

Presentation of the handbook of reference

The Handbook of Reference gathers all the notes of principle relating to the functionalities implemented in the code. The justifications of the methods and modelings refer to notes of specific studies or the scientific literature. A short description in the way in which the functionalities can be used is provided. It is a handbook essential to a rational use of the code.

The Independent Validation relates to the functionalities described by the Handbook of Reference, the Instruction manual specifying only the practical methods making it possible to implement them (cf Plan of Validation [A3.01.01]). Moreover, each Department is been liable in the plan for maintenance for the functionalities starting from the reference documents (cf Plan of Diffusion [A4.01.01]). It is to say the importance of the Handbook of Reference to the title of the Quality assurance.

The Handbook of Reference does not define however the field of validity of the assumptions, the methods and the modelings retained compared to their application to calculation of the structures. This field must be acquired in addition by the user, who is only responsible for the relevance of the results that it produces. For any study under Quality assurance, it will be able to give a report on what it knows of the functionalities employed thanks to the Handbook of Reference, the adequacy of these functionalities to the problem which it deals with is of its only responsibility. The reference material thus does not replace the notes of study aiming at giving elements to delimit this field of validity. These notes which can prove extremely useful, are published under the responsibility of the Departments. They will be quoted, as much as possible, by the reference documents.

The Handbook of Reference must make it possible to establish the link between the documentation of use and the source code for which knows the principles of programming described in Handbook D. It does not substitute for the comments which must be present in the source, but it must facilitate the reading of it. A failure with this principle can lead to the rewriting of the programming or reference material. The reference material must, indeed, make it possible the Departments to quickly find substitutes effective when a developer has suddenly changed function.

Handbooks

R0: General

0 document

R1: Applicability

0 document

R2: Organization of Aster

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R3: Finite elements in Aster

R3.01.00-A	Isoparametric elements	[05/05/95]	<input type="checkbox"/>
R3.01.01-D	Functions of form and points of integration of the finite elements	[15/09/05]	<input type="checkbox"/>
R3.03.01-B	Dualisation of the boundary conditions	[09/02/01]	<input type="checkbox"/>
R3.03.02-A	Conditions of solid connection of body	[12/02/01]	<input type="checkbox"/>
R3.03.03-A	Connection 3D - Beam	[19/12/95]	<input type="checkbox"/>
R3.03.04-A	Efforts external of pressure in great displacements	[05/02/96]	<input type="checkbox"/>
R3.03.06-B	Connection hull-beam	[06/12/00]	<input type="checkbox"/>
R3.03.07-A	Following pressure for the voluminal elements of hulls	[19/12/00]	<input type="checkbox"/>
R3.06.02-A	Linear modeling of the elements of continuous medium in thermics	[30/08/95]	<input type="checkbox"/>
R3.06.03-B	Calculation of the constraints to the nodes by local smoothing	[23/01/97]	<input type="checkbox"/>
R3.06.04-A	Elements of Fourier for the axisymmetric structures	[21/12/00]	<input type="checkbox"/>
R3.06.06-B	Functions of form and points of integration of the elements pyramid at square base	[16/02/02]	<input type="checkbox"/>
R3.06.07-A	Diagonalisation of the thermal matrix of mass	[29/08/00]	<input type="checkbox"/>
R3.06.08-D	Finite elements treating the quasi-incompressibility	[14/04/05]	<input type="checkbox"/>
R3.06.09-B	Finite elements of joint in plane 2D	[19/09/03]	<input type="checkbox"/>
R3.06.10-A	Quadrangular element at a point of integration, stabilized by the method "Assumed Strain"	[03/09/04]	<input type="checkbox"/>
R3.07.02-B	Numerical modeling of the mean structures: axisymmetric thermoelastoplastic hulls and 1D	[06/12/00]	<input type="checkbox"/>
R3.07.03-A	Elements of DKT/DST/DKQ/DSQ/Q4g plate	[12/01/01]	<input type="checkbox"/>
R3.07.04-B	Finite elements of voluminal hulls	[14/04/05]	<input type="checkbox"/>
R3.07.05-B	Voluminal elements of hulls into nonlinear geometrical	[05/04/05]	<input type="checkbox"/>
R3.07.06-A	Treatment of offsetting for the elements of plate DKT, DST, DKQ, DSQ and Q4G	[15/07/03]	<input type="checkbox"/>

R3.07.07-A	<i>Code_Aster</i> : Voluminal element of hull SHB8	[04/08/04]	<input type="checkbox"/>
R3.08.01-A	“Exact” elements of beams (right and curved)	[02/12/96]	<input type="checkbox"/>
R3.08.02-A	Modeling of the cables in <i>Code_Aster</i>	[28/05/96]	<input type="checkbox"/>
R3.08.03-C	Calculation of the characteristics of a beam of cross section unspecified	[01/09/05]	<input type="checkbox"/>
R3.08.04-B	An element of beam with 7 ddls for the taking into account of warping	[02/05/05]	<input type="checkbox"/>
R3.08.05-A	A finite element of cable-pulley	[08/03/96]	<input type="checkbox"/>
R3.08.06-B	Finite elements of right pipe and curve with ovalization, swelling and warping in elastoplasticity	[12/12/03]	<input type="checkbox"/>
R3.08.07-A	Elements of grid of reinforcement GRILLE_MEMBRANE	[05/06/06]	<input type="checkbox"/>
R3.08.08-A	Multifibre elements of beams (right)	[18/11/03]	<input type="checkbox"/>
R3.11.01-A	Formulation of a model of thermics for the thin hulls	[03/11/93]	<input type="checkbox"/>

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R4: Methods of analysis

R4.01.01-B	Pre and Postprocessing for “the thin composite” material hulls	[13/09/02]	<input type="checkbox"/>
R4.01.02-A	Anisotropic elasticity	[28/10/03]	<input type="checkbox"/>
R4.02.01-A	Finite elements in accoustics	[31/08/95]	<input type="checkbox"/>
R4.02.02-A	Vibroacoustic elements	[02/11/92]	<input type="checkbox"/>
R4.02.03-A	Beam élasto-accoustics	[04/07/96]	<input type="checkbox"/>
R4.02.04-A	Coupling fluid-structure with free face	[29/09/95]	<input type="checkbox"/>
R4.02.05-A	Elements of absorbing border	[02/04/01]	<input type="checkbox"/>
R4.03.01-A	Sensitivity of the thermomechanical fields to a variation of the field	[19/01/00]	<input type="checkbox"/>
R4.03.02-A	Calculation of sensitivities in thermics	[01/07/03]	<input type="checkbox"/>
R4.03.03-B	Calculation of sensitivity in mechanics	[19/04/05]	<input type="checkbox"/>
R4.03.04-B	Calculation of sensitivity in dynamics	[02/05/05]	<input type="checkbox"/>
R4.03.05-A	Parametric and not-parametric probabilistic models in dynamics	[06/05/03]	<input type="checkbox"/>
R4.03.06-A	Algorithm of retiming	[26/08/03]	<input type="checkbox"/>

R4.03.07-C	Postprocessing of sensitivity	[29/08/06]	<input type="checkbox"/>
R4.04.01-C	Models of metallurgical behavior of steels in <i>Code_Aster</i>	[29/03/01]	<input type="checkbox"/>
R4.04.02-E	Modeling élasto- (visco) plastic take into account of the metallurgical transformations	[29/04/02]	<input type="checkbox"/>
R4.04.03-B	Law of behavior élasto (visco) plastic in great deformations with metallurgical transformations	[20/01/03]	<input type="checkbox"/>
R4.04.04-A	Models of metallurgical behavior of Zircaloy in <i>Code_Aster</i>	[20/08/02]	<input type="checkbox"/>
R4.05.01-A	Seismic response by transitory analysis	[28/09/99]	<input type="checkbox"/>
R4.05.02-B	Stochastic approach for the seismic analysis	[08/02/99]	<input type="checkbox"/>
R4.05.03-B	Seismic response by spectral method	[06/09/02]	<input type="checkbox"/>
R4.06.02-B	Modal calculation by traditional and cyclic dynamic under-structuring	[08/12/98]	<input type="checkbox"/>
R4.06.03-B	Harmonic response by traditional dynamic under-structuring	[08/12/98]	<input type="checkbox"/>
R4.06.04-A	Transitory response by traditional dynamic under-structuring	[17/10/95]	<input type="checkbox"/>
R4.07.02-B	Modeling of the turbulent excitations	[05/04/05]	<input type="checkbox"/>
R4.07.03-A	Calculation of matrix of mass added on modal basis	[02/10/95]	<input type="checkbox"/>
R4.07.04-B	Coupling fluid-structure for the tubular structures and the coaxial hulls	[23/09/02]	<input type="checkbox"/>
R4.07.05-A	Homogenisation of a network of beams bathing in a fluid	[06/01/98]	<input type="checkbox"/>
R4.08.01-A	Calculation of the thermal deformation	[23/12/98]	<input type="checkbox"/>
R4.10.01-A	Estimator of error of ZHU-ZIENKIEWICZ in elasticity 2D	[11/04/94]	<input type="checkbox"/>
R4.10.02-B	Estimator of error in residue	[14/04/05]	<input type="checkbox"/>
R4.10.03-A	Indicator of space error in residue for transitory thermics	[03/06/02]	<input type="checkbox"/>
R4.20.01-A	Indicators of discharge and loss of proportionality of the loading in elastoplasticity	[06/04/98]	<input type="checkbox"/>

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R5: Algorithms

R5.01.01-C	Algorithm of resolution for the generalized problem	[02/03/01]	<input type="checkbox"/>
R5.01.02-A	Calculation algorithm of the problem quadratic of eigenvalues	[19/06/92]	<input type="checkbox"/>

R5.01.03-A	Modal parameters and standard of the clean vectors	[10/09/97]	<input type="checkbox"/>
R5.02.01-A	Algorithm of linear thermics transitory	[04/05/95]	<input type="checkbox"/>
R5.02.02-A	Non-linear thermics	[22/06/00]	<input type="checkbox"/>
R5.02.04-A	Nonlinear thermics in pointer	[25/03/98]	<input type="checkbox"/>
R5.03.01-D	Quasi static nonlinear algorithm (operator STAT_NON_LINE)	[06/07/05]	<input type="checkbox"/>
R5.03.02-C	Integration of the relations of elastoplastic behavior of Von Mises	[20/03/01]	<input type="checkbox"/>
R5.03.03-A	Taking into account of the assumption of the plane constraints in the nonlinear behaviors	[06/03/01]	<input type="checkbox"/>
R5.03.04-B	Relations of behavior élasto-visco-plastic of Chaboche	[08/12/03]	<input type="checkbox"/>
R5.03.05-A	Viscoplastic relation of behavior of Taheri	[08/09/97]	<input type="checkbox"/>
R5.03.06-A	Model of Rousselier in great deformations	[13/11/02]	<input type="checkbox"/>
R5.03.07-A	Model of Rousselier for the ductile rupture	[10/09/04]	<input type="checkbox"/>
R5.03.08-A	Integration of the viscoelastic relations of behavior in operator STAT_NON_LINE	[02/02/01]	<input type="checkbox"/>
R5.03.09-B	Nonlinear relations of behavior 1D	[02/05/05]	<input type="checkbox"/>
R5.03.10-A	Élasto-viscoplastic relation of behavior of the LMARC for the tubes of sheath of the fuel pin	[11/07/96]	<input type="checkbox"/>
R5.03.11-A	Mono and polycrystalline behaviors elastoviscoplastic	[19/04/05]	<input type="checkbox"/>
R5.03.13-A	Élasto-viscoplastic relation of behavior for cubic polycrystalline materials with centered faces	[22/06/01]	<input type="checkbox"/>
R5.03.14-A	Integration clarifies relations of nonlinear behavior	[22/04/98]	<input type="checkbox"/>
R5.03.15-B	Viscoplastic behavior with damage of CHABOCHE	[02/05/05]	<input type="checkbox"/>
R5.03.16-C	Elastoplastic relation of behaviour to linear and isotropic work hardening kinematic nonlinear. Plane modelings 3D and constraints	[30/12/02]	<input type="checkbox"/>
R5.03.17-C	Relations of behavior of the discrete elements	[14/04/05]	<input type="checkbox"/>
R5.03.18-A	Law of damage of a fragile elastic material	[18/11/03]	<input type="checkbox"/>
R5.03.20-A	Relation of nonlinear elastic behavior in great displacements	[22/06/95]	<input type="checkbox"/>
R5.03.21-C	Modeling élasto (visco) plastic with isotropic work hardening in great deformations	[14/04/05]	<input type="checkbox"/>

R5.03.22-A	Law of behaviour in great rotations and small deformations	[05/08/03]	<input type="checkbox"/>
R5.03.30-B	Plasticity in the beams	[19/12/00]	<input type="checkbox"/>
R5.03.32-A	Law of behaviour of assembly ASSE_CORN	[14/04/05]	<input type="checkbox"/>
R5.03.40-A	Static and dynamic modeling of the beams in great rotations	[13/05/96]	<input type="checkbox"/>
R5.03.50-B	Unilateral contact by conditions kinematics	[19/04/01]	<input type="checkbox"/>
R5.03.51-C	Contact - discrete friction in 2D and 3D	[08/10/03]	<input type="checkbox"/>
R5.03.52-A	Elements of contact derived from a continuous hybrid formulation	[24/03/04]	<input type="checkbox"/>
R5.03.80-A	Methods of piloting of the loading	[21/05/01]	<input type="checkbox"/>
R5.04.02-A	Nonlocal modeling with gradient of deformation	[30/01/03]	<input type="checkbox"/>
R5.04.11-A	Model of Rousselier with gradient of internal variables	[03/02/05]	<input type="checkbox"/>
R5.05.01-B	Solution of a differential equation of the second order by the method of NIGAM	[30/01/03]	<input type="checkbox"/>
R5.05.02-C	Algorithm of direct integration of operator DYNA_LINE_TRAN	[28/02/03]	<input type="checkbox"/>
R5.05.03-A	Harmonic answer	[24/02/03]	<input type="checkbox"/>
R5.05.04-A	Modeling of damping in linear dynamics	[13/02/96]	<input type="checkbox"/>
R5.05.05-B	Dynamic non-linear algorithm of <i>Code_Aster</i> (operator DYNA_NON_LINE)	[06/07/05]	<input type="checkbox"/>
R5.06.01-B	Reduction of model in linear and non-linear dynamics: Method of RITZ	[25/11/05]	<input type="checkbox"/>
R5.06.03-A	Modeling of the shocks and friction in transitory analysis by modal recombination	[12/07/95]	<input type="checkbox"/>
R5.06.04-B	Algorithm of temporal integration of operator DYNA_TRAN_MODAL	[28/02/03]	<input type="checkbox"/>
R5.06.05-A	Forces of fluid blade in transitory calculation on modal basis	[14/05/97]	<input type="checkbox"/>

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R6: Solveurs

R6.01.02-B	Linear Solver of combined gradient type: theoretical study and establishment in <i>Code_Aster</i>	[17/02/04]	<input type="checkbox"/>
R6.02.01-A	In connection with the methods of decomposition of the GAUSS type	[09/09/93]	<input type="checkbox"/>

R6.02.02-B	Method multifrontale	[26/02/01]	<input type="checkbox"/>
R6.03.01-A	Resolution of nonregular systems by a method of decomposition in singular values	[26/06/95]	<input type="checkbox"/>
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R7: Mechanical treatments			
R7.01.01-C	Relation of behavior of Granger for the clean creep of the concrete	[14/04/05]	<input type="checkbox"/>
R7.01.02-B	Modeling of the cables of prestressing	[05/04/05]	<input type="checkbox"/>
R7.01.03-A	Law of behavior to double criterion Drucker Prager for the cracking and the compression of the concrete	[19/03/02]	<input type="checkbox"/>
R7.01.04-B	Law of behavior ENDO_ISOT_BETON	[26/05/05]	<input type="checkbox"/>
R7.01.05-A	Relation of behavior of Bazant for the intrinsic creep of dessication of the concrete	[30/01/03]	<input type="checkbox"/>
R7.01.06-A	Relation of behavior UMLV for the clean creep of the concrete	[04/05/04]	<input type="checkbox"/>
R7.01.08-B	Model of damage of Mazars	[14/04/05]	<input type="checkbox"/>
R7.01.09-A	Law of behavior ENDO_ORTH_BETON	[01/09/05]	<input type="checkbox"/>
R7.01.10-A	Modelings Thermo-Hydro-Mechanics THHM. General information and algorithms	[22/06/01]	<input type="checkbox"/>
R7.01.11-B	Models of behavior THHM	[01/09/05]	<input type="checkbox"/>
R7.01.12-B	Modeling of thermohydration, the drying and the shrinking of the concrete	[26/05/05]	<input type="checkbox"/>
R7.01.13-A	Law CJS in géomechanics	[18/11/03]	<input type="checkbox"/>
R7.01.14-B	Law of behavior of CAM-CLAY	[03/02/05]	<input type="checkbox"/>
R7.01.15-A	Law of behavior of Laigle	[09/09/05]	<input type="checkbox"/>
R7.01.17-A	Law of behavior of the porous environments: model of Barcelona	[31/03/05]	<input type="checkbox"/>
R7.01.21-A	Law of behavior (in 2D) for the steel-concrete connection: JOINT_BA	[09/09/05]	<input type="checkbox"/>
R7.02.01-D	Rate of refund of energy in linear thermoelasticity	[26/05/05]	<input type="checkbox"/>
R7.02.03-B	Rate of refund of energy in non-linear thermoelasticity	[08/10/97]	<input type="checkbox"/>
R7.02.04-A	Lagrangian representation of variation of field	[29/11/96]	<input type="checkbox"/>

R7.02.05-B	Calculation of the coefficients of intensity of constraints in plane linear thermoelasticity	[02/05/05]	<input type="checkbox"/>
R7.02.06-B	Models of Weibull and Rice and Tracey	[20/08/02]	<input type="checkbox"/>
R7.02.07-A	Rate of refund of energy in thermo-élasto-plasticity	[25/04/97]	<input type="checkbox"/>
R7.02.08-B	Calculation of the factors of intensity of the constraints by extrapolation of the field of displacements	[26/05/05]	<input type="checkbox"/>
R7.02.09-A	Identification of the model of Weibull	[30/11/00]	<input type="checkbox"/>
R7.02.10-B	Analyze simplified harmfulness of defect by the method K-beta	[11/04/05]	<input type="checkbox"/>
R7.02.11-B	Law of behavior of Barenblatt	[12/03/04]	<input type="checkbox"/>
R7.04.01-C	Estimate of the fatigue life to great number of cycles and in fatigue oligocyclic	[14/04/05]	<input type="checkbox"/>
R7.04.02-A	Estimate of tiredness under random request	[24/05/96]	<input type="checkbox"/>
R7.04.03-B	Postprocessing according to RCC-M'S	[03/03/03]	<input type="checkbox"/>
R7.04.04-A	Multiaxial criteria of starting in fatigue to great number of cycle: models of DANG VAN and MATAKE	[01/09/05]	<input type="checkbox"/>
R7.04.10-A	Operator of calculation of wear	[01/12/98]	<input type="checkbox"/>
R7.05.01-A	Criteria of structural stability	[15/12/03]	<input type="checkbox"/>
R7.06.01-A	Method ZAC	[11/05/01]	<input type="checkbox"/>
R7.07.01-A	Calculation of load limits by the method of Norton-Hoff-Friaâ	[12/11/97]	<input type="checkbox"/>
R7.10.01-B	Random examination of the answers	[08/02/99]	<input type="checkbox"/>
R7.10.02-A	Postprocessing of modal calculations with shock	[08/01/01]	<input type="checkbox"/>
R7.20.01-A	Projection of a field on a grid	[09/02/01]	<input type="checkbox"/>
R7.20.02-B	Extrapolation of measurements on a digital model in dynamics	[11/02/03]	<input type="checkbox"/>

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R8: Relations with Pre and Post

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R9: Data-processing methods

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