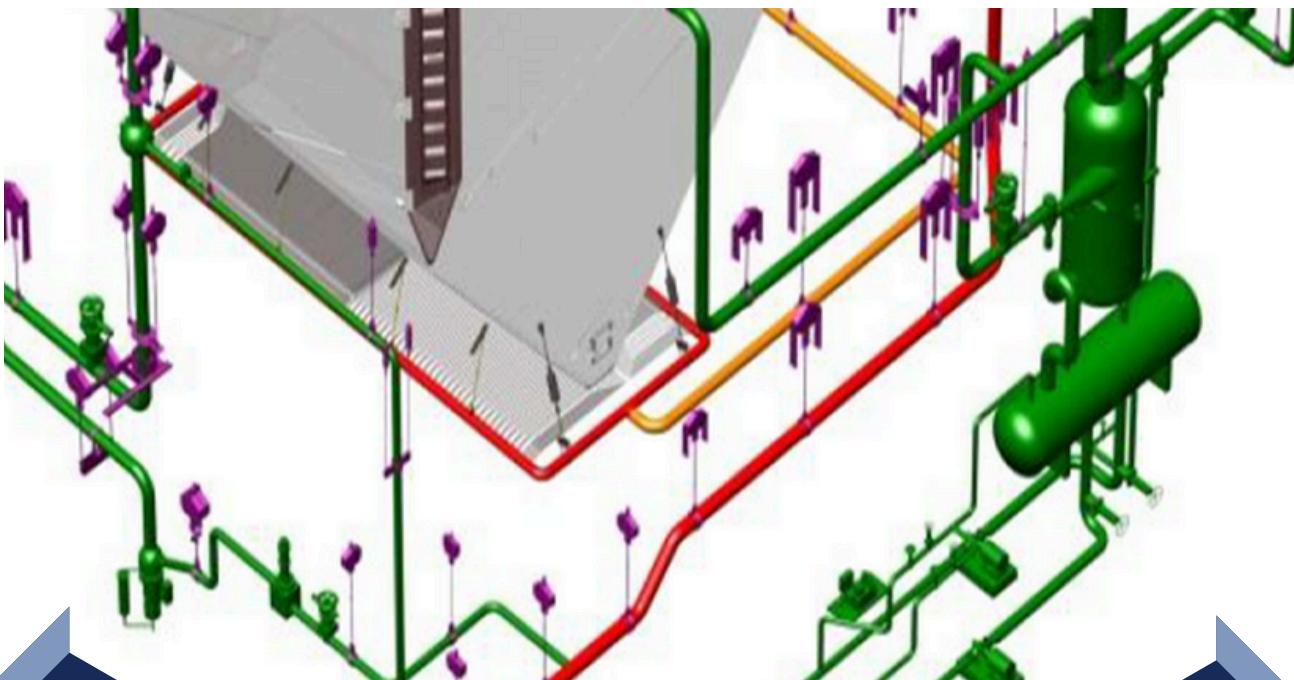
P&ID & GA Drawings: Comprehensive process schematics and general arrangement plans.

Pipe Stress Analysis: Using tools like CAESAR II to ensure code compliance under operating loads.

Pipe Support & Hanger Design: Primary and secondary support selection based on load cases. Spring, rigid, guide, anchor supports with location plan and installation data.

Boiler & Piping Lug Attachment: Design of Boiler & Piping lug attachment.

Isometric Drawings and BoM: Clear and fabrication-ready isometrics with material take-offs (MTO/BOM).

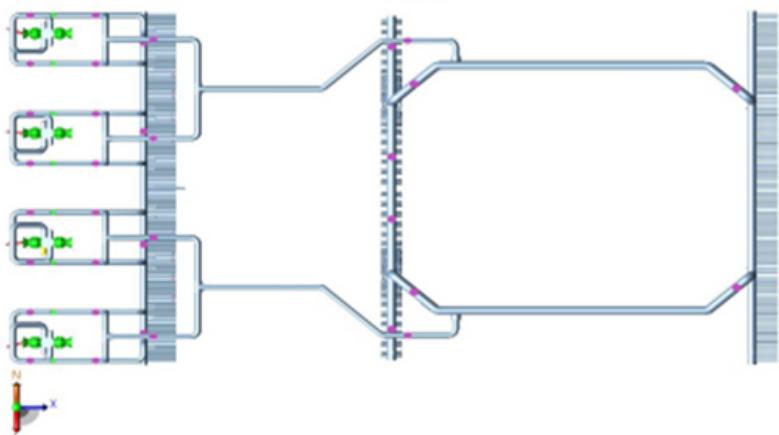
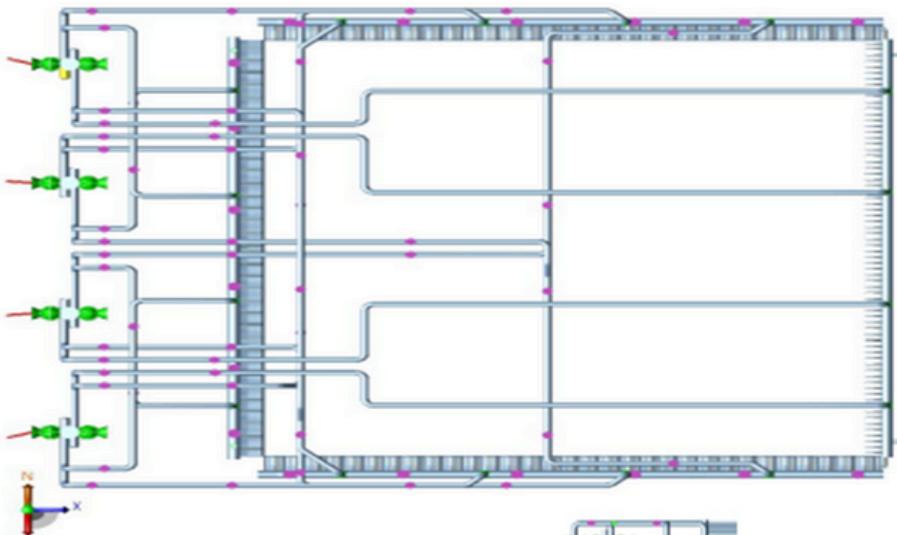




Piping Support

CAESAR II

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Boiler Coil Support

CAESAR II

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What We Do

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Civil and Structural Engineering & Design

Civil Engineering Design

- Architectural & Layout Planning for Industrial and Utility Buildings.
- Earthwork & Land Development Plans, Drainage, Roadway Layouts and Car parking design.
- Utility Duct Banks, Cable Trenches and Earth Pits.

Structural Engineering

- RCC & Steel Structure Design (IS 456, IS 800, AISC, BS Codes).
- Structural Analysis & Load Calculations.
- Foundation Design (Isolated, Raft, Pile, Combined).
- Industrial Building & Equipment Support Structures.
- Module/Skid Structural Design
- Water Retaining Structures Design.
- Seismic & Wind Load Design.Retaining Walls, Water Tanks, Silos, Pipe Racks.

PE Seal & Stamping for Structural

- Construction Surveillance & Certification.

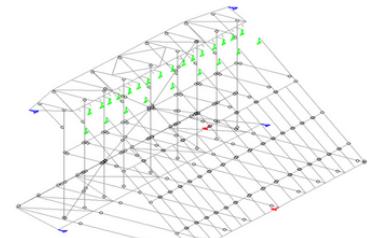
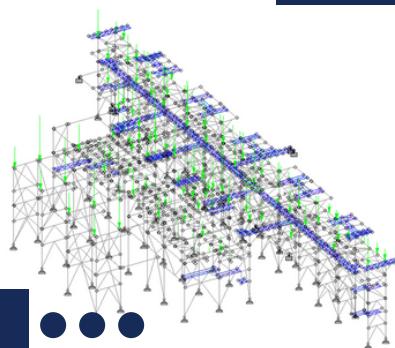
Design Standards & Codes

Main Engineering Standards utilised include AISC, ACI 318, ACI 350, ASCE 7, IBC, OSHA & NFPA.

Steel Structural

STAAD Pro

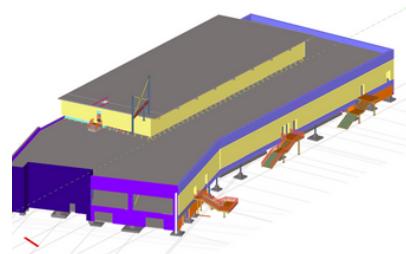
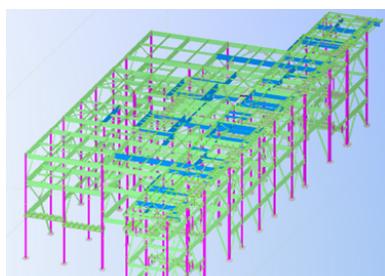
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Steel Structural Model

TEKLA

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E Bus Design, Prototype Development & Homologation

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At **NextGen Engineering Solution**, we provide end-to-end engineering support for E-Bus design, development, and integration — combining expertise in mechanical, electrical, and embedded systems with vehicle simulation and manufacturing support.

1. Vehicle Architecture & System Design

- **EV powertrain configuration:** Central motor, differential, transmission integration.
- **Layout planning:** battery pack placement, motor position, and weight distribution.
- Modular platform development for various bus sizes (7m, 9m & 12m).

2. Battery Pack Design

- Selection of Li-ion / LFP / NMC cells based battery Pack on range, safety, and lifecycle.
- **Design for cooling systems:** air/liquid-based thermal management.

3. Electric Drivetrain Design

- Motor specification & integration (BLDC / PMSM / induction motors).
- Controller tuning, inverter compatibility, and regenerative braking logic.
- Drive cycle simulations (e.g., MIDC, UDDS) for performance validation.

4. Body Structure & Chassis Engineering

- Lightweight materials (HSLA steel, aluminum structures) for improved efficiency.
- Crashworthiness, rollover protection, and NVH optimization.
- Bus frame and suspension design (air/leaf spring, low-floor accessibility).

5. Thermal Management System (TMS)

- Integrated thermal system for motor, inverter, and battery
- HVAC system design for cabin cooling with minimal power draw
- Simulations for cooling/heating profiles in various climates

6. Charging System Integration

- Compatibility with AC (slow) and DC fast charging infrastructure
- CCS2, CHAdeMO, or GB/T charging port selection and controller integration
- On-board charger (OBC) capability assessment.

7. Electrical & Embedded Systems

- Wiring harness design (low and high voltage).
- BMS, VCU, and telematics integration.
- CAN/LIN communication and diagnostic protocols.

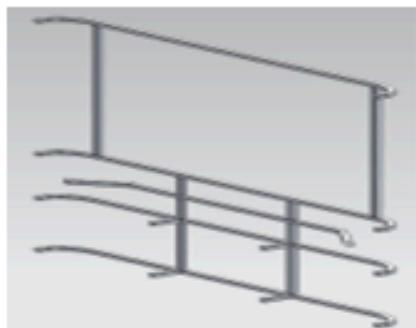
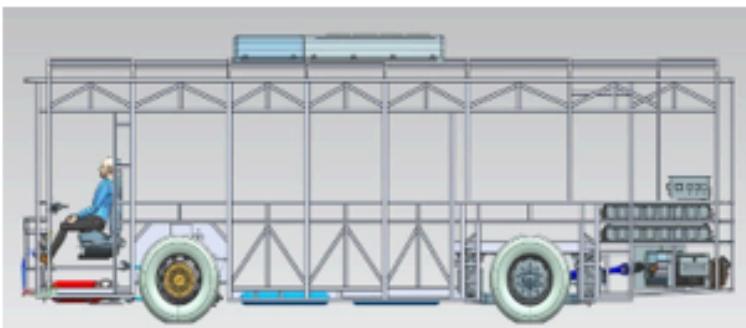
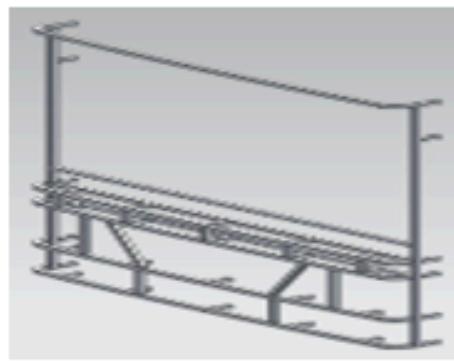
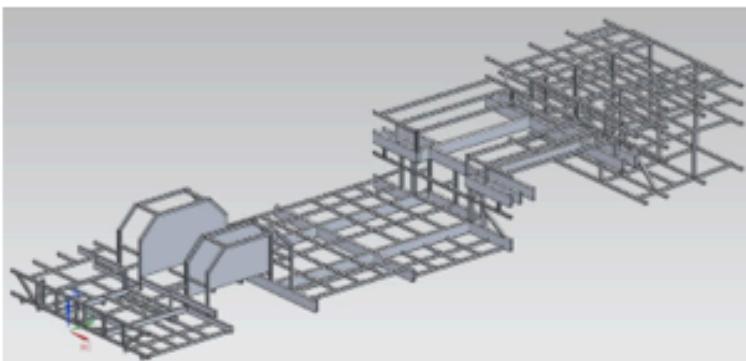
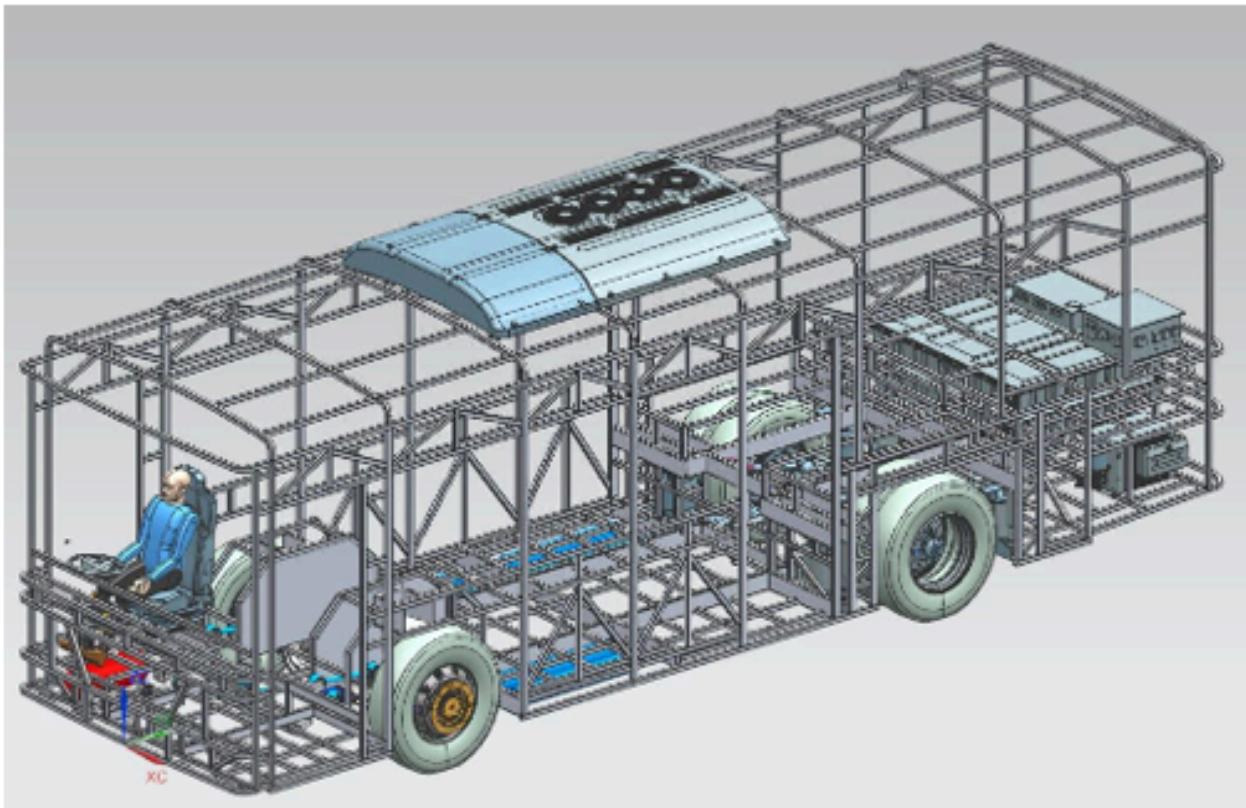
8. Simulation & Testing Support

- Vehicle range and energy consumption simulations.
- Thermal analysis (battery/motor/cabin).
- EMI/EMC planning and fault analysis.

9. Homologation assistance (AIS 038, AIS 156, CMVR)

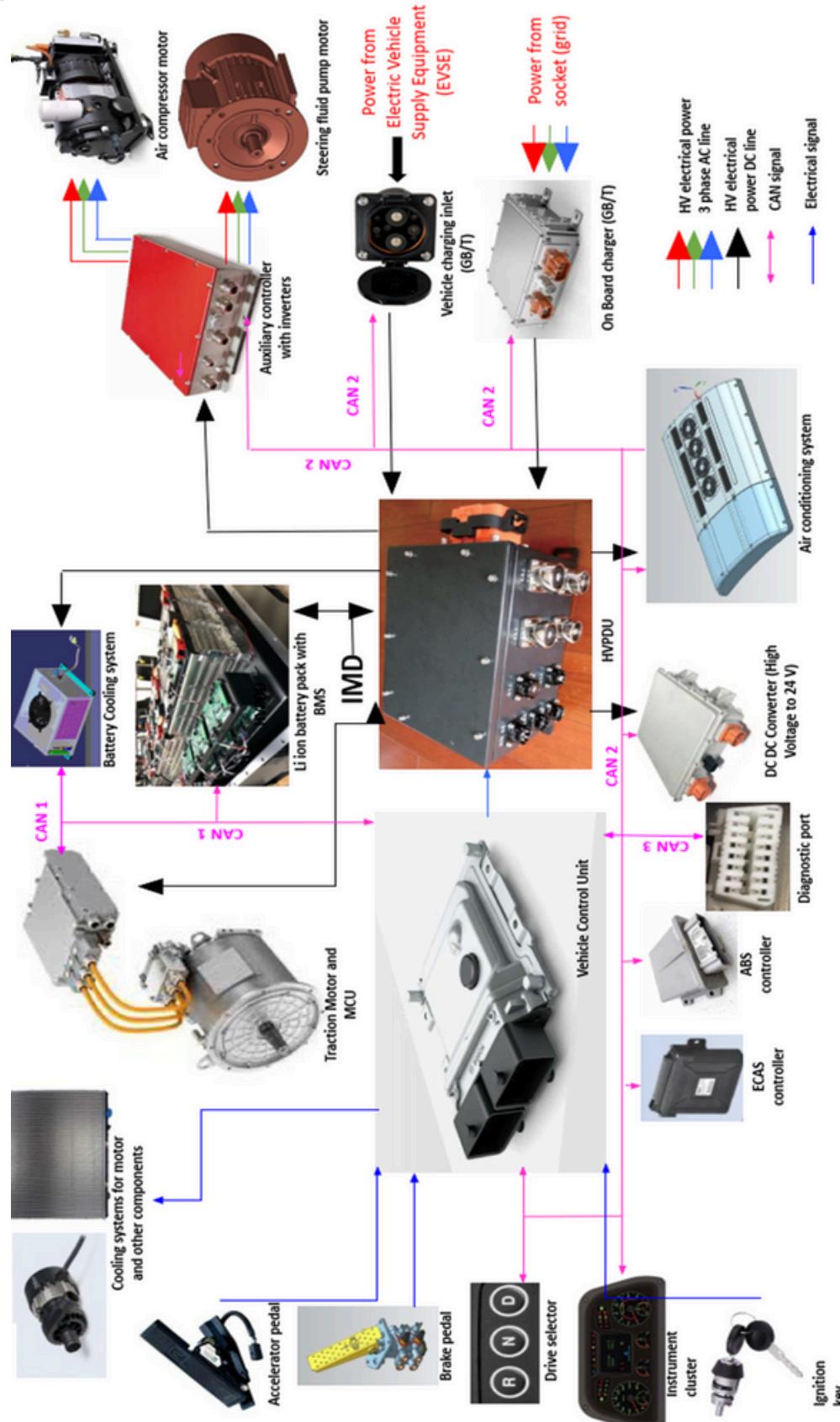
Design capabilities of Monocoque Chassis & Packaging for Electric Bus

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Powertrain integration in Electric Bus

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Root Cause Analysis for Pressure Parts

Boiler pressure parts—including tubes, pipes, headers, drums, and fittings—are critical to safe and efficient plant operation. Failures in these components can lead to unplanned shutdowns, safety hazards, and economic loss. A systematic Root Cause Analysis (RCA) helps identify the true source of failure and guides corrective and preventive actions.

SH choking due to sea water in Boiler circuit



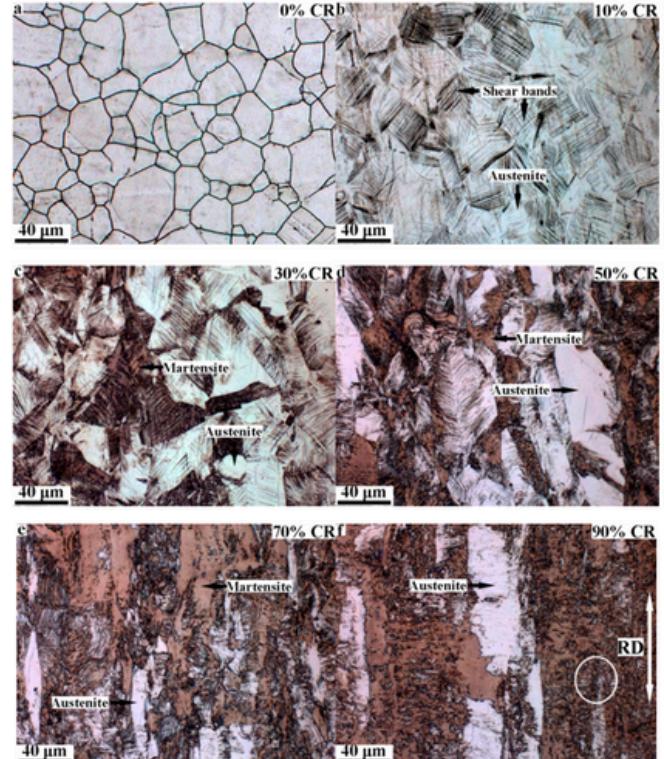
Thermal Fatigue for boiler Water Wall



Corrosion Fatigue of TP347H for Final Re-Heater



SRH failure of TP347H for FRH



Source: Xu, D., Wan, X., Yu, J., Xu, G. and Li, G., 2018. Effect of cold deformation on microstructures and mechanical properties of austenitic stainless steel. *Metals*, 8(7), p.522.



What We Do

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Thermal spray coatings for Boiler application.

Boiler components, especially in high-temperature and corrosive environments such as furnace walls, superheaters, reheaters, and economizers, are subject to accelerated wear, erosion, oxidation, and high-temperature corrosion. To enhance the service life and performance of these pressure parts, thermal spray coatings are increasingly applied as a protective surface treatment.

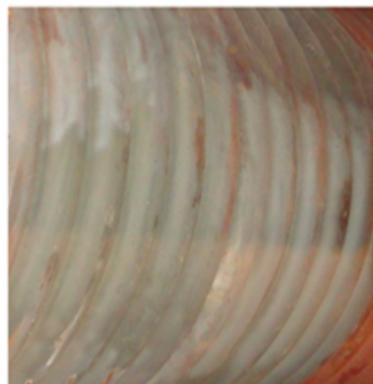
Thermal spray processes deposit metallic or ceramic-based coatings onto boiler tube surfaces to form a barrier against harsh combustion gases, ash erosion, and chemical attack—without altering the base material microstructure.



Nano-crystalline non-stick coating
to prevent slagging and improve
heat transfer in Boiler Water Wall

Sea Water Corrosion resistant Coating for Boiler Water Wall.

- Monthly once shutdown was observed before application of coating.
- The shutdown frequency was drastically reduced due to this coating.
- A coating thickness reduction of 10-20 micron was observed.





What We Do

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Structural Detailing and Shop Drawings

Our detailing team works closely with structural designers and fabricators using industry-standard software like Tekla Structures, AutoCAD, and Revit to generate shop-ready, clash-free, and fabrication-optimized drawings for industrial, commercial, and infrastructure projects.

Steel Structure Detailing

- 3D Modeling of steel frames, platforms, pipe racks, and supports.
- Connection detailing: bolted, welded, or hybrid.
- Anchor bolt plans and base plate detailing.
- Ladder, staircase, handrail, and grating detailing.
- Built-up sections and bracing systems.
- Erection sequences and part identification (marking plans).

RCC Structure Detailing

- Reinforcement detailing for slabs, beams, columns, and footings.
- Retaining walls, water tanks, and machine foundations.
- Bar Bending Schedules (BBS) with cut lengths.
- Expansion joint detailing, rebar lap lengths, and bend shapes.
- Precast and cast-in-situ element drawings.

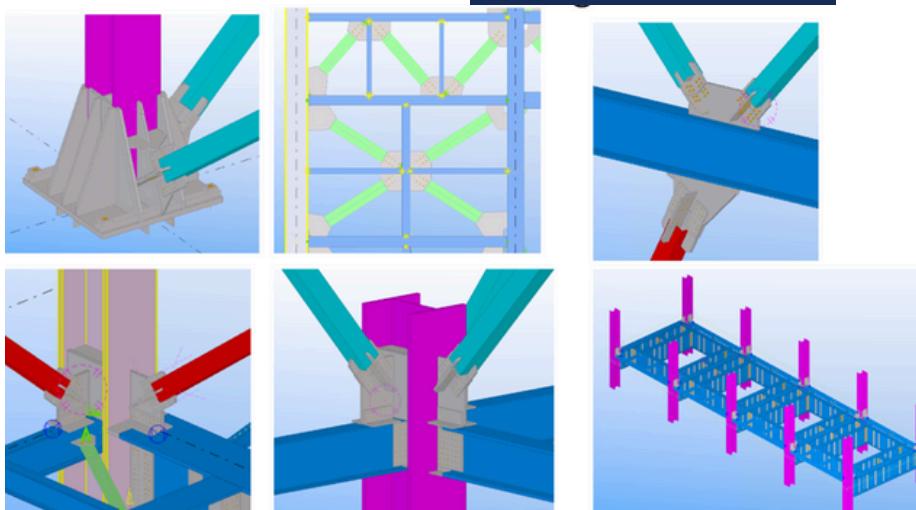
Shop Drawings

- General Arrangement (GA) Drawings.
- Assembly and Single-Part Drawings.
- Material Take-Off (MTO) & Bill of Materials (BOM).
- Weld maps, bolt list, and fabrication notes.

Steel Connections

Idea StatiCa

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NextGen

Softwares We Use...



Our Major Clients ...





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