

Ralf Cuntze: Retired engineer and hobby material modeller

Formerly: MAN-Technologie AG Augsburg, Head of Main Department 'Structural and Thermal-Analysis'

Now: linked to Carbon Composites e.V. (CCeV) Augsburg and IHK-Schwaben, Bayern Innovativ:

- 1959 - 1964 Study of Civil Engineering at Hannover ('stress man')
- 1968 Dr.-Ing. in Structural Dynamics
- 1978 Dr.-Ing. habil. in Mechanics of **Lightweight Structures**
- 1980 - 2003 Lecturer at 'Universität der Bundeswehr' München on fracture mechanics and **lightweight structures** from Fiber Reinforced Plastics (FRP)

Professional career:

1968 - 1970 DLR (German aerospace center: finite element analysis programming)

1970 - 2004 MAN-Technologie, Munich/Augsburg: involved in the *Development of* :

- ARIANE 1-5 Launcher family: Components of central stage + Boosters, high pressure vessels, etc.
- Windenergy rotors (Growian Ø103m, WKA 60, Aeroman). **Since 1970 in Carbon Comp. business**
- Satellite components, Space Antennas; FRP light weight structures, IRAM antenna, SOFIA telescope (in Boeing 747); Automated Transfer Vehicles (ATV1 Jules Verne) + Crew Rescue Vehicle CRV (for ISS) + NASA X38 Demonstrator space plane
- CMC body flap for Crew Rescue Vehicle (2002), Spacelab mission D1 (1985): material experiments,
- Apogee solid propellant motor cases MAGE and IRIS, water-tanks for AIRBUS
- Heat exchanger for gas cooled Solartower GAST(20 MW) and Solarfield constructions (Almeria)
- Gasultra-Centrifuge, Fly wheels (for ship "Trans Swartow", MAN-Buses), Diesel engine parts in metal and in monolithic ceramics for trucks, Structural calculations for MAN buses
- Fusion reactor WENDELSTEIN VII: toroidal ring chamber.

Material applications in the range: 20 K through 2000 K (FRP, CMC, metals, concrete).

Co-author and Convenor of various Handbooks and Working Groups

- IASB - German Aircraft Structural Handbook HSB: since 1972 author and co-author of a large number of design sheets. Co-author of the HSB-Handbook's 'transfer' team into English
- VDI 2014 Guideline "Development of Fibre Reinforced Plastic Compon." (co-author, convenor), VDI-WG 4.3 "Reliability of Structural Components" (1980ies, WG member)
- ESA/ESTEC, since 1978: Structural Requirements Standards, co-author in the 3 working groups: Structural Analysis, High Pressure Vessels (metal and composites), Safety Factors; Contributor to Handbooks: PSS and follower Structural Materials Handbook SMH; Buckling Handbook (first convenor, contributor to several chapters); ECSS (European Cooperation for Space Standardization)
- was involved in EU projects (BRITE, BRITE-EURAM), and BMFT and BMBF research projects.

Miscellaneous

- Surveyor/advisor (since 1980) for German Ministry BMFT + BMBF on R&D Material Programmes (MaTech, MatFo, LuFo, German Material Modelling competence centres). Advisor to EU-project MAAXIMUS (Airbus Toulouse: On improving Aircraft sizing)
- Advisor for German Research Foundation DFG (SFBs, SPPs on modelling structural textiles)
- Originator of the successful Failure Mode Concept (FMC), a general invariant-based foundation for the derivation of failure mode-linked *strength failure conditions* for isotropic, transversely-isotropic (UD), and orthotropic (fabrics) materials applicable for FRP, CMC, metals, concrete, etc. Winner of the World-Wide-Failure-Exercise-I on "UD composites strength failure theories" (WWFE-I, bi-axial stress states). Now, top-ranked in WWFE-II on "UD, tri-axial stress states" considering hydrostatic pressures > 700 MPa
- Numerous single-author publications in different structural fields
- Founder (2010) and co-worker of the working group 'Fatigue of Composites' (only group, world-wide) of all respective German universities.
- Founder and Leader of the Carbon Composites working groups 'Engineering'(2009) and 'Fiber-Reinforcement in Civil Engineering' (2011).