



Driveline and Chassis Technology

ZF Case Study on Selecting Gainesville, GA for Their Manufacturing Facility

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Why did ZF decide to build a wind gearbox plant in USA?

- Strong expected market growth in 2009 and forward
- ZF, as a gearbox and driveline specialist, believed we could make a contribution to wind turbine gearboxes:
 - ◆ Design with improved reliability and efficiency
 - ◆ Automotive quality processes and production systems
 - ◆ Supply chain management processes and system
 - ◆ ZF value added including production of end of line test stands
- Cooperation with global OEM to improve its US supply chain by high quality production of main gearboxes in US
- ZF is an independent producer
- Considered importing from Europe, but this added too much inventory and lead time
- Availability of qualified suppliers in USA



ZF experience in North America

- ZF has several manufacturing plants in North America, located in the Northeast, Southeast, and Mexico.
- Original site selection focused on four locations
- ZF has been operating in North America for 30 years
 - ◆ Primarily automotive driveline, construction equipment driveline, and marine
 - ◆ ZF has had good results on attracting employees, employee retention, and quality record
 - ◆ Sales for North America in 2011: 1.9 Billion Euros
 - ◆ Employees for North America: ~7000



Site Selection Process

- Cross functional team from USA and Germany
- Decision matrix of hard facts (cost based, quantifiable) and soft facts
- Incentives from government were considered, but were not the driver behind the decision
- After inquiries and visits, two sites were eliminated due to cost structure (annual operating costs and taxes)
- Two sites were visited again
- Green field site and renovation of existing building were both considered

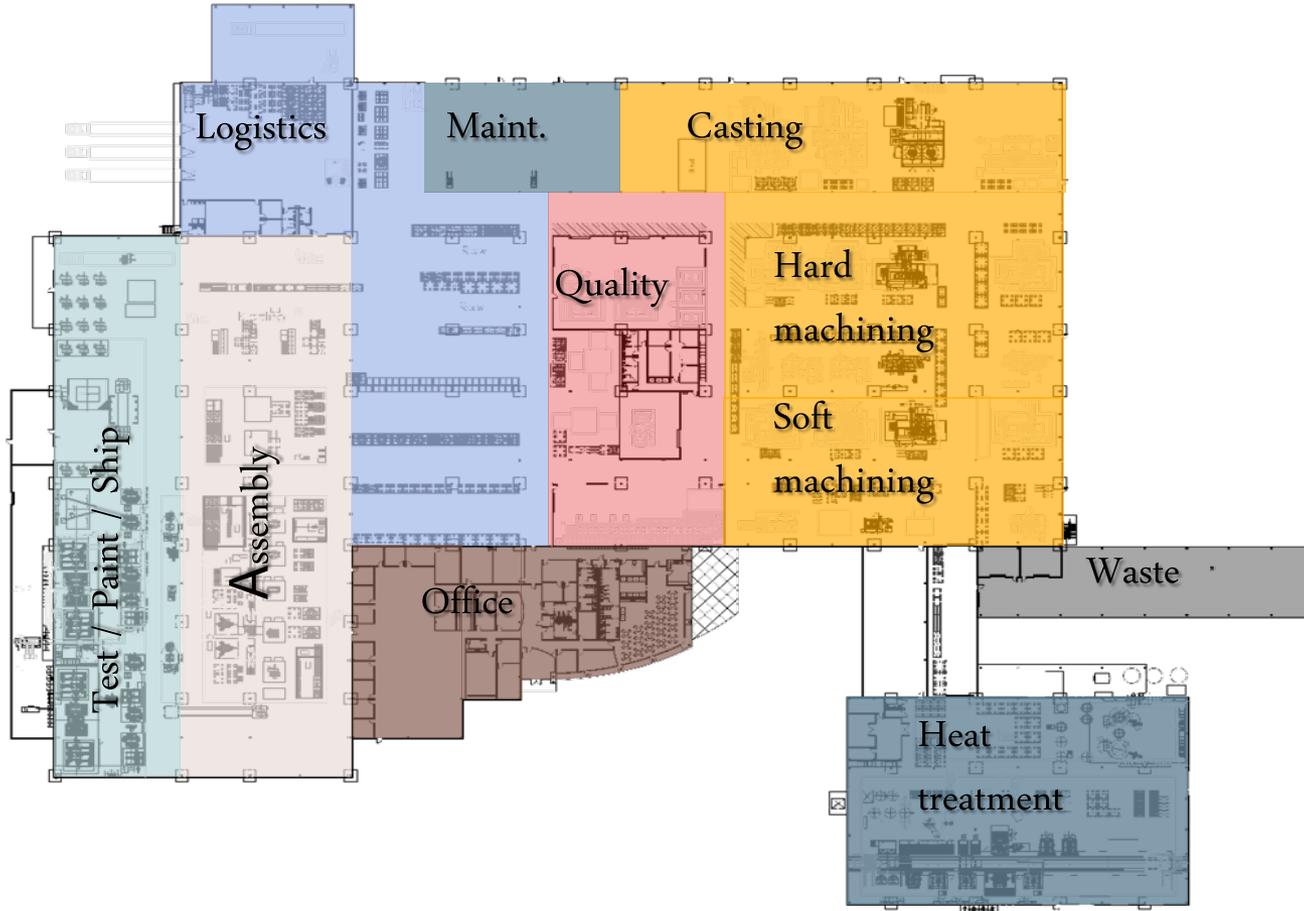


Why did ZF decide to build a plant in the Gainesville, Georgia

- The automotive plant in Gainesville, Georgia (70 miles northeast of Atlanta) has been in operation almost 30 years
- Final decision for Gainesville was based on several factors:
 - ◆ Some overhead structure could be shared between the two plants (human resources, IT, accounting) thereby reducing cost
 - ◆ 56 employees could be transferred to help start the wind plant
 - Familiarity with automotive processes
 - Familiarity with ZF processes & culture
 - ◆ Government support via QuickStart in hiring and training
 - Customized training program to fit ZF's needs
 - Excellent documentation that ZF owns at the end of the training period
 - ◆ Good proximity to supply base (lower logistic cost)
 - ◆ Good transportation connection (highway, port, airport)



ZF Wind Power Scope of Production





ZF Wind Power Gainesville, LLC Aerial Facility Overview View



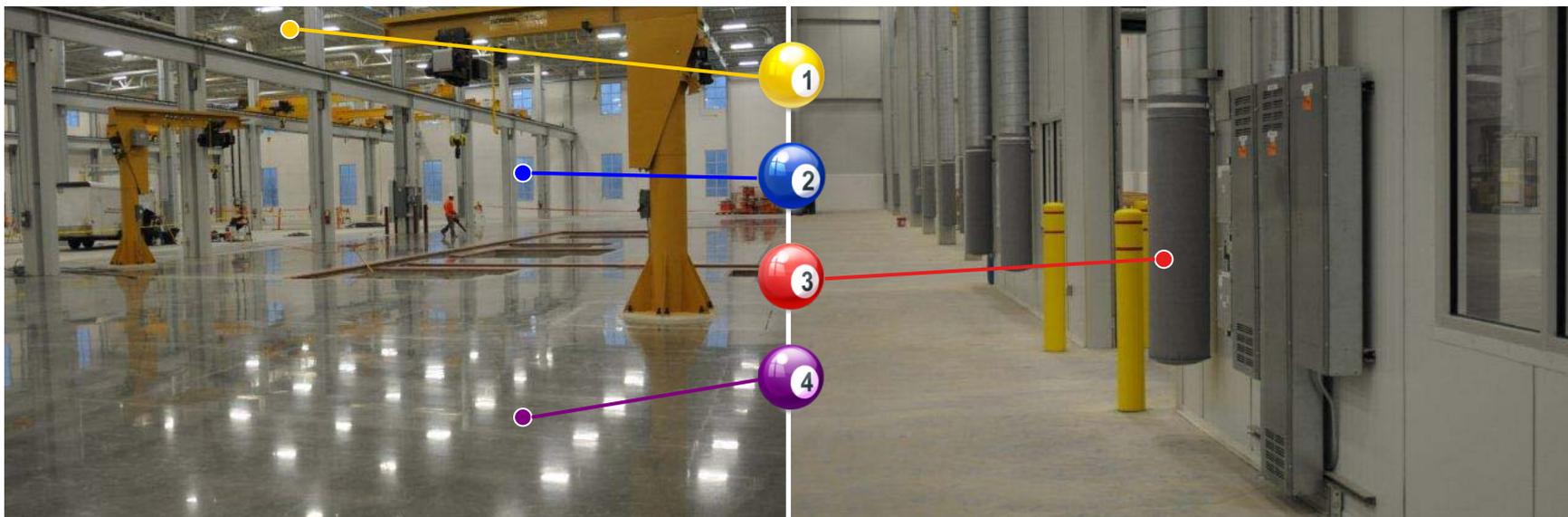


ZF Wind Power Gainesville, LLC Main Entrance





Facility planned for cleanliness, low environmental impact



Feature	Purpose	Effect
1 White roof deck	Reflect light	Less light fixtures required
2 Windows in Assy.	Natural light at process	More light for visual processes Improves morale
3 Duct socks	Distribute air at shop floor	Meet temperature req'mt (+/- 1 deg C) No fans at stations = no dirt blown in gearboxes
4 Polished floor	Reflect light Ensure cleanliness	Less light fixtures required Identify dirt easier



Challenges facing ZF

- Wind turbine gearbox is a new product for ZF
- New manufacturing plant
- New Supply Base
- How to reduce the risk?
 - ◆ ZF utilized the knowledge from our Marine business on large components
 - ◆ ZF purchased Hansen Transmissions in 2011
- Hansen Transmissions brought good product portfolio, wind industry experience, and diverse customer base



ZF Wind Power – Global Footprint

More than 10.000 MW capacity for wind gearboxes



Gainesville, GA, USA

Start 2012
Production: 23.000 m²
Employees:
ramp up to 250
Product range: 2MW
Capacity: 2000MW
Opening: 2011

**Designed according to ZF
automotive standards**



Lommel, Belgium

Start 2001
Production: 110.000 m²
Employees: 820
Product range:
up to 6 MW
Capacity: 6000MW



Tianjin, China

Start 2009
Production: 95.000 m²
Employees: 150
Product range:
up to 3 MW
Capacity: >1500MW



Coimbatore, India

Start 2008
Production: 95.000 m²
Employees: 350
Product range: up to 3 MW
Capacity: >3000MW



Business Case Assumptions

- ZF's original decision in late 2009 to build the Gainesville plant was based upon volume assumptions that included the Production Tax Credit (PTC)
- ZF believes that wind energy will continue to become more efficient, and cost competitive. Productivity and operational efficiencies will continue to offset labor and other cost increases
- Market fluctuations are expected (in 30% range)
- Price competitiveness is expected
- Facility size planned in 2009 was conservative, and less than market forecasts



Status 2012

- ZF invested \$98 Million in the new facility, and planned to hire 250 employees
- The expiration of the PTC has had a significant downward impact on volumes in 2013
- Currently employing 140 people, additional 100 hires are on hold until market stabilizes
- The “boom and bust” cycle of PTC must stop, in order to encourage businesses to make significant capital investments
- Individual states establishing renewable energy targets have had a positive effect on investment and innovation
- A federal, domestic energy policy including renewables is also required to continue job growth and investment in the US



Thank you very much for your attention!

