

KAVAN MS - MECHANICAL DESIGN PORTFOLIO

Advanced CAD & Industrial Engineering Projects

Location: Bengaluru, Karnataka, India

Date: January 2026

Portfolio Repository: github.com/KIO-CIH/Mechanical_Design_Portfolio

EXECUTIVE SUMMARY

Comprehensive portfolio showcasing 4 complete design projects ranging from aerospace-grade assemblies to production-deployed industrial systems. Projects demonstrate advanced SolidWorks proficiency, thermal engineering expertise, and real-world manufacturing implementation.

| Project | Type | Scale | Status |
|------------------------|--------------------|------------------|----------------------|
| Gas Turbine Assembly | Aerospace CAD | 30+ components | Complete Study |
| Smart Assembly Table | Industrial Design | 2 units deployed | Production-Proven |
| Pressing Machine Table | Specialized Table | Optimized design | Implementation-Ready |
| Personal Renderings | Design Exploration | Multiple models | Concept Studies |

PROJECT 1: GAS TURBINE MULTI-STAGE ASSEMBLY

Personal Advanced CAD Study | Jun 2025

Objective: Advance SolidWorks proficiency while gaining engineering insight into gas turbine operation

Project Scope:

- Complete aerospace-grade gas turbine assembly (30+ components)
- Multi-stage compressor, combustor section, turbine rotor, casing
- Professional technical documentation

Technical Achievements:

Complex Assembly Constraints

- 100+ assembly relations maintaining coaxial alignment
- Multi-stage rotor systems with precision concentricity

Professional Documentation

- Bill of Materials with comprehensive specifications
- Complete documentation suite for production reference

Learning Outcomes:

- Mastered advanced SolidWorks parametric techniques
- Gained practical knowledge of gas turbine
- Proved ability to manage complex multi-component assemblies

Portfolio Links:

- 3D Model Renderings: Screenshot-98.jpg, Rendered-Image.jpg
 - Technical Documentation: GasTurbine.PDF
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PROJECT 2: SMART MODULAR ASSEMBLY TABLE SYSTEM

Production-Deployed Industrial Design | Apr 2024 – Apr 2025

Customer Requirements: A manufacturing facilities needed intelligent work tables integrating tools, equipment storage, and real-time status monitoring for assembly line optimization.

Design Solution: Fully modular ESD-safe assembly table with sensor integration, touchscreen monitoring, and tool organization.

Key Features:

Fully Modular Construction

- 40X40 Aluminum extrusion frame with T-nut fastening system
- 5 different configurations delivered to customers
- Enables rapid product adaptation without redesign

Smart Monitoring System (IoT Integration)

- Sensor array tracking operator working time
- Tower lamp indicator showing real-time status (red/green/amber)
- Digital touchscreen Kanban system for material/work status updates
- Real-time data logging for productivity metrics

Ergonomic & Workflow Design

- Optimized height for Sitting assembly operations
- Organized tool placement reducing reach distance
- Material flow optimization reducing pick-and-place time
- Layout validated for human factors engineering

Manufacturing Documentation:

- Bill of Materials with supplier integration
- Inspection checklist ensuring quality control
- Field service documentation for maintenance

Portfolio Links:

- Assembly Table Rendering: Screenshot-102.jpg
 - Technical Drawings: Table_Assembly_Draft.PDF
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PROJECT 3: PRESSING MACHINE TABLE

Specialized Industrial Equipment Support | May 2025

Objective: Design stable support platform for 1.5 ton pressing machine with integrated tool storage

Design Requirements:

- Support structure for pressing machine (significant weight/footprint)
- Guard rails ensuring operator safety
- Cabinet/compartment for machine-related tools and accessories
- Optimized for machine weight distribution and stability

Technical Solutions:

Safety Integration

- Guard rails meeting OSHA/safety standards
- Clear sight lines for operator monitoring
- Emergency access maintained
- Protective barriers preventing tool/material ejection

Tool Organization

- Integrated cabinet for machine-related accessories

- Organized storage reducing setup time
- Quick-access layout for frequent-use tools
- Space-efficient design for shop floor constraints

Manufacturing Feasibility

- Simple assembly procedure (minimal welding)
 - Standard material specifications
 - Cost-effective sourcing
 - Quick deployment capability
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PROJECT 4: PERSONAL MODELING & RENDERING STUDIES

Design Exploration & Visualization Skills

Purpose: Showcase design visualization capability, rendering techniques, and creative CAD modeling

Models Included:

1. Speedboat / Yacht Design
2. Wheel Rim
3. Ratchet