

# FEA - Finite Element Analysis & Design Optimization

## Evaluate, Analyze, and Optimize Performance and Reliability of Product Design and Manufacturing Processes

To successfully deploy new products, you have to move quickly to get an edge in the market. And while product life cycles get ever shorter, the cost of warranty and service is on the rise. The traditional design-prototype-test approach to new product development can be slow and inefficient when problems are encountered.

Deaton Engineering uses Finite Element Analysis (FEA) to accurately model products and processes. Our techniques can measure performance, reliability, wear points and predict failures long before you commit to tooling or start to build. We are adept at helping companies improve profitability by dramatically reducing development time, rework and quality issues. Our approach will help you speed up the design process through rapid optimization.

## Design, Simulate and Virtually Test with FEA Services

### Design Optimization

Our goal is to reduce product development costs and improve quality. FEA helps solve design challenges without arduous manual iterations or prototyping.

### Solution Verification and Validation

Experienced mechanical engineers verify all FEA findings against empirical test data, simplified models, and classical calculations to ensure accuracy. 3-D modeling is also used to validate designs.

### Computational Methods to Support Regulatory Filings for Medical Devices

Utilize FEA to reduce product development costs, limit liability risk, reduce time to market, and support FDA 510k filings. Identify and analyze worst-case implantable device size for use in mechanical testing. Verify radial force, anchoring, dynamic compliance, and fatigue loading conditions.

## FEA & Design Optimization Services

### **FEA for Regulatory Compliance**

- Computational testing
- Identifying worst-case device sizes
- In vivo loading conditions
- Anchoring and fatigue loading conditions
- Design verification and validation

### **Linear Analysis**

- Static analysis
- Stress analysis
- Stress engineering
- Strain analysis
- Critical buckling loads
- Natural frequency
- Modal analysis
- Frequency response
- Response spectrum
- Random vibration
- Mechanical analysis

### **Nonlinear Analysis**

- Nonlinear materials
- Creep and viscoelasticity
- Plasticity
- Temperature dependent materials
- Load and/or geometric stiffening
- Large displacements
- Large strain formulations
- Dynamic loading & analysis
- Contact stress
- Impact loading

### **Thermal**

- Steady state heat transfer
- Transient analysis
- Thermal stress
- Thermal design optimization
- Airflow & pressure characterization
- Thermal engineering

### **Specialty Analysis**

- Seismic analysis
- Wind loading
- Snow & ice loading
- Finite element services list
- Engineering services list