BuiltWorks is a high-performance software application for real-time steel design within the SolidWorks environment, providing tools for 3D solid parametric modelling, analysis and design, connection detailing and automatic generation of both drawings and reports.

BuiltWorks as a software product was developed to meet the Architectural, Engineering, Construction and Plant industries requirements for high performance flexible and versatile tools that include extended integration capabilities to analysis software.

BuiltWorks closely emulates the natural design workflow process to which structural engineers are naturally accustomed. This became possible by exploiting SolidWorks native parametric modelling environment, in which the user can operate intuitively. The process simultaneously achieves high-quality results by the application of built-in and adaptive workflow optimisation tools targeted at structural design standards and specific requirements.

BuiltWorks has been designed with an understanding and consideration of team-workflow and is suitable both for a single PC user and a multi-user network environment. Individual members of a workgroup can therefore collaborate effectively, performing the multiple tasks associated with construction design, analysis, creation of general and detailed drawings and the preparation of specifications and estimates.

BuiltWorks is aimed at 3D modelling, analysis and design, connection detailing, coupled with automated drawing and report generation.
3D Modelling

**BuiltWorks** maintains an intelligent and true solid model-based, SolidWorks architecture. This enables the user to create 3D simulated real-world structures containing all the information required for the design, manufacturing and construction of steelwork structures and assemblies.

**BuiltWorks** uses embedded SolidWorks and add in modelling tools that facilitate the creation of a 3D parametric model of a structure under design by using SolidWorks Weldment and **BuiltWorks** Structural members both in Part and Assembly. These members are placed, per the user’s choice, in the context of a parametric wire frame sketch, building grid axes or existing nodes and elements and these are linked by association to the 3D representation.

Model history is consistently written to a SolidWorks Feature tree which stores all information about model history, structural elements and details, as well as relations and attributes. The information is easily accessible and may be updated or modified simply from the model tree.

The principal feature of **BuiltWorks** is parameter driven architecture, achieved by the automated safeguarding of elemental inter-relational rules. Some elements may be designed as basic elements, e.g., grid axes, working planes, single members or member array, while others are placed in the context of the existing elements and are parametrically associated with them. Thus, when the model or one of its components is modified, the effects of the change to a structural element or connection are propagated from one object to another in accordance with pre-defined parameters. This allows models to be modified quickly and effectively in any design phase.

**BuiltWorks** has extended International standard libraries of steel sections and materials are available while, in addition, the user can create and store elements of arbitrary shapes and parametric sections which can accommodate for curved and tapered members.

**BuiltWorks** has flexible tools for the modelling of member connections. The modelling engine provides features that enable rules to be defined or set on the connection of structural elements, assigning chosen priorities. These innovations allow the precise and smooth allocation of structural elements with the inherent ability to manipulate them: setting relations, aligning, joining and cutting, placing connection plates and fasteners.

**BuiltWorks** contains standard connections prototype libraries, easily expanded by new customised solutions. All structural elements are linked in an associative database so that a cross-section parameter and materials constitute an integral attribute of the model.

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Really useful facilities for steelwork design, with a cutting edge SolidWorks 3D solid parametric modelling approach. This approach incorporates design and analysis tools, connection detailing and the automatic generation of drawings and reports.
Analysis and Design

_BuiltWorks_ generates an input file in the form of the preferred CAE system. Geometry of the model, member cross-section data, offsets of joints housing all the true physical parameters and materials are read: density, strength, module of elasticity and others. From one physical model several variants of an analysis model may be created by the user.

Using _BuiltWorks_ the analysis and design system is launched directly from the SolidWorks environment. After structural analysis and design of the model is performed, results for sections received during Code check are automatically transferred and assigned to the elements of the structural model; the elements are updated in accordance with the parametric model connections and rules.

The available _BuiltWorks_ import of Analysis models from third party FEA systems like STAAD.Pro, RAM, SCAD and LIRA to SolidWorks, automatically transforms the model to a physical solid model for future detailing and drawings generation.

- Pre-Processor features for Analysis Software that includes reading of model geometry, section properties, connection offsets, material properties and constants from the physical model and it’s intelligent transformation to analysis model.

- Analysis using SolidWorks Simulation.

- Integrated two-way interface to leading third-party structural analysis and design system STAAD.Pro that includes export of physical model to STAAD.Pro, import of analysis model from STAAD.Pro, import of design results from STAAD.Pro, parametric model update reflecting results of design.

- Seamless linkage from/to SolidWorks environment to/from third-party local market leaders structural design and analysis system like:
  - RAM (USA)
  - SCAD, LIRA (Russia & CIS)
  - MATRIX Frame (Netherlands)
  - and others.

- Integration between any Structural Analysis and Modelling Software through exchange formats:
  - SDNF
  - CIS /2.0
  - STD.

- Seamless linkage to third-party Connection Analysis Software.
Really Cost-effective system aimed at shortening the project throughput time, enhancing productivity and increasing profitability and the accuracy of results using SolidWorks as the professional structural framework.

**Drawings and Specifications**

*BuiltWorks* allows automatic generation of design stage general arrangement drawings, detailed fabrication drawings of steel assemblies as well as component workshop drawings at any time throughout the process. A large range of international standard formats and differing page layout templates are embedded and can be customized.

Users may choose standard or a customised style of labelling. Thus, complete correlation between the project and the printed information is ensured and errors and discrepancies are prevented. *BuiltWorks* employs regulations and rules of drawing and standard labelling symbols and styles according to ANSI, ISO, BS, and GOST standards. The user has full control over attributes of drawings: layers, colours, line thickness, which allows the creation and application of project/enterprise standards in drawing.

Project drawings – assembly schemes, plans, facades, cross-sections, and other standard or user-defined 2D views are created directly from a general 3D model of a building. All structural elements are linked to databases and so the marking of the structure, in assembly schemes and drawings, is completely automated. Due to the associative link to the model, 2D views can be edited directly in the 3D model.

*BuiltWorks* provides the user with a versatile tool that can report practically anything that is included in the model. *BuiltWorks* creates general and consolidated tables, reports, bills of material (BOM), construction lists and specifications from the general model of the building. The number of components for specification can be obtained by defined methods using the length, surface area or volume parameters. Tables of specifications are generated directly into the drawing or transferred for further processing into Microsoft Excel. Since reports are linked to the model, any changes in the model automatically invokes an update to the report.

**Translators to CAD/CAM Systems**

*BuiltWorks* can read and save data in popular industrial formats, including SDNF and CIS/2.0. This ensures integration of the data between SolidWorks and other CAD systems including those for steel detailing and allows steel manufacturers to use models or drawings generated in digital machine-tool control applications.

*BuiltWorks* automatically produces CNC data for shop machinery in DSTV and DXF formats.