

#### **New features Version 7.24 (January 5, 2022):**

Very short rigid elements had insufficient rigidity compared to non-rigid elements. Their rigidity has been modified so that it is satisfactory for very short rigid elements.

#### **New features Version 7.23 (November 18, 2021):**

The OPTIMISER NUMEROTATION command of the phasing module includes the additional option REPRISE\_PRECEDENTE that allows to keep the numbering from the previous execution of the PH3 module, even after rerun of the PH1 module, provided that the number of nodes of the model is the same.

#### **New features Version 7.22 (July 7, 2021):**

The ACTION DETERMINIST command of the dynamic module has two new options:

- INTENSITE MODALE TOTALE which modulates the intensity of the load by a given  $f$  frequency sinusoidal function or that of the selected mode. If the direction of the initial force (before the factor is applied) to a node is the opposite (in the sense of the scalar product) of that of the nodal displacement of the selected mode, the nodal charge sign is reversed. This option applies only to actions of the non-MOBILE FORCE type. It corresponds to the pedestrian loads as indicated in the 2006 Sétra Methodological Guide: " Passerelles piétonnes -Évaluation du comportement vibratoire sous l'action des piétons " (Pedestrian Bridges - Assessment of Vibrational Behaviour Under Pedestrian Action).
- INTENSITE MODALE PARTIELLE which modulates the intensity of the load by a given  $f$  frequency sinusoidal function or that of the selected mode. If the direction of the initial force (before the factor is applied) to a node is the opposite (in the sense of the scalar product) of that of the nodal displacement of the selected mode, the nodal charge is cancelled. This option applies only to actions of the non-MOBILE FORCE type. It corresponds to pedestrian loads that are applied only if they have an adverse effect on the selected mode. If they are favorable they are cancelled.

Bug corrections in the output of the acceleration and velocity of the points in the text file.

#### **New features Version 7.21 (November 3, 2020):**

The dynamic module no longer stores the eigen vectors in the database but in a separate file with the REUTILISER option of the MODES command. This avoids a saturation of the database. When using this command, memory management and mode computation were improved to increase the convergence speed.

The number of initial eigen vectors has been increased. This may involve differences in signs of participation factors and displacements in eigen vectors compared to previous versions of PCP, which is normal since orthogonal modes of the same period are defined to  $\pm\pi/2$ . Differences in concomitant values also appear: these values are concomitant with very low values for which the concomitant effect is indeterminate. The results provided by PCP therefore remain valid.

#### **New features Version 7.20 (September 1, 2020):**

The CDS\_EC command replaces the CDS one. The user can now dimension or justify under normal stresses sections, studying the combined asymmetrical bending components with the CDS software. PCP creates CDS data files and automatically executed them by using CDS.

#### **New features Version 7.12 (July 17, 2019):**

PCP can now process a roadway which is between 5.4 and 6 meters width for the LM1 traffic load: the LM1 traffic loads in relation with this new feature are available in the ACTION command of the "Traffic loads" module.

Bug correction in the ENVELOPPES command with the key word INFLUENCE in the "Operating loads" module: an error occurred during the reading of the position of the loads.

### **New features Version 7.11 (March 13, 2019):**

The CALCUL NONLINEAIRE command of the PH3 module has been modified: the user has more options to control the evolution of the calculus (see the user guide).

The limit number of nodes and elements has increased from 20,000 to 50,000.

Warning messages have been added in the CDS command of the ETU module.

In the installation guide, precisions details the installation of GMSH, the mesh generator.

Correction of chapter 13 related to the finite elements of the PCP guide and of messages of the console related to this module.

### **New features Version 7.10 (July 25, 2018):**

Method option added in the PRAMETRES RHEOLOGIQUES command of the PH3 module. This option indicates the calculation method of creep : the superposition method, which is the already existing method and the default one, or the Kelvin method (see document R07.01.01 *Relations of behavior BETON\_GTO ARRANGE and BETON\_GRANGER\_V for the clean creep of the concrete* of Code\_Aster documentation).

Bugs correction in the mesh module related to the surface modeling: non-homogeneous sections are correctly managed now in the geometry, mesh and command files (generation of surfaces and their width). These files are also correctly edited when the user does not indicate the segments of the model: when no TRONCON option appears, the whole beam is treated by default, the bug related to the last section that does not appear is now fixed.

Correction of a bug that prevented the activation of the option “Phases sorting”.

### **New features Version 7.03 (April 18, 2018):**

Improvement of errors management in the “dynamic” module.

Bug correction in the “envelop” module. The bug generated a problem during the calculation of the envelop during the call of particular supports.

Modification of the possibilities to the positioning of concentrated loads (from vehicule\_droi to vehicule\_inte) relative to the traffic lanes in the traffic.don file (pcp/appli/cnfg/env).

### **New features Version 7.02 (December 21, 2017):**

During the use of commands COMBINAISON, PONDERATION and ENVELOPPE of “study” module, if the weighting coefficients are not in the expected intervals, then there is no more an error but a warning, letting the software make the calculation.

The user can now change the color of the background and of the font int the computation window.

The user can change the language of the interface and of the documentation more easily thanks to the “Options” tab of the main window.

### **New features Version 7.01 (October 13, 2017):**

Clarifications added in the user guide about the following commands: SECTION CONTOURS ENTIERE of chapter 3 (clarifications about forbidden sections), ENVELOPPES of chapter 9 and COMBINAISON of chapter 12, which clarify the use of these commands for a non-linear calculation.

Correction of modules relative to graphic displays, which returned an error when PCP was used on previous versions of Windows X, and on Windows X since a recent update.

### **New features Version 7.00 (September 14, 2017):**

Mesh modulus added. This modulus will create a 1D, 2D or 3D mesh from the PCP model and a Code Aster command file to do a finite element study. A new chapter in the user guide describes this new module, and some sample files “maillage.don” are provided in the following cases: “bicaisson”, “encorb\_sci”, “pont” and ‘stabilite\_pile”.

“Relatif” option added in the commands PLACER ARTICULATIONS and REMPLACER ARTICULATIONS, which allows the user to set a relative displacement and not an absolute displacement, which can be useful for jacks.

Correction of the commands COMBINAISON, WEIGHTING and ENVELOPPE about the control of the consistency of the weighting coefficient of the user. The user guide has been modified too.

Correction of a bug concerning the display of the forces on the structure for several effects during the display of the results on the structure.

### **New features Version 6.61 (May 19, 2017):**

More precise documentation about variables and scalar expressions in chapter 2 – pseudo-programming, Edit/Do not edit, Chains and Thermal loading commands in chapter 8 – phases, and Circulation command in chapter 9 – operating loads.

Possibility to change the interface colors for graphical output, in Options/Screen/colors of graphical output. White background is available and convenient for screen prints.

The use of “Phases sorting” option generates, during the running of the phase modulus, a file named XXX.PHASES\_TRIEES.dec, where XXX is the name of the phase file created by the user, including the construction phases in a chronological order.

Correction of bugs concerning the display of influence line.

### **New features Version 6.60 (October 17, 2016):**

Interface and documentation available in English

Search factors of concentrated loads have been modified in the file trafic.don. It expands the search field to apply the operating loads.

Bug fixes

### **New features Version 6.50 (September 7, 2016):**

Takeda’s law for seismic calculations added

Static limits abolished

64-bits compilation

English version of the documentation

Bugs fixes, including in the dynamic module, which may lead to differences of results between the versions 6.45 and 6.50

### **New features Version 6.45 (September 3, 2015):**

MAI and OAE modules separated

Infinite rigidity terms increased

**New features Version 6.44 (June 22, 2015):**

Maximum number of vehicle lines per lane which can be studied has been increased (until 20)

**New features Version 6.43 (march 24, 2015):**

Weighting coefficients of favorable and unfavorable effects of the prestressing added

Bug fixes

**New features Version 6.42 (January 21, 2015):**

New material laws added

**New features Version 6.41 (October 1, 2014):**

Bug fixes

Installation process improved

**New features Version 6.40 (June 19, 2014):**

Upper modes filtered

Elastoplastic supports, elements and articulations added. Possibility of modeling elastoplastic soils, prestressed dampers, unilateral dampers...

Bug fixes

**New features Version 6.30 (march 13, 2014):**

Seismic analysis using modal superposition method in the dynamic module added

Linear articulations with articulation threshold added

**New features Version 6.20 (december 9, 2013):**

Decoder change: all expressions must be enclosed within parentheses

Pedestrian loads of the Eurocode added

EXPORTER command modified and IMPORTER command added

**New features Version 6.10 (January 29, 2013):**

Railway laws added

**New features Version 5.24 (July 13, 2012):**

Bug fixes

**New features Version 5.23 (May 16, 2012):**

Orientation of the fourth component in local planes modified (downwards)

Creep laws of the CEB 90 design code and of the Canadian norm S6-06 added

Traffic loads models related to the fatigue of road bridges (European Eurocode 1) added

COMBINAISON and ENVELOPPE commands of the Study module modified

Exporting format of study results (EXPORTER command) modified

st1pcp utility modified: prestressed cables can be retrieved

**New features Version 5.22 (February 10, 2012):**

Skew angle of the support taken into account

Number of values in the traffic table increased

Max and min functions added

**New features Version 5.21 (December, 2011):**

Bug fixes for printing

Limits of number of supports increased

**New features Version 5.20 (November 24, 2011):**

Protection modified

Network protection version

**New features Version 5.10\_3 (September 15, 2011):**

Pseudo-programming added

# can be used to write a comment

**New features Version 5.10\_2 (May 24, 2011):**

Bug fixes in RES module

Loading of curvilinear beam in PH3 module

**New features Version 5.10\_1 (March 4, 2011):**

New generation of more robust 3D files

Online help for the main window

List of persistent data files (liste.don)

**New features Version 5.10\_0 (December 1, 2009):**

European (Eurocodes) Operating loads updated

Behaviour laws of generalized materials

Delayed laws of Eurocodes updated

Eurocodes Spectrum updated

Nonlinear dumping updated

Dongles as new protection keys

**New features Version 4.10:**

New look of the HMI

Influencing area and loads in VRML

**New features Version 3.10:**

Step by step calculation

Stochastic calculus

**New features Version 2.10:**

Dynamic calculation

First Windows version

**New features Version 1.10:**

First UNIX version

**New features Version 1.00:**

First IBM version