

9 yrs. ENGR. EXPERIENCE

18 yrs Workforce EXPERIENCE

Mechanical Engineering
University of Texas Rio Grande Valley

AFFILIATIONS

Amer. Society of Mech. Engineers (ASME)
Amer. Inst. of Steel Construction (AISC)
Int. Fluid Power Society (IFP)
National Academy of Forensic Engineers (NAFE)

EMPLOYMENT HISTORY

[Independent Consultant](#) | Contract

Independent Consultant, 2024 -Present;
Steel structural engineering, custom machinery design, finite element analysis, vibrations, forensics, and root failure analysis.

[JTAM ENGINEERING, LLC.](#) | Full-Time Permanent

Sr. Principal Engineer, 2023 - 2024;
Engineering management, pipe stress analysis, hydraulics, gas compression, piping, pipeline, and production facilities engineering,

[ULTIMUS ENGINEERING, LLC](#) | Contract

Principal Mechanical Engineer, 2023 -2024; Mechanical vibrations, structural analysis, FEA, hydraulics.

[INOVA GEOPHYSICAL, INC.](#) | Full-Time Permanent

Sr. Mechanical Engineer, 2022-2023;
Design & analysis of vibro-seismic vehicles & equipment, R&D, systems design, FEA, fluid power, project management, leadership, testing & validation.

[EMPERIAL INDUSTRIAL DESIGN](#) | Full-Time Permanent

Mech. Design & Analysis Engineer, 2018-2022;
Product design and systems engineering, R&D, FEA, consulting, cross-functional team collaboration, planning, & project engineering.

[THE DANNON COMPANY](#) | Contract

Chem. Process Piping Design Engineer, 2017-2021;
PFD, P&ID, pressure vessel design and analysis, tank drawings, process piping and skid design, hydraulics, facilities planning, and manufacturing.

[BOWMAN ARCHITECTURAL METALS](#) | Full-Time Permanent

Struct. Designer & Proj. Engineer, 2016-2017;
Structural design, engineering drawings, fabrication shop management & coordination, project engineering.

[QUALFON DATA SERVICES](#) | Full-Time Permanent

Data Analyst, 2015-2016;
Programming & numerical methods, statistical data analysis, data processing & management, customer service.

HUMBERTO VILLASENOR, P.E.

BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS
STATE OF WASHINGTON LICENSE.#25011112

CONSULTING ENGINEER

LARGE MACHINERY • PIPING/PIPELINES • HEAVY EQUIPMENT • CUSTOM DESIGN
MECHANICAL • STRUCTURAL • THERMAL • WELDING • FLUID POWER • PROJECTS

3D DESIGN • BOM • FEA • SIMULATION • VIBRATIONS

FIELD & SHOP SUPERVISION, TESTING, & REPAIR

FAILURE ANALYSIS • FMEA

PATENTS & IP

PROFESSIONAL SUMMARY

I have developed a broad & versatile background in engineering and manufacturing in the last 8 years, leading me to a **multi-disciplinary** career of practice in various industries.

My specialized **design & manufacturing** knowledge with a hands-on approach to managing teams & projects, **3D modeling and design, advanced systems engineering analysis, vibrations, testing, validation, fluid power, and troubleshooting** have been augmented by extensive **Finite Element Analysis** simulation work and physical testing that has lead me to develop a clear understanding of the physics that govern any equipment's behavior in various conditions.

My engineering experience spans many industries, giving me a strong background in **design, analysis, and technical leadership**.

My **core competencies** are in **computational structural engineering, piping and pipeline engineering, terminals and facilities engineering, piping and compressor skid design and engineering, fluid power and hydraulics, dynamics and vibrations, identifying project critical risks and failure modes, forensics and post-failure analysis, design and analysis of static and dynamic equipment and machinery, manufacturing, engineering leadership, and project management**, and **consulting** combined with a strong background in API, ASME BPVC Div I & II, ASTM, WRC, ASCE, AWS, AGMA, ASNT, NACE, and DNV standards, with over 6 years of experience in SEC VIII. Div I and Div II pressure vessel engineering.

My passion, breadth of experience, and proven leadership allow me to bring innovative thinking and resource management skills to manage projects of any scale and complexity with efficiency and a **value-added, forward-thinking approach** to support my team to successfully complete projects on time and within budget.

SPECIALIZED PROFICIENCY

Analysis | FEA | Linear, Nonlinear, Dynamic

6 yrs.

Finite element analysis (FEA) expert for linear and nonlinear material, large displacement behavior or transient dynamic responses to variation in loads or constraints; drops, shocks, vibration, fatigue, and thermal, and advanced modeling techniques..

Software: *Inventor Nastran, Ansys, Solidworks Simulation, Femap.*

Analysis | Hydraulics & Pipe | Static & Transient

5 yrs.

Pipe stress analysis and analysis of complex hydraulic and gas systems.

Software: *Caesar II, AFT Fathom, COMPRESS, AFT Impulse, PipeFlo, Amesim, Simulink, MathCAD.*

Design & Analysis | Large, Welded-frame Machines

7 yrs.

Design/verification of material handling or other heavy equipment structures and machinery requiring configuration transformations that were sensitive to vibration, fatigue or welding distortion.

Design & Analysis | Machine Design & Mechanisms

5 yrs.

Design/verification of positive motion-control heavy handling mechanisms & connections for cargo transportation trailers, conveyors, industrial machinery, pressure vessels and accumulators, compressor/pump skids, medical & food grade equipment, and off-road heavy machinery to achieve fast & safe payload motion.

Design & Analysis | Fluid Power & Hydraulics

6 yrs. Custom design, analysis, and specification of complex fluid power systems & components, including hydraulic manifolds, actuators, lift cylinders, motors, fluid conductors, pressure relief/reducing, flow controls, fan/motor drives, & system integration.

Management | Engrg. Design & Projects

5 yrs.

Engagement, training, design process & process & alignment; and multi-disciplinary project scoping, planning, resourcing, field surveys & execution requiring complex interfaces where breadth & depth of engineering dominated decisions.

Patenting | Intellectual Property (IP)

5 yrs.

IP competitive assessment, new research, patent drawings & detailed patent application development.

SPECIAL EDUCATION & TRAINING

FEA SIMULATION | AUTODESK | 2018

Static Linear & Non-linear, Modal Analysis, Multi-Axial Fatigue, Frequency Response, Transient (Dynamic), Pre-Stressed Static, Buckling, Thermal, Shock/Impact.

ASME | HOUSTON, TX | 2022

Geometric Dimensioning & Tolerancing

TMAC | MCALLEN, TX | 2016

Lean Six Sigma Black Belt Academy

PREVIOUS CLIENTS - Direct & Indirect

B2U STORAGE SOLUTIONS | LANCASTER, CA | 2025

Provided consulting and engineering services for the design and analysis of multiple BESS structures, including pile and pre-cast slab foundations, structural steel, and deflagration.

BOCCARD LIFE SCIENCES | WEST JORDAN, UTAH | 2024-2025

Offered consulting and engineering services for the structural design of two elevated platforms that support three vessels with a total weight of 44,000 lbf in a seismic region.

SIEGE ENGINEERING | HOUSTON, TEXAS | 2024

Served as a technical consultant for designing an 8,677 sq. ft. parking lot intended for chemical tanker transport vehicles.

OVERTURF INDUSTRIAL DEVELOPMENT |

WASHINGTON, DC, TEXAS | 2024

Consulted on the design of a proprietary self-standing solar structure for 190mph wind loads; performed FEA, AISC/ASCE 7 code checks, and specified corrosion-resistant materials for installation in a marine environment.

BLAZE EQUIPMENT | FORT WORTH, TEXAS | 2024

Conducted in-depth computational structural analysis of a 6-stage telescopic kelly bar, identifying critical failure points and modes, and delivering targeted recommendations for failure mitigation and control.

NORWEST ENGINEERING | PORTLAND, OREGON | 2024

Provided in-depth elasto-plastic stress analysis of construction loads (100,000 lbf) on a pressure vessel welded bollard lift connection to ensure lifting reliability and structural integrity.

NORWEST ENGINEERING | PORTLAND, OREGON | 2024

Provided in-depth technical analysis to determine the cause of failure for a steel shear connection. The root cause and critical area of highly localized plastic strain that led to crack nucleation site identification was identified and reported.

GHI | DUVAL COUNTY, TEXAS | 2024

Provided engineering and design services to complete Pre-FEED and FEED Phases of proposed two large-scale Piedras Pintas Salt Dome Leaching Plant and associated appurtenances, compression stations, injection and withdrawal of Hydrogen in two (2) caverns. Each cavern is designed to accommodate a storage of 3,000,000 bbls. Based on cavern conditions, the total Hydrogen storage capacity is 12,000,000 kg. The design accommodates a Hydrogen injection and withdrawal rate of 275,000 kg/day per cavern with a total delivery of 550,000 kg/day

MEGlobal | OYSTER CREEK, TEXAS | 2024

Provided an advanced technical analysis consisting of structural, thermal, and mechanical analysis to determine the fitness-for-service of a production petrochemical boiler steel stack.

NEUVENTUS | LIBERTY COUNTY, TEXAS | 2024

Provided engineering and design services to develop, permit application, design, and engineering ten (10) underground gas storage. In working progress with OWNER to complete the development of infrastructure, solution mining, and solution mining assets.

VOPAK | ST. CHARLES, LA | 2023

Provided full-discipline engineering and design for various tank and piping upgrade projects for Freeport, St. Charles, and Plaquemines terminals, as well as Oracle project controls interface, procurement services. Tank reactivation project for the conversion of four existing out-of-service API 653 tanks, interconnecting rack piping, and pumps in an existing brownfield terminal.

VOLTEQ | MIAMI, FLORIDA | 2023

Provided specialized engineering design solutions to a line of electric-powered heavy equipment machinery.

LANGMUIR SYSTEMS | HOUSTON, TEXAS | 2023

Structural, metallurgical, and fatigue analysis of a large CNC equipment subjected to combined loadings.

COVESTRO | HOUSTON, TEXAS | 2023

Provided an advanced FEA vibration analysis on a safety-critical fire suppression rotating equipment. Provided analysis summary and recommendations that minimized the system's peak response amplitudes at the diesel engine's operating rpm and identified the non-synchronous frequencies to be associated with excessive internal bearing clearances at VT pump gearbox.

DOOLEY TACKLEBERRY | HOUSTON, TEXAS | 2023

Provided advanced technical training to a group of Engineers on use of Finite Element Analysis, structural analysis, analysis of vibrations, and frequency response of fire suppression pumping skid.

BLAZE EQUIPMENT | FORT WORTH, TEXAS | 2023

Detailed analysis of a 20,000 lbf load capacity kelly bar storage rack welded connections.

CAPITAL PROJECTS ENGINEERING | SUWANEE, GEORGIA | 2023

Structural analysis of a pressure vessel's agitator loads on nozzle neck, reinforcement pad, and welded connections.

DBO SOLUTIONS | SEATTLE, WASHINGTON | 2019-2023

Conceptual development and detailed engineering & design of a custom bulk waste material transportation trailer rated at 78,000 lbs G.V.W.R. (*Patent Pending*)

AT CONTROLS | HOUSTON, TEXAS | 2018-2019

Gas lift header design & modeling, P&ID design, hydraulics, and equipment sizing, specifications, and selection.

SPECIAL FAMILIARITY

CODES & STANDARDS

AISC | Steel construction

AWS | Welding of steel and alum. alloys

ASCE | Structural wind loading

API | Storage tanks, pipelines, vent sizing

ASME | BPVC, GD&T, welding, fatigue, steel stacks, valves & fittings, piping/pipelines

WRC | Welding and pressure vessel nozzle analysis

NFPA/NEC | Electric motors

AGMA | Gear strength, design, & analysis

ASTM | Steel & Al alloys

ASNT | Weld & material testing (NDT)

DNV | Fatigue strength analysis for steel structures

ISO | Mechanical vibration & balancing

NACE | Corrosion Control

PUBLICATIONS AND PRESENTATIONS

- Villasenor, H., and Axsom, T. (February, 2017). *Engineering Fundamentals Refresh: Strength vs Stiffness vs Hardness. Fictiv.*
<https://www.fictiv.com/articles/engineering-fundamentals-refresh-strength-vs-stiffness-vs-hardness>
- Ibragimov, R. N., and Villasenor, H. (May 6, 2014). "Energy Balance Associated With a Mixing Process at the Interface of a Two-Layer Longitudinal Atmospheric Model." ASME. J. Fluids Eng. July 2014; 136(7): 071202.
<https://asmedigitalcollection.asme.org/fluidsengineering/article-abstract/136/7/071202/374283/Energy-Balance-Associated-With-a-Mixing-Process-at>