

Update and Release Notes for the LS-DYNA Environment Software

from Oasys Ltd



SHELL

PRIMER

D3PLOT

T/HIS

REPORTER

Version 18.0

Contents

	Page	
1	Introduction	1
1.1	Compatibility with LS-DYNA releases	1
1.2	Hardware platforms supported	1
1.3	Graphics hardware supported	1
1.4	Licensing	2
2	Bugs Fixed	3
2.1	PRIMER	3
2.2	D3PLOT	32
2.3	T/HIS	43
2.4	REPORTER	48
2.5	SHELL	51
2.6	Oasys	53
3	Enhancements	54
3.1	PRIMER	54
3.2	D3PLOT	61
3.3	T/HIS	65
3.4	REPORTER	68
3.5	SHELL	70
3.6	Oasys	71

1 Introduction

The Oasys Ltd LS-DYNA Environment 18.0 suite, dated April 2021, is a full release which supersedes all previous releases.

This document lists the enhancements that have been made during development, and the bugs that have been fixed (since 17.1). Each ‘Case ID’ referred to in these lists is unique and should be cited if more information or clarification are required.

1.1 Compatibility with LS-DYNA releases

The 18.0 release has been used and tested with LS-DYNA version R12 and the development version of R13. It supports all the keywords in volumes I, II and III of the released R11.0 User’s Manual. Most of the new keywords in the released R12 User’s Manual are also supported (only some *DUALCESE keywords outstanding). The Oasys 18.0 release also supports the core R13 *IGA keywords.

LS-DYNA R9.0 is the default keyword output format from PRIMER. (However, output may be generated for later releases of LS-DYNA.)

1.2 Hardware platforms supported

The complete Oasys Ltd LS-DYNA Environment 18.0 is available on the following platforms:

Windows	Windows 10 <i>Note that support for Windows 7 has been deprecated as Microsoft is no longer supporting Windows 7. As far as we are aware, the software runs on Windows 7.</i>	64 bit
Linux	RedHat Enterprise 7.x, RedHat Enterprise 8.x	64 bit

For simplicity of support and maintenance only the RedHat Enterprise 7.x build has been released on the website for Linux as this has been found to run on all the machines we have tested (RHEL 7, RHEL 8, SuSE 12.3).

If you require a different Linux build, please contact Oasys Ltd.

1.3 Graphics hardware supported

The default graphics protocol used on all platforms in the table above is OpenGL, which gives good quality 3D performance on a wide range of hardware.

‘Legacy’ X-Windows (2D only) graphics drivers remain in PRIMER on Linux platforms only, since these are used by a small minority of clients who display over a network of mixed machine types. However, this X driver is not maintained or updated and will give poor performance, so it should only be used as a last resort. There are much better ‘thin wire’ graphics solutions available today, and Oasys Ltd can give advice about these on request.

1.4 Licensing

This latest version of the software will only use the LM-X licensing platform to provide an increased level of license security. FLEXlm is not used for Oasys licensing from version 18.0 onwards.

To ensure you're ready to enjoy all the great features Oasys Suite 18.0 will bring, we recommend you update all your Oasys Suite license servers and files as soon as possible.

Action to take

If you're using a floating network license you will need to install the LM-X license server software (version 4.9.24). The software and supporting documentation are available to download from our website and are also included in our installation packages.

Backwards compatibility

The Oasys Suite 18.0 LM-X license file and license daemons are backwards compatible for all currently supported versions of Oasys Suite. This means that any existing 17.x, 16.x, and 15.x software will continue to work with new LM-X license files and servers.

2 Bugs Fixed

The enhancements and bug-fixes for each program have been broken down into a series of topics. Within each topic enhancements and bug-fixes are listed by case ID.

2.1 PRIMER

Adhesive

- **Case 44488**

The From FE (Connection) tool was failing to work for adhesives. This bug appeared when connection layers were extended from just shells to solids and thick shells. The solids of the selected part (the prospective glue) are now excluded from segment creation.

Airbag

- **Case 45340**

There are a few data fields in LS-DYNA, for example FRIC on *AIRBAG_PARTICLE, where the legal values are something like

Value ≤ -1 negative label of some item type
-1.0 < value < +1.0 scalar fractional value, here friction
Value ≥ 1 +ve label of some item type

In other words depending on its magnitude and sign a value might legitimately be either floating point or integer.

PRIMER handles these data fields and performs checks on them during keyed in interactive input, typically in an editor.

These checks also apply if the data field is defined by a parameter when typed in, but in this instance the check for a floating point parameter did not consider the magnitude of the parameter value and rejected it unconditionally (because it was not an integer) even if it lay in the legal 'scalar float' range in this context. In the example above using a parameter evaluating to 0.3 was rejected - wrongly - as not being a valid label in that context.

Fixed by applying the same checks to parameterised floating point input as are applied to plain numbers in the same context.

Belts

- **Case 44805**

When 2D *ELEMENT_SEATBELT elements are used for a belt the node set EDGSET on the relevant *SECTION_SHELL card defines the order of a row of nodes across the belt. This must line up correctly with any slings and retractors across the belt.

Historically PRIMER has checked this against retractors but not sliprings. It now tracks along the belt looking for sliprings and checks these too, ensuring that shell sets SSID1 and SSID2 on the retractor are consistent with the element topology implied by EDGSET.

- **Case 44659**

Read CSV for belts: There was error in the generated belt path for certain 'fixity' strings. Fixed this.

Checking

- **Case 45733**

Fixed a crash if a check was run on a model containing *CONSTRAINED_EXTRA_NODES which did not contain any IDs.

- **Case 45286**

PRIMER was reporting errors when *CONTACT_FORCE_TRANSDUCER was referring to beams. This was not right. This has been fixed now.

- **Case 44846**

If *MAT_ADD_XXX is read but the material referenced was missing, PRIMER set the material type code to *MAT_ADD_XXX and model check reported no errors. This type code is now reported as out of range for structural material.

- **Case 44791**

Incorrect errors/warnings for *FREQUENCY_DOMAIN_FRF card have been fixed. Zero values on <DOF1> and <DOF2> fields are now also permitted.

- **Case 44724**

The check option 'maximum percentage of tria' was causing model check to crash. The error has been corrected.

- **Case 44660**

After element quality check, check categories on the drop-down were un-necessarily greyed out and model check was required to restore them. The buttons are no longer greyed.

- **Case 43588**

*DEFINE_CONSTRUCTION_STAGED_PART previously threw an error message when the Part's element type was TSHELL. However, TSHELL part is supposed to be permitted for the keyword, so the spurious error message has now been removed.

- **Case 42923**

When reading LS-DYNA output files, the dialogue box displayed an incorrect line count. This has been fixed.

Clipboard

- **Case 43515**

In the clipboard, when moving something to an include file, and choosing 'Master file', instead of moving it to the master file, a new include file called “Master file” was being created and it was put in there. This has been fixed.

Connections

- **Case 44918**

Connection operations could give rise to unexpected deletion of some or all contacts in the model. This was observed to happen on remake of a connection when copy-orient had been applied but may occur in other contexts of connection remake.

- **Case 45534**

When an image file (of any type: png, jpg, pdf, etc) was saved with a white background selected, and the current screen background colour was not white, some types of sketched graphics overlying the plot could be lost. An example would be when modifying a connection the line showing the proposed new connection, but a similar problem could occur in other contexts where transient sketched graphics have been added to the plot.

This was because redrawing with a different background colour causes some aspects of the plot to be recreated, since their colour can be dependent on the background colour. As part of this process overlaid sketched graphics were being deleted.

Now fixed: the 'update and redraw' process required to save an image with a different background colour will no longer delete overlaid sketched graphics.

- **Case 44625**

When the option `use_parent_layer` is switched off for bolts, NRB bolts will be made with conventional node set irrespective of the setting 'NRB bolts may use set collect'. The defaults are `use_parent_layer=true`, `use_set_collect=true` but these can be changed by preference settings.

- **Case 44509**

The `NO_ACTION` option on the Remove panel will now support deletion of solids from adhesive connections. The `EMPTY_CONX` action is unchanged, i.e. same as `NO_ACTION` for adhesive, for other connections removes all contents.

- **Case 43477**

When the pitch for MIG line weld was set too small, coincident beams appear in the weld run. This has been fixed by resetting the pitch to the minimum node-node distance if it is below that.

- **Case 43476**

Weld lines (not MIG) made on panel edges could previously move to the wrong edge on 1st remake and then back to correct edge on 2nd remake. This issue did not affect MIG welds which are more commonly used on edges. This has been fixed.

- **Case 43056**

When one changes Part ID in the Connection Table and uses 'update connection data', the Part ID on the elements was not changing. The missing logic has been added to fix this.

Constraints

- **Case 43405**

The field STIFF in *CONSTRAINED_INTERPOLATION_SPOTWELD can now take Function ID when MODEL field is greater than 10. Also, negative Material ID is not written out in versions prior to R12.0

Contacts

- **Case 44726**

Labels for some fields in *CONTACT_XX_THERMAL_{option} were different to those in the R12 LS-DYNA manual. Changed RAD and H to FRAD and H0.

- **Case 44307**

When a PDF image is captured it can sometimes result in the text overlay (that is title, contour bar, etc) of the on-screen image going the wrong colour. This problem rights itself as soon as mouse movement or any other explicit operation causes a screen refresh.

Caused by an internal problem in the graphics driver and now fixed.

- **Case 43309**

The ONLY function for contacts was not working when the contact was defined using *SET_SEGMENT(_GENERAL). This has been fixed to unblank the elements that lie under the segments.

- **Case 43122**

Contact write xls data has been corrected so the reported count of penetrating/tied nodes and the min/max penetrations agree with the values given on the part edit panel.

- **Case 38627**

Contact with Soft=2 (segment based) is now analysed using logic which simulates LS-DYNA's projection algorithm. This should give much better agreement with results published in the mes0000 file.

PRIMER assigns the penetration to the closest node and additionally reports any node to segment penetrations as these are valid information and assist the penetration fixer.

Contour

- **Case 45613**

Contour plotting shell elements with the true thickness option turned on did not draw the shells correctly for high-order elements. This has been fixed.

Curves

- **Case 45304**

Fixed a bug where field values such as SFA in the first line of the load curves would not be correctly applied when read in after being exported using the 'Text edit' option. Details below:

When editing a *DEFINE_TABLE definition it is possible to export the table to an external file using 'Text edit' for editing in an external editor.

Exceptionally for Text edit, which normally only works on the single entity being edited, this exports not only the *DEFINE_TABLE definition but also vestigial *DEFINE_CURVE definitions for all the loadcurves that the table references. This is because a table relies on these curves following it immediately in the keyword deck.

This gave the impression that it was possible to edit the first lines of these curves, changing values like SFA, SFO, OFFA etc. However although these edits would be accepted they would not be applied to the underlying loadcurves since the process which re-imported the modified table definition after the external edit ignored them.

This has been modified so that changes to these vestigial 'first lines' of loadcurves will now be read and re-imported in this case. This is exceptional treatment which applies only to 'curves belonging to a table' in this context.

- **Case 44628**

Scale and offset was being applied unconditionally when clicking Edit curve in PRIMER (from T/HIS). This now takes into account whether or not the scale and offsets button is actually on.

Cut section

- **Case 45583**

Multiple cut planes were not drawn on parts not intersecting the base plane but intersecting another offset plane. This is now fixed.

Database

- **Case 42900**

Field 2 of card 1 (BINARY) in *DATABASE_FSI has been added to the editor.

Deleting

- **Case 45378**

'Cleanup unused' now works for unused *DEFINE_FRICTION (when no PARTs are referenced).

- **Case 43547**

An error check has been added for the case when a load is applied to a massless node. Also cleanup unused has been improved to remove such loads.

Dummies

- **Case 45520**

While updating the Dummy Assemblies, the error/warnings were not getting reported properly. This has been fixed.

- **Case 44767**

Problem with obtaining a discrete element ID during simulation based dummy positioning setup potentially resolved. Now discrete elements are checked for label clashes during creation of spring damper.

Edit

- **Case 45279**

'auto-create off/on' button was obscured in *CONSTRAINED_EXTRA_NODES create panel which is now fixed.

- **Case 45159**

Fixed bugs which resulted in unintended errors for <MCOUP> and <IBOXID> drop down for *CONSTRAINED_LAGRANGE_IN_SOLID create/ modify panel.

- **Case 44770**

The generic editor, used for things like *INITIAL, had a couple of features related to popup menus that did not work:

#1 'Compound' fields, meaning those which might be one entity type if +ve, but a different object type if negative, appeared to ignore the result of a pick or selection from a popup if the data field was currently empty, selection worked OK if the data field already had a value.

#2 Label fields would ignore the result of a right-click popup label selection (1st, 1st in layer, etc).

In both cases typing in a value worked fine.

Both were due to internal coding errors and have been fixed.

- **Case 44742**

The third card in *INITIAL_VELOCITY is optional but was set to be processed unconditionally in the keyword editor. It has been fixed now.

- **Case 44734**

The fields Q, CQ and SOCINIT on EM_RANDLES_BATMAC, _MESHLESS, _SOLID and _TSHELL were incorrectly being rounded to integers when they should be floats. Fixed this.

- **Case 44524**

If *CONTROL_SPOTWELD_BEAM RPBHX applies, the beam part now allows HGID to be defined without error messages.

- **Case 44099**

For *DATABASE_PWP_OUTPUT, fields <i>iaccx/ y/ z</i> now can have any integer value as input which previously had clamping range (0-17). However, warning messages will now be displayed if values are not in this range.

- **Case 44095**

Some 'complex' data fields were not working correctly in all editors:

*DEFINE_BOX_ADAPTIVE field LIDX/NDID (loadcurve if the value was positive, or a node if negative) was not being interpreted correctly in the keyword editor.

*AIRBAG_PARTICLE fields FRIC and PFRIC are functions if >1.0, loadcurves if ≤ -1.0 , and scalar values if in-between. These were defaulting to a loadcurve when positive which was wrong.

Both were due to internal errors in the definition and processing of these fields, now fixed.

- **Case 43876**

The fields LCIDD and LCIDT were not being processed correctly on the *LOAD_MOVING_PRESSURE create panel. Now fixed.

- **Case 43618**

The error in the generic editor, which caused loadcurves that have negative labels being displayed as positive if selected from a popup or created, is fixed.

Encryption

- **Case 44760**

Blocks of PGP data were getting lost when two models from two different directories were read and were output in some new different directory. This is now fixed.

Errortrapping

- **Case 45140**

Fixed a bug where if the user opens the *ALE_REFERENCE_SYSTEM_GROUP create panel in PRIMER and sets PRID to a positive value (while PRTYPE is 0) a warning message about PRID being NULL might display in the dialogue box.

FMH

- **Case 45513**

Column widths in the tree (menu) generated by reading data from a .csv file into the FMH panel were set differently for the top (occupied) part and the bottom (empty) portion. This has now been fixed.

- **Case 45280**

FMH check panel - made some columns wider so that text (headers & values) fit properly.

Formula

- **Case 43147**

Until PRIMER 17.0, input in text boxes, for example edit panels or keyword editors were treated as formula when they contain any arithmetic operator +, -, *, / or brackets, even when they had not got the = sign as prefix. As this can cause unintended formula evaluation due to typing errors, the preference primer*formula_req_equal to require the = sign has now been added. By default this is now TRUE, i.e. the = sign is required.

Geometry

- **Case 44291**

The JT reader library has been updated to the most recent version (10.8).

Graphics

- **Case 45147**

When using NiceDCV on a remote Linux server with a high-specification Nvidia card the graphics window might not be refreshed when a sub-window obscuring it is unmapped or moved aside.

This is simply an issue with the NiceDCV setup. To work around this, the user should set the `GRAPHICS_NO_BACKING_STORE` environment variable in the Oasys Ltd. software.

- **Case 44085**

A warning message was displayed unnecessarily in the slider of the 'orient' tool. This has been fixed.

Groups

- **Case 45717**

When decomposing a group containing set parts defined by range (for example, when calculating mass properties of group) a crash could occur. Now fixed.

- **Case 44663**

Models read with duplicate groups and the setting to permit duplicates on all keywords could hang PRIMER. Now fixed.

Include

- **Case 44950**

Fixed issue where `*INCLUDE_AUTO_OFFSET` and `*INCLUDE_UNITCELL` were written out in LS-DYNA versions incompatible with the keywords.

- **Case 44098**

The include function 'add new child' when used with `*INCLUDE_AUTO_OFFSET_USER` was not applying the label offset correctly. Now fixed.

Include transform

- **Case 45628**

If a `*DEFINE_TRANSFORMATION` card contained `MIRROR` and `ROTATE` transforms `PRIMER` could get the combined transformation wrong. Now fixed.

- **Case 44482**

Fixed a bug involving lost `*PARAMETER_DUPLICATION` cards when defined in an `*INCLUDE_TRANSFORM` file, and increased the speed of processing parameters. Explanation below:

A model which contains self-referential `*INCLUDE_TRANSFORM`s, (generically include file A includes file B, which includes A using some different transform) caused `PRIMER` some real problems when some of those transforms were defined by `*PARAMETERS` which were themselves defined in an include file that underwent transformation.

This led to parameters being duplicated, requiring a `*PARAMETER_DUPLICATION` card to placate `LS-DYNA`, and while `PRIMER` read this it card it got lost during the processing of include transforms. In addition the 'sorting out' phase of parameter processing took an impossibly long time.

In `PRIMER 17.1` the only fix that has been made is to correct the problem that `*PARAMETER_DUPLICATION` cards go missing if they are defined in an `*INCLUDE_TRANSFORM` file. The speed problem can be solved by using the option to pre-read parameters.

In `PRIMER 18.0` the above fix carries over, but in addition the speed problem of sorting out parameters has been tackled so that their usage inside `*INCLUDE_TRANSFORM` is now resolved at least 20x faster than before.

However putting parameters that will be used to define transformations inside a file that will itself be transformed and duplicated is not recommended. Unlike `LS-DYNA`, `PRIMER` has to 'remember' all these duplicate definitions, and sorting them all out requires a lot of processing. It is strongly recommended that users put their parameters either in the master file or in a single include file that is read before anything else.

Integration

- **Case 45500**

In the `LS-DYNA` output tree `D3PLOT` can be opened at a given time state by right-clicking on entities. When no result files were available, `D3PLOT` crashed. Now `PRIMER` no longer opens `D3PLOT` in those cases.

- **Case 43198**

Message about results found when clicking the button 'Post' in PRIMER. Now we distinguish between D3PLOT and T/HIS results.

JavaScript API

- **Case 45783**

The SetMesh() method for the Belt class includes a segment index (number) and a 'data' object. The data object includes a property called 'mode' which allows users to change the mesh mode used for a particular segment. This can, for example, be used to convert a full 1D mesh segment to a mixed 1D/shell segment. Changes to 'mode' would not have worked correctly in previous versions. This has now been fixed.

- **Case 45606**

If a script restricted access in a window by using the Window active property and played a macro that opened the 'pre output check' window, set some options, and closed it, the restriction would be lost. Now fixed.

- **Case 45469**

It was not possible to set a beta angle of 0 for a shell from JavaScript as setting beta to 0 unset the `_BETA` option. The logic has now been changed so that beta can be set to 0. Setting beta to null unsets the `_BETA` option.

- **Case 45263**

If a property on a control card was edited the control card could move to the current include file. Now fixed.

- **Case 45258**

Previously, the PRIMER JavaScript API would return the wrong value for `model.control.contact.isym`. Now fixed.

- **Case 45252**

Previously, setting the MID property on a new layer on `*PART_COMPOSITE` via the JavaScript API function `Part.SetCompositeData()` would not create cross-references between the material and part composite. This has now been fixed.

A similar issue could also affect the entities in the following properties:

- `*BOUNDARY_PRESCRIBED_FINAL_GEOMETRY: NID`
- `*INITIAL_VELOCITY: IRIGID`
- `*LOAD_NODE: M3`
- `*CONSTRAINED_NODAL_RIGID_BODY: PNODE`
- `*SECTION_SHELL: ELFORM, EDGSET`
- `*SECTION_SOLID: ELFORM`
- `*SENSOR_SWITCH: SWIT`
- `*ELEMENT_(T)SHELL_COMPOSITE: MID`

These have also been fixed.

- **Case 45239**

In PRIMER, when using JavaScript to delete a model, input was restricted after the deletion which prevented the window from being used. Now fixed.

- **Case 45229**

Fixed *CONTROL_IMPLICIT_EIGENVALUE JavaScript API support for EVDUMP.

- **Case 44965**

Previously, PRIMER would crash when providing the Curve class constructor with an invalid Load Curve type. This has now been fixed - the JavaScript API will now report an exception instead.

- **Case 44701**

Previously, trying to set the M3 property for LoadNode, in the PRIMER JavaScript API, to a negative value via the property setter or constructor would not work. This has now been fixed.

- **Case 44685**

Previously, accessing the icid property of the VelocityGeneration class, in the PRIMER JavaScript API, would return the wrong value. This has now been fixed.

- **Case 44683**

*CONTROL_MPP_DECOMPOSITION_FLAG_STRESS_STRAIN_CURVE was previously not accessible via JavaScript. This has now been fixed.

- **Case 43829**

Previously, when calling File.Delete(pathname) through the PRIMER JavaScript API, on a Windows machine, the pathname would not be deleted if it were a directory. This has now been fixed.

- **Case 43347**

JavaScript category is now respected even after foreground and background colour may have been previously changed.

- **Case 42405**

The Section JavaScript class was not processing character labels correctly in its constructor. This has now been fixed.

Keyword

- **Case 45215**

For *SECTION_BEAM_AISC:

- Corrected value K from float to integer
- Corrected keyword editor for ELFORM 12

- **Case 45078**

Units for *ICFD_BOUNDARY_PERIODIC fixed.

- **Case 44993**

In *ALE_STRUCTURED_MESH_MOTION, <EXPLIM> was treated as an integer rather than floating point, which now has been fixed.

- **Case 44956**

For *MAT_SEISMIC_ISOLATOR, if ITYPE is greater than 2 then, it used to convert it to 0 but dependent cards were still written out. This is now fixed.

- **Case 44856**

All the *DUALCESE keywords now appear in the quickfind search list.

- **Case 44467**

Fixed incorrect conversion of units in some *EM keywords.

- **Case 44438**

*LOAD_ALE_CONVECTION_ID did not have a title in the additional card for the ID option. This is now fixed.

- **Case 43986**

MAT_119 and MAT_121 headers UNLDOPT have been corrected to IUNLD.

- **Case 43765**

*PERTURBATION_MAT was unable to be read in previously. It is now fixed.

- **Case 43472**

PRIMER showed incorrect number of cards present, in *EM_CONTACT keyword-popup, which now has been fixed.

- **Case 43333**

Added support for Function and Table creating options for the following fields:

<R0CHA> <R0DIS> <R10CHA> <R10DIS> <C10CHA> <C10DIS> in

*EM_RANGLES_MESHLESS, *EM_RANGLES_BATMAC, *EM_RANGLES_SOLID and *EM_RANGLES_TSHELL.

- **Case 43311**

PRIMER showed incorrect number of cards present, in *EM_CIRCUIT keyword-popup, which now has been fixed.

- **Case 43275**

Field activation issue resolved for TMOD > 5 on *ICFD_CONTROL_TURBULENCE.

Kwd editor

- **Case 44601**

The generic editor could produce additional garbage if a model contained PRIMER-specific 'user data' after *END. This is a very rare occurrence, so unlikely to happen in practice, and now fixed.

Labels

- **Case 44516**

When reading a model with duplicate contact labels, PRIMER can change the labels to declash them. Sometimes this declashing used the same new label for more than one contact at a time, so that the labels were actually still clashing. This has now been fixed such that the labels become unique after declashing. This also avoids other errors and crashes later on in a PRIMER session where such a model has been read.

- **Case 43924**

PRIMER has always checked to see if a model can be written out in the selected small / i10 / large format, offering to renumber the model if required. This check had an error in that while it checked the contents of each include file it did not check what items in that include file referred to. For example *ELEMENT_SHELL in include file A might refer to *NODE definitions in include file B, and if the contents of file A were 'small' but those in file B were 'large' the potential for overflow would not be detected.

The following fixes and changes have been made to correct this:

+ In 'Automatic' and 'Keep existing' keyout modes PRIMER now does an internal 'test write' of the model which will detect any overflowing fields reliably.

+ This information is stored at a resolution of 'item type in include file', that is PRIMER records that - say - *ELEMENT_BEAM in include file C overflows its data field.

Three sizes of output are available: 'small', 'i10' and 'large' and we refer to increasing the format from a smaller size to a larger one as 'promotion'. Given the level of detail at which overflowing data is recorded this makes it possible to promote the format of output from at three levels of detail:

- (1) The whole model. } Set on the *KEYWORD
- (2) A whole include file } header card
- (3) Individual keywords in an include file using % or + suffices

In 'Automatic' mode the chosen level of promotion (default = whole include file) is applied automatically; in 'Keep existing' mode you are informed and must choose which to apply.

The existing check for the largest label in the model is retained for the explicit small, i10 and large output options; likewise the existing 'renumber model to fit format' option is also retained.

Macro

- **Case 44518**

Macros to expand tools and keyword menus now work after changing and applying defaults in Window size and layout.

Manual

- **Case 45710**

In some cases on Linux, PRIMER could fail to open the HTML manual if the machine was used by multiple users. Now fixed.

- **Case 44741**

Users can now use the preferences 'All programs*pdf_application' and 'primer*pdf_keywords_arg' to open the keyword manual at the correct page using their preferred pdf reader.

Materials

- **Case 45344**

In *MAT_SPOTWELD_DAMAGE-FAILURE, USERV10 - USERV14 fields were incorrectly omitted while writing out in LS-DYNA versions <R12, which is now fixed.

- **Case 45142**

In `*MAT_SEISMIC_ISOLATOR` when `ITYPE` is set to 0 and `IEXTRA` is set to 1, values entered in `KTHX`, `KTHY`, `KTHZ` were lost. This issue has been fixed.

- **Case 44251**

Load curves now start from `TSRFAC=2` for the keyword `*MAT_FABRIC`

- **Case 44025**

Material definition written within `*ENCRYPTED_START` and `*ENCRYPTED_END` was not full. Now it will write full material definition with zeros for fields that were not defined when read.

- **Case 43617**

`*MAT_SEATBELT_2D` can now be used in the JavaScript material constructor.

Mechanism

- **Case 44853**

Repeated clicking on Global Accuracy button under Mechanism panel no longer compounds calculations on convergence factors.

- **Case 44260**

Radio button default in Mechanism → Position → Options is now set to 'Draw normal' instead of 'Draw wireframe' when 'Reset defaults' is pressed.

Menus

- **Case 44861**

Colour palette wheel no longer disappears if the colour chosen is black.

Merge

- **Case 42587**

When merging two models and setting destination include in Model → Merge panel, it was not moving blocks of PGP to target include and instead ending up in master file. This issue has been fixed.

Mesh

- **Case 45225**

In a model with connections, the creation of swages would sometimes delete the solids and connections in the model. Fixed this.

- **Case 43894**

When there are say three cylinders and third cylinder's radius is less than or equal to second cylinder's radius, PRIMER was crashing. The 'Apply' button has now been greyed out for such situations to prevent this from happening.

Also when the difference in the radii between two adjacent cylinders was less than the element size chosen, PRIMER used to crash. This also has been fixed by checking for this condition, showing a message in the dialog box and breaking from the function.

- **Case 43318**

Selecting nodes using 'screen area' and 'screen polygon' did not necessarily return the nodes in order. Now if the selected nodes are on the free edge, the node order is rearranged before extrusion.

Model modified

- **Case 42860**

Reporting change of include file in model modified is now OFF by default. The function did not always work correctly on connections. This has been fixed.

Morphing

- **Case 44426**

When picking morphing drag handles in Selection mode and then changing visibility of corner, edge, face and/or internal points, sometimes different handles or points appeared as selected. This only affected the sketching, not the actual morphing. This has now been fixed.

- **Case 43068**

Previously, when merging nodes owned by morph boxes the parametric coordinates for the resultant node and its morph box were not updated. Furthermore, the merging of nodes owned by the same morph box was not allowed. This has been fixed such that nodes owned by the same or different morph boxes are allowed to merge together. The morph box that will own the resultant node can either be the box that has the highest or lowest label, out of the group of boxes that own the selected nodes. This option can be specified by the preference 'replace_morb_entry', set to 'HIGHEST' or 'LOWEST', or set in the program options panel.

The same issues also occurred when using Node replace, which have also been fixed as outlined above.

- **Case 43052**

Previously, when trying to create a morph box with pre-existing morph points, via the PRIMER JavaScript API, if an error was thrown because some of the flagged nodes were already owned by another morph box PRIMER would still create a new morph box, albeit empty. This has now been fixed such that a new morph box is not created when this error is thrown.

Nastran

- **Case 44233**

The character limit for NASTRAN include filenames has been increased to 600 characters.

Nodal RB

- **Case 44772**

Repeated creation (autocreate off) of *CONSTRAINED_NODAL_RIGID_BODY with _SPC option lost the option and the values set for CMO, etc. These settings are now preserved whilst the edit panel is active.

Orient

- **Case 44487**

Orient → Reflect previously changed the order of nodes on shells, but this did not reorder the thicknesses for *ELEMENT_SHELL_THICKNESS. Now the thickness values are reordered in the same way.

- **Case 44143**

When orients are encoded by *INCLUDE_TRANSFORM in the orient tool, the process checks that no explicit orient has been previously applied to the include by reading in the original to model zero and remaking the transforms. The process can give numerical discrepancies particularly with rotations. The logic for comparing coordinates has been made more robust to avoid spurious warning message which blocks progress.

Output

- **Case 45376**

Fixed several keyin and keyout bugs involving the i10 format for keyword cards. Details below:

PRIMER supports small, i10 and large formats by reading and writing the relevant suffix on the *KEYWORD card at the top of a file, for example '*KEYWORD i10=y'.

However LS-DYNA only considers that suffix when reading the master file of a deck, ignoring it on any child include files, since child includes are presumed to have the same format as their parent. If a child include file is to have a format that is different to that of its parent then the *INCLUDE statement must have a %, + or - suffix (for i10, long or short format respectively).

PRIMER - wrongly as it turned out - presumed that putting the suffix on the *KEYWORD header would suffice, and did not add any suffices to the *INCLUDE keyword. So if it wrote mixed format decks these would not read into LS-DYNA. Therefore the following fixes and changes have been made:

On keyin:

+ PRIMER now defaults to 'child include inherits format of parent' if no suffix are present on the parent *INCLUDE statement. (This behaviour was always available as an alternative, but it was not the default.)

+ PRIMER (unlike LS-DYNA) still inspects and considers any suffix on the *KEYWORD line of a child include file. If a suffix is found this is presumed to be the 'true' format of the file, superseding any inherited or implied format in the parent file.

On keyout:

+ When the format of an include file is different to that of the master file of the deck then PRIMER now always adds the relevant %, + or - suffix to the relevant *INCLUDE statement.

+ Any include file that is in i10 or long will have 'i10=y' or 'long=y' respectively added unconditionally to the *KEYWORD line at its top.

+ An include file in 'small' format written in a deck where the master file is not 'small' will have the suffix 'long=s' added to its *KEYWORD card.

The addition of suffices to *INCLUDE in the parent file and to *KEYWORD in the child file introduces a degree of redundancy into this process, hopefully future-proofing it. It also means that if a child include file in i10 or long format is read in isolation it should still be processed correctly.

- **Case 44860**

Added field headers to card *MAT_ADD_COHESIVE.

- **Case 44825**

*DEFINE_PRESSURE_TUBE was misread by PRIMER when the optional card 2 was omitted and card 3 was present for TYPE = 1 or 2.

- **Case 44483**

When a model with includes was written in 'merge to master' mode the *TITLE was written above *END (as when the model is written with includes). This has been corrected so *TITLE is written at the top of such a deck. Previously, the default position is top for model with no includes or written in 'merge to master' and bottom for model written with includes. In PRIMER 18.0 this behaviour is configurable by the preference 'dyna_placement_title' which the user can set to DEFAULT, TOP, BOTTOM or BOTH.

- **Case 43053**

When include files are compressed and/or binary, now a compressed and/or binary icon is shown at the end of the string file name in the include tree view. When hovering over the file name an explanation of what it means pops up.

Parameter

- **Case 45277**

*LOAD_BODY parameter names now display in the Vector option fields, where they previously only showed the numerical values.

- **Case 44834**

Fixed a bug where a false comparison error is displayed when running a Model Modified check between a model and the same model whose parameterised data field had been modified, the model then written out, and read back in.

It is possible to get a spurious Model Modified comparison error by the following method:

- + Have a model with a parameter in some data field.
- + Orient, or otherwise change, the model such that the value of that data field changes. This means that the parameter is no longer valid in that field because parameter value and underlying data field value no longer match.
- + Write the modified model out, then read it back in to a new model.
- + Run a Model Modified check on original vs new model. This can show a difference, claiming that the parameter is still used in that data field in the original model but not in the new one, which is not correct.

The reason for this is that it would be prohibitively expensive to check whether every parameterised data field is still valid each time the model changes in any way, so PRIMER does not do this. Instead it leaves the association between parameter and data field until such time as this is exposed to the user, for example when editing the entity, copying it or performing a keyout operation. It is passage through these operations which expose the difference which triggers the removal of the association.

For speed only the edit/copy cases actually remove the internal parameter association, keyout does not, so in the sequence above it can be seen how the error arises. It can also be seen why this is quite a rare occurrence.

This has been fixed by adding 'Model modified comparison' to the list of operations which check and remove the association between a parameter and a data field in which it is used, removing the association if necessary before performing the comparison.

- **Case 44763**

A model which used a parameter for the IRIGID field on *INITIAL_VELOCITY generated internal errors during 'orient' if the parameter was not defined, or used before it was defined.

Nothing to do with parameters: the IRIGID field was incorrectly programmed such that certain internal operations, which happened to include resolving unknown parameters, would cause internal errors.

Now fixed.

- **Case 44500**

Fixed a few bugs related to *PARAMETER_DUPLICATION behaviour:

The way that *PARAMETER_DUPLICATION had been added to PRIMER was wrong in PRIMER 16.0 and 17.0 because when it first appeared some incorrect assumptions were made.

Since then the LS-DYNA user manual has been clarified and PRIMER has been revised to make this card work correctly.

Symptoms of previous wrong behaviour were:

- Treating a multiply-defined parameter that should be ignored as implicitly _MUTABLE in some circumstances.

- Sometimes not ignoring / accepting the correct instance of a multiply-defined parameter.

These errors have been fixed, and *PARAMETER_DUPLICATION in PRIMER is now handled rigorously according to the rules spelled out in the LS-DYNA manual. In particular, input decks with wrongly ordered cards are detected during keyword input and the model is corrected to remove ambiguities arising from this.

- **Case 36596**

*PARAMETERS can now be used on *MECHANISM definitions on assemblies, connections, points, children and stretches. Previously PRIMER would have read models with parameters there, but replaced parameters with their values.

Now PRIMER keeps the parameter references when reading, copying or writing models and allows to update parameter values as on ordinary LS-DYNA keywords, but parameters are still not fully displayed on the mechanism edit panels.

Part table

- **Case 43348**

The part table only showed CON1, CON2 for rigid parts if CMO = 1. This has been modified so values are shown for CMO = 0 or -1 as well. CMO has been added as a new column on the table. Also, a new warning check is given if CMO = 0 and CON1 or CON2 is set.

Part tree

- **Case 43693**

In previous versions, include files could not be deleted in the 'Contents' mode in the Part tree. It worked fine in the 'Include' mode.

This has been fixed now.

Pedestrian

- **Case 45406**

Lower leg and upper leg bumper GTR impact tests now have impact points lying within the bumper test area specified by paragraph 3.10 in the GTR regulation document.

Preferences

- **Case 45505**

PRIMER now gives out confirmatory window message while saving preferences in SQUASH SUB-PANEL

- **Case 43805**

The command line option `-pref=/xxx/yyy/custom_pref` had 2 bugs.
- it was only reading runtime prefs and ignoring startup prefs
- if the preference `primer*script_dir` was used in `custom_pref` it got ignored
Both these have been fixed.

Program crash

- **Case 45245**

In certain cases the following sequence of JavaScript commands:

- + Open an object menu, for example `Part.Select(...)`
- + Move the mouse into that menu and use a keyboard short-cut key

could cause a crash.

This was because keyboard user events passed from JavaScript were being misinterpreted in this context due to an internal error. Now fixed.

- **Case 43962**

Fixed a bug where PRIMER crashed upon opening Discrete under the Element Keyword dropdown, after creating SENSOR_DEFINE_ELEMENT with ETYPE as DISC-ELEM and some latent entry in ELEMID.

Read

- **Case 45019**

PRIMER now reads *BOUNDARY_PRESCRIBED_MOTION_SET_SEGMENT without having to add an empty card 2. Additional card 2 is expected if DOF = 9, 10, or 11 or VAD = 4 on Card 1, otherwise it is skipped.

- **Case 43121**

PRIMER will not crash now when file reading is interrupted by dragging and dropping a new file before the previous file has finished reading.

ReNUMBER

- **Case 45622**

1. Include file with unlabelled content will be shown last for Include entity labels sort option.
2. If general checkbox is turned off, it should now show include files in the correct order.

- **Case 45016**

Fixed some label clash bugs related to BEAM field by changing the relabelling logic. Details below:

If the BEAM field on *DATABASE_BINARY_D3PLOT is set to tell LS-DYNA to generate extra beam elements to duplicate DISCRETE and 1D SEATBELT elements this can cause label clashes if existing beams of the same labels exist.

PRIMER checks for this before keyword output and offers to relabel discrete and seatbelt elements if required, but the relabelling logic was very conservative and tended to result in larger than strictly necessary label increments. Normally this would not matter, but if the result was to increase the labels so that they exceeded the field width in the current output format this would require a larger output format to be used, and a second relabelling process to be gone through.

To try to avoid this the following changes have been made to this logic when a clash is detected:

+ Relabelling will now use the minimum shift of discrete and seatbelt element labels to move them out of the way of existing beam labels, while keeping the existing spacing between labels.

+ A further check is made to ensure that this minimum shift will not push their label range beyond what can be represented in the model's current 'soft' label limit. (99,999,999 for small format; 2,147,483,647 for i10/32 bit format; and so on) If this limit will be breached then the labels are made sequential with no gaps.

Scripting

- **Case 43431**

Sled_test, sba, and luggage_retention JavaScripts were showing a small empty label box above the '<<< Go back to panel' button. It has been deleted.

Selection

- **Case 45612**

Feature line screen-picking of parabolic shell elements could cause a crash. This was due to an internal error resolving the extra mid-side nodes on these elements.

Now fixed for these elements, and also for 8 noded segments on parabolic element faces which would have suffered from the same problem.

- **Case 41168**

Screen area picking of types for which the entity switch is OFF were using simple area pick. For items which use the visibility of the underlying element (e.g.contact, element_mass_part, database_history, set) the pick should only apply if an underlying element is visible. e.g. if all parts of a contact are blanked, then the contact should not select. Also a new preference has been added primer*visible_entities_only_on_object_menu:ON so that strict visibility can be enforced.

Sets

- **Case 44603**

Propagation of selected items in ALE models could select too many parts. This has been fixed.

Timestep

- **Case 43545**

Use of DT on MAT100 for mass scaling is non-preferred as it is rather unclear what the added mass actually is. A new warning check will warn if DT is set and offer autofix to zero DT(s) and set the model timestep from the smallest non-weld element

Units

- **Case 44708**

For VFLAG=1, units of G[i] previously changed the value of the field, which was incorrect. Now, no change to the value occurs upon changing the units.

- **Case 44676**

Corrected the units of BSTART, BSTARTK and beta[i] to U_REC_TIME (wherever applicable) in materials 73, 76, 134, 276.

- **Case 44546**

Unit conversion on MAT_138 fields GIC and GIIC has been corrected.

User interface

- **Case 45597**

Fixed an issue with Dynamic viewing where certain button combinations would result in inconsistent item selection in the graphics window.

Dynamic viewing in both PRIMER and D3PLOT suffered from an annoying problem in the following situation:

- + Click a mouse button and start moving the mouse, far enough to initiate a screen area 'drag out area' selection operation.
- + Click shift or ctrl keys to initiate dynamic viewing. Mouse motion now influences the current view and the cursor changes to show this is the current operation.
- + Release mouse button or shift/ctrl key.

This would revert to the original 'area selection' operation, but this might now be invalid as the model has moved. Typically the screen rectangle will no longer be rectangular, and what is within it will have changed.

A variation on the above is when area selection is not wanted, but a dynamic viewing is started too hastily with the mouse (click and drag before shift/ctrl is pressed) with the result that what the user thought was a simple view change operation becomes some sort of selection one - typically unwanted blanking if the default quick pick mode is current.

These problems have now been fixed in both codes. The fact that what was an area drag has mutated to become a dynamic viewing operation is now detected, and when dynamic viewing finishes the code now 'knows' that area selection is no longer valid and does not try to resume it.

- **Case 45558**

- Corrected a typo in an error message for not selecting a model when running Dummy_Finger_Assembly_Creation_Script.js.

- Corrected a typo in an information window when reloading a property file (.prp).

- **Case 44346**

In the Renumber Includes panel, the text boxes under 'Range unique?' and 'In range?' for main model were not turning green when the fields had correct values. This has been corrected now.

- **Case 44330**

Switching between the Light theme and any other theme, or vice-versa, causes the background colour of the plot to swap between black and white so the plot is redrawn with the new colour in SH shaded mode.

However if the current plot contained 'mixed mode' plotted elements that use HI hidden line mode their background colour failed to be updated to the new background colour until a new explicit plotting command was given.

Now fixed: if changing theme also changes the plot, background colour mixed mode HI plotted elements will update correctly.

- **Case 44299**

The 'Preview Mesh' button in Mesh → Ruled remained grey throughout in the new UI. Now it has been modified to change colour when it is supposed to.

- **Case 44106**

The red warning button on dialogue box previously did not function correctly when clicked while writing out .ztf files. This is now fixed.

- **Case 43698**

Text now fits on the following buttons in the new UI:
'→pencheck.csv', 'Incl scale and offsets'

- **Case 43600**

In the Connection → Contact panel, the following 3 buttons were grey. They are now green (as they used to be in the old interface):

- DELETE & REMAKE CONNECTION CONTACT
- Repair NOT-CONNECTED
- Repair NOT-STICKING

- **Case 43582**

The BPRM animation has a pair of + / - buttons for framerate control. They had different colours. They are now consistent with each other.

- **Case 43440**

The SFA, SFO, OFFA and OFFO textboxes in the DEFINE_CURVE editor no longer change colour to green when the 'Incl scales & offs' option is toggled on. Instead the labels above them change to the corresponding toggle button colour of every theme.

- **Case 43432**

Listing and settings panels of contour and vector plots had a blank area on the RHS. These panels have now been made narrower.

- **Case 43430**

Colour of parameter button (in top-right corner of panels) not appropriate in the dark or light themes. Changed from dark blue to light blue.

Views

- **Case 41566**

Fixed PRIMER crashing when screen picking nodes while using Match Image under the Viewing toolbar dropdown.

Volume 3

- **Case 43826**

Filter functions for ICFD keywords now work correctly.

Write

- **Case 45516**

When a model contains one or more compressed include files these will have extensions .gz or .zip. In the normal case of writing them out in the format in which they were read these extensions will be preserved, however if the model is subsequently written out in uncompressed form it could end up writing child.key.zip when the file was in fact not a .zip file. Likewise .gz.

This was a simple omission: the case of 'child file was compressed but is no longer' had not been considered in the filename revision logic. Now corrected.

- **Case 45248**

When packaged .zip file output was chosen and the destination for include files was 'same as master' PRIMER wrongly put include files in a sub-directory in the .zip file.

This made the resulting file package unreadable since the master file did not have any pathname for that sub-directory in *INCLUDE filenames (correctly, because they were meant to be in the same directory) yet the files themselves were in a sub-directory within the .zip package.

This was an internal error: the 'same as master file' include file destination was not considered in the special logic used to write .zip file packages. Now fixed.

- **Case 44745**

*EM_MAT keywords have now headers for every instance.

- **Case 44743**

*EM_ISOPOTENTIAL_CONNECT now writes keyword headers for each instance of the card.

- **Case 44517**

When reading a model that contains skipped data and then writing it out in merge in master mode, skipped data was not getting inserted back. This has been fixed now.

- **Case 44484**

From R9.0 onwards LS-DYNA permits individual keywords to be promoted to I10 input format. PRIMER now takes advantage of this as follows:

V17.1: A simple 'promote small format keywords that contain 8 wide fields to I10 format' switch is added.

V18: The same switch is added but it has the options 'Promote if needed', 'Promote always' and 'Promote to I10 / large if needed'.

In V18 the 'automatic' and 'keep original' format keyout options also have options to promote individual keywords.

- **Case 44071**

Writing a .ztf file for a model with thick shells which had erroneously been assigned *SECTION_SHELL was found to crash as the extraction of integration points (nip) failed. Though this is a user error, some traps have been added to PRIMER to prevent the crash.

Xref

- **Case 43337**

The cross-reference tree when invoked on a dummy or mechanism was not showing the items that it refers to such as 'dummy mech assembly', 'mech connection', etc. This has now been corrected.

2.2 D3PLOT

Animation

- **Case 45311**

If an image or movie was written out of D3PLOT and it contained Shell element parts which were being drawn using the option to display them with their thickness, then those parts could be missing from the image. The problem would only occur if the parts were either being cut by a cut section or if only a subset of the elements in the part were being drawn.

- **Case 45156**

The default frame rate when writing Movies has been changed to 25 fps. This value can be controlled using the new **d3plot*output_frame_rate** preference.

- **Case 44413**

The version of FFmpeg used by D3PLOT (and now also REPORTER) has been updated to 4.3.1.

- **Case 45389**

If a movie file of a contoured model was exported without having already manually animated the model, the contours could be scanned with data scan set to first/last (i.e. the max/min values calculated based on the first and last frames only). If the data values in intermediate frames fell outside the first/last frame max/min, then the contour bar values in the movie file would not be correct. This has been fixed.

Attached

- **Case 44961**

In the dialogue command Attached menu a new option has been added for Rigid Parts to swap between unblinking single elements or the whole part.

Previously this option existed in the GUI, but the dialogue command options only had an option for controlling the behaviour in deformable parts.

The four options for single/whole parts in rigid/deformable are now:

```
/attached selection single_elem  
/attached selection attached_part  
/attached rigid_selection single_elem  
/attached rigid_selection attached_part
```

(the first two already existed and are unchanged)

- **Case 43978**

If the recursive option was used in the Attached menu, then D3PLOT would track across deleted elements and find flying unattached elements.

In D3PLOT 18.0 the recursive option no longer tracks across deleted elements unless the user has turned on the option to draw deleted elements.

- **Case 43446**

In previous releases, Attached worked on a per-model basis and this meant that if a model was in multiple windows with different entities blanked in each window, the effect of an Attached operation was to unblank the same elements in all windows.

In D3PLOT 18.0 the Attached menu has been modified so that it now has window tabs instead of model tabs when multiple windows are active. The Attached operation now works on a per-window basis.

Blanking

- **Case 45152**

If you used the Quick Pick 'Key In' option to try and blank any of the Multiphysics Parts then nothing happened. Now fixed.

Contacts

- **Case 41558**

The order in which contact surfaces appear on the XY data panel has been changed. Previously, the slave surfaces were followed by all master surfaces:

Slave 1
Slave 2
Slave 3
Master 1
Master 2
Master 3

Now slave and master for the same contact are paired like so:

Slave 1
Master 1
Slave 2
Master 2
Slave 3
Master 3

Contour

- **Case 45540**

If the option to plot data relative to a reference node was turned on while a reference state was also set, then the values displayed could have been incorrect. This has been corrected.

- **Case 45381**

When D3PLOT calculates the contour bar range for SI, CT or LC plots then by default, it only includes the values from external visible faces of 3D elements. To include the values from internal faces, you previously had to switch on the drawing of internal faces.

From version 18.0 onwards D3PLOT has a new option in the Data menu. If selected, D3PLOT will include the internal faces when calculating the contour bar range without having to switch on the drawing of internal faces.

For backwards compatibility, the default in D3PLOT 18.0 is still to use just the external visible faces but this can be changed via a new preference option, **d3plot*contour_bar_3d_faces**.

- **Case 44007**

If a contour plot with limiting values was created, then any entity types for which the component was invalid were drawn as uncoloured (grey) items, even if the user had selected the 'omit' option. In D3PLOT 18.0, this behaviour has been changed so that by default, uncoloured items are not displayed when the limiting values 'omit' option is selected.

A new option has also been added to the limiting values menu to switch off the new behaviour and to revert to the previous logic if preferred.

- **Case 43610**

If some items had the display mode changed from 'Current' to 'Shaded' then when Auto Transparency was used, those items would be drawn opaque and the transparency level applied to uncoloured items wouldn't be applied to them.

D3PLOT 18.0 has a new option which can be used to apply the uncoloured transparency value to Shaded items. The default is the same as in previous versions so that Shaded items are still drawn opaque, but the Auto Transparency menu now has a new option, "Treat Shaded as Uncoloured", which applies the transparency to the Shaded parts as well.

Cut section

- **Case 45071**

The JS API function GetCutForces sometimes returned incorrect values when used in a D3PLOT session started from the command line with **-d=TTY**. This has now been fixed.

- **Case 44978**

D3PLOT would report the wrong cut section forces if a cut section was defined when magnified displacements were also set.

In D3PLOT 18.0 this has been fixed if the cut section has been defined using BASIC space.

When DEFORMED space is used it is not possible to calculate the forces within D3PLOT, so D3PLOT 18.0 now checks for the combination of DEFORMED space and Magnify displacements and, if they are both set, it refuses to calculate the forces and displays a warning message telling the user why they have not be calculated.

- **Case 44728**

When switching on multiple parallel cut planes (with uniform spacing) via a dialogue command and then changing the spacing to a smaller number, D3PLOT would sometimes continue to draw the (smaller) number of planes relevant for the larger spacing. Now the number of cut planes drawn updates correctly.

- **Case 44189**

The drawing of the intersection of warped quadrilateral faces with cut planes has been improved.

- **Case 44152**

Cut planes intersecting warped quadrilateral shells can have all four edges intersecting the plane. D3PLOT now correctly draws two capping line segments on these shells, rather than one.

Data components

- **Case 43193**

Fixed an issue where the button that normally displays 'Vel' would read '???' when Volume 3 analysis results were opened in D3PLOT.

Dialogue command

- **Case 45134**

Fixed an issue where the AVI_READ dialogue command would crash if passed a filename to a non-existent file. The AVI_READ and AVI_DISPLAY commands are now deprecated in favour of MOVIE_READ and MOVIE_DISPLAY following the addition of MP4 support to D3PLOT.

- **Case 45069**

Some dialogue commands for beam properties caused D3PLOT to crash. Now fixed.

- **Case 44678**

Fixed an issue that caused D3PLOT to crash if the dialogue command to set user-defined contour levels was entered as a single line.

Filtering

- **Case 38357**

When selecting all visible items with All_Vis from an object menu, text filters were not respected, so items not displayed on the menu due to the filter were also selected. Now, only items on the list are selected.

General

- **Case 44530**

If a model contained both SPCs and either NRBs or Loads, and if PRIMER had created a ZTF file, then the internal numbering of the NRBs and Loads was incorrect if SPC forces has been written out to a LSDA (binout) file.

This error would result in the incorrect entity types being reported as being connected to nodes which should have had SPCs on them (as shown in the write table when listing connected elements). It also meant that using the Attached menu to find items attached across NRBs didn't work correctly. This has now been fixed.

Graphics

- **Case 44989**

For a faded background colour, the option to use Auto was not working in D3PLOT 17. It is now fixed.

- **Case 44988**

In a colour popup, if you create a new colour, you now see it applied immediately.

In the Part Tree or when using Quick Pick, when selecting a single item to change the colour and create a new colour, then the colour palette is initialised as the current item colour (instead of black).

Image

- **Case 45363**

D3PLOT has an option to capture image files at 2× and 4× screen resolution. On Linux, when the Window Dressing options to clip the image to a sub-set of the screen (e.g. 'Part screen', 'Report format') were used, the resulting image had a superimposed grid of horizontal and vertical stripes. Now fixed.

Integration

- **Case 45636**

REPORTER templates containing a mixture of D3PLOT and T/HIS items could cause a crash if generated in a D3PLOT session linked with T/HIS rather than in separate D3PLOT and T/HIS sessions. This has been fixed.

- **Case 44494**

If a composite part had an even number of layers and data was plotted using the 'Min/Max/Mag All' option for one of the Extra time history variables, then the plot could incorrectly show 0 for those elements. This has now been fixed.

JavaScript API

- **Case 45532**

D3PLOT could crash if a JavaScript was run multiple times without any model loaded. Now fixed.

Labels

- **Case 45466**

The label font size at maximum and minimum contour values was not updated correctly when the List option was not selected on the Max & Min options in the Data menu. Now the font size updates correctly.

Materials

- **Case 44493**

If data was plotted on composite parts for one of the Extra time history variables, then everything worked correctly if the surface was changed to one of the 'Min/Max/Mag All' options.

If the same data was plotted by selecting the component via the Material Properties data component category, then the 'Min/Max/Mag All' options could report incorrect values.

This has now been fixed.

Menus

- **Case 45201**

In D3PLOT 17.1, reading a settings file would cause the user colours to be modified. In D3PLOT 18.0, the user colours remain determined by the user_colours.xml file.

- **Case 44392**

When running REPORTER with a linked D3PLOT-T/HIS session, the Variables panel sometimes failed to update and move any newly created variables to the list of existing variables when the capture was updated. Now fixed.

Part Tree

- **Case 45015**

Fixed an issue where the colour popup could appear stranded when its parent menu closed.

Preferences

- **Case 43800**

Fixed an issue where D3PLOT was not applying locking to startup preferences (like `graphics_type`, `maximise`).

- **Case 43742**

When running D3PLOT with the command line option `-pref=/xxx/yyy/custom_pref`, if the preference `'script_dir'` was used in `'custom_pref'`, the setting got lost and the scripts did not appear on the tree. Now fixed.

Program crash

- **Case 45658**

D3PLOT could crash when picking a part in a window containing multiple models, one of which contained no solid or thick shell elements. This has been fixed.

- **Case 45539**

D3PLOT could crash when writing out `*INITIAL_STRESS_BEAM` cards if the model contained Belytschko-Schwer beams and the PTF files did not contain all of the output data required for Belytschko-Schwer beams. Now fixed.

- **Case 45200**

D3PLOT could crash when reading back in a `d3plot/.ptf` file that had been created using the `Cutdown/Compress` option from within D3PLOT, if the file was written in the re-ordered format and the ZTF file was embedded within the file.

The crash would occur if the cut-down model only contained a subset of the original parts and contained spotweld assemblies that referenced elements in parts that had not been output to the file. This has now been fixed.

Properties

- **Case 45549**

In the Properties menu, the settings for the entity and label switches were not copied across to other models when `'All Properties'` were exported. Now fixed.

Read

- **Case 45657**

When a model was reopened (File → Reread model) the current plotting mode would initially revert to shaded, swapping to the current mode (e.g. SI) only when the mouse was hovered over it, triggering a Predictive Pick redraw.

Now fixed: The original plotting mode is remembered and reused immediately when a model is reread.

- **Case 45281**

Fixed an issue where D3PLOT could appear to hang for some time when reading in a model while displaying the following message: *Computing quick draw list in family 0*

- **Case 43854**

In the 'Multiple Models (Search Directories)' the file type filters sometimes filtered by the wrong type when opening a new model. For example, when D3SSD files were selected, the bottom of the panel actually showed D3EIGV files. This has now been fixed.

Sections

- **Case 44867**

True beam sections in D3PLOT were not always drawn consistently with those in PRIMER and the LS-DYNA keyword manual. For ICST = 5 on the *INTEGRATION_BEAM card the drawing in D3PLOT 18.0 has now been changed from a solid box to a tubular one.

Session

- **Case 44640**

If multiple copies of D3PLOT were started by the same user on the same machine and they all used the options to save or restore session files then things could go wrong as they would try to use temporary files with the same filenames.

From D3PLOT 18.0 onwards, each occurrence of D3PLOT creates unique pathnames for any temporary files. In addition, D3PLOT 18.0 will tidy up and remove these temporary files when it has finished with them or if the user exists D3PLOT.

- **Case 44312**

If a session file was opened in D3PLOT by double-clicking on it and some of the models it referenced were unavailable then the Apply button was still active and would generate error messages if you clicked it. Now fixed.

Settings file

- **Case 45361**

If a settings file was written out that included measurements that had been defined using a reference state, then when the settings file was reloaded the relative state was not re-applied to the measurement. Now fixed.

- **Case 45360**

If 'Traces' were setup in D3PLOT and a settings and properties file were then written out, the 'Traces' were not restored when the files were read back into another session. Now fixed.

- **Case 45010**

If you read a settings file from D3PLOT 16.1 or earlier where the overlay colour was set to 'element', it came out violet. This has now been fixed and it comes out 'element' colour as expected.

Shortcut

- **Case 44725**

Corrected 'w' shortcut key processing to open the Images panel on the Raytrace tab if that was the last one accessed in a session.

User interface

- **Case 45653**

When D3PLOT or T/HIS were linked to REPORTER in shared memory mode the item tree would not necessarily update to include a vertical slider when the contents extended beyond the bottom of the item tree box. This has been fixed.

- **Case 45373**

In a linked D3PLOT-T/HIS session, if a graph was changed from child to sibling or vice-versa then 'Bad window id in: 0' error messages would be displayed and the REPORTER Panel could be displayed in D3PLOT. This has been fixed.

- **Case 43674**

The 'Select None' text now fits in the button in the Write Table panel in the new UI.

- **Case 43641**

Adjusted scaling of object menus in D3PLOT so text fits on the Scr_Area button in the new UI.

- **Case 43460**

The colour of Window and Model tabs was not changing when hovering over them. Now fixed.

- **Case 43410**

Yellow and dark blue colours in the key of the FLD graph were not readable in light and dark themes respectively. Changed to dark orange and olive, which are readable in all themes.

- **Case 42503**

The button text 'Tools' on the T/HIS link button has been changed to 'T/HIS'. It now only says 'Tools' when the T/HIS link is actually open and the T/HIS tools buttons are shown.

Views

- **Case 44545**

If a window contained multiple models and perspective viewing was switched on, then the options in the GUI to modify the perspective settings were not applied and the view did not update. Now fixed.

Write

- **Case 45086**

If a new model was opened in D3PLOT while the Write Keyword menu was open, then the menu was closed as normal, but when it is subsequently re-opened, the Model tabs were not displayed and the terminal window showed some error messages. Now fixed.

- **Case 44082**

If a model was loaded into multiple windows then the 'Write Keyword', 'Write Scan' and 'Write Global' menus always used the first window that the model was displayed in when extracting data.

In these menus which use model tabs D3PLOT 18.0 has a new option that allows you to select which window is used when extracting data.

If a model appears in more than one window, then by default the first window containing the model is used (same behaviour as previous versions), but a popup menu is activated that allows you to select any of the other windows that the model is also in.

Beside the popup (which shows the currently selected Window) the state time for the selected window is also displayed to make it more obvious which state data will be extracted from.

In SCAN mode, if you have selected multiple states via the 'Envelope' option then the popup is disabled and the time display unmapped.

XY Data

- **Case 45626**

Fixed an issue where outputting an XY Data composite graph for an element type other than solid elements, if multiple element types present in the model, would generate incorrect data.

2.3 T/HIS

Annotation

- **Case 45538**

Annotations in the Measure menu did not show x- and y-values. This has been fixed.

Curve table

- **Case 44423**

If the contents of the curve table were written out to a CSV or XLXS file and the curve table was displaying injury criteria, then any lines containing the model summary incorrectly showed zero for the injury criteria where they should have shown '-' for the values that did not apply. Now fixed.

Curves

- **Case 45254**

If you displayed the history for a curve in T/HIS and tried to delete the last operation used to create the curve, then when you clicked on 'Update Curve', the curve was rebuilt as it originally was with the last operation still being applied. This has now been fixed.

- **Case 45223**

A crash could occur after deleting curves with annotations. This has been fixed.

Dialogue command

- **Case 43433**

Added StartTHisLink() and ExitTHisLink() JS API functions to D3PLOT. You can now open and start the T/HIS link via JavaScript.

These have been added to replace the use of DialogueInput() which was previously not able to open the link correctly when a JavaScript Window was open. This bug should now also be fixed, although it is recommended to use the new functions mentioned above for this purpose.

FAST-TCF

- **Case 45265**

A FAST-TCF script could extract data from the wrong in-plane (or solid) integration point if the script contained multiple read commands where the first command did not specify an integration point and the second one did. Now fixed.

- **Case 43419**

If an airbag and airbag part both had names, then if the option to write names in place of entity IDs into FAST-TCF scripts was switched on (this is the case by default), then FAST-TCF Read commands for airbag part data would not be processed correctly. This has been fixed.

Menus

- **Case 45228**

Previously, if you selected a user-defined colour for your title or axis, it changed on the graph, but did not show as changed in the menu. This has been fixed.

- **Case 45108**

In some circumstances, if the option to select models was changed to 'Search Directories', then in the panel that lists the models, the buttons used to select the models were too small and did not display any text. This has been fixed.

- **Case 44118**

On Windows, the sequence:

- Move mouse into menu of items
- Let it auto-expand
- Move mouse over button at top of menu

could cause the 'Hover over lighting up' of the button to display in the wrong place, typically near the top of the scrollable list of menu items. Now fixed.

Preferences

- **Case 43799**

T/HIS was not applying locking to startup preferences (like graphics_type, maximise). Now fixed.

Properties

- **Case 44502**

Fixed an issue where FAST-TCF curve legend properties for the minimum and maximum Y-values were not being correctly read into T/HIS.

Read

- **Case 45476**

For Volume 3 ASCII files (CESE, ICFD, EM) with the format of *file_name_xxx.dat* or *file_name.xxxx.dat*, if you read more than 100 files, errors would pop up in the dialogue window. Now fixed.

- **Case 45346**

T/HIS could sometimes crash if it attempted to read data from an LSDA (binout) file on a remote disk system while an LS-DYNA analysis creating the LSDA file was still running. In T/HIS 18.0 some changes have been made to improve reliability.

- **Case 45240**

Some BINOUT files produced by beta versions of LS-DYNA R12.1 were displayed in T/HIS with the X-axis unit set to 'Frequency' instead of 'Time'. Now fixed.

- **Case 44589**

T/HIS failed to read a CSV with an extra comma and white space at the end of each line. Now fixed.

Session

- **Case 44639**

If multiple copies of T/HIS were started by the same user on the same machine and they all used the options to save or restore session files, then things could go wrong as they would try to use temporary files with the same filenames.

From T/HIS 18.0 onwards, each occurrence of T/HIS creates unique pathnames for any temporary files. In addition, T/HIS 18.0 will tidy up and remove these temporary files when it has finished with them or if the user exists T/HIS.

- **Case 42795**

If a session file was saved for a D3PLOT-T/HIS linked session where curves had been sent to T/HIS from D3PLOT, then the model number, entity type and entity ID for the curves were not recorded in the session file. This meant that when the session was re-opened the curves were created correctly, but they were not assigned to the correct model and the entity type and ID were not set. Now fixed.

Speed

- **Case 45462**

A JavaScript that performed operations on many curves was slower in T/HIS 17 than in T/HIS 16. Now T/HIS 18.0 no longer updates the Curve Manager menu while a JavaScript is running. If the JavaScript is interactive, e.g. uses curve picking, or is run from the debugger, the curve manager menu will be updated. This behaviour can be changed by setting the new preference **this*javascript_update_curve_menu** to TRUE instead of FALSE (the default).

User interface

- **Case 45409**

In the Read panel, a new 'Read Models' subheading was added to make it easier to find the New Model and other related buttons.

- **Case 45393**

Adjusted the 'Edit in PRIMER' popup to be more readable across a wider range of screen dimensions and display settings.

- **Case 45035**

The Read and Generate X Values buttons in the CSV menu have been changed to radio buttons and function accordingly.

- **Case 44827**

Fixed an issue where the Operate output curve selection menu would become disabled for the remainder of the T/HIS session.

- **Case 44812**

Fixed an issue whereby the Graph Toolbar 'Auto Hide' functionality did not persist when re-reading and 'Extracting to match' curves.

- **Case 44503**

Fixed the Y Max and Y Min curve property tick boxes from unintentionally changing into a mixed state colour when the Highlight and Display text options have both been turned on.

- **Case 44319**

A slider was added to the Select Int Points and Node panel for better operation on smaller screens.

- **Case 43691**

The colours in the curve History buttons had been lost in the new UI. Now, the buttons are blue when modified and green when inserted.

- **Case 43479**

T/HIS Keyboard input was white text in the Light theme, making it very difficult to read. Changed so that the text input is now the same colour as the regular dialogue input.

- **Case 43212**

Under certain situations on Linux, while trying to save out an image or curve file without specifying the file extension, it would not be added to the final filename. Now fixed.

2.4 REPORTER

Capture

- **Case 45224**

If you open a template created in REPORTER 16.1 or earlier in REPORTER 18.0 or later, any D3PLOT and T/HIS items will continue to be captured and generated using the old pre-version-17 method (in versions 17.0 and 17.1, they were automatically converted to the new method, but this caused problems for some users' templates).

- **Case 45056**

Fixed an issue where D3PLOT Items would sometimes fail to load the image when conducting a fresh 'old method' Capture.

Library

- **Case 45562**

The 'LS-DYNA Version and Revision' *version.js* Library Program script has been updated so that it works with newer d3hsp/OTF files that can include:

1. An Ansys legal notices header above the LSTC header
2. LS-DYNA revision names incorporating the newer Git revision hashes instead of the older SVN revision numbers

Shortcut

- **Case 43423**

All main window keyboard shortcuts can now be used while the Logfile has focus.

Standard templates

- **Case 45644**

Fixed an issue that could prevent the GTR Head Impact 2020 template from updating properly after you Edit Settings from any of the buttons on the template.

- **Case 45423**

In the IIHS Side MDB Impact 2017 template, if you Set Observations on page 2 after the template had generated, then any changes to the head protection rating were not then reflected in the Overall rating displayed on page 1. Now fixed.

- **Case 45386**

In the USNCAP templates, the N_{ij} calculation and chest transducer rotation for the HIII 5F passenger were using the same values as for the HIII 50M driver. Now fixed. Additionally, the HUMANETICS_HIII_5F_V2.0.2 dummy info now looks for cross sections rather than beams for upper neck and femur inputs so as to be consistent with the FE model.

- **Case 45098**

In many of the standard templates, calculations of compression forces were given the incorrect sign when run with LSTC dummies. In addition, some body region calculations were not considering both negative and positive values when comparing against rating limits. These errors have now been fixed.

- **Case 45097**

In the CSV files for LSTC HIII 50M dummies in `reporter_library/templates/dummy_info`, the knee slider inputs were incorrectly configured as spring elements. They are now configured correctly for `*JOINT_STIFFNESS`.

User interface

- **Case 45632**

The page number in the main window title bar will now correctly display the current page (usually the last in the Template) after report generation.

- **Case 45394**

The page number listed in the page navigation box should now correctly correspond to the current page (usually the last in the Template) after writing a PDF, PowerPoint, or HTML file.

- **Case 44362**

The JavaScript function `Template.EditVariables` now accepts an optional boolean argument to determine whether selected Variables should be displayed alphabetically (true) or in the list order in which they were passed to the function (false).

- **Case 43422**

The filename in the main window title bar will now correctly have an asterisk appended to it to indicate the file has been modified when Variables are edited or updated.

- **Case 14096**

All dialogs accessed via the menu bar (or created via JavaScript) should now appear on the same display screen as the main window. If manually repositioned, these dialogs should remember their previous position when being reopened. When moving the main window to a new display

screen, all of these dialogs should follow to the new screen (excluding an open Logfile or a maximised dialog).

2.5 SHELL

Filename

- **Case 45456**

If there is a space in the *KEYWORD_ID card fields, the SHELL was unable to submit the model for LS-DYNA run. This has been Fixed.

- **Case 43407**

Support panel leaves a grey patch upon dismissal on Linux machine. This has been fixed.

Edit

- **Case 44046**

When the 'dyna_versions' file is not present, the default CPU settings were not imposed in the SHELL submit panel. This has been fixed.

Filename

- **Case 43630**

LS-DYNA submission fails from certain directories with whitespace in path. This has been fixed.

Memory

- **Case 44389**

For the command line SHELL, the memory value conversion was incorrect at times. This has been fixed.

Sensor

- **Case 44649**

Kill Switches did not work for LS-DYNA submission with LSTC format outputs. This has been fixed.

User interface

- **Case 44531**

Added new environment variable 'SHELL_REMOTE_FAST' to launch faster (non-iconised) versions of the SHELL GUI on the Remote Linux machines.

- **Case 44398**

Re-configured the PRIMER/D3PLOT and T/HIS 'Options' panels for widgets consistency and usage.

- **Case 44289**

On Linux the PRIMER 'Options' panel was getting launched in Full-screen size. This has been fixed.

- **Case 44091**

The SHELL main menu popups were not mapped with the Left-mouse click on the buttons like 'Themes', 'Manuals' and 'Utilities'. This has been fixed.

- **Case 43898**

Corrected the widget label string for processors in the Submit panel.

2.6 Oasys

Program hanging

- **Case 43859**

Fixed an issue on Windows where, when process A fired off linked process B (e.g. PRIMER launched a linked D3PLOT session), and then process A terminated normally, its console (MS-DOS) window got 'left behind' until child process B was eventually killed.

User interface

- **Case 43485**

The dashed outline for the most-recently-selected tree item is now coloured more suitably for the current GUI theme. Additionally, the right-hand and bottom borders have been shifted in by 1 pixel so they no longer get left behind when a different item gets selected. This applies to all tree menus in PRIMER, D3PLOT & T/HIS.

- **Case 43485**

Fixed an issue where the unblanked status of selected items in the Part Tree could become lost.

3 Enhancements

The enhancements and bug-fixes for each program have been broken down into a series of topics. Within each topic enhancements and bug-fixes are listed by case ID.

3.1 PRIMER

Animation

- **Case 42863**

PRIMER's boundary prescribed motion animation function now permits you to specify an analysis timestep of your choice that can override the default value computed by the function.

Belts

- **Case 44271**

Added the option to create *AIRBAG_REFERENCE_GEOMETRY automatically when meshing seatbelts (for nodes on the seatbelt that are meshed in SHELLs). Option available in panels:

- Mesh - Tickbox
- Auto-refit - Radio button

- **Case 43682**

Seatbelt fitting enhancements:

- Duplicated some fitting parameters on the popup panel to make them more obvious
- Added a dropdown menu (with 4 levels of mesh fineness) to control 'Max curve angle', 'Belt length' and '#rows'

- **Case 43627**

Changes made to the seatbelt fitting panel:

- Added 'Pause' button - duplicate of 'Stop' button
- Added 'Step' button - next by 1 iteration
- Replaced 'Restart' button with 'Reset' button - back to initial state (because 'Restart' is just 'Reset' + 'Fit')
- Changed buttons to icons - added hover text and button alias

- **Case 42693**

Seatbelt fitting - increased maximum '#rows' from 19 to 100

Checking

- **Case 45214**

Added a model check for MAT_054 where if DFAILT > 0 then DFAILC must be < 0.

- **Case 42073**

A new text box has been added on the LS-DYNA output reader panel which informs whether the analysis has terminated properly or not.

Clipboard

- **Case 44277**

Header box in Clipboard object selection menu now updates to reflect number of items being added or removed.

Compare

- **Case 44731**

Part compare write to Excel format now indicates whether the filename already exists by showing the text in a red colour. The panel is now unmapped once the write to Excel is complete.

Connections

- **Case 43692**

PRIMER's merge bolt connection requires that rigid shells of the bolt overlap deformable shells of the layers. This is necessary as emptying the connection involves deleting the rigid shells.

The connection tool 'From FE' has been enhanced to handle the case where the rigid shells are not initially overlapped with deformable by creating deformable shells on them so the connection can be created.

Contacts

- **Case 45075**

*CONTACT_AUTOMATIC_GENERAL_INTERIOR is now included in the segment edge check phase of contact checking.

Contour

- **Case 44070**

The values Area (for shells only) and Volume (for beams, shells, solids and thick shells) have been added to the list of data components that can be contoured as element properties in SI/CT mode.

Cut Section

- **Case 45206**

Cut sections modifications:

- Added a custom spacing option to PRIMER's multiple cut sections feature.
- Added PRIMER manual links to help messages for thick cuts and multiple cuts.

Element quality

- **Case 45707**

Added max solid spotweld/adhesive warpage to the CHECK OPTIONS panel Quality category.

Encryption

- **Case 44252**

The ability to read partially encrypted *AIRBAG cards has been added.

The *AIRBAG must have suffix `_ID` and the first line of:

[Label] [Title]

must be provided in clear. Thereafter PGP encryption can start on any line.

The implications inside PRIMER are as follows:

- Checking is suppressed for encrypted airbags since it is assumed that no data values will be known.
- The PGP data is remembered and reproduced verbatim on keyout.
- If the model also contains partially encrypted loadcurves these will be locked against deletion if the model also contains encrypted loadcurves (or materials, as before).

Graphics

- **Case 44661**

The 'Saved properties' panel was a bit obscure, since the only way of accessing it was to hover over the [Save P] button.

Two new ways of invoking it directly have been added:

- (1) A direct access from the [Display] popup menu.
- (2) Via the short-cut key '~'. (Like all keyboard shortcuts the key can be re-assigned)

In addition in the Saved Properties panel itself the [Reset attributes] popup menu has been added, giving an easy way of resetting visual attributes.

IGA

- **Case 44507**

Added warning if NODE is referred to by *ELEMENT_SHELL_NURBS_PATCH

- **Case 44473**

Added support for mass calculation for *ELEMENT_SHELL_NURBS_PATCH

- **Case 44242**

Added high order basis function checks to *ELEMENT_SHELL_NURBS_PATCH.

- **Case 44241**

Added checks on NISS/NISR and PS-PR fields to *ELEMENT_SHELL_NURBS_PATCH.

Implicit

- **Case 45483**

A new tool has been added to help setup the *CONTROL cards required to run various types of implicit analyses. This tool can be accessed from the 'Implicit' button on the Tools panel. The tool offers a selection of implicit analysis types: Static, Transient (Direct or Modal), Buckling (standalone or intermittent), Eigenvalue (standalone or intermittent), Frequency Domain (FRF).

By default, the tool will open in a simplified mode which requires less input to setup the different analysis types, however an advanced mode is also available to allow more customisation/use of non-standard options.

Include

- **Case 43009**

Added new warning text below the text box if file exists.

JavaScript API

- **Case 44917**

The `_MORTAR` keyword option can now be set on supported contact types using the Contact JavaScript class.

- **Case 43767**

Added new `SensorDefine` class to PRIMER JavaScript API.

- **Case 43625**

A GUI Builder has been added to the JavaScript menu to allow you to interactively create windows and widgets for a JavaScript GUI, rather than having to code it by hand. This is present in PRIMER, D3PLOT and T/HIS.

Keyword Editor

- **Case 44671**

Enabled keyword editor for `*ELEMENT_SOLID_NURBS_PATCH` with first two cards.

Macro

- **Case 45190**

Added new preference `'write_checkpoint_files'` and a command line option with the same name to regulate the writing of the checkpoint files in PRIMER.

Manual

- **Case 43024**

Added access to the LS-DYNA User Manuals from Help → Keyword manuals.

Mass

- **Case 43728**

Assign mass using `*ELEMENT_MASS_PART` creates new definitions in the same include as the `*PART`, using `*ELEMENT_MASS` creates them in the same include as `*ASSIGN_MASS`. This behaviour is now switchable on the main panel (or by preference settings) so you can use `PART includes` or `ASSIGN_MASS includes` as you wish.

Measure

- **Case 42415**

Added new option for number format similar to D3PLOT.

Mechanism

- **Case 42958**

Added new preferences for value related options in Mechanism → Position → Options.

Mesh

- **Case 44109**

The user now has extra control over splitting quad shell into two tria shells. The user can choose the diagonal along which the shell has to be split. Four options are now available for the user:

1. Short diagonal
2. Long diagonal
3. N1 → N3
4. N2 → N4

- **Case 43741**

A Settings button has been added to the Geometry Meshing panel and Area Remesh panel which will take the user to Program → Meshing options where meshing parameters can be changed.

Pedestrian

- **Case 43142**

'Line Labels' labelling style is added to pedestrian markup script in PRIMER.

Read

- **Case 45461**

Added the preference to read any file as a *KEYWORD file irrespective of the extension (like *.inp, *.dat etc.) or read based on the file extensions.

- **Case 34393**

Added support for Dragging and Dropping of IGES, JT, LAYUP, NASTRAN and ABAQUS filetypes to improve support for geometry.

Renumber

- **Case 44608**

Added sorting functionality in Renumber → Visualise panel.

Scripting

- **Case 43305**

Added JavaScript support for *CONSTRAINED_LINEAR_GLOBAL and *CONSTRAINED_LINEAR_LOCAL.

- New Linear class.
- JavaScript API manual updated.

- **Case 43141**

As per ECE R42 regulation, Slow Speed Front 4 & 2.5kmph and Slow Speed Rear 4& 2.5kmph test setup added to standard crash test setup script.

User interface

- **Case 45563**

On some VMWare installations the status of the 'Shift' and 'Control' keys is not reported correctly with the result that these keys can appear to be 'stuck' in the pressed state.

It is possible to determine the state of these keys by secondary means, and although this is not the default this option can be turned on by setting environment variable SM_VMWARE_BUGFIX.

This is quite a rare problem and users should discuss it with Oasys Ltd first to see if a better solution is available.

3.2 D3PLOT

Blanking

- **Case 43608**

In D3PLOT 18.0 the Blank menu now has a propagate tab '==>' which can be used to propagate the blanking from one window to another.

In D3PLOT, blanking is a per-window attribute. This means that if a model is displayed in more than one window, then different items in the model can be blanked in different windows.

The new propagate tab can be used to synchronise the blanking across all the windows a model is in. The blanking status is copied for each model in the 'source' window to all of the selected 'target' windows that the model exists in.

If for example you have:

Window 1 - Containing Models 1 & 3

Window 2 - Containing Models 1 & 2

Window 3 - Containing Model 2 & 3

Window 4 - Containing Model 4

and you copy the blanking from Window 1 to the other windows then afterwards:

Window 1 - No changes

Window 2 - Model 1 blanking changed to match Window 1

Window 3 - Model 3 blanking changed to match Window 1

Window 4 - No changes

The Blanking menu also has a new 'M ==> M' button that can be used to propagate the blanking from one model to one or more other models. Items are matched by type and ID so the blanking status of PART 1 in the 'source' model is copied to PART 1 in the 'target' model(s). If PART 1 does not exist in a target model, the status is ignored.

If a target model contains items that do not exist in the source model, then their status is unchanged.

Contacts

- **Case 43597**

In D3PLOT 18.0 the default is now to automatically blank contact segments if the underlying element is blanked. This works for both blanking individual elements and when a part is blanked.

The Blank menu also has a new Options menu in which this new behaviour can be switched off. It also contains an option to swap the parent element to the first 3D element (solid or thick shell) instead of the first shell.

New preference options have also been added to switch the new logic off by default and to swap the default parent to the first 3D element if required.

Cut section

- **Case 45036**

In D3PLOT 18.0 a new data component has been added for cut sections:

FM_MAGNITUDE_CUT_FORCE

Previously the X,Y and Z forces could be output in both the Write and XY Data menus, but not the resultant.

This component has also been added to the CUT_SECTION_SUMMARY data component in the Write menu so the resultant force is also now output along with the other cut section data.

- **Case 30447**

Cut sections modifications:

- Added a custom spacing option to D3PLOT's multiple cut sections feature
- Added D3PLOT manual links to help messages for thick cuts and multiple cuts

D3PLOT Viewer

- **Case 37286**

D3PLOT can now output models in the 3D GLB format with support for shaded and contoured plots and single frame or animated output. GLB files output from D3PLOT are best viewed in D3PLOT Viewer, but can be viewed in other viewers, e.g. in Microsoft PowerPoint, with reduced functionality.

Data components

- **Case 43708**

D3PLOT can now calculate and contour section forces for thick shells of Gaussian, Lobatto, Trapezoidal and part composite sections. By default, section forces for thick shells are switched off, but can be switched on in Display Options → Thick Shells or by setting environment variable TSHELL_SHOW_RESULTANT to TRUE.

Include

- **Case 44986**

There is now the ability in Quick Pick, under Colour, to Colour by Include.

Macro

- **Case 45191**

Added new preference **d3plot*write_checkpoint_files** and a command line option with the same name to regulate the writing of the checkpoint files in D3PLOT.

Materials

- **Case 45293**

Updated the file mat_prop.csv with the latest material history variable names.

Measure

- **Case 37467**

A new Measure class has been added to the D3PLOT JavaScript API. It allows you to create measurements and to draw them in the graphics windows with similar options to those available on the interactive Measure panel.

Menus

- **Case 42550**

The new colour popup has been added in the following places:

- Airbag particles
- Watermark transparent colour
- Blob plot symbol colour
- Streamlines
- Using the Edit window to set model colours
- The hidden and fill colours for Crit, Vel and Vec plots
- The current overlay colour for the window
- Setting the edge colour for the undeformed geometry

Movies

- **Case 37615**

D3PLOT can now read MP4 files into a window background for synchronised playback with model animation, similarly to old functionality using AVI files.

- **Case 30717**

D3PLOT is now able to write video files in the MP4 format using H.264 encoding. Model animations can be captured in MP4 format and passed to an open REPORTER session for playback.

Preferences

- **Case 44526**

Added a preference **d3plot*mat_prop_location** to allow a user-defined location for the file `mat_prop.csv` of material history variables.

User interface

- **Case 44636**

It is now possible to capture animations to REPORTER by selecting Movie or GIF from the drop-down menu on the REPORTER panel Capture button.

3.3 T/HIS

Component

- **Case 44980**

T/HIS 18.0 supports the following new data components that can be written to the Airbag ASCII file ABSTAT of the LSDA (binout) file.

- Mass out
- Mass in
- Mass out through fabric
- Mass out via vent

These new options are output instead of the mass flow rates by setting MLKBAG on *CONTROL_OUTPUT.

Data access

- **Case 40883**

When reading ISO-MME data, the curves listed in the menu can be filtered by location in the model, e.g. Head, Foot, Wheel.

Data components

- **Case 44852**

T/HIS 18.0 supports the 'torsion' data component that can now be written out for spotweld beams to the LSDA (binout) and ASCII (swforc) output files.

- **Case 44820**

T/HIS 18.0 now supports the following new data components for seatbelt slings:

- Warp angle
- Skew angle
- Coulomb friction coefficient
- Spring normal force
- Side 1 belt force
- Side 2 belt force

FAST-TCF

- **Case 44320**

A 'Script generated' message is now displayed in the command window upon the generation of FAST-TCF script.

JavaScript API

- **Case 44922**

Constants have been added to the Read class which can be used in the various Read functions.

- **Case 42784**

New properties `label_font` and `label_size` have been added to the Datum class in the JavaScript API, to allow the font and font size to be set for datums via JavaScript. The properties can take values assigned using Datum class constants that can be found in the user manual.

Macro

- **Case 45192**

Added new preference 'write_checkpoint_files' and a command line option with the same name to regulate the writing of the checkpoint files in T/HIS.

Menus

- **Case 45074**

A dynamic Location pop up that sets up options according to channel list has been added to the ISO menu.

- **Case 44848**

The Curve Label pop-up has been added to the ISO menu with new options Channel Code or Channel Name.

Read

- **Case 43569**

The time taken to read a large T/HIS curve file back into T/HIS has been considerably reduced in version 18.0.

This speed up is even more noticeable in the linked D3PLOT-T/HIS case when a large number of curves or points is sent to T/HIS from D3PLOT.

- **Case 42584**

Added T/HIS reading support for EM ASCII file types:

```
em_boundaryOut  
em_circuit  
em_circuit0D  
em_circuitRes
```

em_timestep
em_rogoCoil
em_globEnergy
em_partData
em_isoPotConnOut
em_isoPotOut
em_randlesCell
em_randlesCellTot
em_randlesCellTotEn
em_randlesIntShort
em_randlesIntShortTot

- **Case 15901**

An option has been added to the Read → ISO-MME menu to label the curves with the Channel Code, rather than the Channel Name.

- **Case 44599**

Support has been added to the ISO Read menu so that it can read v2.0 of the format.

- **Case 45475**

Added support for the new EM files with *em_file xxx.dat* format to be read in when reading using the 'Multiple Directories' option. Also added support for volume 3 (ICFD, CESE and EM) files to be read in if they have a prefix when using multiple directories.

Units

- **Case 45474**

Added 'charge' as a unit in T-HIS.

Write

- **Case 43968**

A new option has been added to the Write menu to output curves in the ISO-MME format.

3.4 REPORTER

Licensing

- **Case 44733**

Along with the rest of the Oasys Suite, REPORTER has transitioned to LM-X licensing for version 18.0, so the FLEXlm licence is no longer supported.

Movies

- **Case 3485**

Support for the playback of MP4 movies and animated GIFs has been added to REPORTER. These can be captured directly from D3PLOT for use with a D3PLOT item or be added to a template through an image or image file item. Playback can be controlled by hovering over the item or using the buttons in the new animation toolbar.

Powerpoint

- **Case 44261**

You can now use the `-pptx` command line argument to trigger PowerPoint output. Both `-pptx` and `-ppt` arguments have the same behaviour (they output `.pptx` files).

Similarly, the JavaScript API method `Template.Ppt` has been deprecated in favour of `Template.Pptx` (both continue to output `.pptx` files).

- **Case 44259**

REPORTER has been able to write PowerPoint (`.pptx`) files since version 11. In REPORTER 18.0 support for the old `.ppt` VBA output has been removed.

Preferences

- **Case 44540**

The first sixteen colours saved in PRIMER, D3PLOT or T/HIS are now read into REPORTER via the `user_colours.xml` file and are accessible via the 'Custom colors' panel (select 'More colours...'). Any user colours added in REPORTER via 'Add to Custom Colors' can be saved to `user_colours.xml` via the new 'Fonts and Colours' tab in the Preferences dialog and will thereafter be accessible in PRIMER, D3PLOT and T/HIS.

- **Case 39537**

Font settings can now be saved directly from REPORTER via the new 'Fonts and Colours' tab in the Preferences dialog. There is also a new 'Startup' tab with preferences for maximising the main window, and also to specify the starting directory for REPORTER (previously these preferences could only be modified via the preferences editor in the other programs).

Standard templates

- **Case 44532**

The part lists necessary for the MPDB deformation algorithm are now exposed in the unencrypted script *d3plot_MPDB_barrier_parts_blanking.js*, allowing the template to be adapted to work on modified or third-party FE models.

- **Case 44115**

Following the release of Euro NCAP MPDB Compatibility Assessment templates in version 17.1, REPORTER 18.0 includes the C-NCAP MPDB Compatibility Assessment templates, with variants for 2022 and 2023 scoring. For more information on the templates, open REPORTER and select Help → Additional user guides.

- **Case 44013**

Improvements were made to the MPDB Compatibility assessment barrier deformation calculation to eliminate flying elements from consideration.

Text

- **Case 44127**

You can now specify a font mapping table CSV file in a location other than the installation location, to make customised font mapping more convenient.

User interface

- **Case 45506**

The Legacy GUI theme has been deprecated and is no longer accessible from the Preferences dialog. If you wish, you can still select Legacy theme via **reporter*gui_theme** in your *oa_pref* file.

- **Case 42966**

The 'LS-DYNA' tab in the Preferences dialog has been renamed 'Oasys Items'. All of the settings in the Program Locations dialog have been moved to this tab, and they can now be saved from REPORTER along with the other preferences.

3.5 SHELL

D3PLOT Viewer

- **Case 44752**

Added support to write out the 3D Export (GLB) files from the D3PLOT options panel.

ISO-MME

- **Case 44771**

Added support for ISO-MME to SHELL's T/HIS options panel.

Macro

- **Case 45193**

Added support to regulate the Read/Write of the Checkpoints files in the D3PLOT, PRIMER and T/HIS options panels.

PowerPoint

- **Case 44498**

Removed the obsolete VBA output option from the REPORTER options panel.

3.6 Oasys

Integration

- **Case 43511**

Models loaded into a PRIMER session can be submitted for LS-DYNA analysis directly from within PRIMER. The LS-DYNA job submission can be done on the same machine as PRIMER or on a networked Linux machine.

Performance

- **Case 44551**

Various keyboard shortcuts have been added to speed up text selection:

Shift + Left Arrow : Highlights from the current cursor position to the left by one character

Shift + Right Arrow : Highlights from the current cursor position to the right by one character

Shift + Up Arrow : Highlights from the current cursor position to the left-most character in the string (0 or prefix)

Shift + Down Arrow : Highlights from the current cursor position to the right-most character (length of the string)

Ctrl + Left Arrow : Jumps the cursor from the current cursor position to the left-most character of the word

Ctrl + Right Arrow : Jumps the cursor from the current cursor position to the right-most character of the word

Ctrl + Shift + Left Arrow : Highlight the rest of the word to the left of the cursor position up to the breaking character

Ctrl + Shift + Right Arrow : Highlight the rest of the word to the right of the cursor position up to the breaking character

Double Click Left Mouse Button : Highlights the whole word

Triple Click Left Mouse Button or Ctrl + A : Highlights the whole line