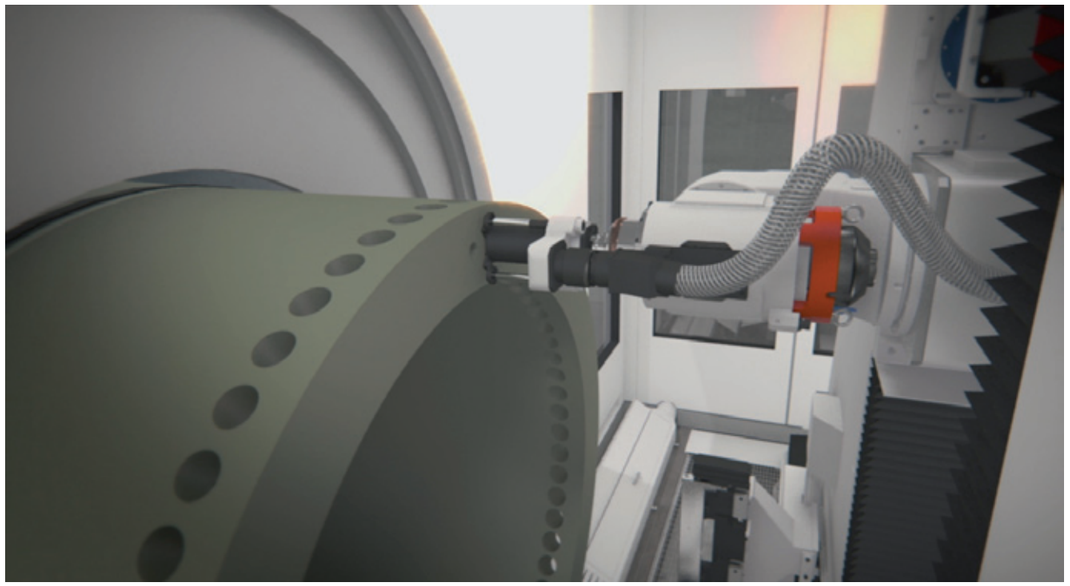
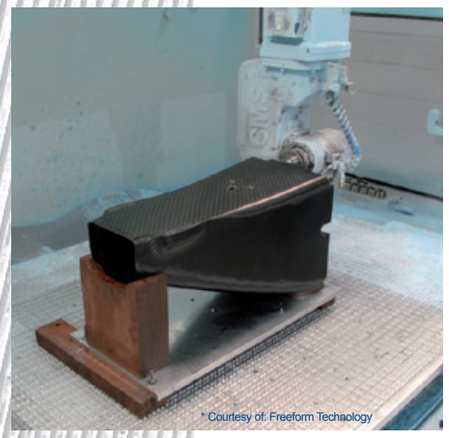
blade root machining

CMS Industries

CNC solutions for the rotor blade drilling and milling

CMS INDUSTRIES FOR BLADE ROOT MACHINING





* Courtesy of: Freeform Technology

CMS Ares machining centre producing
the model and trimming the composite nose
component of a competition car

CMS Poseidon for the plug production

.01

Why CMS Industries

CMS Industries

Partner of

The University Of Sheffield.
Advanced Manufacturing Research Centre
BOEING

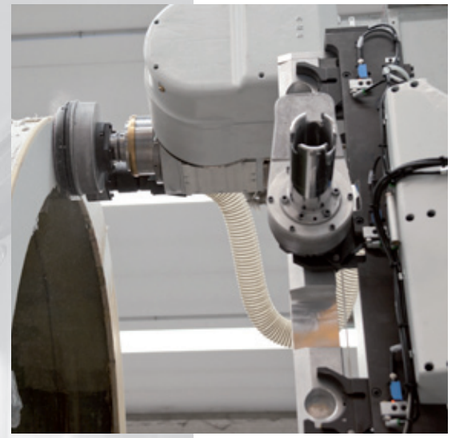
Official Supplier of
ORACLE
RACING

Competence and passion at the service of the customer

Founded in 1969, CMS Industries has reached a turnover
of 100 millions Euros, with more than 500 employees,
4 subsidiaries and a worldwide sales network.
CMS Industries products, CNC machining centres,
thermoforming machines, CNC cutting robots, waterjet systems,
compete to produce space shuttles, military and civil aircrafts,
Formula 1 cars, competition and road vehicles, America's Cup boats,
yachts, wind power generators.
Every machine delivered is produced utilizing the high level
of technical competence, precision and quality
that comes as standard with CMS products.
Each design is based on the fundamental basics
of CMS technology but tailored to customer's individual needs.
These solutions cater for all customer requirements
from single process operations right up to the mass production
of similar parts with each process optimized to suit - all backed up by
a worldwide customer support network.

Courtesy of DAHER-SOCATA

CMS Cronus machining an aircraft part



trimming (by blade) and finishing

drilling in axial and radial direction

.02

Why to process the blade root by CNC

advanced materials technology

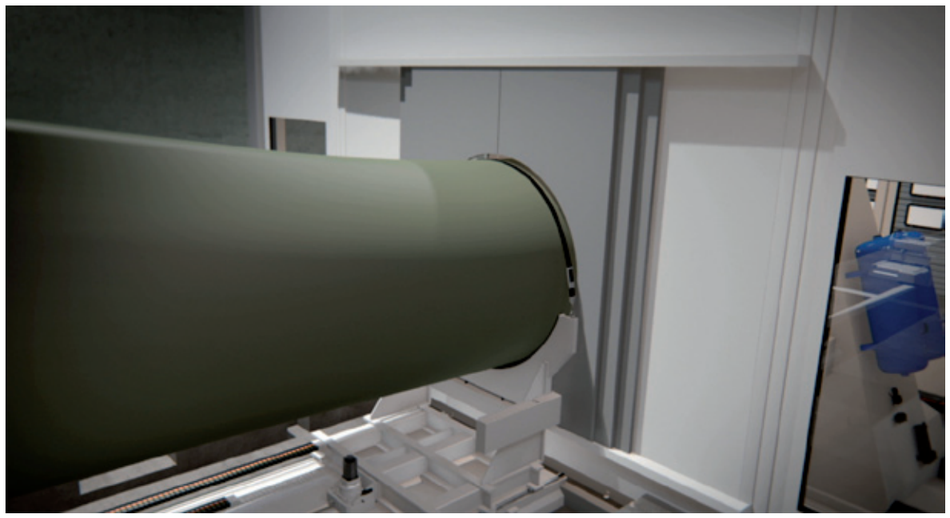
The accurate processing of the blade root is a key factor reducing rework and increasing wind turbine life.

The drilling and milling of the blade root is a fundamental requirement in the mechanical assembly of the blade and hub and the level of precision has a major influence on the operation of the entire wind turbine.

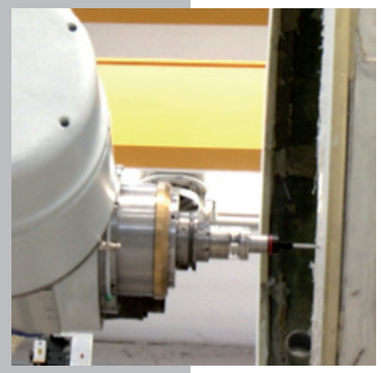
By using the CMS machining solution the precision level of this process ensures the highest degree of accuracy on the market and thus the most effective wind turbine operation.

CNC vs PLC
The CNC-based architecture gives a great advantage in flexibility and in an easy reuse of the same system for several models of rotor blade.
Different models can be produced simply by changing the CNC program.
A new CNC program can be automatically generated by post-processing the relevant CAD/CAM project.
With the PLC-based solution a change of model needs a new set-up/testing of the whole system, along with relevant additional costs.
Basically a PLC-based solution is dedicated to only one or few models of rotor blades.

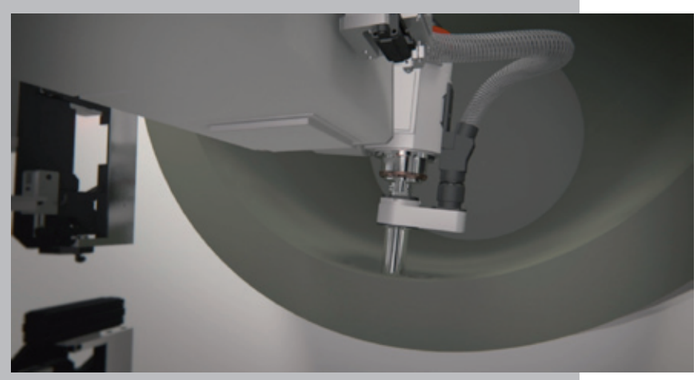
CNC vs robots
While a solution based on robots may seem to be the most flexible and easy to use, it has serious limitations and drawbacks when put into practical use.
These include -- lower processing accuracy due to its geometry, inefficient dust suction/removal, creating a dirty environment, each robot has to be treated as a single machine meaning a low integration level and longer testing time, due to the complicated post-processing, an higher risk of errors.



simultaneous machining with
two operating units



automatic blade alignment



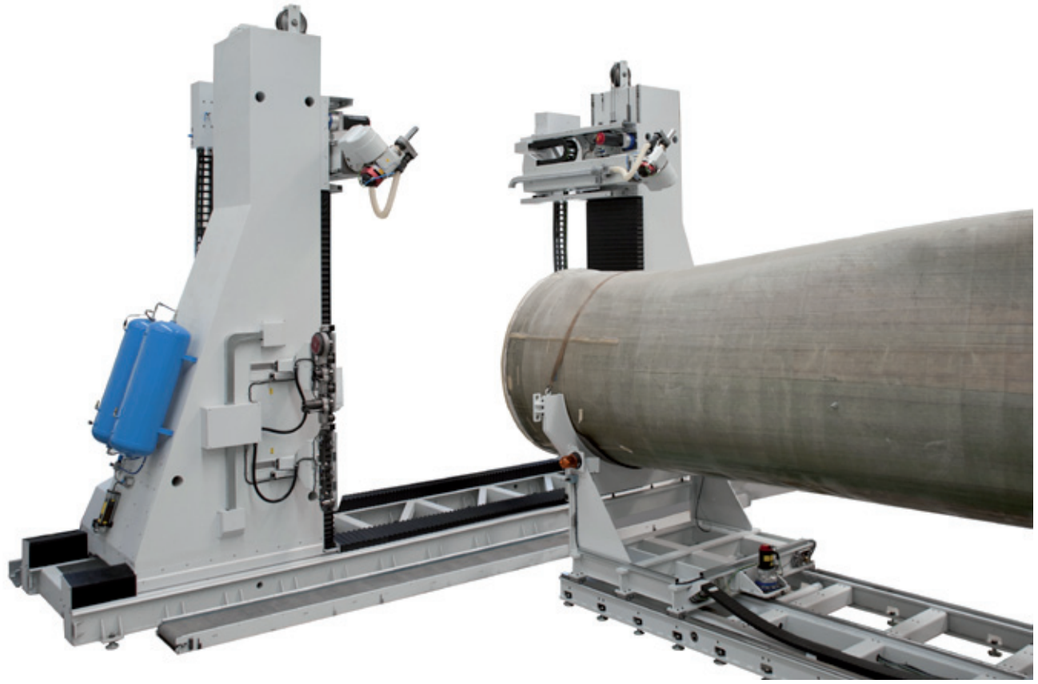
due to the unique technology of CMS
tool cooling systems are not required

CMS Cms
advanced materials technology

.03
Why CMS EOS

EOS offers a complete coverage of the drilling and milling process of the rotor blades and all the benefits of an automatic solution, with the architecture base of CNC machining centres

- productivity, accuracy and repeatability
- flexibility - allows processing of new and different models of rotor blade
- less manual operation needed
- safer and cleaner working environment



Processing time: 2 hours 30 minutes
(Example: blade diameter 2200 mm and 50 T-bolts. Simultaneous machining with two operating units. T-bolts needing 2 holes: 1 radial + 1 axial. Automatic blade alignment included. No tandem cycle. No T-bolts insertion)

CMS Cms
advanced materials technology

tandem cycle

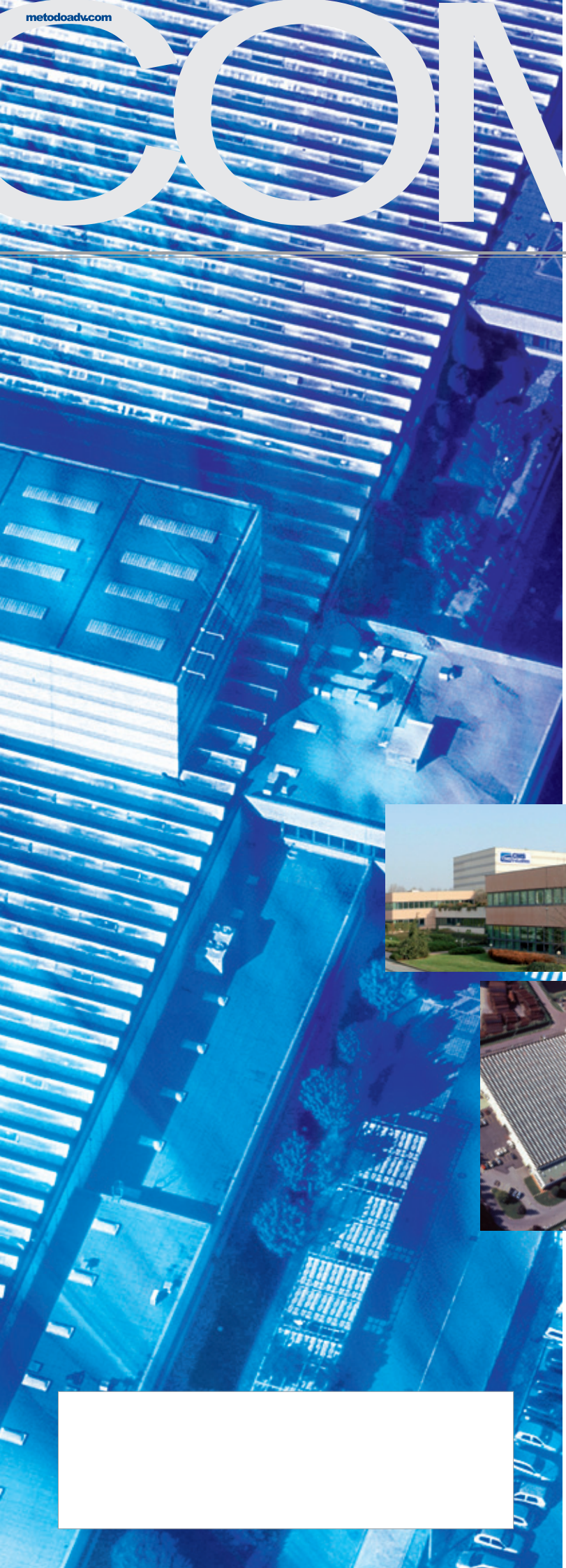
Main features
- Single or double 5 axes operating unit with tool changer magazine. Electrospindle power: 28 kW.
- Full enclosure and suction hoods on each operating unit. Very efficient dust extraction.
- Rotor blade holder: carriages managed by CNC, fully integrated with the system.
- Automatic blade alignment. The CNC program of each blade is automatically adjusted to the actual position of the blade.
- Options: tandem cycle; T-bolt insertion.

single or double operating unit
drilling / milling

single or double operating unit
drilling / milling
tandem cycle

single or double operating unit
drilling / milling / T-bolts insertion

single or double operating unit
drilling / milling / T-bolts insertion
tandem cycle



THE COMPANY

ACWINDE-0112E

CMS Industries

Founded in 1969, CMS SpA (Costruzione Macchine Speciali) merged together four companies under the brand CMS Industries which has reached a turnover of 100 millions Euros, with 3 production facilities, 4 subsidiaries and a worldwide sales and service network.
CMS Industries is specialized in producing multi-axis CNC machining centers, thermoforming machines, CNC routers and waterjet cutting systems which represent the answer to the high demand of the leading industries in the Aerospace, Automotive, Marine Industry, Wind Energy, Stone, Glass and Wood sectors.
This wide products line, joining together quality and precision, offers a comprehensive range of flexible, innovative and cost-effective solutions to cover several production phases or to be customized for specific processes.
From 2002 CMS SpA is part of SCM GROUP (www.scmgroup.com)

CMS Balestrini
wood technology

CMS Cms
advanced materials - plastic - wood technology

CMS Brembana
glass - stone technology

CMS Tecnocut
waterjet technology

www.cmsindustries.it

Technical data are not binding and may be changed by CMS without prior notice.

CMS Cms
advanced materials technology

CMS S.p.A.

Zogno Plant
24019 Zogno (BG) Italy
Tel. +39.0345.64201
Fax +39.0345.64280
info@cmsindustries.it