



Engineering Best Practices

The wind industry is constantly evolving to meet growing renewable energy demands. Blades and other wind components are projected to continue increasing in size and weight. These longer and heavier components are challenging to move through existing infrastructure channels and require early planning with a cross-functional team to develop innovative transportation solutions. Engineered fixtures that minimize blade

swing-out, control the pre-bend shape of blades as they move through curves, or are designed for multiple modes are the cutting edge of transportation technology that are transforming wind industry logistics in new and exciting ways.



[Watch Our Video of Engineered Solutions in Action](#)

Glossary

Engineering Terminology These terms help explain the proper steps to accommodate for wind blades, and how they relate to transporting wind components through supply chain.



Securement - the restraint(s) that attach a commodity to a railcar

Fixtures - engineered solutions that secure commodities safely to a railcar

Root Bolster - fixture that secures the root end of a wind blade to a railcar

Tip Stand - fixture that supports the tip end of the blade



Vibration Control - the engineering solutions required to protect commodities by reducing vibrations, forces, and impacts during rail transit



Flatcar - railcar with an open, flat deck

Consist - sequence of railcars with a locomotive to form a unit



Railcar Stability - engineering analysis that evaluates railcar balance when loaded with a commodity. Calculations for CG and the L/V Ratio are required to ensure railcar stability.

Center of Gravity (CG) - the center of the mass of an object

L/V Ratio - engineering equation that relates the downward force with the lateral force acting upon the rail and wheel



Clearances - the space between the clearance envelope and the clearance profile

Clearance Envelope - allowable dimensions within which a commodity must fit in order to travel safely through the rail network

Clearance Profile - the overall height and width of a secured component on a railcar

Acronyms

OEM - Original Equipment Manufacturer **SME** - Subject Matter Expert

CG - Center of Gravity **PM** - Project Manager **RR** - Railroad