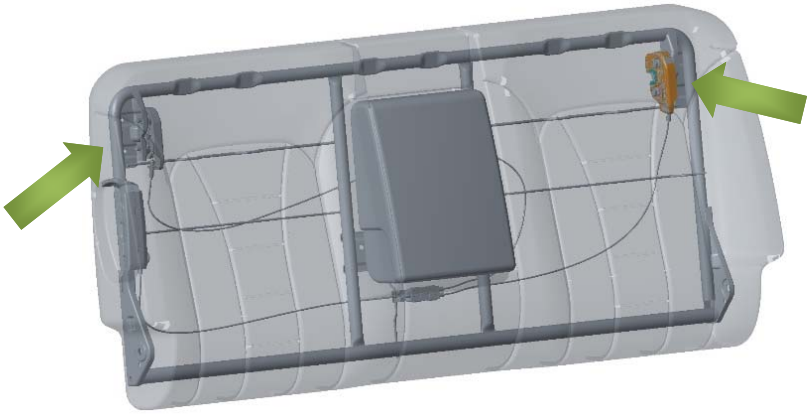
Virtual Engineering, Inc.

Engineering Your Competitive Edge…

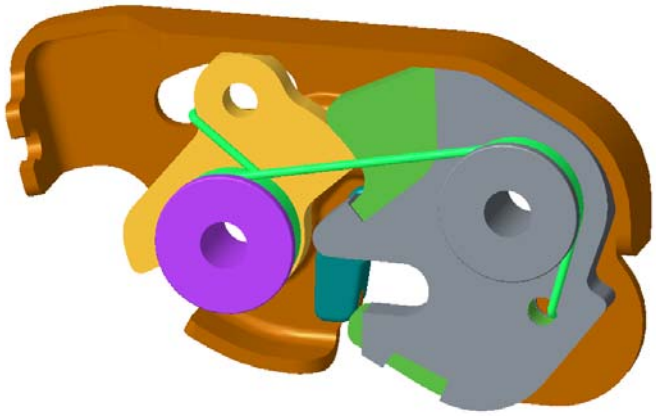
High Back Latch Assembly – Design and Analysis

- **Objective:**
  - Engineer a High Back Latch for a bench seat
- **Constraints:**
  - Meet or exceed performance specifications for strength and durability
  - 2,400 N ultimate strength
  - Design within existing package space…no changes to frame allowed
  - Must not rattle
  - 29.2 N maximum release efforts

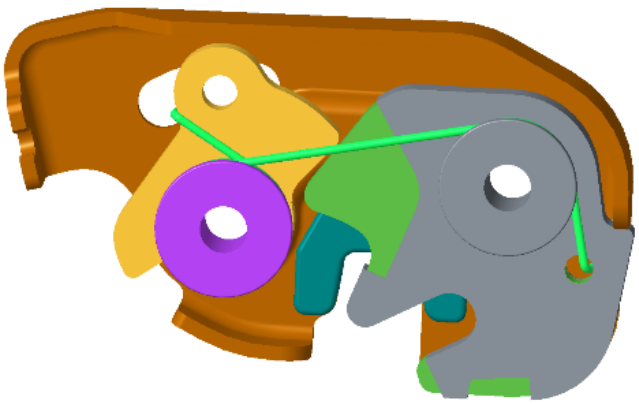


Bench Seat Back

Production Assembly



Locked



Unlocked

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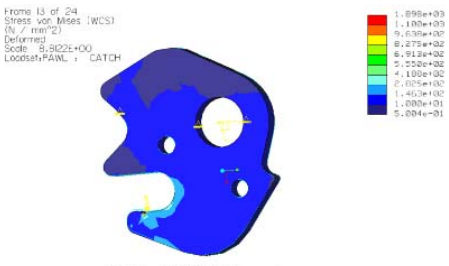
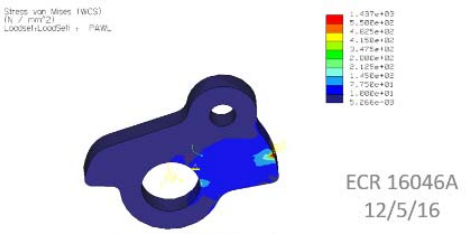
- **Process:**
  - Designed with 0° locking angle
  - Key locking components manufactured using fine blank stamping process to minimize dimensional variations
  - Combined Spring for Catch and Pawl into one part, minimizing part count and reducing assembly complexity
  - Mounting holes located at center of Catch and Pawl Pivots to minimize package space and maximize assembly strength
  - TPU Bumper and TPC-ET over-molded Catch prevent BSR
  - Performed FEA for static strength forward load requirement
  - Authored DFMEA, Test Specification, DVP&R, and maintained Open Issues List
  - Completed all tolerance stack-ups
  - Created prototype and production drawing packages with GD&T
  - Coordinated testing: Obtained quotes, ordered parts, reviewed samples, approved set-ups, and witnessed testing
- **Results:**
  - ***Light weight*** mechanism (Latch mass = 0.3 kg)
  - Release efforts calculated in Enventive were 29.2 N max; test results were 18.2 N
  - Test results exceeded requirements at specified reliability and confidence levels
  - Successful product launch

Creo Simulate FEA

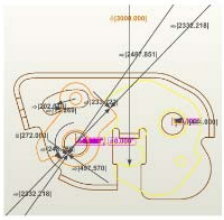


Catch 3,000N Load

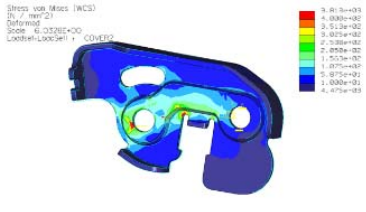


Pawl 2,332N Load

Enventive Load Calculation

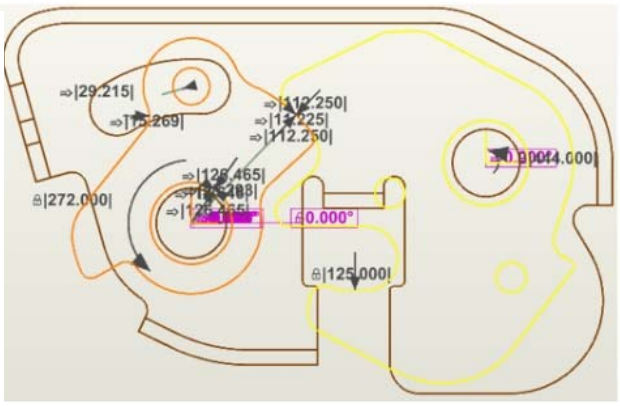


Pawl Load Calculation with 3,000N Catch input =2,332N



Cover 3,000N Load

Enventive Release Effort Calculation



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