

# CURRICULUM VITAE

## ERIC M. DEFEND, P.E.

**Mechanical Engineer**

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### PROFESSIONAL SUMMARY

Eric M. Defend is a licensed Professional Mechanical Engineer with over a decade of experience analyzing, designing, and evaluating heavy construction and mining equipment systems. His work focuses on identifying root causes of multifaceted mechanical failures involving hydraulic systems, intake/exhaust systems, structural components, fatigue mechanisms, and critical assemblies in off-highway and large mining equipment.

Mr. Defend has led and supported investigations of high-risk mechanical issues associated with catastrophic failures, safety incidents, and warranty claims for large mining and construction trucks. His experience includes failure analysis, load and stress evaluation, design review of safety-critical components, and interpretation of engineering data to determine causation.

### AREAS OF EXPERTISE

- Mechanical failure analysis
- Root-cause analysis of complex equipment failures
- Heavy construction and mining equipment
- Off-highway trucks and large mobile machinery
- Hydraulic system failures and loss-of-control events
- Structural and fatigue failure mechanisms
- Bolted joint analysis and joint integrity failures
- Finite element analysis (FEA)
- Product safety and design defect evaluation
- Warranty and reliability investigations

### PROFESSIONAL LICENSURE

**Professional Engineer (Mechanical)**

State of Illinois • License No. 062071993 • Licensed: 2020 – Present

### EDUCATION

**Bachelor of Science in Mechanical Engineering**

University of Illinois at Urbana-Champaign • Graduated with Honors, 2014

### ENGINEERING EXPERIENCE

*(Selected experience relevant to expert witness work)*

**Caterpillar Inc.**

**Design Engineer – Off-Highway Truck Hydraulic Installation**

2014–2016, 2018–Present

Mr. Defend has served in engineering roles supporting large off-highway mining and construction trucks, with responsibilities centered on critical mechanical systems.

Relevant experience includes:

- Conducting failure analyses on hydraulic and structural systems associated with safety, reliability, and durability concerns
- Investigating root causes of mechanical failures involving load paths, fatigue, improper assembly, and system interactions
- Performing stress, fatigue, and fit-up evaluations of mechanical components and assemblies

- Leading formal design reviews for high-risk issues affecting product safety and reliability
- Evaluating field and warranty data to identify failure trends and contributing factors
- Supporting corrective actions through engineering analysis and validation testing

Mr. Defend has addressed hundreds of complex mechanical issues related to new product introduction, assurance-of-supply concerns, and in-service failures of heavy equipment components.

## **Starfire Industries, LLC**

### **Mechanical Design and Test Engineer**

2016–2018

Mr. Defend performed mechanical design, testing, and failure analysis of pressure-containing and mechanically actuated systems used in controlled test and operational environments.

Relevant experience included:

- Investigating mechanical and pressure-related failures observed during prototype and system testing
- Evaluating component performance under load, pressure, and thermal conditions
- Identifying failure modes related to design assumptions, material behavior, and assembly interfaces
- Modifying mechanical designs based on observed test results and documented failure mechanisms
- Fabricating and inspecting prototype components to evaluate form, fit, and function

This work involved structured testing, documentation of observed failures, and engineering analysis to determine causation and corrective actions.

## **TECHNICAL SKILLS**

- Finite Element Analysis (FEA)
- Fatigue and stress analysis
- Hydraulic, intake/exhaust, and structural system design and evaluation
- Failure mode identification
- Root-cause investigation methodologies
- Geometric Dimensioning & Tolerancing interpretation and application
- Engineering documentation review and analysis

## **EXPERT WITNESS SERVICES**

- Mechanical engineering expert witness services
- Forensic mechanical failure analysis
- Accident and incident investigation involving machinery
- Product liability and design defect evaluation
- Warranty dispute and reliability analysis
- Engineering report preparation for litigation

## **CONTINUING EDUCATION**

(Selected – Expert Witness Practice)

### **How to Write a Bulletproof Expert Witness Report**

**SEAK, Inc.**

This course addressed principles of expert witness report preparation, including clarity of opinions, precise language, avoidance of advocacy, disclosure of assumptions and limitations, and effective communication of technical analysis for a lay audience in litigation contexts.