

Andres Ledezma

Mechatronics Engineer | Manufacturing, Test & Automation
Engineering | Operational Excellence

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PROFESSIONAL SUMMARY

Mechatronics Engineer with 5 years of experience at General Motors' Ramos Arizpe Assembly Plant, progressing from Maintenance Group Leader to Process Engineer to Lead Manufacturing Engineer. Specialized in PFMEA (L3/L4), error-proofing, process control, and end-of-line test parameters (vacuum decay leak testing, fluid fill), with hands-on PLC troubleshooting and Python automation experience.

As an Operational Excellence (OpEx/DMAIC) leader, delivered cost avoidance and savings including a North America-wide brake-test fix standardized across 6 GM plants and the prevention of BEV front drive unit leaks. Proven across both BEV and ICE vehicle platforms. Fully bilingual (Spanish / English).

KEY ACHIEVEMENTS

- **~\$300K cost avoidance per plant, across 6 plants** — Fixed a North America-wide brake stroke-test failure by catching leaks before brake fill; 3,000 rework hours eliminated.
- **Front drive unit leaks prevented** — Made the BEV drive unit and the ICE engine use one bolt, so a too-long bolt can no longer damage the drive unit case and force a front drive unit replacement.
- **90% fewer coolant overfills at BEV launch** — Fix adopted into GM's global coolant fill bulletin for every plant launching BEVs.
- **~260 engineering hours/year saved** — Python tool that automatically classifies A/C evacuation & fill machine data as OK/NOK.

PROFESSIONAL EXPERIENCE

Lead Manufacturing Engineer — General Motors, Ramos Arizpe Assembly Plant

Ramos Arizpe, Coahuila, Mexico

Dec 2023 – Oct 2026

ABS eBoost Stroke Test Failure Reduction — OpEx Leader, Project #7507 (Quick Win, RedX)

- **Problem:** A North America-wide brake pedal out-of-position failure affected 6 plants and 3,000+ vehicles. Defects were only caught late at the end-of-line OBD-II flash & test station, after brake fluid fill, forcing a full system purge and rework on every affected unit.
- **Action:** Applied RedX methodology to trace the dominant cause to moisture inside a supplier-provided component, then tightened the vacuum decay leak-test limit from 1.5 to 0.9 mmHg so faulty units are rejected *before* brake fill.
- **Standardization:** Rolled out the change to all 6 affected plants through a Tool & Equipment Bulletin (TEB) update.
- **Result:** ~\$300,000 USD cost avoidance per plant, with 6 plants affected, and 3,000 rework hours eliminated.

A/C System Moisture Detection — Evacuation Test Optimization

- **Problem:** Moisture introduced by a supplier's A/C components went undetected until after refrigerant charge, so affected vehicles needed refrigerant recovery, re-evacuation, and recharge.

- **Action:** Applied the same early-detection approach as the eBoost project, adjusting the A/C evacuation & fill machine's vacuum decay parameters so moisture-contaminated systems are rejected *before* refrigerant charge.
- **Result:** est. ~\$200,000 USD in rework avoided at one plant, with two more plants involved.

Front Drive Unit Leak Prevention (2024 Equinox EV / Blazer EV)

- **Problem:** On some 2024 Chevrolet Equinox EV and Blazer EV, the similar, longer ICE engine bolt could be installed by mistake on the electric drive unit. The too-long mounting bolt damaged the drive unit case and caused a fluid leak, and the field repair was replacing the whole front electric drive unit (GM Customer Satisfaction Program N24247).
- **Action:** Led the change to a single bolt part number for the drive unit and the ICE engine, so the wrong bolt can no longer be installed.
- **Result:** Root cause removed at every plant building these drive units, avoiding more leaking drive units and front drive unit replacements under GM coverage.

A/C Evacuation & Fill Machine Data Analyzer (Python Automation) — *OpEx Leader, Project #7512*

- **Problem:** Manufacturing Engineers manually reviewed A/C evacuation & fill machine records vehicle by vehicle in the plant's equipment data system (machine parameters and sensor data) — about 1 hour per review, weekly and during every breakdown.
- **Action:** Developed a Python automation tool that classifies 100% of vehicles (by VIN) as OK/NOK by vehicle model and machine AUTO/MAN mode.
- **Result:** ~260 engineering hours/year saved across 5 engineers (plus faster breakdown response); manual review eliminated and model-specific quality risk reduced; reusable at other plants.

10mm Socket Inventory & Consumption Cost Reduction — *Team Member, 3D Cover Design Lead*

- Designed, prototyped, and validated 3D-printed socket covers that allowed replacing a high-cost socket (\$55.50/unit) with a low-cost socket plus cover on 50% of 229 General Assembly fastening tools.
- **Result:** \$8,732 savings in Year 1; \$26,198 over 3 years.

Coolant Fill Equipment Parameter Optimization (BEV Launch)

- **Problem:** During early BEV production, coolant overfills left vehicles unsellable until corrected at the repair line.
- **Action:** Analyzed and re-tuned the coolant fill equipment parameters for the BEV cooling system.
- **Result:** Overfilled units reduced by 90%; est. ~\$35,000 USD in repair-line rework avoided at our plant ($\approx 1,000 \text{ units} \times 0.5 \text{ hr} \times \$70/\text{hr}$). Fix adopted into GM's global coolant fill bulletin, preventing the issue at every plant that later launched BEVs.

Process Engineer — General Motors, Ramos Arizpe Assembly Plant

Ramos Arizpe, Coahuila, Mexico

Aug 2022 – Dec 2023

- Developed Level 3 and Level 4 PFMEA programs for new model launches: Chevrolet Equinox, Chevrolet Blazer, Cadillac, and the Honda all-electric platform.
- Owned Level 4 PFMEAs for current production models; improved occurrence and detection ratings by implementing critical error-proofing (EP) devices and closing highest-priority PFMEA risk items in line with GM North America global call-to-action items.

- Reviewed Process Control Plans (PCP) and translated them into systematic actions, ensuring full PCP compliance.
- Analyzed Tool & Equipment Bulletins (TEBs) covering critical parameters, verification checks, calibrations, process validations, and critical maintenance procedures.
- Improved safety, productivity, quality, and response time through EP devices, 3D-printed tooling, and standardized problem-solving methods.

Maintenance Group Leader — General Motors, Ramos Arizpe Assembly Plant

Ramos Arizpe, Coahuila, Mexico

Sep 2021 – Aug 2022

- Led a team of maintenance technicians supporting chassis production lines, driving equipment availability and continuous improvement.
- Performed fault tracing and root cause analysis using PLC logic; enhanced PLC programs to prevent recurring failures and quality escapes.
- Developed custom preventive and predictive maintenance programs and task plans.
- Conducted critical spare parts analysis to reduce unplanned downtime risk.
- Tracked and reported maintenance KPIs: MTTR, MTBF, and equipment availability.

SOFTWARE PROJECTS

TypeQuest — Free Learn-to-Code Web App · typequest.cc

- Designed and launched a free, mobile-first programming course web app with no ads and no account required, installable on a phone's home screen.
- Covers Python, JavaScript, Go, C, and SQL, with real code running directly on the user's device.
- Includes a computer vision track using real OpenCV and an industrial robotics track, connecting programming to manufacturing and automation applications.

TECHNICAL SKILLS

Quality & Risk

PFMEA (L3/L4), Process Control Plans, Error-Proofing (EP), Root Cause Analysis, RedX

Continuous Improvement

OpEx / DMAIC, Cost Reduction, Standardization (TEB updates)

Test & Process Equipment

Vacuum & Pressure Leak Testing (vacuum decay), Fluid Fill Equipment (brake, coolant, A/C evacuation & fill), End-of-Line Flash & Test (OBD-II)

Automation & Controls

PLC Programming & Troubleshooting, Python Scripting / Automation

Maintenance

Preventive & Predictive Maintenance, Spare Parts Analysis, MTTR / MTBF / Availability

Design

3D CAD Design & 3D Printing (tooling and fixtures)

Change Management

ECR, PTR, PRTS, Tool & Equipment Bulletins

CORE STRENGTHS

Problem solving · Decision making · Team leadership · Fast learner · Self-motivated

EDUCATION

B.Eng. in Mechatronics Engineering

Instituto Tecnológico de Saltillo
Saltillo, Coahuila, Mexico · Jun 2016 – Jul 2021

ADDITIONAL INFORMATION

Volunteer

Swimming Instructor, Aletas.mx, Saltillo (2024 – Present) — teach swimming to children with disabilities, building their confidence, motor development, and physical well-being.

Languages

Spanish (Native) · English (Fluent / Professional)

Interests

Ironman 70.3 triathlon · Open water swimming