

Speaker Introduction



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Specializing in structural analysis and safety compliance for critical telecommunications infrastructure. Extensive experience applying data-driven engineering principles to tower deployments and modernization projects across North America.

- *Structural engineering for telecom towers*
- *5G infrastructure deployment*
- *Regulatory compliance and safety analysis*

Data-Driven Structural Analysis for Telecom Towers

Transforming structural analysis through engineering data and automated workflows

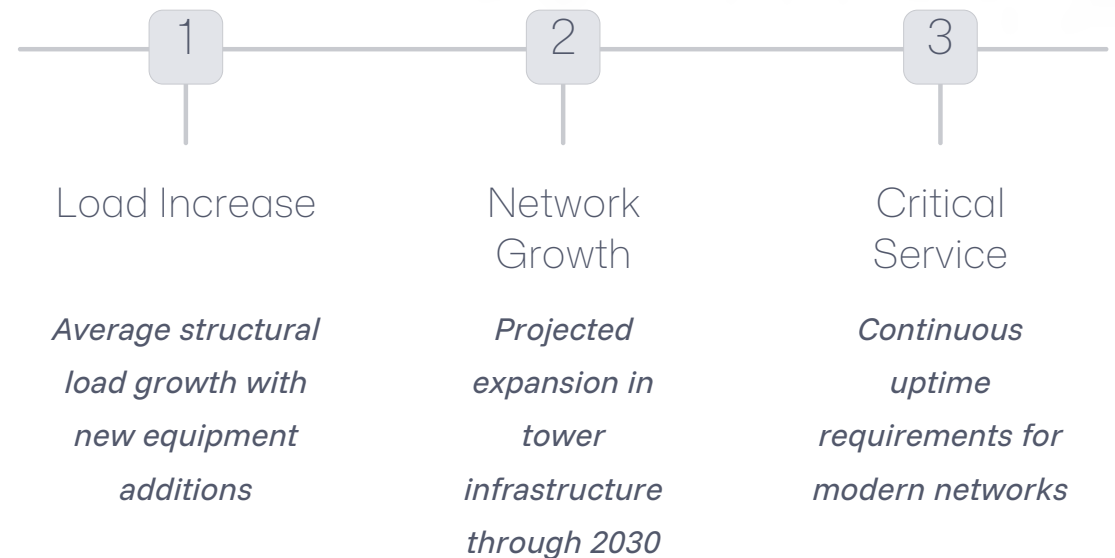
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The 5G Infrastructure Challenge

Global wireless demand is surging. Network upgrade deployments are creating unprecedented structural demands on telecommunications towers, requiring new approaches to safety, analysis, and long-term reliability.



Engineering Standards Foundation

Our structural analysis framework is built on rigorously tested industry standards that ensure safety and regulatory compliance across all telecommunications infrastructure projects.

International Building Code (IBC)

International Building Code compliance and jurisdictional requirements

ANSI/TIA-222

*Structural Standard for
Antenna Supporting
Structures, Antennas, and
Small Wind Turbine Support
Structures*

ASCE 7

*Minimum design loads
and associated criteria for
buildings and structures*

AISC 360

*Specification for
structural steel buildings
and connections*

ACI 318

*Building code
requirements for
structural concrete
foundations*

Comprehensive Load Analysis

Critical Load Types

Telecommunications towers must withstand multiple loading combinations. Code-driven approach evaluates each load type using historical data, environmental modeling, and site-specific parameters to ensure structural integrity under all scenarios.

ASCE 7-22 Basic LRFD Load Combinations (Section 2.3.1)

1. $1.4D$
2. $1.2D + 1.6L + 0.5(L_r \text{ or } S \text{ or } R)$
3. $1.2D + 1.0W + L + 0.5(L_r \text{ or } S \text{ or } R)$
4. $1.2D + 1.0W + L + 0.5(L_r \text{ or } S \text{ or } R)$
5. $0.9D + 1.0W$
6. $1.2D + E_v + E_h + L + 0.2S$ (Seismic)
7. $0.9D - E_v + E_h$ (Seismic)

Dead Loads

Equipment weight, antennas, platforms, structural members

Wind Loads

Velocity pressure, exposure categories, topographic factors

Ice Loads

Radial thickness, density, concurrent wind conditions

Seismic Loads

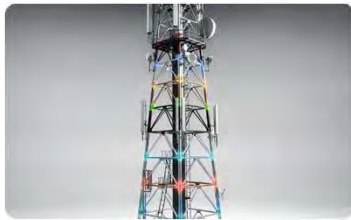
Ground motion, site classification, response modification

Thermal Effects

Temperature gradients, expansion, material properties

Scalable Analysis Platform

Modern engineering software enables consistent, repeatable structural analysis across thousands of tower sites with comprehensive documentation and quality control.



Advanced Modeling

Detailed finite element analysis with automated load application and member design checks



Documentation

Standardized reporting formats meeting regulatory requirements and audit standards



Data Integration

Centralized databases enabling trend analysis and portfolio-wide insights

Key Engineering Data Inputs

High-quality structural analysis requires comprehensive, well-organized datasets from multiple sources. These inputs feed both traditional analysis and emerging ML monitoring systems.



Structured Datasets

*Material properties,
member dimensions,
connection details,
foundation specifications*



Stress Ratios

*Demand-to-capacity
ratios for all structural
members under
combined loading*



Deflection Trends

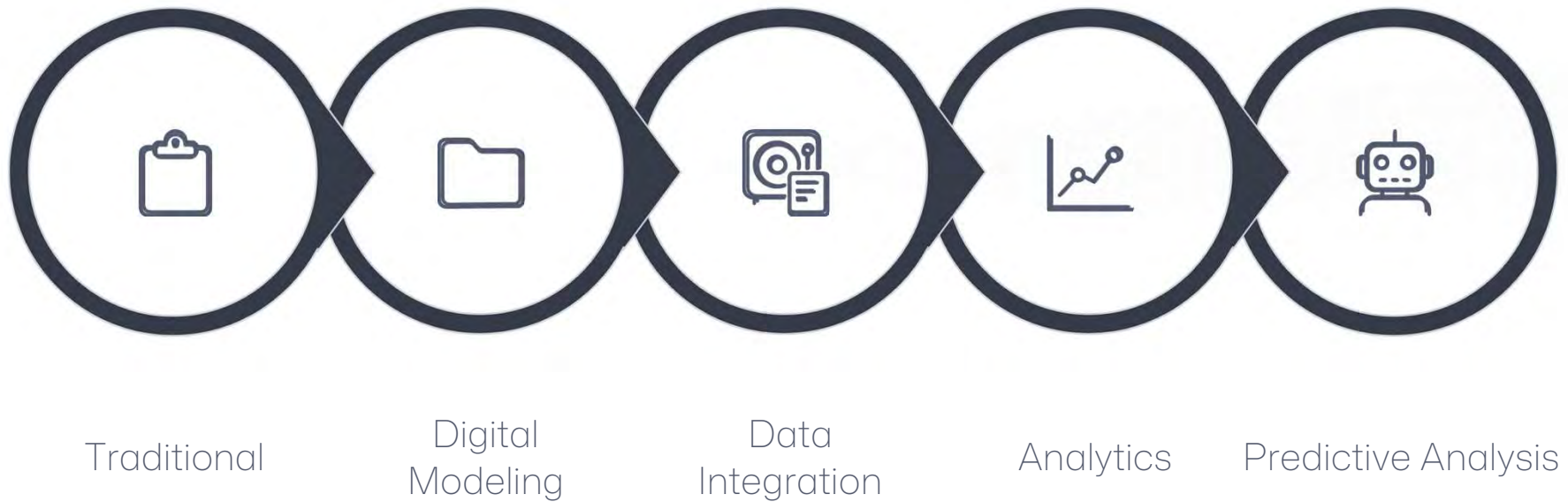
*Historical displacement
data, serviceability limits,
dynamic response
characteristics*



Inspection Records

*Visual assessments,
corrosion documentation,
connection condition,
crack propagation*

From Analysis to Intelligence



The evolution from traditional structural analysis to AI-enabled monitoring represents a fundamental shift in how we manage tower infrastructure. Each stage builds on structured engineering data to enable more proactive decision-making.

Business Impact of Data-Centric Approach

Integrating traditional structural engineering with modern data analytics delivers measurable value beyond technical performance improvements.



Extended Service Life

Proactive monitoring and data-driven maintenance decisions significantly extend tower operational life beyond original design expectations



Reduced Liability

Comprehensive documentation and consistent analysis protocols provide strong defensibility in regulatory and legal contexts



Proactive Decisions

Analytics-ready reporting enables leadership to make informed capital allocation and risk management choices

The Future of Resilient Infrastructure

As network demand continues to surge, the convergence of structural engineering rigor with ML-enabled monitoring creates unprecedented opportunities for safer, more reliable telecommunications infrastructure.



Traditional Engineering

Standards-based analysis and proven design methodologies



Structured Data

High-quality datasets enabling advanced analytics



Machine Learning

Predictive models and intelligent monitoring systems



Resilient Networks

Safer infrastructure supporting critical communications

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Thank You

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