



Türkiye’de Rüzgar Türbinleri Sertifikasyonu

İZMİR RÜZGAR SEMPOZYUMU VE SERGİSİ 23-24 ARALIK 2011



ACCREDITATION

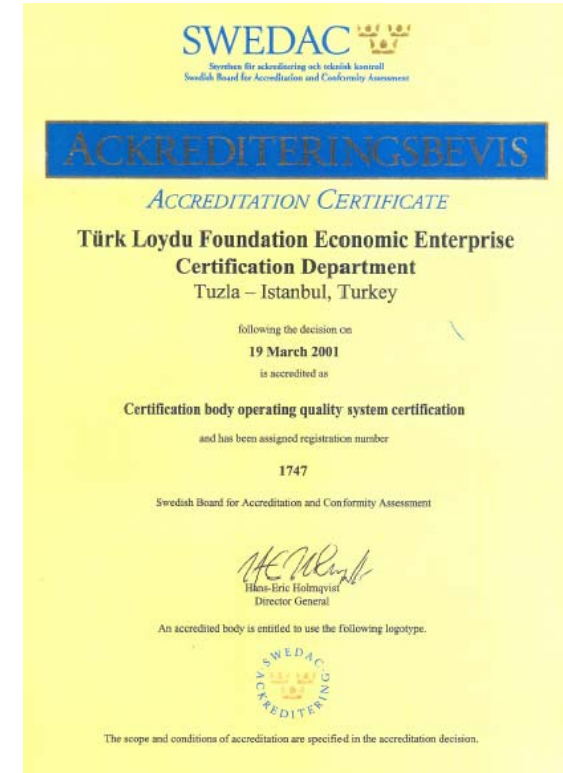
● TS EN ISO/IEC 17020
TURKAK



● TS EN ISO 17021
TURKAK



● ISO 17021
SWEDAC



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Total Installed Capacity (World)

2009

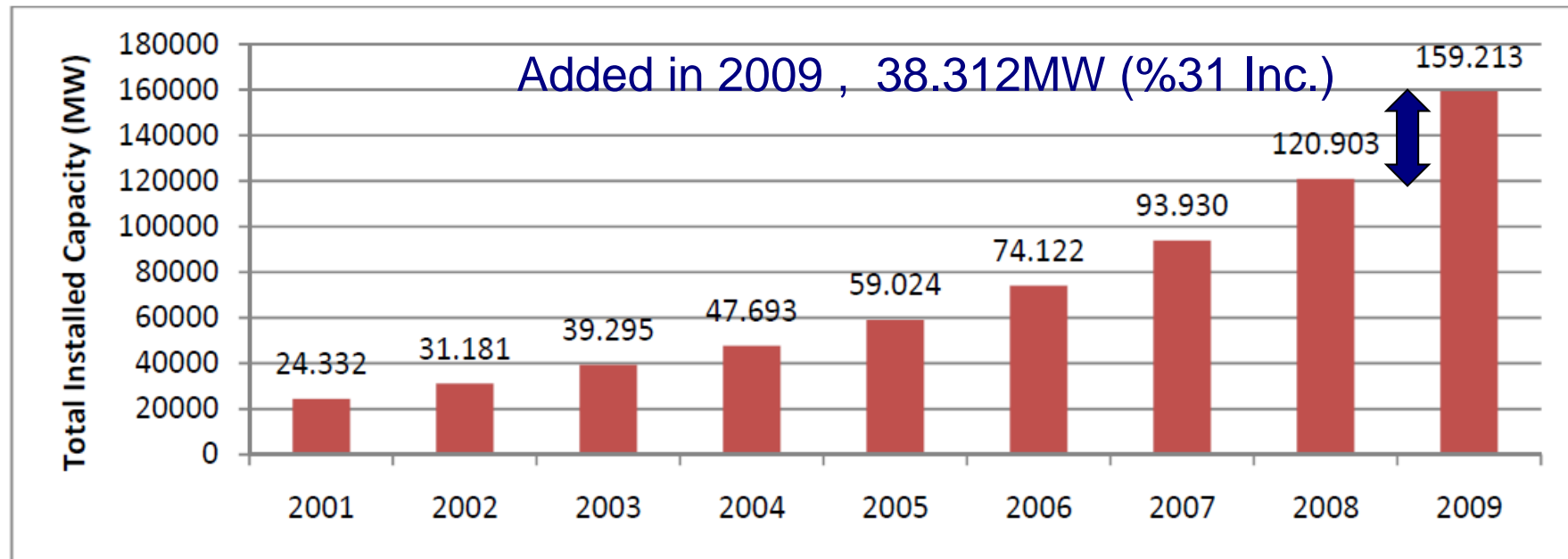
Total Capacity:

✓ 159.213MW
550.000 employed p.

2020 (EU Plan)

350.000 MW ???

✓ Total Capacity ~ %100 Increase / 3years !!!

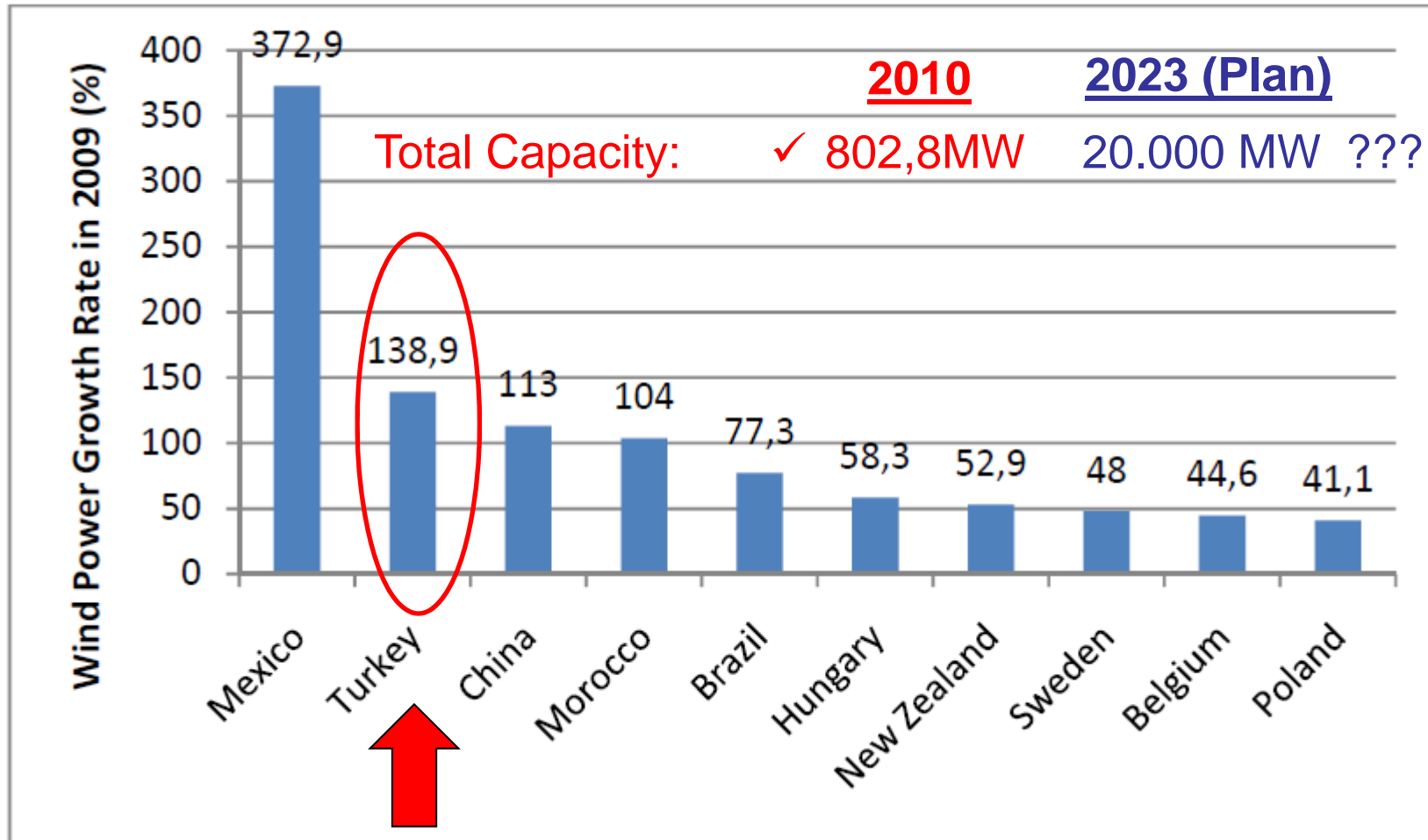


World Wind Energy Association WWEA 2010, World Wind Energy Report 2009



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Wind Energy Capacity (Turkey)

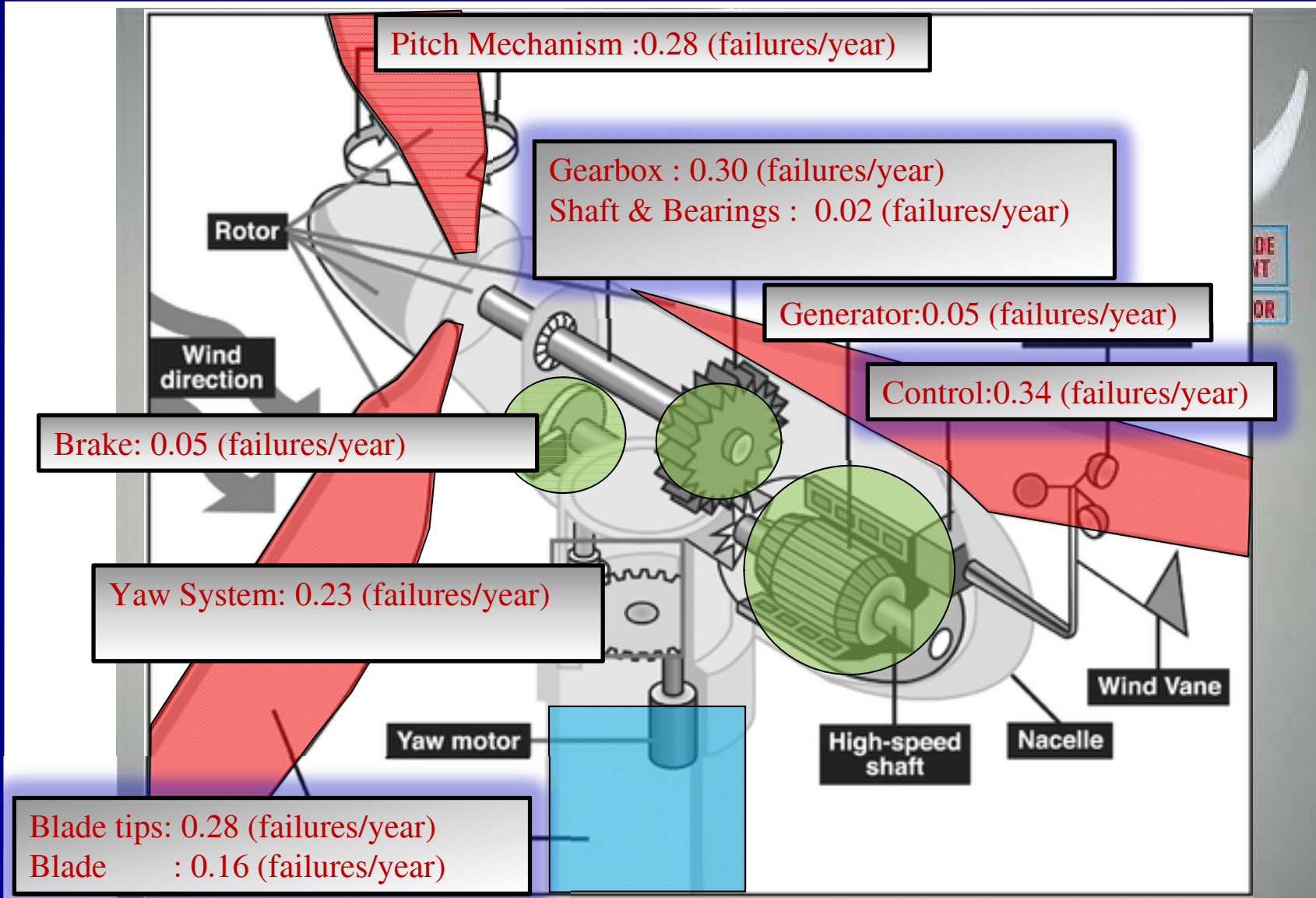


World Wind Energy Association WWEA 2010, World Wind Energy Report 2009



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FAILURE STATISTICS :



Bussel G.J.W., Zaaijer M.B.



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TOWER FAILURE:



www.windaction.org



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BLADE FAILURE:



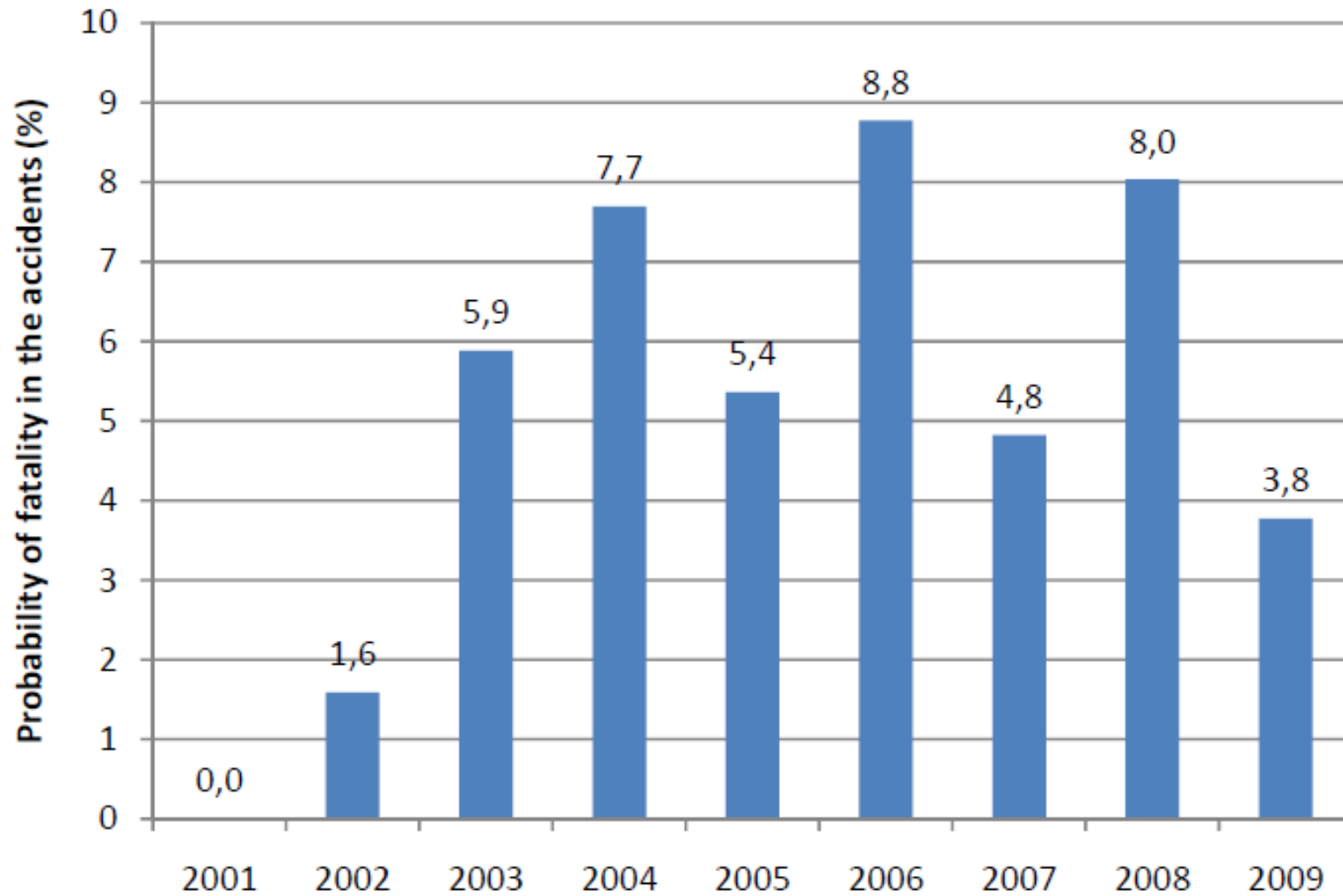
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GEARBOX FAILURE:



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ACCIDENT STATISTICS:



www.caithnesswindfarms.co.uk



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RISKS:

ELIMINATING RISK IS NOT AN OPTION!

It's how you manage
your most critical risks...



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CERTIFICATION:

- ✓ Ensures that the product shall comply with the state of the art codes, standards and guidelines.
- ✓ Indicates the quality and the level of the product (WT)
 - ✓ Maintenance costs are greatly influenced
- ✓ Transfers technology into the manufacturing system.
 - ✓ Accelerates the development of a product (WT)
- ✓ Minimises the risk of technical and economical failure.
 - ✓ Marketing of product (WT) is supported for owners, banks and insurers



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STANDARDS & TL GUIDELINES FOR CERTIFICATION OF WT:

IEC 61400 SERIES STANDARTS

- **IEC 61400-1: Design Requirements**
- IEC 61400-2: Small Wind Turbines
- IEC 61400-3: Design Requirements, Design Requirements for offshore wind turbines
- IEC 61400-11: Acoustic noise measurements techniques
- IEC 61400-12-1: Power Performance measurements
- IEC 61400-13: Measurements of mechanical loads
- IEC 61400-14: Declaration of sound power level and tonality
- IEC 61400-21: Measurements of power quality characteristics
- **IEC 61400-22 (TS): Conformity Testing and Certification of WT**
- IEC 61400-23 (TR): Full scale structural blade testing
- IEC 61400-24 (TR): Lighting protection



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STANDARDS & TL GUIDELINES FOR CERTIFICATION OF WT:

IEC 61400-1

- Outlines **minimum** design requirements
- Specification of **external conditions**
 - Wind Turbine Classes
 - Wind Conditions
 - Other environmental cond.
 - Electrical Power network cond.
- Specification of **design load cases**
- **Requirements** for design
 - Control and protection system
 - Mechanical & Electrical System
 - Assembly, installation and erection
 - Commissioning, operation and maintenance



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STANDARDS & TL GUIDELINES FOR CERTIFICATION OF WT:



IEC 61400-22

Edition 1.0 2010-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Wind turbines –
Part 22: Conformity testing and certification

Eoliennes –
Partie 22: Essais de conformité et certification



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STANDARDS & TL GUIDELINES FOR CERTIFICATION OF WT:

IEC 61400-22 Provides:

- **Definitions of the elements** in a wind turbine certification process;
- **Procedures for conformity evaluation** in a wind turbine certification system;
- Procedures for **conformity surveillance**;
- Rules for **the documentation that is to be supplied** by an applicant for the conformity evaluation;
- Requirements for **certification and inspection bodies and testing laboratories**.



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STANDARDS & TL GUIDELINES FOR CERTIFICATION OF WT:

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**RÜZGAR TÜRBİNLERİNİ
SERTİFİKALANDIRMA ESASLARI**

CİLT F



Kısım 200 - Rüzgar Türbinlerini Sertifikalandırma Esasları
2010

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**RÜZGAR TÜRBİNLERİNİN
DURUM İZLEME SİSTEMLERİNİ
SERTİFİKALANDIRMA ESASLARI**

CİLT F



Kısım 202 - Rüzgar Türbinlerinin Durum İzleme
Sistemlerini Sertifikalandırma Esasları
2010

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**AÇIK DENİZ RÜZGAR TÜRBİNLERİNİ
SERTİFİKALANDIRMA ESASLARI**

CİLT F

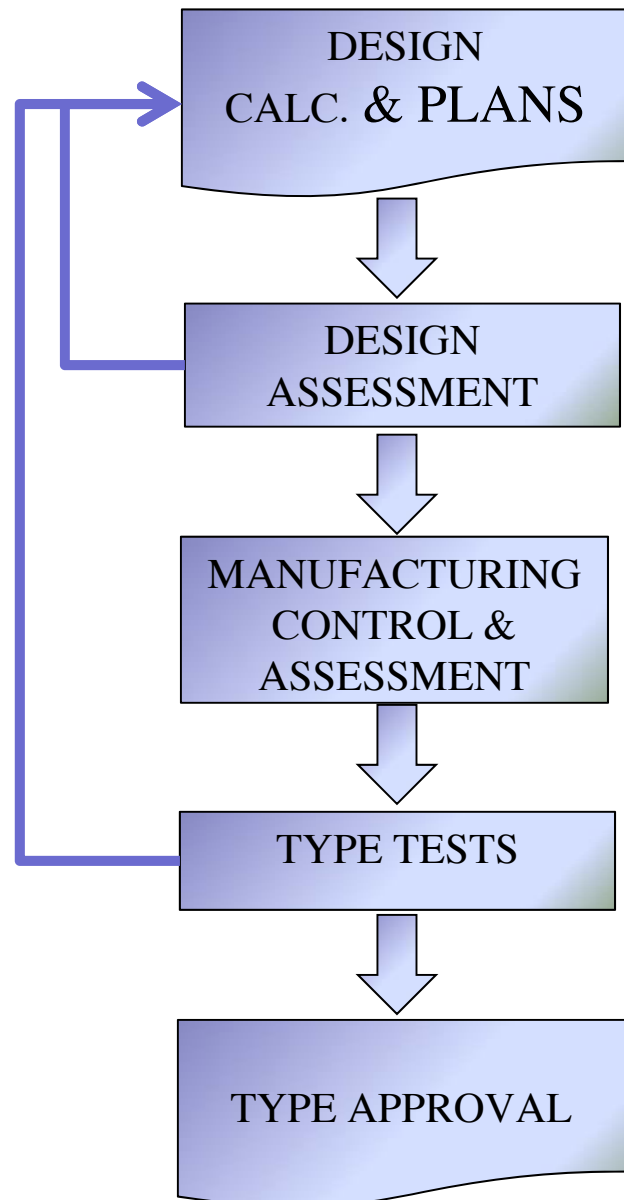


Kısım 201 - Açık Deniz Rüzgar Türbinlerini
Sertifikalandırma Esasları
2010



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Type Approval:



- ✓ Requirements
- ✓ Assumptions
- ✓ Methodologies

- ✓ QC used to control design Process (ISO9001)
- ✓ Control and Protections System
- ✓ Loads and Load Cases
- ✓ Rotor Blades - Machine & Structural Components
- ✓ Electrical Components – Housings
- ✓ Personnel Safety (Hand rails, Emergency stop butt. Etc)

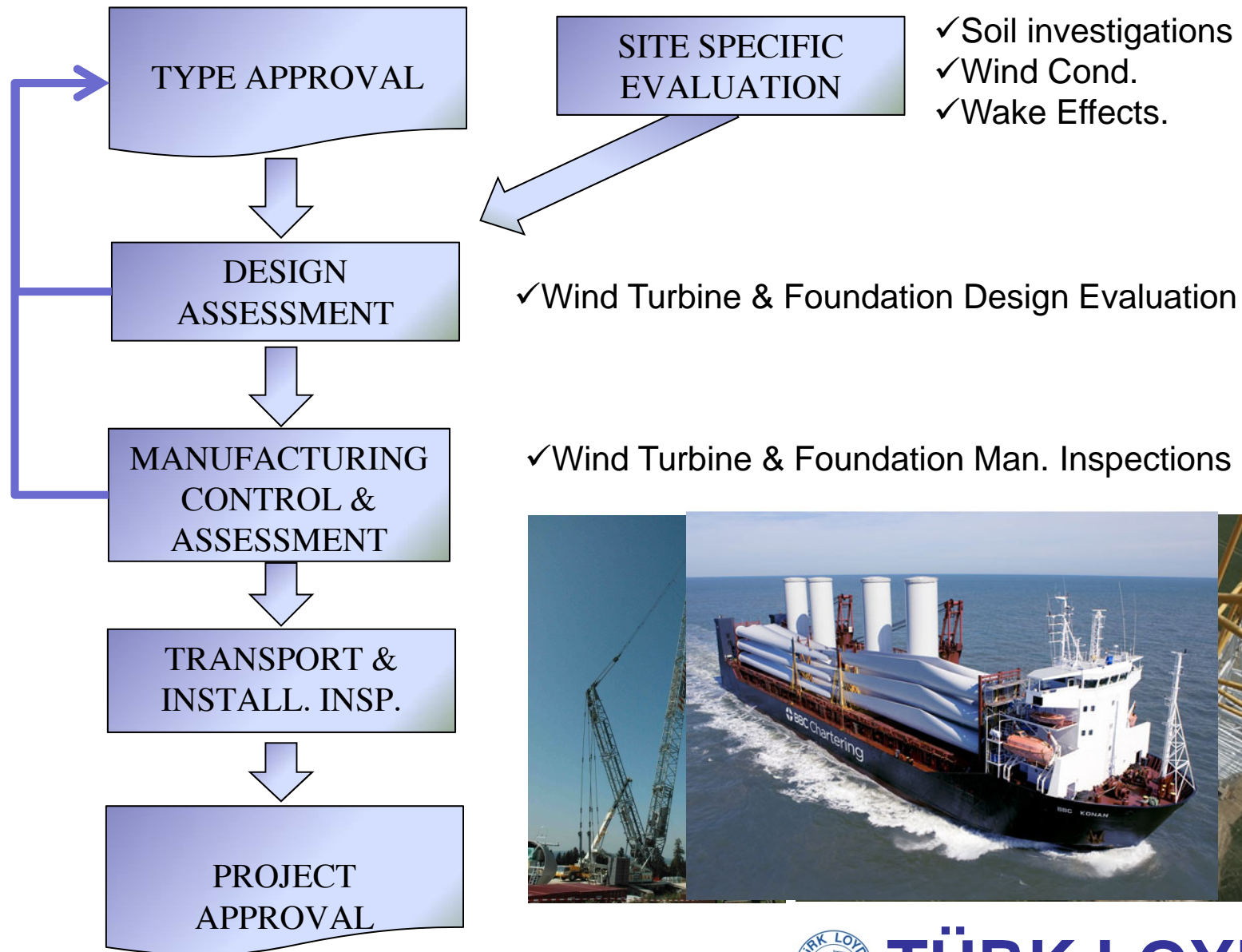
- ✓ QMS used in manufacturing Process (ISO9001)
- ✓ Manufacturing Inspection

- ✓ Safety and Function Tests
- ✓ Power Performance Tests
- ✓ Load Measurements
- ✓ Blade Test
- ✓ Acoustic Noise Measurements



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Project Approval:



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