Case Study

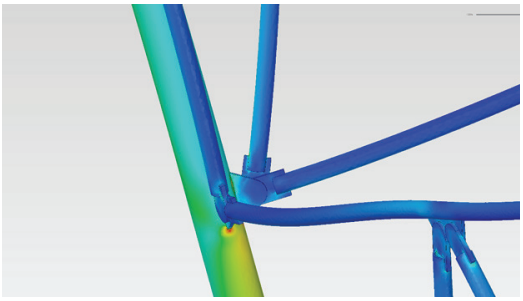
ANSYS® + Jet Towers

"WISPs competing to provide internet service to underserved areas in rural Brazil face the challenge of building towers quickly and putting them into operation so they can sign up customers before competitors enter the market. Design, construction, shipment and installation of a typical 45-meter wireless tower normally takes about five weeks. We used ANSYS AIM to optimize the design of a modular line of towers that can be shipped and assembled in only one week."

Ricardo Damian
Director of Engineering
Jet Towers

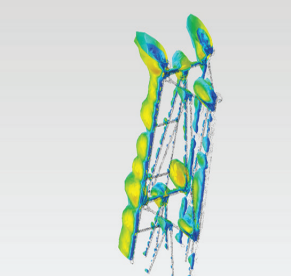
ANSYS

Jet Towers



FEA used to compare connection methods in truss tower modules

Modular Wireless Towers Designed in AIM Cut Installation Time by 80%



CFD simulation of forces exerted by wind on the tower structure

Providing internet service via optical fiber is not economical in much of rural Brazil because of the low population density. Several Brazilian wireless internet service providers (WISPs) are addressing this market with tower-mounted Wi-Fi, which considerably lowers the initial investment required. These companies are looking to quickly build large numbers of towers so they can begin signing up customers and start earning a return on their investment.

Challenges

Jet Towers management had the idea of a modular line of towers based on components that are designed and built in advance. These components could then be assembled and installed in a fraction of the time required to design and build each tower from scratch. The modules needed to be optimized from both a fluid flow and structural perspective so they could be used to construct antennas with a wide range of heights and load-supporting capabilities while keeping total installation costs to a minimum. This represented a potentially overwhelming task for a company with only one design engineer and no analysts.

Technology Used

ANSYS® AIM®

Engineering Solution

The design engineer started with ANSYS AIM by using computational fluid dynamics (CFD) to determine the wind loading exerted by diffe ent tower structures and to predict wind loa ing produced by several common antenna designs. From this information, the engineer derived the drag coefficients and estimated load for other antennas. Using finite element analysis (FEA), the engineer evaluated the perfomance of different structural profiles and connetion methods. The engineer then simulated a wide range of alternatives and designed more than 20 modules that minimize the material, manufacturing, foundation and installation cost of the finished antennas He embedded the design into a spreadsheet for sales reps, so they can now easily enter paraeters that the spreadsheet uses to automatically determine which modules can be combined to build an optimized antenna.

Benefits

AIM guided the Jet Towers' design engineer through a complete multiphysics workflow, making it possible for a non-analyst to design a line of modular towers that delivers a superior product at a competitive price in only one week, one-fifth the time required by conventional methods. Jet Towers' ability to provide antenna towers with shorter delivery times is resulting in rapid growth; in its first eight months of operation, the company has already built and installed 35 towers.

Company Description

Jet Towers is a small startup company in Brazil, specializing in modular towers for the telecommunications industry. They pride themselves on short delivery time of highly engineered products. Engineering simulation has allowed Jet Towers to design and build products faster, keep up with growing market demand and experience rapid growth.

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