CURRICULUM VITAE DR.-ING. HERMANN ROCHHOLZ

PERSONAL DETAILS

Address: I–39044 Neumarkt; Kahnstr. 6
Date/place of Birth: October 5, 1962 in Nuremberg, Germany
Located: Kahn Street 6, 39044 Egna, Italy
Nationality: German
Martial status: divorced
Mail(preferred)/tel.: hermann@rochholz.de / 0039 331 80 444 60

JOB WORK EXPERIENCE

(See also "Detailed Job History and Skills")

From 09/15 **Teacher (Technical School Bolzano/Brixen/Sterzing (South Tyrol, Italy))**
Subject: Mechanics, Mathematics, Technical Drawing, Physics

From 10/16 **Tutor (Pegasus Bozen)**
Subjects: Mechanics, Mathematics, Chemistry, Natural Science, ...

10/13 to 12/15 **Consultancy Wind Power/Miscellaneous**
Assessment of wind turbines and surveys
Parallel: Preparation of the teaching activity by recognition of the study title in Italy
Short-term break because of my mother's illness

03/11 to 09/13 **Rotor Blade Specialist (Leitwind Wind Energy AG, Bozen, Italy)**
– about 700 employees (laid-off for operational reasons)
Aerodyn. layout of several Rotor blades incl. programming of interfaces
"Reverse Design" of products of suppliers
Quality assurance/quality checks of rotor blades

07/02 to 01/11 **Research Engineer Rotor Blade (Nordex SE Wind Energy, Hamburg)**
Aerodynamic layout of several rotor blades incl. programming of interfaces
Development of a semi-automatic system for rotor blade layout
Layout/Aerodyn. design of the turbines N100/N117 ("Benchmark of low wind turbines")
Optimization of S77 with NOI rotor blades (Improvement $> 6{,}5\,\%$)
Quality assurance and check of rotor blades and finding of other failure processes
Project management: Certification of a rotor blade retrofit in due time

08/98 to 06/02 **Development and Project Work Aerodynamics, Oberpfaffenhofen**
(**Fairchild-Dornier Airplanes**) > 2000 employees (limited by bankruptcy)
Responsible for the "Application Rules" of the airplane Do728 Jet
– Combining flight mechanic and simulator input with
wind tunnel and calculation results

10/96 bis 09/98 **Research and Development Engineer, Karlsruhe, Germany)**
(Research Center, Institute for Reactor Safety) > 5000 Employees (time-limited)
Creation of several geometries of reactor containments and
Calculation of flow within these reactor containments
Programming of a semi-automatic grafical interface
for fast data comparison with certification bodies

08/94 bis 09/96 **Projekt Engineer (DASA Ottobrunn)** (limited in time)
1) Pre-development of hypersonic orbiters in the "FESTIP"-Program
2) Calculation of the flow within an inlet of a turbine in transonic flow

August 1994 **PhD Graduation, TU Munich, Institute of Fluid Mechanics**
Title: Eulerian solutions for the Separation of Carrier/Orbiter-Systems during the separation process in hypersonic flow (CFD)

1988 to 1993 **Scientific Assistant, TU Munich, Institute of Fluid Mechanics**
(limited in time)
Tasks/Successes:
– Work on several research projects in different topics
– Complete institute work incl. mentoring students during diploma thesis

STUDY

1982 to 1988 Technical University Munich: Base study: Mechanical engineering
Main study: Aerospace Engineering
Industrial practice (1/2 year): Training workshop, tool design and construction, ropery, grinding machines, foundry, plastics processing tools, quality assurance.
Student job: Company of steel constructions (mounting of stairs with welding etc.)

1981 to 1982 Military service

SCHOOL

1968 to 1981 Gesamtschule Ehringshausen, followed by Gymnasiale Oberstufe Wetzlar
Focus: Physics and chemistry

COMPUTER-KNOWLEDGE

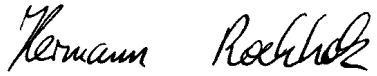
Operating Systems:	Windows, several Unices, sys-admin Cray J90
Programming Skills:	Fortran, Matlab-clone (Scilab), Shell skripts. Basics: Python, Delphi.
Applications:	CFD-Methods, grid generators, Microsoft-applications, visualisation software (Tecplot), singularity methods Basic knowlege CFX, Freecad,Pro-Engineer, CATIA.

FURTHER TOPICS

Language Skills	German:	First Language
	English:	Fluent - very good
	Italian:	Better than basic knowledge
Further Training	Autocad, Pro-E, several teamwork/conflict-/self-management/QA workshops	
Further Knowledge:	Plastics processing (mainly fiber reinforced), Mould building, Glues	
Abilities:	Technically very skilled, systems analyst, broad basic knowledge	
Patents:	Wind turbine control, aerod. power optimizing, fiber application, nacelle design,...	

HOBBIES AND INTERESTS

Sports (MTB, Skiing, Hiking,...), DIY, Industrial design, (LED)-lighting...



I – Neumarkt (Egna), March 18, 2018

Detailed Job History and Skills

The engineering study at the Technical University of Munich consists of two parts: The first one is a classical study af mechanical engineering. In the second part, the main study, I focused on aircraft technology and within that in fluid mechanics.

Before I was employed at the **Institute of Fluid Mechanics** at the TUM, I did there my last student work at the wind tunnel and via this institute my diploma thesis at MTU. At the institute I held practical courses for students and was involved in the institute work. After finishing a research project dealing with unsteady aerodynamics I became the person in charge for the Special Hypersonic Research Project 255. My work was mainly flow simulation with self-programmed CFD-methods and grid generators. These programs were used later during the successful progress of the research project and for companies like DASA and Grob Aircraft Industries. This was followed by project work at the **DASA**, where I calculated an unsteady flow phenomenon within a jet engine inlet. Then I worked at "FESTIP" in an international team preprojecting a space transportation system and coordinating European subcontractors.

After that I changed to the **Research Center FZK** in Karlsruhe. There I calculated flows and combustion in nuclear power plants and coordinated the results with the certification authority.

After all these time-limited jobs I was employed by **Fairchild-Dornier**, where I was the interface between aerodynamics and flight mechanics. I made and evaluated wind tunnel tests and provided the results for the flight mechanic dataset and the simulator dataset of the Do 728 airplane.

During the insolvency I changed to the wind turbine manufacturer **Nordex AG**. My main task there was the aerodynamic design of rotor blades for 4 years. I got the possibility to generate the aerodynamics of the first complete inhouse-built rotor blade (2.5 MW nominal power). After that I had to design the aerodynamics of the 117 m low-wind machine. To keep loads and torque in limits I had to limit the machine to 2.4 MW. My tasks were in detail:

- Creation of a program to generate the surface of the rotorblade providing all relevant interfaces to CAD, load calculation and structural layout.
- Rotor blade development.
- Evaluation and modification of wind tunnel polars for 3-D-purpose.
- Optimizing of rotor blade performance.
- Coordination with the gearbox responsible, structural mechanic people and load calculators.
- Project Management of the certification of a rotor blade retrofit ("Airpac-retrofit"). This included the definition and management of specific material testing, detection of the correct structure of the rotor blade, planning and implementation of a rotor blade test, retrofit a CFRP shaft, supplier evaluation of producers and technical support to the installation of patented blade damper, introduction of a new vibration sensor and finally the coordination with structural mechanics, load calculators and certification authorities. In parallel, a weekly documentation of the progress to the board was made. This project was completed in due time (6 months).

Before I was fully involved in rotor blade development (this was made by external consultants before) my tasks were as following:

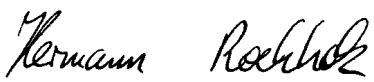
- All "classical" tasks of an engineer (creation/checking of technical drawings and drafts, ...).
- Writing of work instructions and testing them before.
- Quality-check of rotor blade moulds and rotor blades of all manufacturers.
- Writing many specifications and checklists for quality assurance.

- Creation of material specific tests (Carbon fiber and polyurethane glue) including construction of test apparatus.
- Support of service people.
- Support of logistics (Design of transport tools, evaluation of rotor blade damages, ...)
- Calculation and optimization of control curves.
- Optimization of wind turbines with aerodynamic add-ons and adaption of control curve (yield increased by more than 6.5%).
- Supervision of students and colleagues making their Diploma Thesis (CFD).
- Wind tunnel tests.
- Project manager deicing of rotor blades.
- Writing of patents.

From March 2011 to September 2013 I was employed at an Italian wind company **Leitwind** building direct-drive wind turbines. They are buying partially their blades from different blade manufacturers. In this company I had similar tasks than before:

- Evaluation of competitors wind turbines.
- Evaluation of wind turbine performance and aerodynamic optimization.
- Development of a multi-receptor lightning-system according new GL-Rules.
- Evaluation of rotor blade aerodynamics.
- Creation of work instructions for gluing, painting, etc. especially for using GFRP.
- Working out presentations for these basic works to teach colleagues.
- QS-Check of different rotor blade types of different manufacturers.
- Aerodynamic layout of rotor blades including interface programing to structural programs.
- Evaluation and support of the Indian Blade Company (Leitner-Shriram in Gummidipundi).

After that I worked intermittently as a consultant. I optimized rotor blades and evaluated wind turbine manufacturers for a customer. Since 2015 I am working as a **teacher** in technical schools. At the moment I am teaching technics a the middle school. Additionally I am working as a tutor.



I – Neumarkt (Egna), March 18, 2018