Version 18.0

Build	Module	Description	ID
27.11.18	General	Adjustments to the current program version TRIMAS® 18.0.	13138
04.10.18	General	Adjustments to the current program version TRIMAS® 18.0.	12988
09.08.18	General	Adjustments to the current program version TRIMAS® 18.0.	12861
12.06.18	HAUZU	The variance coefficient was incorrect in the combinations for the limitation of the crack widths for a **solely external prestressing**.	12686
12.06.18	HAUZU	**Prestressing steel stresses (condition I)** Wrong components were used in the combination generation to some extent for statically determinate systems.	12644
12.06.18	HAUZU	The combination generation of the quasi-permanent combination of actions for the limitation of the concrete compressive stresses was not correct with a **solely external prestressing**.	12632
07.05.18	Evaluation	The **utilizations of the flange connections** for struts and ties (lateral reinforcement) can now be evaluated separately.	12026
07.05.18	Evaluation	The **utilizations of the tie** due to shear force, torsion, shear force + torsion and the **torsional longitudinal reinforcement** can now be evaluated separately.	12024
07.05.18	Input	After a geometrical modification of a bridge cross-section in the graphic cross-section editor, the herefrom generated cross-sections are adjusted.	11431
07.05.18	Interface	The utilizations of the flange connections are now also issued in the summary of the results from the recalculation.	12027
07.05.18	NAZWEI	Utilizations of the main tensile stresses and main compressive stresses (ULS) are now issued in the evaluation (if the analysis has been carried out).	12021
07.05.18	NAZWEI	**Shear force and torsion bearing capacity** In special cases is - in addition to the already existing analyses - an analysis of the principal compressive stresses in the ultimate limit state necessary, which can now be carried out with the program. The principal compressive stresses are - depending on the value of the principal compressive stresses I - either carried out and limited in the uncracked state or according to the framework analogy in the cracked state. The utilization levels can be displayed as graph.	11936
07.05.18	Output document	The header of the diagram "Utilization - summary in lateral direction" has been replaced by "Utilization - summary shear force and torsion".	12020
07.05.18	QUER	The display of some components in the graphical user-interface has been adjusted, in order to consider the specified scaling in the display settings of the operating system.	12369
07.05.18	Design	The reason for the error message in the design of **trough cross-sections** (L-sections) has been resolved.	12124
07.05.18	HAUZU	A **fatigue analysis** for reinforced concrete is now also carried out with **only external prestressing**.	12314
07.05.18	HAUZU	"+G2" is no longer displayed in the combination texts for the **construction state stresses** and in the **decompression analysis**, if no action "G2" (finishing loads) exists.	12187
07.05.18	HAUZU	**Prestressing steel stresses** In the load case combination names was "G1" removed, since the structure dead load has no effect on the prestressing steel.	12180
07.05.18	HAUZU	The proportion of the support settlement can be specified directly (see control STEU 'SLSO') for the decompression analysis, however, this proportion was not considered in every combination.	11953
07.05.18	NAZWEI	The **stresses in the construction state** are now also carried out, if multiple construction states have been entered in TRIMAS, but no real construction state system exists.	12351

Version 17.0

Build	Module	Description	ID
01.02.18	NAZWEI	The **construction state stresses** have been corrected.	12317
17.11.17	General	Adjustments to the current program version TRIMAS® 17.0.	12128
19.10.17	Calculation	**rectangular cross-sections with multiple layers** I the terminated cracking the value rho,eff was not correctly calculated for rectangular cross-sections without flange connections, which consist of several partial areas.	11542
19.10.17	HAUZU	For a **2-stage prestressing in coupling joints**, the variance coefficient of the prestressing was not correctly applied in the calculation of the neutral axis stresses for the analysis of the initial cracking.	11713
19.10.17	HAUZU	In the analysis of the ultimate limit state of pedestrian bridges, the traffic load groups 1 and 2 are alternatively considered in a calculation. Only the uniformly distributed traffic loads (gr1) are applied in the SLS analyses.	11712
19.10.17	NAZWEI	The planned service life was overwritten by the stress analyses in the construction state. This had an influence, if the lambda4 value was automatically calculated.	11615
19.10.17	NAZWEI	**Laying dimension cvL** Did a BEWA line exist in the xan interface and the cvL parameter was not defined, then the concrete cover was incorrectly calculated.	11484
05.05.17	General	Adjustments to the current program version TRIMAS® 17.0.	11360
02.05.17	NAZWEI	**Limitation of the prestressing steel stresses** Since prestressing steel layers with varying materials are allowed, the admissible prestressing steel stresses in the SLS are calculated per layer. In the process, wrong utilizations of the prestressing steel stresses arose.	11252
02.05.17	NAZWEI	**Tension flange connection** The shear parts in the tension flange are omitted, if no reinforcement and no prestressing steel exist; i.e. the tension flange connection cannot be designed.	11220
02.05.17	Superposition	The labeling "M(t)" has been replaced with "M(x)" in version 17.0. The existing superposition load case "Balken/M(t)" has not been transferred, when opening input data from version 16.0 and older.	11330
14.03.17	Analyses	**Optimization of the strut angle against torsional action effects for bridge recalculations** The strut inclination for the shear force design and for the torsion design can be defined by the user. These settings are valid globally for all analysis sections of one calculation run. In order to enhance the optimization of the torsion design, 2 additional alternatives are offered: • the local strut inclinations for the shear and torsion design can be specified at each analysis section (ORTS-Zeile); these specifications are valid until the next modification, so that several areas can be handled differently • at each analysis section (ORTS-Zeile) the strut inclination can be optimized based on the torsional bearing capacity with the objective of the utilization at the existing longitudinal torsion reinforcement preferably being = 1; the strut angle found this way is used for the torsion design, the shear force design is still carried out depending on the loading, i.e. the shear design is carried out according to the 2nd method with 2 variable strut angles	10469
14.03.17	Input	The selection of the load case attributes for dead load and prestressing has been assigned better and limited accordingly for different types of bridges: • *Reinforced concrete bridges and steel composite bridges* Dead load: *in-gate* and *construction state* Prestressing: *in-gate* and *construction state* • *Concrete composite bridges* Dead load: *precast member* and *in-situ concrete* Prestressing: *precast member* and *composite* • *Steel bridges* permanent load no prestressing	9971

Build	Module	Description	ID
14.03.17	NAZWEI	**Utilization levels in the recalculation of existing bridges according to the NRR** The utilization levels are now displayed in the graphs "Utilization level summary - longitudinal direction" (graph 1), "Utilization level summary - lateral direction" (graph 2) and "Announcement behavior - summary" (graph 3). New are the diagrams for "Fatigue - reinforcing steel" and "Fatigue - prestressing steel" in graph 1, the diagrams for "Longitudinal torsion reinforcement", "Flange connection reinforcement", "Flange connection of the strut" and "Web of the strut" in graph 2 as well as the diagram "Residual prestressing steel area for a req. residual safety of gamp=1.1" in graph 3. Furthermore, the table "Summary of the utilization levels" has been extended with the columns "Fatigue - reinforcing steel", "Fatigue - prestressing steel" and "Flange connection reinforcement".	9855
14.03.17	NAZWEI	**Flange connection design for tensile flanges** In addition to the hitherto flange connection design for compression flanges, there is now also a flange connection design for tensile flanges. For single web cross-sections also prestressed tensile flanges can be dealt with, i.e. if tendons exist outside of the web area in a tensile flange. All tendons are automatically assigned to the webs for box girders. A removal into the connecting flange area is therefore not possible.	9827
14.03.17	QUER	Before the calculation it is checked, whether the flange cross cuts run vertically. The coordinates are adjusted automatically.	9965
14.03.17	QUER	The web width of a T-beam or a trough cross-section is now being dimensioned.	9964
14.03.17	HAUZU	**Shrinkage coefficients according to DIN Fb** When using the DIN Fb the drying shrinkage has been multiplied with a safety factor, which is only valid according to DIN EN.	11087
14.03.17	NAZWEI	**Robustness reinforcement according to EN 1992-2, respectively, ÖNorm B 1992-2** The robustness reinforcement according to ÖNorm was wrongly calculated for I-beams. However, the robustness reinforcement was correctly calculated for T-beams or hollow sections.	10985
14.03.17	NAZWEI	The surface reinforcement for prestressed structural members according to DIN 1992-2 table J.4.1 is omitted when using EN or ÖNorm.	10984
14.03.17	NAZWEI	**Minimum reinforcement for the limitation of the initial cracking** The minimum reinforcement is analogously to DIN-Fb und reduced, if the restraint stress resultants are smaller than the cracking stress resultants and if there is no prestressing, respectively, prestressing wihtout bond.	10855
14.03.17	NAZWEI	**Requirements for the analyses in the serviceability limit state** A "Requirement class" was issued in the output of the design parameter when using the DIN EN. Since there is no requirement class in this standard, the text has been corrected. From now on, the requirements for the analyses in the SLS of road bridges or railroad bridges are issued with a hint to the tables. The alphabetic character in brackets corresponds with the old requirement class according to DIN-Fb and replaces the text about the requirements in the SLS in the further output list.	10744
14.03.17	QUER3	Problems in the calculation of the **effective width**s in the foundation slab of **arbitrary hollow cross-sections** have been resolved.	11041

Version 16.0

Build	Module	Description	ID
28.11.16	HAUZU	**Material specifications for non-prestressed superstructures** Are polygonal, non-prestressed structural members to be designed, then a virtual prestressing, i.e. prestressing with reference axis but no further input, is required. This has always been the case. Now, the material specifications are written in the HAUZU interface *.xah directly from TRIMAS, so that the specifications are automatically available also with a change of material.	10467
28.11.16	NAZWEI	**Fatigue analysis for the NRR** If the recalculation guideline (NRR) and a analysis level > 1 is preset, a fatigue analysis is always carried out independently from the requirement class. It is proceeded analog with analysis level 1, if the decompression analysis is not fulfilled.	10559
14.10.16	HAUZU	**Shear design** The neutral axis stress Sig.cd, which was not calculated correctly with a 2 level prestressing, is being considered in the shear force bearing capacity without reinforcement.	10212
14.10.16	HAUZU	**Drying shrinkage** The printout of the equation was corrected.	9980
14.10.16	HAUZU	**Limitation of the concrete compressive stresses in the cracked cross-section** For non-prestressed structural members of new buildings (not refurbishment), the design combination for the stress limitation was incorrect.	9899
14.10.16	NAZWEI	The variance coefficients of the prestressing r.inf / r.sup are issued once for the crack width limitation and once for the stress analyses in the summary of the design parameters and the recalculation guideline.	9932
14.10.16	NAZWEI	**Fatigue analysis in the coupling joint** Sometimes the wrong inadmissible fatigue strengths were journalized and thus the utilizations incorrectly calculated.	9895
14.10.16	QUER3	Are the first 4 characters of the cross-section name equal in multiple cross-sections, then wrong accesses to the database occurred.	9968
14.10.16	QUER3	**Effective slab widths in the bottom chord** The effective slab width was partially applied on the wrong side for the automatic calculation of the effective slab widths in the bottom chord of I-beams (cut open box girder).	5285
17.05.16	HAUZU	**Decompression acc. to recalculation guideline level 1** The variance coefficient r_sup for the prestressing has been corrected.	9810
17.05.16	NAZWEI	**Design according to ÖNorm** For the design according to ÖNorm the distribution of the robustness reinforcement onto the flange ends has been corrected. Furthermore, the vertical web edges were switched off for the initial cracking.	9825
17.05.16	NAZWEI	**Shear design** • for box girders with varying web thicknesses, the shear force distribution onto the webs has been corrected appropriate to the shear resistances • the output of the preset transverse and longitudinal torsion reinforcement in the flanges when applying the NRR (recalculation guideline) has been completed in the summary of the shear reinforcement	9778
17.05.16	NAZWEI	**Name of the 2nd prestressing steel material** For varying prestressing materials the name of the 2nd material type was not displayed correctly, if the tendons with this material type did not already exist in the 1st analysis section.	9737
04.04.16	HAUZU	**Fatigue analysis** The statically indeterminate part of the prestressing is now applied unfavorably characteristic and no longer as mean value. The statically determinate part of the prestressing remains the same, i.e. 0.90-fold for regular sections and 0.75-fold for coupling joints.	9694

Build	Module	Description	ID
04.04.16	NAZWEI	The **minimum longitudinal reinforcement for bridge construction** was no longer automatically set to 3.93 cm2/m in version 16.0.	9695
16.02.16	Design	**Compilation of the shear reinforcement** Now also the existing shear reinforcement (= specified shear reinforcement), besides the required shear reinforcement, and their utilization levels are being issued when applying the recalculation guideline.	9020
16.02.16	General	Program modifications for the **compatibility with Windows 10**.	9526
16.02.16	General	In the summary of the results for the recalculation guideline the assessment "fulfilled / not fulfilled" is only issued when the necessary data is available.	9358
16.02.16	NAZWEI	**Varying tendon types for inner prestressing with post-tensioning** The prestressed concrete design has been upgraded for 2 different prestressing steel types with post-tensioning. The additional prestressing material with the bearable stress range has to be defined in the xan-interface file via the identifier MATZ. The following prestressing methods are available in PONTI: • post-tensioning • external prestressing • mixed prestressing - internal bonded / external prestressing • mixed prestressing - internal bonded with varying prestressing steel types Other prestressing methods such as pretensioning are available with PONTIcompositeConcrete.	9603
16.02.16	NAZWEI	**Minimum reinforcement for the limitation of the crack width** According to DIN FB and also according to DIN EN the width of the minimum reinforcement is reduced correspondingly, if the restraint stress resultants do not meet the crack stress resultants. • According to DIN FB this only applies for structural members without prestressing (reinforced concrete) or for structural members with prestressing without bond • According to DIN EN this applies without any restrictions The program has been modified, that the possible reduction according to DIN EN is carried out thoroughly. The proceeding according to DIN FB remains.	9379
16.02.16	NAZWEI	**stochastic announcement behavior** The parameter of the required number of residual tendons "nbr", which is necessary for this analysis, is now issued besides the number of residual tendons at cracking "ncri" and the total number of tendons "s". The calculative residual safety for prestressing steel failure is being pictured. The factor "nbr" is iteratively calculated in a way, that the residual safety achieved with the required number of tendons corresponds with the admissible value 1,10. The analysis is only carried out, if no sufficient residual safety exists and an iteration is possible.	9175
16.02.16	NAZWEI	**Shear loading capacity acc. to RCG** Two options can be selected when applying the recalculation guideline at level 2: • only according to the modified framework model with crack friction • analysis of the principal tensile stresses and at their exceeding automatic use of the modified framework model, respectively, for exceeding of the admissible tensile edge stresses solely application of the modified framework model The utilization levels of the principal tensile stresses and the results from the framework model are issued separately in the summary of the utilization levels. Thereby it is already distinguishable in the summary of the utilization levels, in which sections the application of the principal tensile stress model is sufficient, in which sections both analyses - the principal tensile stresses as well as the framework model - are being used and in which sections only the application of the framework model has been carried out.	9015
16.02.16	NAZWEI	**Limitation of the construction state stresses** The tensile edge stresses and the concrete compressive stresses are no also issued graphically in a diagram.	8916
16.02.16	NAZWEI	**Concrete compressive stresses in the construction state** Now also the concrete compressive stresses and the prestressing steel stresses under consideration of CSR at the time of examination are issued besides the tensile edge stresses in the construction state.	8915

Build	Module	Description	ID
16.02.16	QUER	Now, the area "single-span" can be selected for a cross-section in the property window. Thus, the decisive length for the calculation of the effective slab width can also be determined correctly for a single-span beam.	9309
16.02.16	QUER	A hyphen "-" and a blank are not allowed in the cross-section name. Likewise, the cross-section name has to be unique. This is checked right after the input and, if necessary, the name is adjusted directly.	9192
16.02.16	QUER	When closing a project with changes, the user is asked whether to save the data and recalculate.	8933
16.02.16	QUER	**effective slab widths** If effective slab widths exist or have been calculated according to standard, then the effective slab widths are now always issued after the cross-section values and the shear distribution. Furthermore, the printout and confirmability of the results have been improved.	8902
16.02.16	QUER	The previous standards for the calculation of the torsion coefficients (DIN 4227) and for the calculation of the effective slab widths (DIN 1075) can be specified in the project properties for a recalculation. The global setting of the standard in the ribbon bar will then be ignored.	8749
16.02.16	HAUZU	**Prestressing force losses due to relaxation for 2-stage prestressing** Due to different prestressing materials for internal prestressing and external prestressing (2-stage prestressing) high prestressing force losses resulted. The program HAUZU calculated the relaxation losses with the same material coefficients.	9631
16.02.16	Input	The specified prestressing steel class for the stress range was not saved in the dialog "Edit prestressing method".	9337
16.02.16	NAZWEI	**Load bearing capacity analysis in the accidental situation** There are 3 accidental situations in bridge construction: • accidental situation "below the bridge" • accidental situation "on the bridge" • accidental earthquake situation Case 2 and 3 are basically identical, i.e. they have the same prerequisites and a consistent heading	9348
16.02.16	NAZWEI	**Analysis control of the main tensile stresses in the SLS** analysis: STEU PTST or STEU PTST 1 no analysis: STEU PTST 0 or omit keyword	9314
16.02.16	NAZWEI	**Concrete tensile strength with early restraint** The externally entered reduction factor compared to the 28 day concrete tensile strength is now only applied for the initial cracking - e.g. for discharge of the hydration heat. This value is 0.50 by standard, but should be set significantly higher depending on the structural member thickness.	9210
16.02.16	NAZWEI	Now also the utilization levels of the stress range in the transverse reinforcement as well as of the principal tensile stresses are displayed under "Fatigue shear force" in the table of the utilization levels.	8919
16.02.16	QUER	When dividing the subareas, these were not always arranged in the correct order.	9452
16.02.16	QUER	The number of printing lines in the output was not memorized correctly or modified unwished when editing the project settings.	9423
16.02.16	QUER	The amount of printed lines was not transferred correctly from the input file.	9323

Version 15.0

Build	Module	Description	ID
15.12.15	NAZWEI	**Variance coefficients r_inf / r_sup acc. to NRR** The variance coefficients of the prestressing are being used modified for the following analysis in Level 2: • Decompression (no modifications) • Limitation of the concrete compressive stress (new for concrete compressive and reinforcement stresses) The variance coefficients in the limitation of the crack widths and in the analyses against fatigue remain unchanged. The variance coefficients for the crack width limitation are issued in the summary of the design parameters.	9440
15.12.15	NAZWEI	**Indiction behavior** In the iterative calculation of the necessary number of tendons nbr (in order to achieve a residual safety of at least 1.1) a program termination occurred. At the same time, the reduced tendon area Ap,red is calculated in a way, that it is always rounded up and thus whole-numbers are being used.	9428
05.11.15	General	Adjustments to the current program version TRIMAS® 15.0.	9394
15.09.15	General	When generating the summary of the calculation results according to the recalculation guideline for multi-span bridges, the application terminated if no result data existed.	9241
15.09.15	HAUZU	**Printout of the creep and shrinkage coefficients** The printout is readable again.	9221
15.09.15	NAZWEI	**Longitudinal torsion reinforcement** The printout of the longitudinal torsion reinforcement has been left out inadvertently in the summary of the shear reinforcement. The longitudinal torsion reinforcement is additionally issued in the summary of the longitudinal reinforcement.	9228
15.09.15	NAZWEI	**Individual cracking** The axis distance of the reinforcement at the flange ends was not considered in the case of a design in the flanges, so that the required reinforcement was not converted correctly from (cm2) to (cm2/m).	9227
02.08.15	HAUZU	**Printout of the creep and shrinkage coefficients** Long cross-section names are now considered in the short output.	8901
02.08.15	NAZWEI	**Utilization levels of the shear reinforcement** The utilization levels of the shear reinforcement and the longitudinal torsion reinforcement are documented in the summary of the shear reinforcement. The diagonal tie carrying capacity is issued besides the strut carrying capacity in the summary of the utilization levels.	8894
02.08.15	General	When generating the "Summary of the calculation results" an error message is no longer issued, if not all data is available in the result file of the bridge recalculation due to the user-defined settings.	9143
02.08.15	HAUZU	**Moment rounding off** The transfer of the support forces for the rounding off of the moment is working again. Thereby the allocation of the correct extremal support forces (min/max) to the extremal support moments (max/min) was corrected. A reduction of the support moments (max/min) exclusively by the associated support forces is not possible.	9165
20.05.15	Evaluation	**Evaluation of the design results in TRIMAS** The explanation of the design values has been completed.	9019
20.05.15	NAZWEI	The record type BEWA (Center distance and limit diameter) is also transferred into the transfer file (*.dah) for prestressed beam bridges.	9018
20.05.15	NAZWEI	2 decimals are issued for the position of the element [Sect(m)] in the summary of the shear design again.	9016
20.05.15	NAZWEI	A program termination could occur during the calculation of the crack width in the design of laterally prestressed slabs.	8886

Build	Module	Description	ID
22.04.15	Design	**Long-term impact of the concrete** The long-term impact of the concrete (alfacc value) according to RCG can be specified by the user in TRIMAS and be imported by the design program.	8883
22.04.15	QUER	For slit box sections the atmospheric circumference can be entered in the property window, in order to consider the effects of shrinkage correctly. By default, the circumference is determined in the calculation of the cross-section values.	8930
22.04.15	HAUZU	**2-stage prestressing and RCG** If 2-stage prestressed existing structures were recalculated according to the recalculation guideline (RCG), the texts with the variance coefficients of the individual stresses were incorrect. The stress resultants and therefore the stresses have always been correct however.	8912
22.04.15	Input	For the action type "Traffic, horizontal" (e.g. braking/starting) gamma.sup = 1.35 (up to now 1.50) according to DIN-EN.	8917
22.04.15	NAZWEI	**Strut inclination according to RCG level 2** A crack angle, which was limited incorrectly, is required for the calculation of the strut inclination.	8950
22.04.15	NAZWEI	**weighted inner lever arm** The weighted inner lever arm is always used when applying the RCG level 2. The calculation of the weighted inner lever arm has always been based on eq. 12.14. From now on, the inner lever arm is calculated with Sig.pd <= fp01,d; i.e. the result is generally higher. Furthermore, the weighted inner lever arm is also calculated for the mixed construction with internal and external prestressing.	8949
22.04.15	NAZWEI	**Utilization of the tie (RCG)** The utilization of the tie from the shear force capacity is always calculated from the ratio "req. reinforcement / specified reinforcement". The issued utilization ratio only relates to the shear force and torsion capacity - not to fatigue.	8911
22.04.15	NAZWEI	**Shear force fatigue according to RCG** In the analysis of the fatigue shear force capacity and use of the recalculation guideline the specified shear force reinforcement is always used for the calculation of the utilization of the stress range. If the stress range should be exceeded, the reinforcement is being increased, which is recorded in the summary of the shear reinforcement.	8892
22.04.15	NAZWEI	**inner lever arm according to RCG** The initialization of the weighted inner lever arm did not always function correctly, so that wrong values were applied for the shear design.	8891
22.04.15	QUER	When importing the user-defined effective slab widths, the bottom as well as the top point of the web-flange-subarea will be accepted as reference point.	8931
22.04.15	QUER	The symbol "-" is now supported when importing point coordinates. The coordinate labeled like this is interpolated from the adjoining points.	8770
16.03.15	Design	**Service path loads for railway bridges** Service path loads do not belong to the action group of the main traffic loads. Since the crack width limitation according to DIN Fb was originally performed under the infrequent combination of actions, the analysis according to DIN EN is treated under the "frequent combination of actions for crack width limitation". Thereby the combination coefficients of the modified frequent combination of actions correspond with the "old" infrequent combination of actions, whereby the service path loads are considered psi1-fold.	8826
16.03.15	Design	**Damage equivalent coefficients for railway bridges** The printout of the lambda values for the fatigue analysis has been corrected. The values themselves were correct.	8816
27.02.15	Design	**external strut angles** The strut angle can directly be specified as negative or positive value: - negative value -> lower limit of the strut inclination - positive value -> strut angle is set without interrogating the lower or upper limit	8588
27.02.15	Design	**Error message, if tendon outside of cross-section** Wrong warnings occurred for inclined cross-sections.	8513

Build	Module	Description	ID
27.02.15	Design	**Shear force reinforcement** The stirrup reinforcement per web and the shear reinforcement per flange can now be entered. This input is mandatory when using the recalculation guideline.	7831
27.02.15	Design	**Recalculation Level 1 in the decompression analysis** The variance factor of the prestressing is different between level 1 and level 2. It is now possible to always use the correct value of the selected recalculation level for the decompression analysis by directly specifying the recalculation level.	7696
27.02.15	General	**Recalculation guideline Excel-Sheet** The utilization of the shear as well as torsional longitudinal reinforcement is issued in the summary of the results for the bridge recalculation.	8575
27.02.15	HAUZU	**Shear design according to DIN 4227** Are the live loads divided up into axle loads and uniformly distributed loads - as it is common from DIN FB on - only the internal forces under "P" were considered in the design actions for the shear design. Now, the program considers all live loads also for the analyses according to DIN 4227.	8768
27.02.15	Input	**Bikeway and walkway bridges** The UDL loads for uniformly distributed loads as well as the TS loads for regular maintenance vehicles have to be entered for bikeway and walkway bridges. • UDL loads with the load case attribute "traffic load" or/and "traffic load, walkway" • TS loads with the load case attribute "excluding load, lane i", i=1,6 Both traffic loads are considered as mutually exclusive in generating the combinations, i.e. either the one or the other loads are acting. For all analyses in the SLS only the UDL loads are acting, since all combination coefficients of the maintenance vehicle are 0. Irregular, unplanned maintenance vehicles are "accidental traffic loads", however. The calculation is carried out in a separate calculative run in the accidental situation. Existing projects with the previous bridge usage "Bikeway and walkway bridges with maintenance vehicle" are mapped to "Bikeway and walkway bridge" when being opened.	8426
27.02.15	NAZWEI	**Construction state stresses** The construction state stresses, which are conceived as the analysis of the concrete stresses and prestressing steel stresses in condition I up to the point where the finishings loads (G2) start to act, were restructured in NAZWEI. The period under consideration can be specified, an arbitrary amount of load cases is possible and no external superpositions are necessary. The calculation is performed under consideration of creep & shrinkage, possible system creep and relaxation due to sudden column settlement. Depending on the system history, a very flexible load generation in the construction state is possible.	8685
27.02.15	NAZWEI	**Diagram of the utilization levels** The utilization of the strut bearing capacity has been added to the diagram.	8565
27.02.15	NAZWEI	**Flange connections and shear parts in the compression flanges** Hitherto it was approximately assumed, that the compression area only exists in the compression flange; i.e. the web areas in compression outside of the deck or the base plate were not applied calculationally. This is on the safe side. From this version on, also the compression areas in the webs outside of the flanges are considered, so that the shear parts in the compression flange become smaller and therefore the shear force design is more favorable.	8519
27.02.15	NAZWEI	**Fatigue analysis according to the main tensile stress model** The stress ranges in the fatigue analysis are, according to the new recalculation guideline, optionally calculated • with the framework model with crack friction or • based on the main tensile stress model The selection is automatically done according to the • Approach under negligence of the shear force reinforcement • Approach under consideration of the shear force reinforcement	8375

Build	Module	Description	ID
27.02.15	NAZWEI	**Enhancement for the recalculation guideline (RCG)** The shear force and torsion design resistance is performed according to the new recalculation guideline optionally • with the framework model with crack friction and modified crack angle approach or • based on the main tensile stress model with limited neutral axis stress (Limitation of the main tensile stresses) Thereto the input of the lateral reinforcement per partial cross-section (web, flange) is required. The program automatically decides, with the help of the maximum edge tensile stresses, which analysis model will be used. Furthermore it can be enforced, that only the modified framework model is used for calculation when applying the RCG. Overall, the program can determine the shear force and torsion design resistance according to the normative framework model (Level 1), modified framework model or the main tensile stress model (Level 2).	8336
27.02.15	NAZWEI	**Damage equivalent coefficients** In order to be able to determine the Lambda_ 2 value, the coefficient Q for the traffic type is required. This value is allocated depending on the traffic category according to table A106.1. If thereof differing values are desired, the Lambda_2 value must be entered directly.	8196
27.02.15	QUER	***NEW:* graphical input of cross-sections** Polygonal bridge cross-sections (open or closed) of concrete bridges can now be entered graphically, whereby the import of existing *.daq-files is possible without any difficulty. The user selects the desired geometry from the template directory, which includes multiple cross-section macros with all common superstructure cross-section types for street, railroad and pedestrian bridges. Modified cross-section inputs can be saved to the template directory. The total width as well as the total height can be adjusted directly for a rough adjustment. The precision adjustment may be done by editing the coordinates of the vertices, the flange and web widths in the tables as well as graphically interactive in the viewport. Additionally, recesses or steel fishplates can be inserted into the cross-section. Furthermore, there is the possibility to define the torsion contour thru a substitute rectangle or a substitute box girder The effective slab width is either calculated automatically according to standard or may be specified directly.	8576
27.02.15	Design	**adm. concrete compressive stresses in the construction state** The factor ßcc related to fck instead of fcm.	8741
27.02.15	Design	**Concrete compressive stresses** The concrete compressive stresses are analyzed in the uncracked condition under the rare combination of actions and are opposed to the admissible stresses. As admissible stress 0,60 fck is being used instead of 0.45 fck.	8728
27.02.15	Design	**Possible column settlement** The text for the design combinations has been corrected in the result list. The error only occurred for railway bridges and when a possible column settlement existed.	8648
27.02.15	Design	**Input control of the tendon ordinates** A warning message is shown , if tendon ordinates are outside the cross-section. For an inclined upper chord, a wrong error message was displayed.	8638
27.02.15	Design	**Shear force design of slabs** Providing that reinforced cross-sections have been defined in QUER and were designed as "slab" with NAZWEI during a regular PONTI task, the cross-section widths were not calculated.	8499
27.02.15	Design	**Ultimate limit state checks according to the recalculation guideline (RCG)** If the bending capacity was exceeded at one position, no analyses of the shear force and torsion resistance could be performed in the following design sections. The program has been modified, so that only in the sections were the bending capacity has been exceeded the shear analysis will not be performed.	8275

Build	Module	Description	ID
27.02.15	Design	**Utilization table** All design results are summarized in a table at the end of the result list, which has been revised fundamentally. Amongst other things, the utilizations of the main tensile stresses, as well as the bearing capacity of the strut and diagonal tie have been added. This is also valid if the recalculation guideline option is used.	7981
27.02.15	Evaluation	The selected design standard is now issued correctly in the header for the diagram output of PONTI design results (Concrete bridge).	8668
27.02.15	General	The help texts for the dialog input have been updated.	8309
27.02.15	General	In the summary of the results from the bridge recalculation, the units for the bending moment in the ultimate limit states have been corrected.	7816
27.02.15	Input	The setting of cross-section variants is no longer possible for concrete bridges. These setting possibilities are only active for composite concrete as well as composite steel bridges from now on.	8555
27.02.15	Input	A calculation setting has been changed in the **demo-example** "orthotropes Faltwerk". The cross-section values relate to the principal coordinate system now.	8508
27.02.15	Input	**Load case attributes for construction state loads** The load case attributes for construction state loads have been fundamentally revised. Now, the following load case attributes are available for variable construction state loads: • Live load (Construction state) • Temperature (Construction state) • Wind (Construction state) • Snow (Construction state) The permanent construction state loads such as "Dead load construction state" and "Prestressing construction state" remain unaffected by this.	8430
27.02.15	NAZWEI	**Terminated cracking** The analysis of the terminated cracking is performed for bridge construction, if the tensile edge stresses are > fctm in the decisive combination.	8758
27.02.15	NAZWEI	**Summary of the utilization levels in the short output** In the short output - i.e. the short printout <u>without</u> a detailed output - the utilizations for the stress limitation of concrete were not saved correctly.	8595
27.02.15	NAZWEI	**Design decision for the shear design** 2 conditions according to 6.3.2 are consulted for the design decision. The condition according to NCI 6.3.2(5) is only used for "approximately rectangular cross-sections". If condition 2 becomes decisive for the design, the relevant analysis section is marked. There is a note displayed at the end, that the design has been performed due to not meeting condition 2.	8443
27.02.15	NAZWEI	**Printout of the shear reinforcement for the recalculation guideline (RCG)** The minimum shear force reinforcement had been turned off automatically when using the RCG. This automatism has been removed.	8442

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Build	Module	Description	ID
02.02.15	Design	**Drying shrinkage** The calculation of the shrinkage coefficient for "Drying shrinkage" is now performed under consideration of the safety factor for the long-term extrapolation of delayed deformations according to DIN 1992-2/NA, B105.	8494
22.10.14	NAZWEI	**Operation instruction for coupling joints according to recalculation guideline (RCG)** Phi.fat, which considers the surface roughness in the calculation of the damage equivalent coefficient, is always 1.0 according to DIN 4227-1.	8474
15.10.14	HAUZU	**Variance coefficient of the prestressing for the decompression analysis** There are different variance coefficients for stage 1 or 2 when using the recalculation guideline option. This was not transferred correctly for stage 1 in the printout of the individual stresses.	8444
22.09.14	Design	**Recalculation guideline for the decompression analysis** The analysis level can now be specified, so that the variance factor of the prestressing can be specified depending on the level when using the recalculation guideline.	7887
22.09.14	General	The setup of the header and footer in the PONTI navigator for the output format DV504 is possible again. This requires the installation of the current base package.	7837
22.09.14	HAUZU	**Increase factor for LM3** For extremely differing spans or layout of the prestressing, the criterion which was used for the determination whether it is a span area or a support area failed.	7961
22.09.14	Design	**Shear force design resistance** bw,nom is to be set as section width in the web for the strut design resistance due to shear force. This also applies for the neutral axis 101-102, etc.	8321
22.09.14	Design	**Concrete tensile strength** The calculation of the time-dependent concrete tensile strength has been corrected.	8194
22.09.14	Design	**Tendon height** Error message for the tendon position being outside the cross-section has been corrected.	8088
22.09.14	HAUZU	**Design according to DIN 4227-1** In the design according to the old standard, the heading of the diagram depictions and the file names of the plot files were corrected. Furthermore, the assignment of the individual design analyses to LCC BZ, DK, H and HZ has been reestablished.	8374
22.09.14	HAUZU	**Recalculation guideline** The parameter *Level 1* or *level 2* of the recalculation has been added for a better control of the analysis. It is controlled via the control keyword "BIST", 7th parameter.	7902
22.09.14	HAUZU	Is HAUZU started with an improper program version (64-Bit-Version for a 32-Bit result database or 32-Bit-Version for a 64-Bit result database), an error message with the corresponding note is displayed. Afterwards the program is terminated.	6744
22.09.14	Interface	Now, the details for concrete and reinforcement steel from the specified design parameters as well as the first used prestressing method are logged in the MATE lines of the DAH file.	8147
22.09.14	NAZWEI	**Fatigue resistance analysis** Caching the stress range has not been zeroized sufficiently with more than 2 truck lanes, so that sometimes the same values existed in the following design section.	8056
10.03.14	General	Adjustments to the current program version TRIMAS® 14.0.	7787
10.03.14	NAZWEI	**Strut angle** The lower bound of the strut inclination can be specified externally. The input value was not transferred.	7784
22.02.14	NAZWEI	**Crack width limitation according to DIN 4227-1/A1:1995 (RCG)** The crack width limitation can be performed according to the old DIN 4227-1/A1 in the course of the recalculation guideline.	7669

Build	Module	Description	ID
22.02.14	NAZWEI	**Damage equivalent coefficient Lambda1** The damage equivalent coefficient Lambda1 is determined according to the duct material.	7668
28.01.14	Design	**inner lever arm** The weighted inner lever arm for the shear design was always used when applying the recalculation guideline. Now, the greater inner lever arm from the deformation or the weighted inner lever arm is being used.	7531
28.01.14	Design	**Possible column settlement** In order to make the printout of the individual stresses more transparent, the product of gamma x reduction factor is issued, i.e.for - road bridges, new, 0,6-fold - road bridges, NRR Level 2, 0,4-fold - railway bridges, new, 0,9-fold Generally, the reduction factor can be specified in the TRIMAS input.	7439
28.01.14	Design	**Recalculation level 1 / 2** Several parameters have to be assigned differently in the design according to level 1 or level 2. The default assignment has been unified insofar, that the column settlement, the temperature and the lower bound of the strut inclination are generally preset according to level 1. The reduction factors for the restraint stress resultants and the lower strut inclination Theta have to be modified with a negative value (-21.8 or -18.4) for analyses according to level 2. Up to now, the lower bound of the strut angle was reduced automatically. For a positive input of the strut angle, the automatic determination of the strut inclination is omitted - the input value is always used.	7438
28.01.14	Design	**Damage equivalent coefficients Lambda2 and Lambda4 for road bridges** The amount of trucks per year are equated with the values according to DIN-Fb or DIN 1992-2 when using the recalculation guideline. So far they corresponded to table 10.5 to 10.7, Column 6.	7437
28.01.14	Design	The function "Design prestressed concrete -> Accidental design situation" distinguishes between two analyses from now on: • Accidental design situation with actions below the bridge • Accidental design situation with actions on the bridge or earthquake	7291
28.01.14	Design	**Short output of the reinforcement** In the summary of the longitudinal reinforcement the reinforcement areas are no longer issued in requirement class B.	7197
28.01.14	Design	**Limits of the strut inclination angle** The limits of the strut inclination angle are set automatically depending on the selected standard and bridge usage. Differing from this, the lower limit can now be specified directly by the user. The requirements according to NRR 12.4.3.3 in stage 2 can be specifically set with this.	7027
28.01.14	HAUZU	**Walkway bridges** Either the load case attribute "traffic load" or "traffic load walkway" can be assigned to UDL traffic loads (group 1) on walkway bridges.	7319
28.01.14	HAUZU	**Decompression analysis** The information about the statical determinateness of a prestressed system is required for the decompression analysis according to DIN EN 1992-2/NA. So far all members of the bridge were considered, now only the prestressed beams are decisive for the statical determinateness of a bridge.	7119
28.01.14	NAZWEI	**possible column settlement** The possible column settlement is now always considered in the ULS design combinations, if it exists. If the possible column settlement does not exist, the probable column settlement is applied instead. Up to now, the possible clumn settlement has only been used, if it was more unfavorable than the probable column settlement.	7550

Build	Module	Description	ID
28.01.14	NAZWEI	**Principal tensile stresses** The principal tensile stress analysis for the limitation of shear cracking is performed in the program component NAZWEI as of version 14.0. The analysis is automatically performed, if - the web slenderness is > 3 for road bridges - it is a railway bridge No analysis is performed, if the keyword 'PTST' does not exist. With this, the analysis for the limitation of shear cracking in the program component HAUZU can be omitted.	7501
28.01.14	NAZWEI	**Duct material for the recalculation guideline application** The program always assumed steel ducts when applying the recalculation guideline. Now the setting - steel duct or plastic duct - is transferred from TRIMAS.	7421
28.01.14	NAZWEI	**Individual cracking** In order to enforce an analysis of terminated cracking independently from the design decision, the time of cracking is sometimes reduced. This caused an early restraint in the individual cracking analysis and thus a reduction of the relevant concrete tensile strength fctm. From now on, the early restraint is only considered for < 27d.	7419
28.01.14	NAZWEI	**inner lever arm for the shear design** The inner lever arm results from the strain energy in the ULS and is treated differently depending on whether it's calculated according to NRR or not. Furthermore, the inner lever arm can now be specifed directly (ORTS line 9. column).	7301
28.01.14	Design	**Construction state stresses in box sections** The variance factors of prestressing were designed for centric prestressing. From now on, the general variance factors for construction states are applied.	7366
28.01.14	Interface	The unit cm^2 in section 1.2.1 was corrected to kNm, since the design moment, respectively, the bearable moment is issued and not the required reinforcement.	7292
28.01.14	NAZWEI	**Concrete compressive stresses** For reinforced concrete members mainly in compression, it could happen that the concrete compressive stresses in condition II were not determined correctly.	7535
28.01.14	NAZWEI	**Strut bearing capacity** The strut bearing capacity for solid cross-sections in the web VEd/VRdmax was possibly not determined correctly.	7516
28.01.14	NAZWEI	**Shear design for combined action from V+T** So far, the design decision was only based on VEd/VRdc. As of now, for nearly rectangular web cross-sections (full cross-sections) torsion is also considered.	7451
28.01.14	NAZWEI	**Lambda values for road bridges** Are the lambda values for the reinforcement determined automatically, the same k1 value as for prestressing steel has been used. This is only correct for tendons with plastic ducts, i.e. there the k1 value of reinforcement and prestressing steel is equal.	7418

Version 13.0

Build	Module	Description	ID
05.11.13	Evaluation	**Excel-Sheet output for DIN EN 1992-2/NA according to NRR (recalculation guideline)** The output with excel has been adjusted and now allows a summary of the results for the recalculation according to DIN EN 1992-2/NA.	7243
05.11.13	NAZWEI	**Strut inclination** the strut inclination relevant for the design does not only result - loading dependent due to V (Method 2) *or* - from the combined loading due to V + T (Method 1) but also from the - optimization of the strut bearing capacity due to V and - optimization of the strut bearing capacity due to V + T (New) if this is > 1; i.e. the strut angle is increased in the allowed limits until the bearing capacity is met. The design is performed with the last calculated value of the strut inclination. These changes were made in NAZWEI (new shear analysis) as well as in HAUZU (old shear analysis).	7231
05.11.13	HAUZU	**Principal tensile stresses for road bridges** The analysis of the principal tensile stresses for road bridges has to be done with the frequent combination, if the web slenderness is > 3. The wrong combination coefficient was applied for live loads in this analysis.	7219
05.11.13	HAUZU	**Torsion design resistance** If the strut design resistance due to shear force is not sufficient, the strut angle is iteratively increased till the required design resistance is met. The resultant strut angle has not been considered for the torsion design. This has been changed, i.e. now the same strut angle is used for the torsion design as is for the strut design resistance analysis.	7212
05.11.13	NAZWEI	The setting STEU 'STAD' is transferred from the input for HAUZU to NAZWEI.	7233
05.11.13	NAZWEI	**Strut bearing capacity due to shear force** In the analysis of the strut bearing capacity in the web, the nominal web width is being used. This nominal web width corresponds to the web width of all tendons being in the top or bottom flange.	7214
05.11.13	Prestressing	With horizontal eccentric tendons and a relatively large tendon length, inaccuracies on one side of the tolerance range could occur. If additionally the prestressing has been done from the end, this small error had a big influence on the friction losses.	7210
10.10.13	Design	**Analyses according to DIN 4227-1/A1** The analyses of the bearing capacity can only be carried out if a NRR licence is available. Since this standard can not be selected in TRIMAS, the design standard has to be defined in the naz input via STEU 'CODE' 0. It is no longer imported from the Standard.xml.	7120
10.10.13	NAZWEI	**indirect crack width limitation** The limiting diameters were sometimes calculated with a reference concrete tensile strength of fct0 = 3,0 instead of 2,9 in the indirect analysis of the longitudinal reinforcement according to DIN EN.	7185
10.10.13	NAZWEI	**T-beam with very large difference in height between the left and the right flange connection** In t-beams with a very large difference in the position of the connecting flanges (> 1,00 m) some reinforcement edges which have been defined via BEWL before, were no longer issued and saved.	7175
10.10.13	NAZWEI	**Increase coefficient for LM3** The increase coefficient 1,40 / 1,75 of the fatigue load LM3 in the design action has been determined correctly, but was not transferred correctly to the design program, so that a wrong factor has been shown for the column area in NAZWEI.	7104

Build	Module	Description	ID
10.10.13	NAZWEI	**Lambda values** The lambda values can either be calculated automatically or input directly. The lambda value is calculated automatically if it is equal to 1.00. The input lambda value is transferred if its value is unequal to 1.00. The margin retrieval has been improved.	7040
04.09.13	Design	**Shear reinforcement details in the TRIMAS evaluation** The shear reinforcement details can be displayed again in the TRIMAS evaluation.	6998
04.09.13	Design	Summarization of the utilization levels In the output of the bending capacity A(B) the value from the strut inclination has been considered.	6903
04.09.13	HAUZU	**Load capacity coefficient ß.71** The ß.71 values from the bending capacity were determined incorrectly from Version 12.0 on.	7013
04.09.13	HAUZU	**Shrinkage strain according to EN 1992-1-1** The shrinkage strain has been calculated according to "DIN Fachbericht", respectively, DIN 1045-1. As of now, the shrinkage strain is calculated according to the selected standard, i.e. if DIN EN is selected the coefficient is calculated according to EC 2-1-1.	6938
04.09.13	HAUZU	**License warning** If no license exists, a note is displayed directly on the screen.	6658
04.09.13	NAZWEI	**Summarization of the shear reinforcement** The page header has not been issued on all pages. Furthermore, all results req. (V+T) are issued under consideration of the minimum shear reinforcement. The settings in STEU MINB 1 x, where x can be 0, 1 or 2, are available in the detailed output.	7002
04.09.13	NAZWEI	**Design according to DIN 4227** In the design according to DIN 4227 together with the recalculation guideline the results from the normal stress analysis / decompression analysis were not saved for the excel sheet. Now, the maximum stresses from LC H and LC HZ are displayed span by span in the excel sheet.	6986
04.09.13	NAZWEI	For new projects, the MATE-line for NAZWEI is now generated correctly.	6973
04.09.13	NAZWEI	**Circular recesses in the web** There were problems in determining the effective web width in the center line if circular recesses were at the height of the center line.	6946
04.09.13	NAZWEI	**Shear force design** There were problems in the shear force design for an inclined edge at the UE of the web with negative ordinates of the polygon points. The minimum web width could not be determined correctly.	6939
04.09.13	QUER3	**Shear area of thick-walled, polygonal, open cross-sections** If a substitute rectangular cross-section has been specified as torsional contour independently from the geometry in QUER3, the shear area for the determination of the stress resultants has been calculated from the substitute cross-section. As of now, the shear area is equal to the web area.	6995
04.09.13	QUER3	**License warning** If no license exists, a note is displayed directly on the screen.	6875
08.07.13	Design	**graphic result display of the stress distribution in the uncracked state according to DIN EN 1992-2** The text headings of the decisive combinations of actions was wrong for railway bridges. - Plot of the existing compressive stresses: quasi-permanent combination of actions and rare combination of actions without prestressing - Plot of the decisive stresses for the terminated cracking: frequent combination of actions	6831
08.07.13	HAUZU	**Live loads in the construction state at the time t0** For live loads in a construction state at the time t0 (PMAX,t0 and PMIN,t0), the stress results are correct again.	6845
08.07.13	Prestressing	The prestressing material and the load case "Monolithic system" were imported incorrectly and assigned during the import of tendons.	6842

Build	Module	Description	ID
25.06.13	Design	**Reinforcing steel with smooth surface according to the recalculation guideline** The significantly worse composite properties of the smooth reinforcing steel can be considered.	6670
25.06.13	Design	**Concrete design according to DIN EN 1992-2/NA** The design procedures are basically these which have been defined in DIN EN 1992-1-1/NA. Compared to the DIN Fachberichten the following changes are effective • Secant modulus of concrete under consideration of the development over time • Drying shrinkage • Exposure classes as requirement for the durability • Analysis of the robustness due to reduced prestressing steel surfaces • Analysis of the shear force capacity without reinforcement • Strut inclination angle <= 45° • Variance factors of the prestressing for stresses in the construction state and for unbonded prestressing • only tendons of class 1 may be used	6669

25.06.13	Design	**Minimum reinforcement according to DIN EN 1992-2/NA**
		For the minimum reinforcement it is distinct between
		- Surface reinforcement
		  - the surface reinforcement was improved at several positions, e.g. the vertical edges of the free cantilever edges
		  - flanges according to table NA.J.4.1 for prestressed members
		- Flexural tensile reinforcement
		  - Robustness reinforcement
		  - Individual cracking / initial cracking
		- Shear force reinforcement
		  - compact cross-sections
		  - structured cross-sections
		- Torsion reinforcement
			6667

25.06.13	Design	**Analysis of the composite joint in cross girders manufactured section by section** Now, a shear joint analysis appropriate to the surface roughness can be performed. This applies both for the shear force analysis as well as for the analysis against fatigue in the composite joint. The analysed section in the composite joint is marked with a 200 number, e.g. 201-202. The maximum of the required reinforcement from shear force capacity, torsional capacity and shear joint capacity is decisive.	6663
25.06.13	Design	**Shear force design resistance in areas** For the shear force design resistance of concrete without shear force reinforcement, the effective reinforcement content rho must be considered. Thereby, the influence of the principal shear force direction Phi0 is treated according to Latte/Rhomberg.	6662
25.06.13	Design	**Damage equivalent coefficients Lambda according to DIN EN 1992-2/NA and ARS 22/2012** The lambda values are partially influenced on the number of truck lanes. These on the other hand depend on the traffic category and on the standard cross-section: - Traffic category 1: Bridges with 2 or more lanes per direction - Traffic category 2: Bridges up to standard cross-section RQ 15,5 - Traffic category 3: Bridges with local traffic For the automatic calculation of the Lambda values, the specifications "LANE" in the xan file are required.	6661
25.06.13	Design	**Result summarization according to the recalculation guideline** - the strut capacity due to V, T, V+T is automatically added to the Excel sheet - the required shear reinforcement in the web Asw due to V+T is automatically added to the Excel sheet - the required torsion longitudinal reinforcement AsTL due to T is automatically added to the Excel sheet	6654

Build	Module	Description	ID
25.06.13	Design	**Result list** The result list includes both detailed printouts with reproducible results as well as short printouts with tabular and well-arranged results. It has been extended with the shear design results. Thus, the complete printout is more compact and better arranged. - Detailed printout per analysis - Summarization of the longitudinal reinforcement - Summarization of the shear reinforcement - Summarization of the utilization levels of all analyses	6653
25.06.13	Design	**Minimum reinforcement** The minimum shear reinforcement for compact and structured cross-sections has been revised.	6652
25.06.13	Design	**Different design methods** The strut inclination, which can be specified differently according to various methods, has a major influence on the shear design: - Method of the combined action effects with uniform strut inclination for shear force capacity and torsion capacity - simplified method I with a loading-dependent strut inclination for shear force and 45° inclination for pure torsion - simplified method II with a loading-dependent strut inclination for shear force, 40° inclination in the compression chords and 45° inclination for pure torsion - Specify strut inclination Theta manually between the upper and the lower bound The first method is set by default.	6651
25.06.13	Design	**Parameter settings for the shear design** Parameters differing from the default are to be defined in the NAZWEI interface now. These are fully described in "PontiFormulare.pdf". The most important keywords are "MINB" and "SHEAR". If the strut inclination is to be selected, i.e. directly input, the keyword "SCHU" is added.	6650
25.06.13	Design	The entire shear design has been moved from the program component HAUZU to the component NAZWEI, i.e. all analyses of the shear force capacity and the torsional capacity as well as the analyses against fatigue of the struts and ties due to shear force and torsion will be carried out together with the bending capacity, earthquake capacity, stress limitation and the fatigue analyses in longitudinal direction. Therefore, all reinforced concrete as well as prestressed concrete analyses are pooled in one program. The data export to the next design program is thus omitted. Further changes result from these changes.	6646
25.06.13	Design	The verification of bridges according to the **recalculation guideline** was upgraded to **non-prestressed shell structures**. The reinforcement specification can currently not be done independently from the area.	6277
25.06.13	Design	In the **fatigue design** - especially for box-type cross-sections - **extremely high Eta values** (increase factor for the reinforcement stresses) arose in the web, because thereto only the web reinforcement has been considered. Now, the **entire reinforcement (reinforcing steel and prestressing steel) in the tensile zone** is used for the determination of the Eta value. This leads to considerably lower Eta values and therefore smaller stress amplitudes in the reinforcing steel. Furthermore, there is the possibility to specify the Eta value directly for top and bottom.	5645

Build	Module	Description	ID
25.06.13	Design control	The analysis control has been changed for the analysis in the serviceability limit state according to DIN EN 1992-2/NA. While the basic Eurocode (EN 1992-2) and all national annexes except Germany use the exposure classes for the analysis control, the analysis control in Germany is performed with "Requirements" as stated in Tables 7.101DE and 7.102DE. Accordingly, for the longitudinal direction it is distinguished between: - Reinforced concrete - Prestressing with bonded tendon (default application) - Prestressing with unbonded tendon - Composite construction (default application for box girder cross-sections in a new structure or for retrofitting an existing structure) For road bridges as well as for pedestrian and bicycle bridges it has to be additionally selected between - statically determinate systems - statically indeterminate systems This setting is affixed to the structural member, i.e. it has to defined per structural member. Pure construction state systems and lateral systems are still to be defined in the HAUZU interface.	6655
25.06.13	Design control	The input of the control parameter for the verification of bridges according to the recalculation guideline was incorporated into the design control.	6278
25.06.13	Evaluation	In the superposition of the support forces the corresponding support deformations (displacements and rotations), and in the superposition of the node deformations the corresponding support forces, are also calculated and can be issued in the context menu.	5467
25.06.13	General	**Input of an existing longitudinal reinforcement** The input of the longitudinal bending reinforcement via "BEWL" as part of a recalculation according to the recalculation guideline (NRR) has been simplified significantly. Only • edge numbers • Distance from the axis in cm • existing longitudinal reinforcement cm2/m - i.e. 4 specifications per edge - have to be defined. Example: "BEWL 2 3 4.5 7.85". Old, complete inputs with 6 specifications are also valid. Yet, the order of the reinforcement edges is still the same (c.f. manual): 1. Top chord 2. Bottom chord 3. Webs from left to right	6672
25.06.13	General	Because of several modifications in the database, old projects made with Version 12.0 or below have to be created anew, i.e. the databases with QUER3, HAUZU and NAZWEI have to be renewed.	6666
25.06.13	General	**Partial safety and combination factors of the new load model according to DIN EN 1990-2** The partial safety factor for LMM has been reduced from 1.50 to 1.35. The value 1.50 only applies for vertical impacts from pedestrians on pedestrian bridges. For military loads according to STANAG 2021 the partial safety factors in DIN EN 1990, Table NA.A 2.1 may be used. The combination factors are the same as according to DIN Fachbericht. All partial safety and combination factors are pre-set in the selection of the appropriate load case attribute. Conclusion: While the design actions in the ULS increase moderately, the design actions in the SLS increase significantly. The design actions in the FLS remain unchanged.	6660
25.06.13	General	**New load model LMM according to DIN EN 1991-2** With the new bridge construction standard, the new load model LM 1 according to EN 1991-2 - called LMM in DIN EN 1991-2/NA - is used. It is a 3 lane load model with significantly higher axle and distributed loads compared to DIN Fachbericht 101. Load macros are available for this purpose in the generation.	6659

Build	Module	Description	ID
25.06.13	General	The "infrequent" combination of actions is omitted in DIN EN 1992-2/NA. Therefore, the crack width limitation has now to be executed with the "frequent*" combination of actions, which however is numerically equal to the earlier "infrequent" combination, for all bridges that had to be handled with "requirement class B" according to DIN Fachbericht, e.g. railway bridges. Yet it has to be notably distinguished between "frequent" and "frequent*". conclusion: Nothing but the name changes for railway bridges. It is different for road bridges, if the structure model is statically determinate. In this case, there are now two "quasi-permanent" combinations of actions. One is used for the decompression analysis, and the other for the stress limitation of the concrete and of the prestressing steel. Therefore it has to be distinguished between "quasi-permanent" and "quasi-permanent*". For statically indeterminate systems everything remains as according to DIN Fachbericht.	6657
25.06.13	General	**Process of the analysis control and the context menu** "All stresses in the uncracked state" : Decompression analysis, construction state stresses, concrete compressive stresses, prestressing steel stresses "All analyses in the cracked state" : Surface and robustness reinforcement, bending capacity, minimum reinforcement from initial cracking, limitation of the crack width, fatigue of the longitudinal reinforcement and of the prestressing steel, earthquake capacity, shear force capacity and torsional capacity, fatigue of the lateral reinforcement due to shear force and of the struts due to shear force and torsion "Limitation of the shear cracking" : Principal tensile stresses "Accidental design" : Bending capacity, shear force capacity and torsional capacity	6649
25.06.13	General	As of **1.May 2013** the new, eurocode based bridge standards were introduced by the **BASt** and the **EBA**. - DIN EN 1990-2/NA - DIN EN 1991-2/NA - DIN EN 1992-2/NA As of **Version 13.0**, the new bridge standard can be selected and used via "Options->Standards". The **ARS 22/2012** has also been considered. The setting is valid globally for the entire structure model.	6648
25.06.13	General	All design results are available per element, per span and for the entire structure in a XML-file. The name of the file is based on the project name (projectname.XML) and it is located in the tri-directory.	6647
25.06.13	General	Now, the **release notes** are available in **English**.	6457
25.06.13	General	Program modifications for the **compatibility with Windows 8**.	6369
25.06.13	Prestressing	**New dialog with parameters of the prestressing systems** The selection of the prestressing methods as well as the displaying and editing of individual parameters of the selected prestressing method has been redesigned fundamentally. The dialog has been extended with several parameters because of the new DIN EN 1992-2/NA; e.g. prestressing steel classification, duct material, bearable stress amplitude and equivalent prestressing steel diameter. According to the new standard, the nominal web with is influenced significantly by the duct material steel or plastic.	6665
25.06.13	Prestressing	**New database for prestressing systems** The prestressing methods by DSI, VSL and BBR were updated and added into a xml-based database.	6664
25.06.13	Deformations in the cracked state	**Shrinkage deformations in the cracked state** For highly reinforced cross-sections, the bending stiffnesses were not calculated correctly.	6673
25.06.13	Design	**Limitation of the crack widths in shell structures** The calculation of the crack distance is carried out according to EN 1992-1-1, Gl. 7.15, if the direction of the principal tensile stresses differs more than 15 degrees from the decisive reinforcement direction of an orthogonal reinforcement mesh. The decisive reinforcement was possibly determined incorrect, so that a too large crack width was determined with a too high "max. crack distance srmax".	6678

Build	Module	Description	ID
25.06.13	Design	**Minimum reinforcement in bored piles** For circular cross-sections in **bridge construction** generally bored piles are assumed, for which the minimum reinforcement is automatically calculated according to EN 1536 regardless of being a bending member or a compression member. The structural minimum reinforcement (16mm / 15 cm) has been removed in this case.	6675
25.06.13	Design	**Constraint stress resultants in the ULS** Constraint stress resultants such as "possible column settlement" and "temperature" can be reduced in all ULS analyses, generally - to 60% for new buildings - to 40 % for existing buildings according to recalculation guideline (NRR) Example: gamma.sup= 1.35 x 0.60 = 0.81 or gamma.sup= 1.35 x 0.40 = 0.54. The settings are made in the TRIMAS generation, but the design programs did not import the reduction factor. Instead, a default value was used. The reduction is also carried out in the accidental situation.	6668
25.06.13	Design	As of Version 12.0, in parts of the tendon length the superposition of planned and unintended angular displacement was calculated too low for spatial prestressing. This resulted in lower friction losses and as a consequence in possibly a bit higher prestressing forces in comparison to Version 11.2. The calculation of the friction losses was adapted to Version 11.2 again.	6598
25.06.13	QUER3	Revision of the cross-section template "Strasse-1_Trägerrost_Pb".	6168