# Wind Logistics: Solve for Tomorrow Today

Clay Gambill - IAIS Railroad

As wind turbine components continue to grow, the wind energy industry faces more and more challenges to transport components from factories and ports to wind farm sites. Leveraging rail for long-haul transportation is not only safe but also significantly reduces CO2 emissions.

#### What:

Understand physical constraints of the transportation mode needed

# Impact:

Clean, safe, reliable

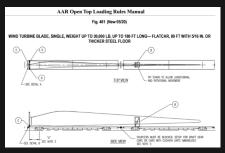
- Rail is 3-4x more fuel efficient than trucking
- Rail reduces carbon footprint by up to 82%

## **Rail Shipments:**

AAR & Industry Standards

- Each railroad is unique and has a clearance "envelope" to fit within
- Blades with a large pre-bend have a bigger envelope to fit within, so will cost more to transport

Designing main wind components for rail transportation will allow for long term, reliable transportation solutions.



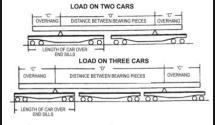


Fig. 30.1 Arrangement of load on two or three cars







Testing a >70M blade with railroads, blade design engineers, and rail fixture engineers: 1 blade over 3 rail cars in a curve





#### How.

Rail securement drawing demonstrating compliance with AAR OTLR rules

- Engage qualified and certified engineers or an engineering firm
- Contact rail industry experts using industry associations: Railroad Industrial Clearance Association (RICA), Transload Distribution Association of North America (TDANA) & others.

### Whv:

- Leverage rail network and economy of scale for large (25 turbines or greater) wind farm development
- Greater flexibility of truck assets with short haul final mile use
- 1 blade train = +/- 10 sets of blades
- 1 tower train = +/- 60 tower sections
- Well-suited for projects >500 miles from origin port or factory

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