Fourth European Conference on Residual Stresses

Quatrième Conférence Européenne sur les Contraintes Résiduelles

Volume 2
EXPERIMENTAL DETERMINATION OF RESIDUAL STRESSES AND THE RESULTING STRESS INTENSITY FACTORS IN RECTANGULAR PLATES
Schindler H.J. and Landolt R. .................................................................509

RESIDUAL STRESSES AND REACTIVITY OF SOLIDS. DETERMINATION AND ROLE PLAYED ON THE SURFACE REACTION [HYDRIDATION AND OXIDATION].
Bernard F., Hyvernage O., Sciora E. and Gérard N. ..................................519

INFLUENCE OF RESIDUAL STRESSES ON THE FATIGUE BEHAVIOUR OF WELDED JOINTS
Nitschke-Pagel Th., Wohlfahrt H. and Macherauch E. ..................................529

INFLUENCE OF RESIDUAL AND APPLIED STRESSES ON NICKEL OXIDATION AT 550°C.
INFLUENCE OF A PREOXIDATION TREATMENT
Moulin G. and Maurel F. ........................................................................537

DEVELOPMENT OF A FATIGUE LIFE PREDICTION MODEL INCORPORATING RESIDUAL STRESSES. APPLICATION TO THE ROLLER BURNISHING TREATMENT
Berard J.Y., Flavenot J.F. and Lasserre S. ..................................................547

PREDICTION OF A FATIGUE BEHAVIOUR OF MATERIALS UNDER RESIDUAL STRESSES INFLUENCE
Cacko J. .................................................................................................557

RESIDUAL STRESSES IN NOTCHES RESULTING FROM IMPACTS
Gros V., Taweel B.Al., Ceretti M., Prioul C. and Lodini A. ............................567

RELAXATION OF INTERNAL STRESSES IN CHEMICALLY VAPOUR DEPOSITED TiN/TiB2 DOUBLE LAYERS
Te Nijenhuis J., Delhez R., Becht J.G.M., De Keijser Th.H. and Mittemeijer E.J. ..........................................................577

RESIDUAL STRESSES IN OVERLAPPING LASER MELT HARDENING OF GRAY AND NODULAR IRON
Grum J., Sturm R. and Zerovnik P. ...........................................................585

CRACK TIP RESIDUAL STRESSES IN LOW ALLOY HIGH-STRENGTH STRUCTURAL STEEL AFTER CRACK PROPAGATION WITH DIFFERENT LOADING MODES
Jägg S. and Scholtes B. ........................................................................595

APPLICATIONS

Residual Stresses Effects ..................................................................605

AN EXPERIMENTAL APPROACH OF STRESS CORROSION CRACKING MECHANISM. THE CASE OF VESSEL HEAD PENETRATIONS IN FRENCH PRESSURIZED WATER REACTORS
Ternon F. and Faidy C. .................................................................607

NEUTRON DIFFRACTION DETERMINATION OF THE COMPLETE 3D RESIDUAL STRESS DISTRIBUTION SURROUNDING A COLD EXPANDED HOLE
Edwards L. and Wang D.Q. .................................................................619
COMBINATION OF X-RAY AND NEUTRON DIFFRACTION, HOLE DRILLING AND FE - CALCULATIONS FOR THE DETERMINATION OF THE RESIDUAL STRESS STATE IN BRAZED JOINTS OF STEEL AND CEMENTED CARBIDE
Bing K., Pintschovius L, Eigenmann B. and Macherauch E. ................................. 627

STRAINS AND STRESSES IN MICROELECTRONIC PACKAGING
Schubert A., Dudek R., Vogel D. and Michel B. .................................................. 637

OPTIMIZATION OF THE RESIDUAL STRESSES AND DISTORTIONS OF WELDED BEAM STRUCTURES
Zhang F, Nitschke-Pagel Th. and Wohlfahrt H. .................................................. 647

INFLUENCE OF CARRIER, PROCESSING CONDITION AND MICROSTRUCTURE ON RESIDUAL STRESSES IN BORIDE LAYERS
Kroukovitch M. ................................................................................................. 657

DETERMINATION OF RESIDUAL STRESS DISTRIBUTION IN AIN/Cu JOINED LAYERS
Takahashi Y, Munekawa S. and Tanaka S.i .................................................... 663

RESIDUAL STRESS MEASUREMENT IN STEEL MILL ROLLS USING MAGNETIC BARKHAUSEN NOISE ANALYSIS
Pacyna J., Kokosza A. and Wojtas A.S ................................................................. 669

X-RAY AND SEM INVESTIGATIONS OF PRECIPITATES IN NITRIDED LAYERS. APPLICATION TO CHROMIUM-ALLOY-STEELS
Locquet J.N. and Barrallier L ........................................................................ 679

TURNING RESIDUAL STRESSES IN AN AUSTENITIC STAINLESS STEEL USING TiN-COATED AND UNCOATED CEMENTED CARBIDE TOOLS
M'Saoubi R., Outeiro J., Le Calvez C., Lebrun J.L. and Dias A. ......................... 689

MEASUREMENT OF RESIDUAL STRESSES IN STRUCTURAL STEEL WELD METAL
Riggantti R., Vega C. and Garin J.L .................................................................... 699

WORKPIECE THICKNESS EFFECTS ON THE RESIDUAL STRESSES IN SILICON NITRIDE-MOLYBDENUM BRAZED JOINTS
Slifirski J., Yvon P.J., Ceccone G. and Peteves S.D .............................................. 709

X-RAY ANALYSIS OF RESIDUAL STRESSES IN AIN-Cu-JOINTS
Auerswald E. and Kämpfe B. .............................................................................. 719

Residual stresses and processing ..................................................................... 725

SURFACE MODIFICATIONS INDUCED BY SMALL LASER IMPACTS

INFLUENCE OF TEMPERATURES ON RESIDUAL STRESSES IN GRINDING CERAMICS
Tönshoff H.K. and Lierse T. ............................................................................ 735

RESIDUAL STRESSES AND SURFACE PROPERTIES DUE TO HIGH-PRESSURE WATER PEENING
Tönshoff H.K. and Marzenell C. ..................................................................... 745
RESIDUAL STRESSES IN MULTI-PASS COLD DRAWING OF HIGH CARBON STEEL WIRE
Bonner N.W., Holden T.M., Mills G., Modlen G.F. and Webster P.J. ............................755

X-RAY DIFFRACTION STUDY OF THE MECHANICAL AND MICROSTRUCTURAL STATE OF
METALLIC THIN FILMS
Branger V., Goudeau Ph., Badawi K.F., Bimbault L. and Durand N. ............................765

GENERATION AND STABILITY OF SHOT PEENING RESIDUAL STRESSES IN DIFFERENT
ALUMINIUM BASE ALLOYS
Zinn W. and Scholtes B. ..........................................................775

ANALYSIS OF X-RAY INTERFERENCE LINE PROFILE OF HARDENED AND QUENCHED
AND TEMPERED STEELS
Hoffmann B., Vöhringer O., and Macherauch E. ....................................................785

THERMAL AND COLLISIONAL EFFECTS ON THE INTRINSIC STRESS IN NITRIDE LAYERS
DEPOSITED BY ION-BEAM BASED TECHNIQUES
Djouadi M.A., Quesada J., Bouchier D., Pitter J. and Cerny F. ...............................795

RESIDUAL STRESSES IN METALLIC SANDWICH SHEET
Shamshirsaz M., Quaegebeur J., Hariri S., Degallaix S. and Robin C. .........................805

CONTROL OF THE DEFORMATIONS AFTER MACHINING OF LARGE ALUMINIUM ALLOY
PARTS.
Masse C., Bourniquel B. and Feron J-L ..................................................815

AGE CREEP FORMING PROCESS MODELLING AND EXPERIMENTATION IN ALUMINIUM
ALLOYS - VALIDATION ON ARIANE 5 MAIN TANK BULKHEADS SEGMENTS
Bonnafe J.P., Destandau C. and Fougeras J. ................................................823

CHARACTERIZATION OF SPRAYED AL2O3 COATINGS BY MEANS OF NONDESTRUCTIVE
AND PARTIALLY DESTRUCTIVE MEASURING METHODS
Tietz H.D., Mack B., Böhm St., Gieland U., Kockelmann H., Schwarz Th. and Didra H.P.829

RESIDUAL STRESSES IN WATER-ASSISTED LASER TRANSFORMATION HARDENING OF
55C1 STEEL
Cassino F.S.L., Moulin G. and Ji V. ..................................................839

HETEROGENEOUS MATERIALS AND INTERNAL STRESSES

I AND II ORDER STRESSES IN A DUPLEX STAINLESS STEEL DURING ELASTIC AND
PLASTIC LOADING, X-RAY DIFFRACTION EXPERIMENTAL STUDY AND SELF CONSISTENT
MODELLING
Inal K., François M., Gergaud P. and Lebrun J.L ..............................................853

DETERMINATION OF STRAIN FIELDS IN SINGLE CRYSTALS OF Ni-BASED ALLOYS WITH
COHERENT PRECIPITATES
Härting M., Britton D.T., Härting A., Schneider J.M. and Kostorz G. .........................863

RESIDUAL MICROSTRESSES AND DISLOCATION INTERACTIONS IN PPMCs
Pyzalla-Schieck A., Duz V.A., Gavriljuk V.G., Petrov Yu and Ussov Yu .....................873
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETERMINATION OF RESIDUAL STRESSES IN PERLITIC STEEL WITH DIFFERENT CEMENTITE SHAPE USING MECHANICAL AND X-RAY METHODS</td>
<td>883</td>
</tr>
<tr>
<td>Kornmeier M. and Scholtes B.</td>
<td></td>
</tr>
<tr>
<td>STRESSES IN THE MATRIX OF REINFORCED POLYETHERKETONE (PEK)</td>
<td>891</td>
</tr>
<tr>
<td>Chauhan D. and Hauk V.</td>
<td></td>
</tr>
<tr>
<td>EXPERIMENTAL STUDY AND MODELLING OF THE STRAINS IN THE NEIGHBOURHOOD OF THE BOUNDARY OF A NICKEL BICRYSTAL BY X RAY DIFFRACTION AND INTERFERENTIAL MICROSCOPY</td>
<td>901</td>
</tr>
<tr>
<td>Derraz Y., Durand L., Lavelle B. and Roques Y.</td>
<td></td>
</tr>
<tr>
<td>MACRO- AND MICROSTRESSES IN THE CEMENTITE AND FERRITE PHASES OF COLD DRAWN STEEL WIRES MEASURED WITH XRD AND NEUTRON DIFFRACTION</td>
<td>911</td>
</tr>
<tr>
<td>Van Acker K. and Van Houtte P.</td>
<td></td>
</tr>
<tr>
<td>INTERNAL MISMATCH STRESSES ASSOCIATED WITH CrN PRECIPITATION IN NITRIDING LAYERS OF Fe-Cr ALLOYS</td>
<td>921</td>
</tr>
<tr>
<td>Vogel N., Hazotte A., Dulcy J., Michel H. and Denis S.</td>
<td></td>
</tr>
<tr>
<td>PHASE SPECIFIC STRAIN AND STRESS DISTRIBUTION IN A MONOCRYSTALLINE NICKEL-BASED SUPERALLOY AFTER HIGH TEMPERATURE DEFORMATION</td>
<td>931</td>
</tr>
<tr>
<td>Müller A., Gnäupel-Herold T. and Reimers W.</td>
<td></td>
</tr>
<tr>
<td>ROLE OF INTERNAL STRESSES ON THE DIFFRACTION PEAK'S BROADENING</td>
<td>941</td>
</tr>
<tr>
<td>Mabelly P., Hadmar P., Desvignes M. and Sprauel J.M.</td>
<td></td>
</tr>
<tr>
<td>X-RAY AND NEUTRON DIFFRACTION MEASUREMENT OF MICRO AND MACROSTRESSES IN METAL MATRIX COMPOSITES</td>
<td>951</td>
</tr>
<tr>
<td>Watts M.R., Withers P.J., Korsunsky A.M. and Fitzpatrick M.E.</td>
<td></td>
</tr>
<tr>
<td>EFFECT OF PLASTIC FLOW ON THE THERMAL MISMATCH STRESS IN AN Al/SiCp METAL MATRIX COMPOSITE</td>
<td>961</td>
</tr>
<tr>
<td>Fitzpatrick M.E., Withers P.J., Baczmanski A., Hutchings M.T., Levy R., Ceretti M. and Lodini A.</td>
<td></td>
</tr>
<tr>
<td>EVALUATION OF INTERGRANULAR STRESSES IN HCP MATERIALS</td>
<td>971</td>
</tr>
<tr>
<td>Pochettino A.A. and Ortiz M.</td>
<td></td>
</tr>
<tr>
<td>INFLUENCE OF NICKEL-BASE SUPERALLOY SINGLE CRYSTAL MACROSTRUCTURE ON THE RESULTS OF X-RAY MEASUREMENTS</td>
<td>977</td>
</tr>
<tr>
<td>Brückner U., Epishin A., Nolze G. and Schuler W.</td>
<td></td>
</tr>
<tr>
<td>HOMOGENEOUS MICROSTRESSES CAUSED BY HEAT AND DEFORMATION, SOME EXAMPLES</td>
<td>981</td>
</tr>
<tr>
<td>Behnken H. and Hauk V.</td>
<td></td>
</tr>
<tr>
<td>RESIDUAL STRESSES IN THREE-PHASE SINTERED MATERIALS AFTER MECHANICAL SURFACE TREATMENT</td>
<td>989</td>
</tr>
<tr>
<td>Hauk V. and Krüger B.</td>
<td></td>
</tr>
<tr>
<td>TRIAXIAL ELASTOPLASTIC STRESSES IN THE FERRITE PHASE OF PEARLITIC STEEL AND THEIR INFLUENCE ON THE RESULTS OBTAINED FROM X-RAY STRESS ANALYSIS</td>
<td>997</td>
</tr>
<tr>
<td>Belassel M., Lebrun J.L. and Ruppersberg H.</td>
<td></td>
</tr>
</tbody>
</table>
X-RAY ELASTIC CONSTANTS, SINGLE CRYSTAL ELASTIC CONSTANTS AND TYPE II RESIDUAL STRESSES OF Y₂O₃-STABILIZED ZrO₂
Amos D., Eigenmann B., Macherauch E. and Löhe D. ................................................................. 1003

COMPARISON BETWEEN EXPERIMENTALLY EVALUATED AND ANALYTICALLY CALCULATED THERMAL RESIDUAL STRESSES IN A CARBON FIBER REINFORCED Si₃N₄ MATRIX COMPOSITE
Sabouret E., Marty B., Moretto P. and Veyret J.B. ................................................................. 1013

EFFECTS OF FORMING AND DEFORMATION UNDER TENSION ON X-RAY RESIDUAL STRESS OF A SUS301 STAINLESS STEEL SHEET
Takimoto A. ................................................................. 1023

NEUTRON RESIDUAL STRESS ANALYSIS IN PMMCs
Pyzalla-Schieck A., Genzel C. and Reimers W. ................................................................. 1033

MACROSCOPIC STRESSES IN MULTIPHASE MATERIALS FROM X-RAY STRESSES IN A GIVEN PHASE
Hadmar P., Mabelly P., Barralier L. and Sprauel J.M. ................................................................. 1043

MEASUREMENT OF RESIDUAL STRESSES IN RAILS
Singh U.P., Thakur R.C., Topno R., Singh R. and Jha S. ................................................................. 1053

SECOND RANGE STRESSES DISTRIBUTION IN A COARSE GRAINED AUSTENO-FERRITIC STEELS SUBMITTED TO A MACROSCOPIC LOADING
Inal K., Gergaud P., and Lebrun J.L. ................................................................. 1061