DR. PETAR AGATONOVIC
Pappelweg 11
D-85244 Röhrmoos
Germany
Tel.: ++9138-8160
Email: P.Agatonovic@t-onine.de
www.agatonovic.de

Origins of Me and my Family Name

Born on 17.12.1934 in Pančevo (Kingdom Yugoslavia) Father, Roman Catholics, Ferenz Agoston Ph.D. jurist and mother Dusanka.

The first name I have get according to the deceased eldest brother of the father, Dr. Peter Agoston, Hungarian Social Democratic leader of moderate direction. My Further Dr. Ferenz Agoston and his Brother Dr. Peter Agoston have the same father Francis Augenstein but not the same mother (due to the early death of father's first wife, Peter's mother).

My uncle Dr. Peter Agoston was Professor of Private Law at the Univ. Budapest and, during the Revolution of 1918-19, Hungarian State Secretary. During the Hungarian Soviet Republic, as deputy People's Commissiar of Foreign Affairs, he tried to make truthful connections with the Entente Powers. However, he was picked up by the Counter-Revolution 11.15.1919, and, against the opposite guarantee of the Entente Powers sentenced to death, purely by the exchange of the captives came to Moscow. After that, he lived in emigration (Moscow, London, finally Paris, where on 6 September 1925 he died). He translated works of Engels, Bebel and Mehring to Hungarian language on *Pál Rab* pseudonym.

Probably this, to existing time not very advantageous, story and severe illness initiated my father to change the family name a year after my birth in Serbo-Croatian like name - Agatonovic. With the same-named families in Serbia, I have not at all to do. Regrettably, because of early death of my father (1937 when I was only two and half years old), world war and general after war European turbulences, I have not received a chance also up to nowadays to get to know anyone of the father's family or relatives. I do not know where they live. Birthplace of my father Selmecbanya is now in Slovakia and calls today Banská Štiavnica. It was very surprising to me, that the Farský Úrad (Rimskokatolicka cirkev, farnost' Banská Štiavnica) does not give any answers to my letter asking for the details about my family. The same happened when I was in Budapest. The reason for this I never experienced. Probably someone wants to avoid this.

As the expert in juristic science (see Figure) in Kingdom Yugoslavia my father prepared for publication 'The Law on Judicial Procedure in Civil Cases (Civil Procedure)' for the Kingdom of Yugoslavia passed together with the 'New Criminal Code of the Kingdom of Yugoslavia' in 1929 (publishing company: Zagreb, "Themis", 1930) in which way a unique system of justice throughout the territory of the Kingdom of Yugoslavia has been introduced. Up to his death, he systematically prepared for publication with the comments, with the cooperation of Themis publishing company in Zagreb, different other important lows of Kigdom Yugoslavia.


NOS RECTOR
ET ALMA AC CELEBERRIMA
REGIA SCIENTIARUM UNIVERSITAS HUNGARICA
LECTURIS SALUTEM.

To receive all these books, as the last and only alive family member (together with other memories of subjective values to my beginnings and personal things and documents), being localized in the family flat in Belgrade (Kneza Danila 59/I) , the present local judgment in Republic Serbia has been disapproved me. Les surprising, as the today local judges in Serbia are the students of the university professor, being blamed in den Hag, so that they learn from the expert how the justice and laws may

be twisted. The early extensive works of my further to support the establishment of justice by lows in the young country have been annihilated. Just, well, that my father must not experience it happens.

Curriculum Vitae and Personal Profile

EDUCATION

1953 - 1960 Studies of Mechanical engineering, Diploma in Mechanical Engineering (Dipl.-Ing.)

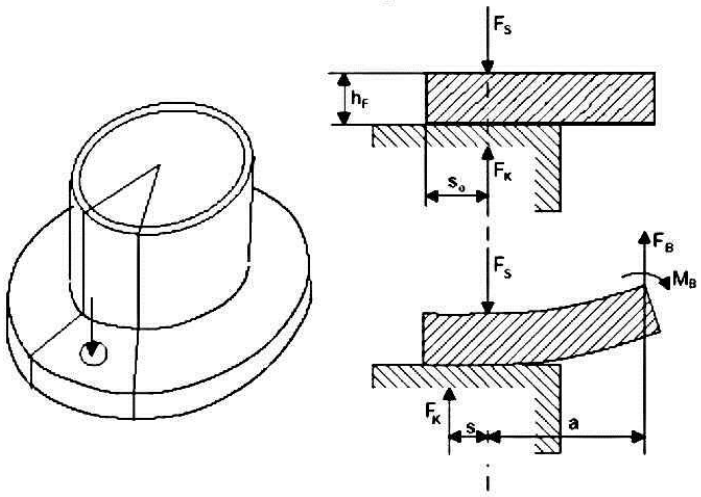
1971 - 1973 Ph. Thesis (Dr.-Ing). TU Berlin

SOME MORE IMPORTANT LECTURES AND COURSES ATTENDANCES:

1. Aufbauseminar Systemtechnik IV (Anwendungen systemtechnischer Methoden auf ausgewählten Themengebieten)
   „Systemlehre technischer Konstruktionen“
   Brennpunkt Systemtechnik TU Berlin 27.9 -1.10.1971
2. Bildungswerk der Bayerischen Wirtschaft e.V., Seminar
   „Entscheidungs- und Arbeitstechnik“
   Sporthotel Achental, Grassau, 27.9 -29.9.1976
3. AGARD Lecture Series Nr. 91
   „Advanced Manufacturing Techniques in Joining of Aerospace Materials“
   20./21.10.1977
4. Lehrstuhl f. Metallurgie und Metalkunde, TU München,
   „Hochschulpraktikum Schadensanalyse“
   In 26.-28.10.1977
5. Internationales Symposium
   „Numerical Methods in Fracture Mechanics“
   University of Swansea, 9 -13.1.1978
6. Seminar
   “Führen bei MAN”
   2. + 29./30.4 + 14.5.1981 (MAN intern)
7. Course of
   “Advanced Seminar on Fracture Mechanics“
   ISPRA courses Commission of the European Communities, Programme of training and education, Joint Research Center (19-23 .10.1981)
8. Course on
   “Structural Reliability”
   Lousanne 1985, Institute for Computational Engineering
9. Intensive course on the subject of
   “Industrial Corrosion”
   The Center for Professional advancement, 2-5.11 1987 in Amsterdam, the Netherlands
10. Intensive course on the subject of
    “Metallurgy for non-Metallurgists”
    The Center for Professional advancement, 19-23.12.1988 in Amsterdam, the Netherlands
11. MAN 32.
    “Kolleg Führung für Hauptabteilungsleiter
    12.-16 Juli 1992 in Nierstein
12. Course on
    “Nonlinear Finite Element Analysis”
    Institute for Computational Engineering, Munich – Germany 14-18.12.1992

PROFESSIONAL HYSTORY

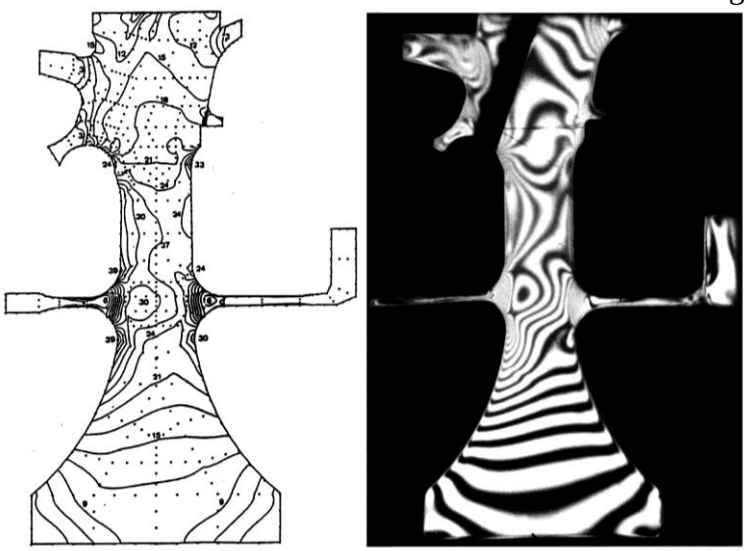
1960 - 1963 at FAMOS (Motor Engine Factory YU) Design, Failure mode analysis of components
1963 - 1966 at Institute for Engines and Motor Vehicles (ITV) in Belgrade (YU) as senior scientist
1966 - 1971 at the University of Belgrade (YU) as senior assistant
1971 - 1973 at the Technical University of Berlin Postgraduate study as Docent–Stipendiant of Alexander of Humboldt Foundation, Germany
Dissertation: Verhalten von Schraubenverbindungen bei zusammengesetzter Betriebs-Beanspruchung (Behaviour of Bolt connections under the complex loading)
Development of non-linear models for the calculation of multiple bolt connections



1973 - 1981 at Motoren-Turbinen-Union, München as Head for Lifetime and Fracture Mechanics Analyses (Leiter der Stelle "Schwingfestigkeit und Bruchmechanik, EGS 5)

Flight Engines Structure Development **(for Tornado, Larsac 04, J-10-D),**
RB-199 Engine for Tornado Airplane

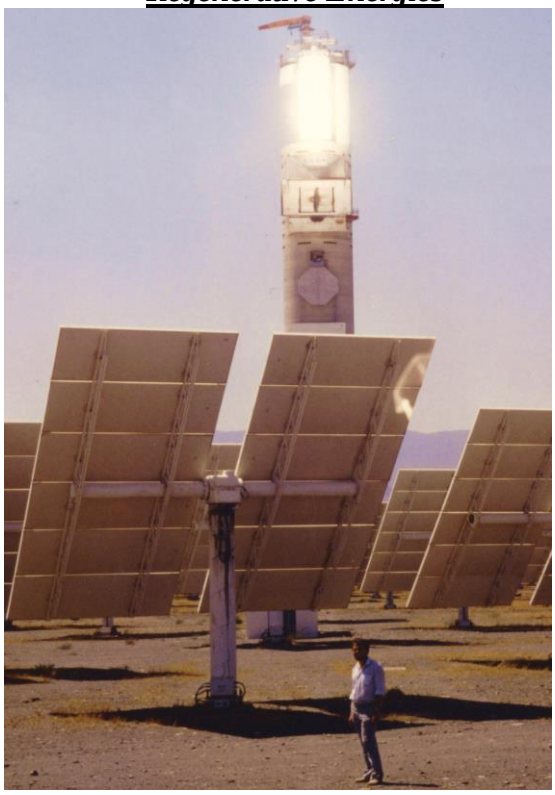
- Mean pressure turbine, service life of components (LCF)
- Service strength behaviour of turbine disks for development engines
- Design of critical bolt connection at rotating components
- Engine Flight Monitoring



Mean pressure turbine disc

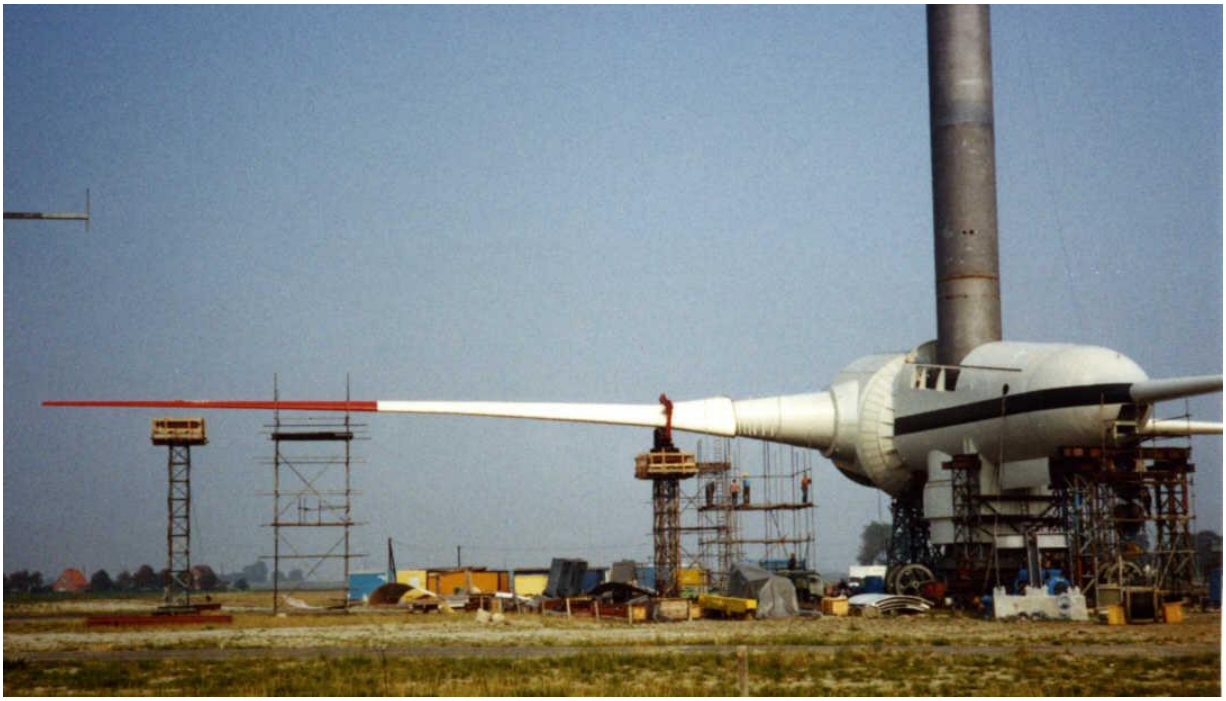
1981 - 1996 at MAN-Technologie AG, Munich as Head of the department: Integrity of structures and thermal-mechanical Analysis

Regenerative Energies

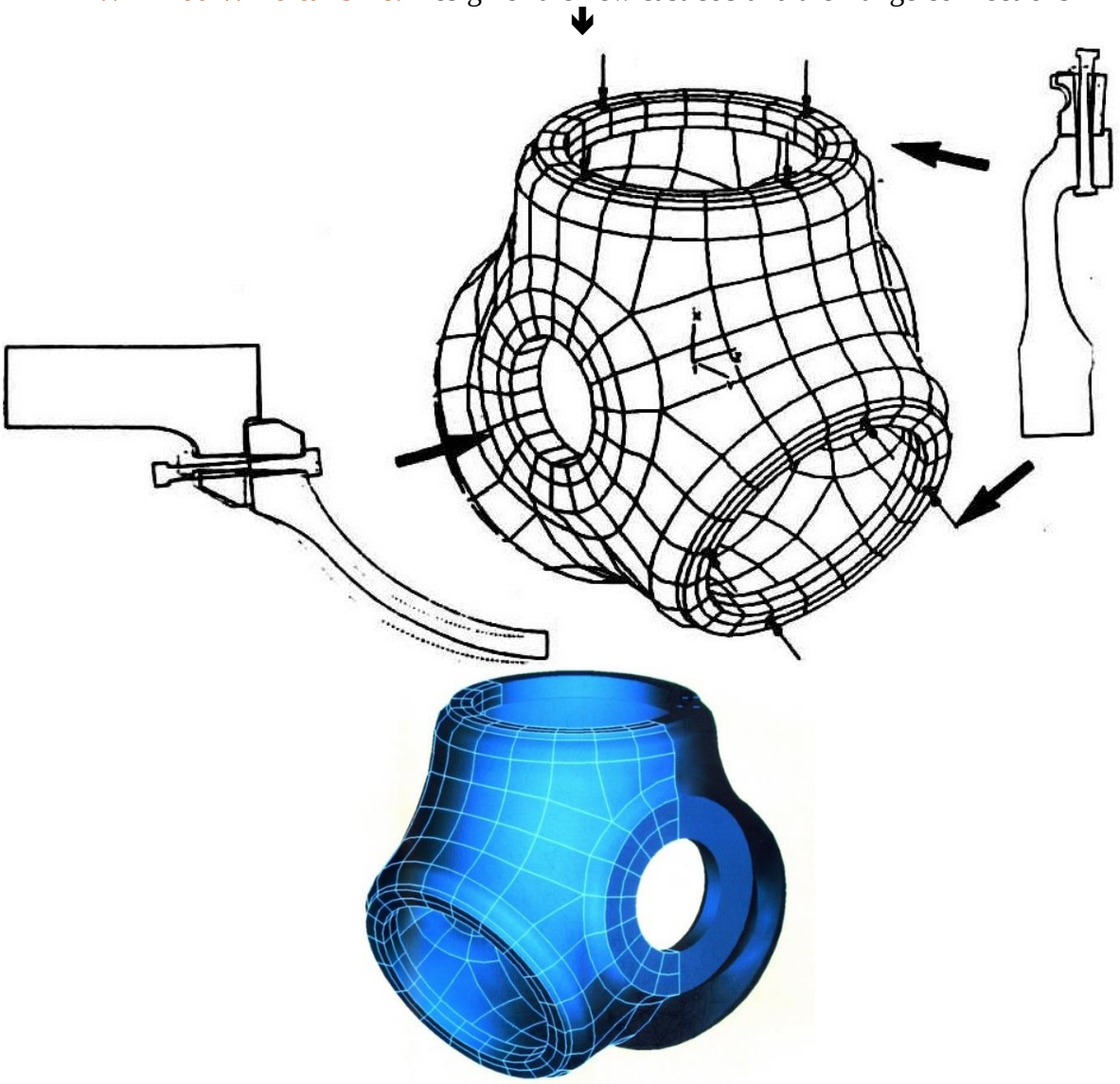


Solar Power Station:
GAST (Gas cooled Solar Tower): Design and testing (in Almeria, Spain) of metallic (for 800° C) and ceramic (900° C) heat exchangers

Wind turbines: **GROWIAN**: proof of the service life for Metallic parts of the blade

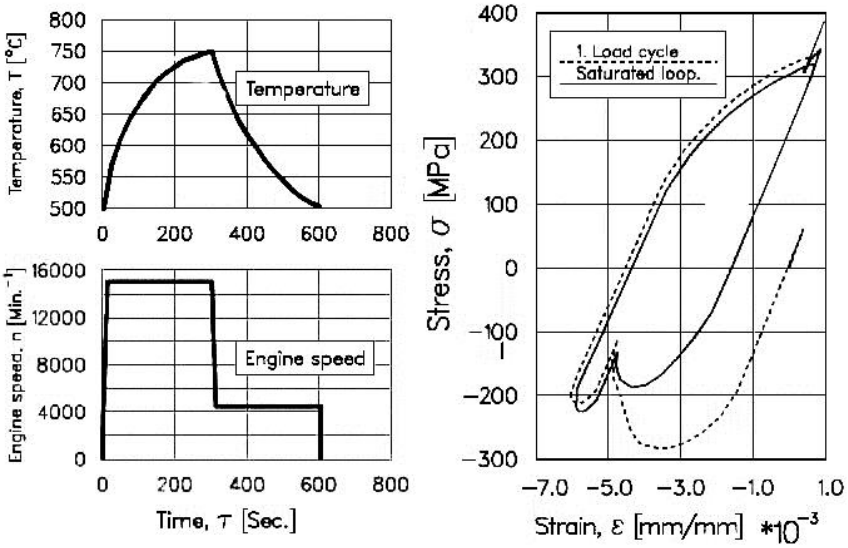


WKA-60 Wind turbine: Design of the new cast cob and the flange connections



BRITE P.1209 (as leader of the international project):

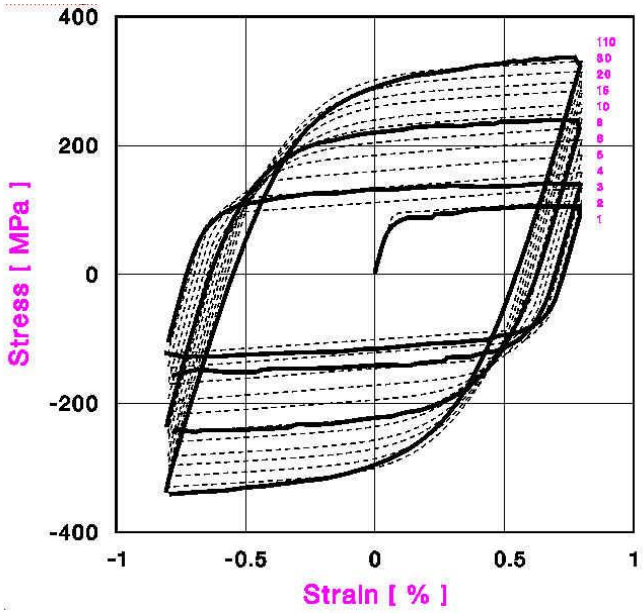
Creep-fatigue-Oxidation evaluation using time-temperature-substitution approach



Advanced design with high temperature materials (Considering the interaction of creep, fatigue and oxidation effects), life time management based on

time – temperature – substitution

Improvement of the SRP-Method

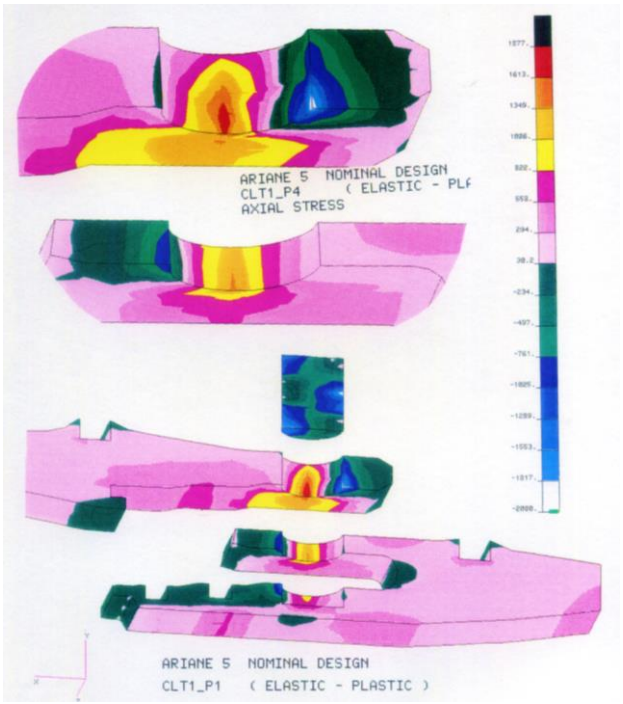


Development and application of visco-plastic material lows to the creep fatigue life prediction

Space structures:

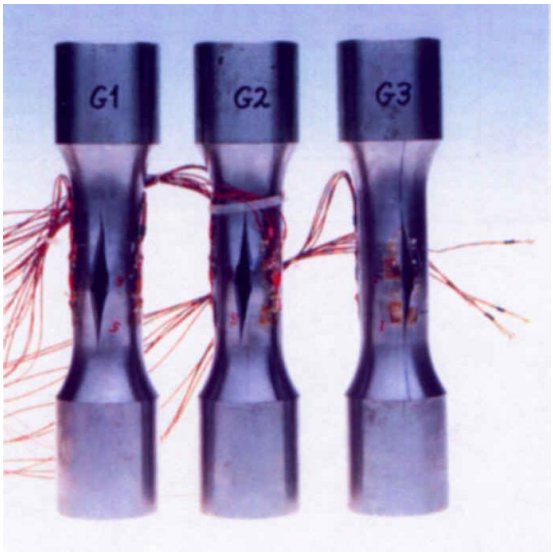
ARIANE 5 Booster case

Optimization of the booster case structure of the ARIANE 5 rocket engine and the justification of design criteria based on fracture mechanics



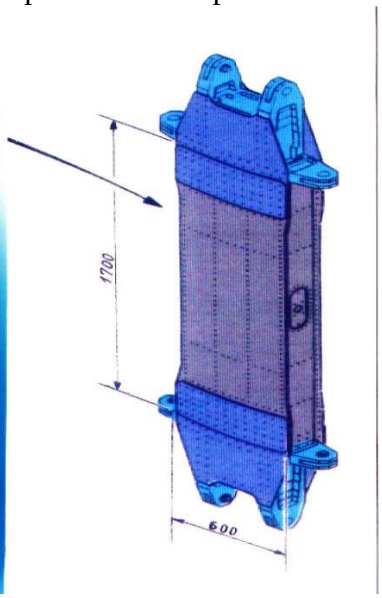
Field and factory Clevis-Tang-Connection for joining of the case segments

Investigation of the **The failure behaviour** of high strength steels for light weight structures (Booster case) under multi axial loading

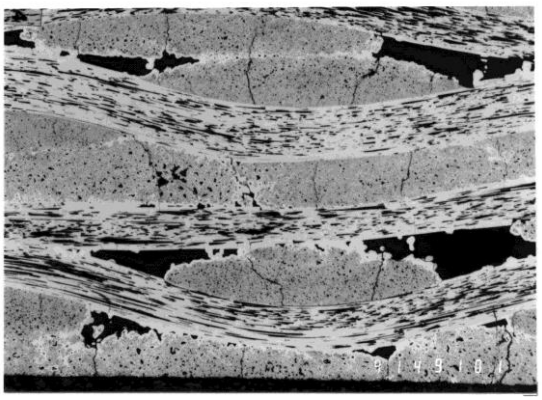


Thermal protection for HERMES space plane

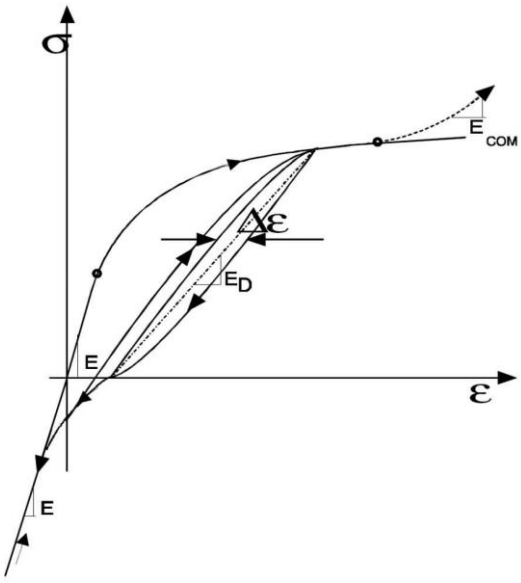
Experimental and numerical simulation to the optimization of parts of the thermal protection



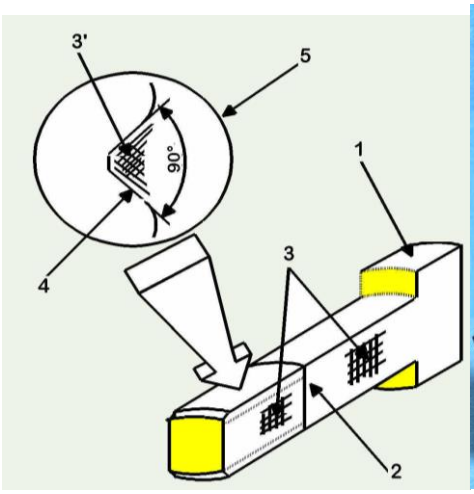
Development of new materials



Investigations of the failure behaviour of fibre strengthened ceramic materials (CMC: Ceramic Matrix Composite)

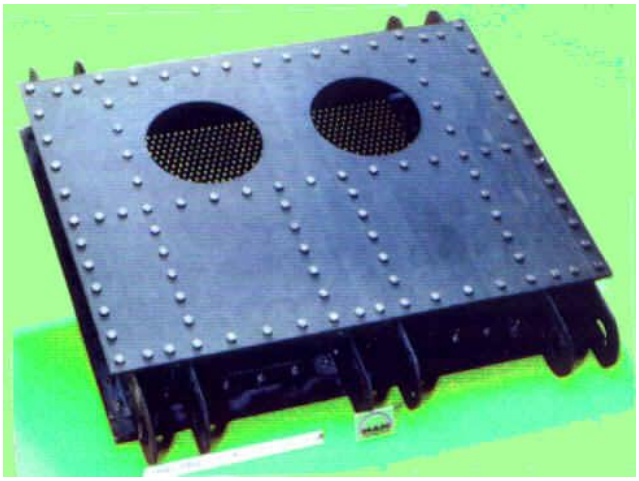


Metallic and **ceramic Bolt Connections (patented)** for the applications up to 1450 °C



Structural materials, manufacture and design of metallic (refractory) and ceramic high temperature bolt elements for the application in the space structures, particularly for the light weight CMC structures

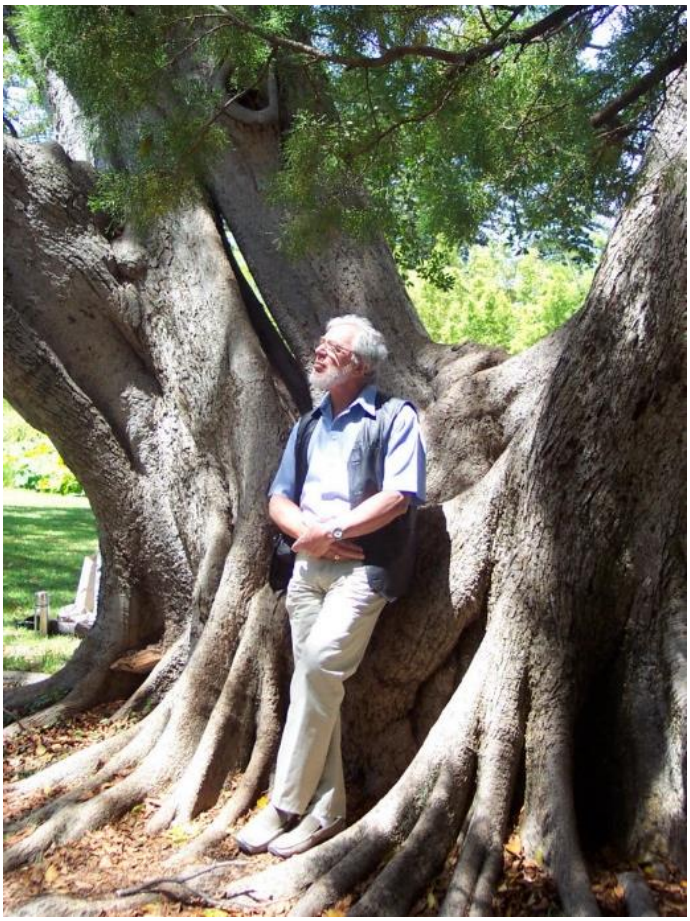
Material adequate Design of components and structures of CMC materials



Sänger space plane: Intake ramp

Structure Integrity of Launchers (Leader of the ESA Project: Elastic Plastic Damage Tolerance Design.***)***

Now retired !



EXPERT KNOWLEDGE

- Medium technical and project management, particularly in the area of the development.
- Planning and quality control of the product design. Numerical analysis, test design and results evaluation for the prediction of strength (structure integrity) and function.
- Fracture mechanic design, Non-linear fracture mechanics and Light weight structures, Fracture mechanics lifetime analysis
- Strength and lifetime analyses under fatigue, creep and creep-fatigue conditions, metallic and non-metallic materials for high temperature applications, thermal-mechanical analysis, ceramic materials, light weight structures and thermal protection, CMC - application.
- Non - linear Finite elements analysis and the quality control of the FE - analysis
- Introduction of new methods and products, appraisal of the technology-transfer potential: materials, lightweight structures, selection of the new materials and material substitution

ADDITIONAL KNOWLEDGE

Application MARC-software for non-linear Finite elements analysis (leading expert), application WORD, EXCEL, MATHCAD, own software, Internet - applications

INVENTIVE ACHIEVEMENTS

First analytical solution for eccentrically loaded multiple bolt connection (Beam-plate models of bolt connection) (Dissertation TU Berlin and supplementary developments)

- More accurate than linear models (for example VDI)
- Direct consideration of the geometry and preload force effect

Creep-Fatigue-Oxidation Interaction Model (BRITE 1209 Programme)

- Improvement of the SRP (Strain-Range–Partitioning) model by including interaction effects of partitioning
- Has been generalized to the Time-Temperature Substitution Model
- Allows accurate accelerated testing under dwell time conditions

A residual load prediction model for components with surface crack based on stress-strain approximation (ESA Project: Structure integrity of Launchers)

- More accurate than current R6-models
- May easily be extended to crack propagation under non-linear situation and creep-plasticity conditions

Clevis-Tang Connection for European ARIANE 5 Booster

- Safe against rotation
- Improved sealing conditions

Bolt-Nut Connection from Ceramic-Matrix-Composite (CMC) Material (patented, HERMES, SÄNGER Projects)

- Utilization of material properties equals metallic design strength (in spite of stress concentration)

LECTURES IN THE FIELDS OF

- Basic mechanic, particularly Strength mechanics
- Fracture mechanics analysis
- Finite element method, basics and application
- Materials, application under the consideration of the stress conditions and environment, HCF/LCF interaction, service loads and load interaction

INTERNATIONAL EXPERIENCE

(1) International projects leadership (FRG, ESA, Great Britain, Netherlands)
(2) International contacts with cooperation partners (ESA, Great Britain, France, Netherlands, Portugal, USA)
(3) Lectures during the conferences and to the seminars (see list of publications) in many countries in the World between China, Japan, USA, etc.

MEMBERSHIP WITHIN WORKING GROUPS

(1) AGB2 „Bruchmechanische Schweißnahtbewertung“ Deutscher Verband für Schweißtechnik e.V.
(2) Arbeitskreis „Thermische Werkstoffermüdung, Forschungsvereinigung Verbrennungskraftmaschinen e.V.
(3) Gesamtarbeitskreis „Bauteilfestigkeit“ Forschungskuratorium Maschinenbau e.V.
(4) Technical Advisory Board, MARC Nonlinear Finite Element Analysis System

MARC TECHNICAL ADVISORY BOARD: L. TO R., SVENN BORGERSEN, DOUGLAS SWANSON, RON SAKAGUCHI, ANDY JAY, LOU CRAIN (MARC PRESIDENT), EDWARD WILSON, PETAR AGATONOVIC, NORMAN WALKER, KEITH MAINQUIST, AND RENATO PERUCCHIO

LIST OF UNRESTRICTED PUBLICATIONS:

(1) **Agatonovic, P.:** Structural Integrity Analysis of Multi-bolted Connections using the Innovative Beam Model, Structural Integrity and Life, Vol. 11, No3 (2011), pp. 147-156.

(2) **Agatonovic, P.:** Experimental and numerical aspects of structural security, NATO Advanced Research Workshop "Security and Reliability of Damaged Structures and Defective Materials"., held in Portoroz, from 19th to 22nd October 2008.

(3) **Agatonovic, P.** : The fracture mechanics in the plastic range. 10th International Fracture Mechanics Summer School: „Fundamentals of Fracture Mechanics and Procedures for Structural Integrity Assessment" Zlatibor (RS) 23/27 Jun 2008

(4) **Agatonovic, P**. Simplifications for conservative structural integrity assessment. 10th International Fracture Mechanics Summer School „Fundamentals of Fracture Mechanics and Procedures for Structural Integrity Assessment" Zlatibor (RS) 23/27 Jun 2008

(5) **P. Agatonovic.:** Fracture Case Studies – Basic Principles, in. From Fracture mechanics to Structure Integrity Assessment, 8th International Fracture Mechanics School in Belgrade (RS) 23-27 June 2003. Ed. S. Sedmak and Z. Radakovic pp. 159 – 192.

(6) Agatonovic, P.: Development of Ceramic Matrix Composites (CMC), Presented at Workshop: New Trends in Fracture Mechanics Application, Section A in Belgrade (RS) 23-27 June 2003.

(7) **Agatonovic, P**.: Die Restfestigkeit bestimmen, Spannungs-Dehnungs-Annäherung – ein neues Verfahren, Materialprüfung 41(1999), pp. 24-30.

(8) **Agatonovic, P.** : K_I mittels Spannungs-Dehnungs-Annäherung abschätzen: Verifikation des Verfahrens, Materialprüfung 41(1999), pp. 77-84.

(9) **Agatonovic, P**.: Development of residual strength evaluation tool based on stress-strain Approximation, International Journal of Fracture 98, pp. 129-152, Kluwer Academic Publishers, the Netherlands.

(10) **Agatonovic, P**.: Werkstoffgerechter Entwurf von Strukturen und Bauteilen aus faserverstärkten Keramiken, Konstruktion 49, H. 7-8 (1997) 17-29, Springer VDI Verlag,

(11) **Agatonovic, P**. and T.K.Henriksen: Development of Residual Strength Prediction Tools for the Structure Integrity of Launchers Based on Elasto-Plastic Fracture Mechanics, Conf. on Spacecraft Structures, Materials and Mechanical Testing, 27-29 March 1996, Noordwijk, The Netherland, ESA/ESTEC.

(12) **Agatonovic, P** and M. Windisch: RESIDUAL USER'S MANUAL (Program for the Residual Strength Prediction of Structures Containing Defects Considering Non-Linear Material Behaviour), Developed under ESA / ESTEC Contract No. 9934/92/NL/PP(SC), MAN Technologie AG.

(13) **Agatonovic, P**.: Neue Entwicklungen in Werkstofftechnologie und -anwendung für den Hochtemperatureinsatz, VDI-AK Werkstofftechnik, TU München. März 1996.

(14) **Agatonovic, P**. at all: Structural Integrity of Launchers, Part A: Elastic Plastic Damage Tolerance Design, ESA Contract 9934/92, Final Report, Munich, March 1995. MAN Technologie AG.

(15) **Agatonovic, P**. and D. Sygulla: Experience in Experimental and Numerical Simulation for the Optimisation of TPS Element Design, 2nd European Workshop on Thermal Protection Systems, Stuttgart, Germany 1995.

(16) **Agatonovic, P**. and G. Fauvel: Thermal Protection Analysis and Modelling for the Case of Lightweight Porous Insulation of Re-Entry Spacecraft, 2nd European Workshop on Thermal Protection Systems, Stuttgart, Germany 1995.

(17) Woydt, M., Dogigli.M, and **Agatonovic, P**.: Concept and Technology Development of Hinge Joints Operated at 1600°C, 3rd European Workshop on High Temperature Materials, Stuttgart, Germany 1995.

(18) **Agatonovic, P**. and D. Sygulla: Analysis Needs for Advanced Space Structure Technology – A Challenge for MARC, MARC European Users Conference 1995, Düsseldorf, Sept. 1995.

(19) **Agatonovic, P**.: New Developments in Engineering of Materials at High Temperatures, NATO ASI, Mechanical Behaviour of Materials at High Temperature' Sesimbra Portugal 1995.

(20) **Agatonovic, P**.: CMC Component Joining, NATO ASI, Mechanical Behaviour of Materials at High Temperature Sesimbra Portugal 1995.

(21) **Agatonovic, P**., M- Windisch and R. Grunmach: ESA Contract 9934/92, Final Report, Structure Integrity of Launchers, Part A: Elastic Plastic Damage Tolerance Design.

(22) Mühlratzer, A., **Agatonovic, P**. Köberle, H and Wildenrotter K: Design of gradient-CVI derived CMC Components, Advanced Structural Fibre Composites, Edd. P. Vicency, Techna Sri 1995.

(23) **Agatonovic, P**: Wie verkraften zähe Werkstoffe den Riss?, VDI-AK Werkstofftechnik, Vortrag 16.2.1995.

(24) **Agatonovic, P**.: Advances in Joint Technique for Lightweight CMC Structures, Proceed. Of nt. Symp. on Advanced Materials for Lightweight Structures, ESTEC, Noordwijk, March 1994 ESAWPP- 070), pp. 85-90.

(25) **Agatonovic, P**.: Qualitätssicherung der FE-Analyse und die Verantwortung des Anwenders, MARC Anwendertreffen, 14/15.9.94

(26) Windisch, M. and **P. Agatonovic**: MARC Anwendung zur Untersuchung des Versagens angerissener Bauteile, MARC Anwendertreffen, 14/15.9.94

(27) **Agatonovic, P**.: Lifetime temperature dependence of components, Presented, European Conference ' Life Assessment of Industrial Components and Structures', Cambridge, 30 Sept/1 Octob. 199 3.

(28) **Agatonovic, P**. : Das Diffusionsprinzip in der FE-Analyse und seine Anwendung am Beispiel der Strömung durch porösen Medien, MARC Anwendertreffen, 10/11.9.93

(29) **Agatonovic, P**, R. Hartmond and D Holzportz: Structure Integrity Evaluation of the MPS-CPN Intersegment Connection, in ' European Symposium: ARIANE 5 Structures and Technologies', CNES 10-14 May1993, Arcachon, France.

(30) Sygulla, D, A. Mühlratzer and **P. Agatonovic**: Integrated Approach in Modelling, Testing and Design of Gradient-CVI Derived CMC Components, Prep. for publ. for AGARD 76th Structures and Material Panel Meeting. Workshop 2: Introduction of Ceramics into Aerospace Structural Composites, Antalya Turkey 18-23 April 1993.

(31) **Agatonovic, P**. : High temperature Lifetime Management using Time-Temperature-Substitution, in 'Creep and Fracture of Engineering Material and Structures' 5th Int. Conf. Swansea, U.K. April 93 Ed. by B. Wilshire and R.W.Evans, The Institute of Materials, London, pp. 613 - 622.

(32) **Agatonovic, P**.: Time-temperature Substitution Approach in Component Lifetime Assessment and Testing, BRITE-EURAM Workshop on Monitoring, 8/9 December 1992, Louvain-la-Neuve, Belgien.

(33) Hartmond, R., **P. Agatonovic** und C. Schäfer: Strukturstabilität zylindrischer Körper unter Druck - zwischen Theorie und Realität, MARC Benutzertreffen 1992, 4/5 Novemb. 1992 Munich.

(34) **Agatonovic, P**.: Application of viscoplastic modelling to creep-fatigue life prediction, Proceedings 3rd Int. Conf. on Low Cycle Fatigue and Elastic-plastic Behaviour of Materials, Berlin (Germany) 7-11 Sept. 1992 Ed. by K.-T. Rie, Elsevier Applied Science.

(35) **Agatonovic, P**. and U. Clormann: Analytical Prediction and Test verification of the Multiaxial Behaviour of High-Strength Steel for Lightweight Structures, Proc. Intern. Symp. 'Advanced Materials for Lightweight Structures', ESTEC Noordwijk, The Netherlands, March 1992 (ESA SP- 336, October 1992), pp. 87-92.

(36) **Agatonovic, P**. and M. Dogigli: Structural Material, Manufacture and Design Requirements for High-Temperature Fasteners for Space Plane Technologies, Proc. Intern. Symp. 'Advanced Materials for Lightweight Structures', ESTEC Noordwijk, The Netherlands, March 1992 (ESA SP-336, October 1992). pp. 325-332.

(37) **Agatonovic, P**., J.M. Church and R. Hurst: Constitutive Laws for Describing the Service relevant Creep Behaviour of Metallic Materials, Proc. Intern. Symp. 'Advanced Materials for

Lightweight Structures', ESTEC Noordwijk, The Netherlands, March 1992 (ESA SP-336, October 1992), pp. 355-360.
(38) **Agatonovic, P**. : MARC und die Anwender - ein System, das sich laufend ergänzen soll, MARC Benutzertreffen 1991, 18/19 Sept. 91 München.
(39) **Agatonovic, P**. : Anwendung von viscoplastischen Materialmodellen bei der Berechnung von Hochtemperaturbauteilen, MARC Benutzertreffen 1991, 18/19 Sept. 91 München.
(40) **Agatonovic, P** and N. Taylor: Optimisation of a Life Prediction Method for Environmental Assisted Damage of Components Operating at High Temperature, 6th Int. Conf. on Mechanical Behaviour of Materials (ICM6) in Kyoto/Japan 29th Juli-2nd August 1991.
(41) Sygulla, D. and **P. Agatonovic**: Analysis and Testing of Ceramic Matrix Composites in Diesel Engine, Presented 4th International Symposium in Ceramic Materials and Components for Engines, June 10.12, Göteborg, Sweden, Ed. R. Carlsson, Elsevier Science Publisher Ltd. (UK)
(42) Agatonovic, P. at all: Life time prediction and Extrapolation Methodologies for Computer-Aided Assessment of Component Service Behaviour Under Stress at High Temperature, Final Technical Report July 1991, BRITE Proposal P-1209, Contract RI 1B – 0112 –D(B), Proj. Coordinator MAN Technologie AG. Partner: BABCOCK Energy technology Centre, Renfrew, UK and Institute of Advanced Materials, JRC Petten (Netherlands), CEC.
(43) **Agatonovic, P**. and M. Windisch: Role of Combined Numerical and Experimental Investigation in the Justification of the Structure Integrity and Damage Tolerance of Space Structure, ESA Int. Symp. on spacecraft Structures and Mechanical Testing, Noordwijk (NL), 24-26th April 1991.
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