FOREWORD

The Tekla Structures glossary is intended for technical writers, user interface designers, marketing people, trainers, and the end users of the software. The glossary aims to facilitate communications related to Tekla Structures by clarifying various concepts and terms.

The glossary explains the contents of 586 Tekla Structures related concepts as they are used in Tekla Structures. The relations between concepts are illustrated by means of concept diagrams, and the definitions and supplementary notes offer an effortless way to familiarize oneself with Tekla Structures terminology. The glossary gives also different types of recommendations on the usage of the English terms.

Terms have been compiled broadly, since the construction terminology is not fully established, but a number of synonyms (that is, words with the same meaning) exist. In such cases the glossary gives first the terms used in the Tekla Structures user interface and the Tekla Structures related communication.

The Tekla Structures glossary is maintained as the software develops. In January 2019 Tekla Structures glossary was revised with new and updated concepts that mainly relate to the latest updates in Tekla Structures, including additions related to property panes and updates related to views and points.

The glossary was first published in 2009. In earlier revisions from spring 2010 to January 2018 numerous concepts were updated to reflect the development of Tekla Structures and the established use of terms in the user interface, and on the basis of comments received from the glossary users.

Several people from both Tekla Structures development and the Finnish Terminology Centre TSK (Sanastokeskus TSK) have participated in compiling the glossary and given their expertise on both Tekla Structures and on terminology work to the project. In addition, a number of Tekla Structures specialists have taken part in the glossary project in the form of comments and feedback. Their expertise on different subject matters has proved to be indispensable for the project.

Any questions and comments related to the glossary can be sent to:

Email: tekla.documentation@trimble.com
# Table of Contents

**FOREWORD** .................................................................................................................. 2

**STRUCTURE AND LAYOUT OF THE GLOSSARY** .............................................................. 2

- Grouping of the glossary and searching for terms ................................................................. 6
- Interpreting diagrams ........................................................................................................... 7

1 **Basic concepts** ................................................................................................................ 11
   1.1 Modeling with Tekla Structures ..................................................................................... 11
   1.2 Tekla Structures architecture ........................................................................................ 14
   1.3 User interfaces ................................................................................................................ 17
   1.4 Tekla Structures related online services ...................................................................... 18
   1.5 Tekla Structures objects ................................................................................................ 23
      1.5.1 Model objects ........................................................................................................... 26
      1.5.2 Building objects ....................................................................................................... 27
      1.5.3 Reinforcement .......................................................................................................... 31
      1.5.4 Cast units .................................................................................................................. 35
      1.5.5 Pour units .................................................................................................................. 37
      1.5.6 Assemblies ................................................................................................................. 39
      1.5.7 Modeling aids ............................................................................................................ 42
      1.5.8 Components .............................................................................................................. 45
   1.6 Settings and properties .................................................................................................... 48
   1.7 Tekla Structures intelligence ........................................................................................ 52
   1.8 Views ............................................................................................................................... 56
   1.9 Coordinates, planes, points, and lines .......................................................................... 60
      1.9.1 Coordinate systems ................................................................................................. 60
      1.9.2 Planes ....................................................................................................................... 62
      1.9.3 Points and lines ........................................................................................................ 66
      1.9.4 Snap .......................................................................................................................... 68
   1.10 Modes ............................................................................................................................. 70

2 **Modeling** ........................................................................................................................ 73
   2.1 Model types ..................................................................................................................... 73
   2.2 Parts .................................................................................................................................. 76
   2.3 Part properties and profiles ............................................................................................. 82
   2.4 Details ................................................................................................................................ 85
   2.5 Component creation and structure ............................................................................... 90
   2.6 Component objects in steel components ..................................................................... 91
      2.6.1 Basic component objects ....................................................................................... 91
      2.6.2 Additional component objects ............................................................................... 94
   2.7 Filtering and visualization tools .................................................................................... 95
   2.8 Numbering ....................................................................................................................... 97

3 **Drawing** .......................................................................................................................... 101
   3.1 Drawing types ................................................................................................................ 101
   3.2 Drawing layout and drawing views .............................................................................. 103
   3.3 Creating and modifying drawings in Tekla Structures ................................................ 107
   3.4 Objects in drawings ........................................................................................................ 110
      3.4.1 Associative annotation objects ............................................................................... 110
      3.4.2 Independent annotation objects ........................................................................... 115
      3.4.3 Graphical symbols in drawings ............................................................................. 117
      3.4.4 Dimensions .............................................................................................................. 117

4 **Templates and reports** ..................................................................................................... 120

5 **System** ............................................................................................................................ 123
   5.1 Files .................................................................................................................................. 123
   5.2 Folders ............................................................................................................................ 127
   5.3 Catalogs ........................................................................................................................... 129
   5.4 Import and export ............................................................................................................ 132

6 **Managing model** ............................................................................................................. 136

7 **Analysis** ........................................................................................................................... 142
   7.1 Loads .............................................................................................................................. 142
   7.2 Analysis and design ........................................................................................................ 144
      7.2.1 Analysis objects ....................................................................................................... 144
      7.2.2 Analysis settings ....................................................................................................... 147

**INDEX** ............................................................................................................................... 150
<table>
<thead>
<tr>
<th>Concept diagram</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Modeling with Tekla Structures</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Tekla Structures architecture</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>Tekla Structures interfaces</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Tekla Structures online services</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>Trimble Connect and Trimble Connector</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Objects</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Model objects</td>
<td>27</td>
</tr>
<tr>
<td>8</td>
<td>Building objects</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>Reinforcement</td>
<td>34</td>
</tr>
<tr>
<td>10</td>
<td>Rebar set</td>
<td>35</td>
</tr>
<tr>
<td>11</td>
<td>Cast unit</td>
<td>37</td>
</tr>
<tr>
<td>12</td>
<td>Pour unit</td>
<td>39</td>
</tr>
<tr>
<td>13</td>
<td>Assemblies</td>
<td>41</td>
</tr>
<tr>
<td>14</td>
<td>Modeling aids</td>
<td>44</td>
</tr>
<tr>
<td>15</td>
<td>Components (parts of Tekla Structures functionality)</td>
<td>47</td>
</tr>
<tr>
<td>16</td>
<td>Components (groups of model objects)</td>
<td>48</td>
</tr>
<tr>
<td>17</td>
<td>Settings and properties</td>
<td>51</td>
</tr>
<tr>
<td>18</td>
<td>Tekla Structures intelligence</td>
<td>55</td>
</tr>
<tr>
<td>19</td>
<td>Views</td>
<td>59</td>
</tr>
<tr>
<td>20</td>
<td>Coordinate systems</td>
<td>62</td>
</tr>
<tr>
<td>21</td>
<td>Planes</td>
<td>65</td>
</tr>
<tr>
<td>22</td>
<td>Points and lines</td>
<td>68</td>
</tr>
<tr>
<td>23</td>
<td>Snap</td>
<td>70</td>
</tr>
<tr>
<td>24</td>
<td>Modes</td>
<td>72</td>
</tr>
<tr>
<td>25</td>
<td>Models</td>
<td>75</td>
</tr>
<tr>
<td>26</td>
<td>Part types</td>
<td>80</td>
</tr>
<tr>
<td>27</td>
<td>Parts according to their roles in the model</td>
<td>81</td>
</tr>
<tr>
<td>28</td>
<td>Part properties</td>
<td>84</td>
</tr>
<tr>
<td>29</td>
<td>Bolt assembly</td>
<td>88</td>
</tr>
<tr>
<td>30</td>
<td>Cuts and fittings</td>
<td>89</td>
</tr>
<tr>
<td>31</td>
<td>Component creation</td>
<td>90</td>
</tr>
<tr>
<td>32</td>
<td>Basic component objects</td>
<td>93</td>
</tr>
<tr>
<td>33</td>
<td>Additional component objects</td>
<td>95</td>
</tr>
<tr>
<td>34</td>
<td>Filtering and visualization tools</td>
<td>97</td>
</tr>
<tr>
<td>35</td>
<td>Numbering</td>
<td>100</td>
</tr>
<tr>
<td>36</td>
<td>Drawing types</td>
<td>102</td>
</tr>
<tr>
<td>37</td>
<td>Drawing layout and views</td>
<td>106</td>
</tr>
<tr>
<td>38</td>
<td>Drawing settings and properties</td>
<td>110</td>
</tr>
<tr>
<td>39</td>
<td>Associative annotation objects</td>
<td>114</td>
</tr>
<tr>
<td>40</td>
<td>Independent annotation objects</td>
<td>116</td>
</tr>
<tr>
<td>41</td>
<td>Indicators</td>
<td>117</td>
</tr>
<tr>
<td>42</td>
<td>Dimensions</td>
<td>119</td>
</tr>
<tr>
<td>43</td>
<td>Editors and templates</td>
<td>122</td>
</tr>
<tr>
<td>44</td>
<td>Files</td>
<td>126</td>
</tr>
<tr>
<td>45</td>
<td>Folders</td>
<td>128</td>
</tr>
<tr>
<td>46</td>
<td>Catalogs</td>
<td>131</td>
</tr>
<tr>
<td>47</td>
<td>Import and export</td>
<td>135</td>
</tr>
<tr>
<td>48</td>
<td>Organizer</td>
<td>140</td>
</tr>
<tr>
<td>49</td>
<td>Managing model</td>
<td>141</td>
</tr>
<tr>
<td>50</td>
<td>Loads</td>
<td>144</td>
</tr>
<tr>
<td>51</td>
<td>Analysis objects</td>
<td>146</td>
</tr>
<tr>
<td>52</td>
<td>Analysis settings</td>
<td>149</td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS

Picture 1. Bolt assembly and bolt elements.................................................................85
STRUCTURE AND LAYOUT OF THE GLOSSARY

Grouping of the glossary and searching for terms

The glossary has been grouped thematically into chapters, and the aim has been to place related concepts in each chapter close to each other.

At the end of the glossary, there is an alphabetical index. In addition to the preferred and deprecated terms, the indexes also include other terms closely related to the concept in question. These other terms have been provided with a reference to the preferred term and its number. The concepts have been numbered in the glossary.

The entry describing reference model is cited below as an example with explanations:

<table>
<thead>
<tr>
<th>474</th>
<th>- consecutive entry number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>property file</strong></td>
<td>- English terms; the most preferred term is given first</td>
</tr>
<tr>
<td>not: † properties file</td>
<td>not: = the synonym does not have the same meaning as the preferred term or is linguistically erroneous</td>
</tr>
<tr>
<td>file that contains properties or settings in the property pane or a dialog box</td>
<td>- definition (begins with a lower-case letter, no full stop)</td>
</tr>
<tr>
<td></td>
<td>- italics = refer to a concept defined elsewhere in this glossary; italics serve as a link to the concept in question</td>
</tr>
<tr>
<td></td>
<td>Property files are saved in the current model folder. The user can copy property files to the project or firm folders for future use.</td>
</tr>
<tr>
<td></td>
<td><strong>User-defined attributes</strong> can be stored as a property file.</td>
</tr>
<tr>
<td></td>
<td>- notes supplementing the definition</td>
</tr>
<tr>
<td></td>
<td>- further information on the concept, examples, information on the use of the terms, and so on.</td>
</tr>
<tr>
<td></td>
<td>- indented</td>
</tr>
<tr>
<td></td>
<td>- written as normal sentences</td>
</tr>
</tbody>
</table>
The following symbols and notations have been used in certain cases with terms:

* proposed term
† obsolete term
<Tekla Structures> the subject area of the definition
verb part of speech (if other than a noun)
not: the synonym does not have the same meaning as the preferred term or is linguistically erroneous
rather than: the term is not preferred
(in concrete detailing) additional information about usage of the term

/US/ American English
/UK/ British English
/IN/ Indian English
drawing (1) homonym; the number in brackets after the term indicates that the glossary contains several terms that have identical spellings but different meanings

pl plural

Interpreting diagrams
The concept diagrams and the glossary are intended to support each other. The diagrams illustrate the relationships between concepts and help the reader to understand entities. They do not portray any individual situation, event, or system, and they should not be confused with, for example, organization charts.

The concept relations appearing in this glossary and their established notations are described in the following:

Concept
• concepts defined in the glossary are represented inside a frame by a preferred term and a definition, for example as follows:

<table>
<thead>
<tr>
<th>assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>building object that represents a structure that consists of one or several parts and possibly other objects (1)</td>
</tr>
</tbody>
</table>

• the diagrams also include auxiliary terms, which are represented inside a frame but not printed in boldface, or auxiliary definitions; they facilitate the interpretation of the diagrams but are not defined in the glossary
• the diagrams do not include any synonyms or notes (given in the glossary)
**Generic relation (line that ends with a triangle ——>)**

- between a broader superordinate concept (associative annotation object) and a narrower subordinate concept (dimension and mark)
- the subordinate concept has all the characteristics of the superordinate concept and at least one additional characteristic, and it covers a smaller set of objects than the superordinate concept
- a subordinate concept can be regarded as a special case of the superordinate concept
- the triangle points towards the superordinate concept, for example:

```
associative annotation object
annotation object that is updated according to the changes made to the related model object
```

```
dimension
associative annotation object that represents building object measurements
```

```
mark
associative annotation object that is used for the identification of an individual building object and that displays a set of property elements that the user has selected
```

**Partitive relation (line that ends with a diamond ——◇)**

- subordinate concepts relate to parts of the whole to which the superordinate concept relates
- the subordinate concept does not have the characteristics of the superordinate concept as in a generic concept system
- the diamond points to the superordinate concept
- multiplicity in a partitive relation is represented by a number followed by two dots and an asterisk *, where * designates any number larger than 1 (e.g. 1..*); one or more such parts are typically needed to form a whole; if the multiplicity of the parts is not essential for the concept in question, the notation referring to the number of parts is left out
- nested assembly, for example, consists of a parent assembly and one or several sub-assemblies, for example:

```
nested assembly
assembly that consists of several assemblies on many assembly levels
```

```
parent assembly
assembly in a nested assembly that is subordinate to assemblies on the lower assembly level
```

```
sub-assembly
assembly in a nested assembly that is subordinate to a parent assembly
```

```
1..*
```
Associative relation (line without a symbol)

- a wide range of concept relations that cannot be classified as generic or partitive
- for example, relations based on time, location, function, tool, or origin
- the type of the relation is usually clarified by the linguistic form of the definition or by the note
- for example, the relations between assembly, assembly hierarchy, and assembly level are associative:

<table>
<thead>
<tr>
<th>assembly hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>arrangement of assemblies that describes the manufacture and erecting of the actual assembly to be built</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>building object that represents a structure that consists of one or several parts and possibly other objects (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>assembly level</th>
</tr>
</thead>
<tbody>
<tr>
<td>assembly's place in the assembly hierarchy</td>
</tr>
</tbody>
</table>

Multidimensional concept system (line that is connected to a criterion of subdivision)

- the superordinate concept leads to different selections of subordinate concepts when different criteria of subdivision are used; the criteria are represented in frameless text
- subordinate concepts from several different dimensions can be combined to form new concepts
- subordinate concepts that belong to a single dimension (those indicated by the same criterion of subdivision), are always mutually exclusive
- in a multidimensional generic relation, the relation from the criterion of subdivision to the superordinate concept is represented with a line with a triangle and the criterion of subdivision is marked in the middle of the line:

<table>
<thead>
<tr>
<th>model object</th>
</tr>
</thead>
<tbody>
<tr>
<td>object (1) that is represented in a model (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>solid object</th>
</tr>
</thead>
<tbody>
<tr>
<td>model object that is represented as a closed 3D boundary representation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>reference model object</th>
</tr>
</thead>
<tbody>
<tr>
<td>model object that is an individual part of an imported reference model</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>component object</th>
</tr>
</thead>
<tbody>
<tr>
<td>single model object that belongs to a component (2)</td>
</tr>
</tbody>
</table>
in a multidimensional partitive relation, the relation from the criterion of subdivision to the superordinate concept, that is the whole, is represented with a diamond symbol and the criterion of subdivision is marked in the middle of the line:

- Dashed lines illustrate concept relations that give supplementary information to the definition and help to understand the concept:

  - Mixed concept system:
    - the same concept system includes several different types of concept relations, for example, both generic and associative relations
1 BASIC CONCEPTS

1.1 Modeling with Tekla Structures

1 Tekla Structures

*BIM* software for organizations that operate in design, detailing, manufacturing, and construction

Tekla Structures includes specialized *configurations* for structural engineers, steel detailers and fabricators, precast concrete detailers and manufacturers, as well as contractors.

2 BIM; building information modeling

process of *modeling* and communicating the structure of a building in detail to benefit the entire construction life cycle

BIM facilitates the exchange and use of building information in a digital format.

3 modeling

simulation of an *object (1)*, a system, or a process that exists or will exist in the real world

The product of modeling is a *model (2)*.

4 model (2)

pattern of an *object (1)*, a system, or a process that exists or will exist in the real world

5 model (1); Tekla Structures model

*building information model* that is built with *Tekla Structures* and that represents a structure to be constructed, containing information needed to manufacture and construct the structure, and other information related to the *project*

A model (1) is the single source of information for *drawings (1)* and other *model outputs*, such as *reports* and *NC files*. This ensures that the information in drawings (1) and reports is always up to date, since they react to modifications in the model (1) and are updated accordingly.

Tekla Structures supports multiple users working concurrently on the same model (1), even in different locations.

A model (1) can be utilized in other software.

6 reference model

*model (2)* which the designer can use as an aid when building another *model (2)*

A reference model is created in *Tekla Structures* or in other software and can be inserted to Tekla Structures. The reference model appears together with the *model (1)* but it is not modified by Tekla Structures. The user can *snap* to reference model *points (1)*.

For example, an architectural model, a plant design model, or a heating, ventilating, and air-conditioning (HVAC) model can be a reference model.
7 comparison set
set of object properties that are used for detecting changes in reference models

Tekla Structures compares different versions of the reference model based on a comparison set, which tells if a change in a property is considered a change.

8 drawing (2)
building contract document that shows, in graphic or pictorial form, the design, location, and dimension of the elements of a project

9 drawing (1); Tekla Structures drawing
drawing (2) that includes the output of the selected information in a model (1) or a part of the model (1) and other information related to the model (1) and the project

Drawings (1) react to modifications in the model (1) and are updated accordingly.

Tekla Structures includes the following types of drawings (1): single-part drawings, assembly drawings, cast unit drawings, general arrangement drawings, and multidrawings. Tekla Structures creates drawings (1) using the drawing properties defined for each type of a drawing (1).

Every drawing (1) is made up of a drawing layout and drawing views.

10 report
model output that is represented as a list of information for the entire model (1), selected objects (1), or selected drawings (1)

Reports react to modifications in the model (1).

Reports are for quantity surveying or any other measurement purpose.

11 project
organized action which aims at constructing a structure, or a complex of structures

A project can include several models (2), for example models (1) created with Tekla Structures.
Concept diagram 1. Modeling with Tekla Structures.
1.2 Tekla Structures architecture

Tekla Structures configuration; configuration

Tekla Structures software set-up for a specific user group

Tekla Structures license is a permission to activate and use certain Tekla Structures configurations. A Tekla Structures configuration consists of a set of features that the user is entitled to based on the license agreement, and is the commercial part of Tekla Structures.

There are several Tekla Structures configurations, for example, Steel Detailing, Precast Concrete Detailing, and Engineering.

Tekla Structures environment

region- or company-specific settings and information that are predefined in Tekla Structures or that are defined by the user

To be able to use Tekla Structures, the user must install the software and for region-specific settings at least one Tekla Structures environment. The software installation includes the common and blank project environments and the global settings. The common environment and global settings form the basis for all other environments.

Property files form the largest part of a Tekla Structures environment. A Tekla Structures environment consists of, for example, profile catalogs, part property files, and drawing settings.

common environment

Tekla Structures environment that forms a basis for other environments

The common environment is included in the software installation and includes the global settings, macros, symbols (2), items, and fonts, for example. The common environment and global settings form the basis for all other environments.

default environment

Tekla Structures environment that contains basic example settings that are not related to any standards specific to a country or a region

local environment

Tekla Structures environment that contains settings that are based on country- or region-specific standards and are different from the global settings

The local environment settings may override the global settings.

blank project

Tekla Structures environment that contains only generic content and is used as a basis for customized environments

The blank project contains, for example, parametric profiles and undefined materials, and it can be used for gathering region-, company-, or project-specific settings, tools, and information. The blank project comes with Tekla Structures software installation.

Tekla Warehouse can be used to download content to a blank project.
role

user group profile in a certain *Tekla Structures environment* that limits the available files and settings.

In *Tekla Structures*, different roles may be available in each Tekla Structures environment. Typically the following roles are available: concrete contractor, general contractor, engineer, precast concrete detailer, rebar detailer, and steel detailer.

feature

part of *Tekla Structures* functionality that is maintained and owned by Trimble Solutions and that is included in the Tekla Structures installation.

extension; application

part of *Tekla Structures* functionality that is developed in order to extend the capability of Tekla Structures but that is not included in the Tekla Structures installation.

component (1)

part of *Tekla Structures* functionality that is used for creating a group of *model objects* that are easy to model and modify as a single unit.

Components (1) are located in the *applications and components catalog*.

Components (1) can be used for creating, for example, parts, bolts (1), and reinforcing bars.

The created *component (2)* adapts to changes in the *model (1)*. For example, Tekla Structures automatically modifies a *connection* if the user modifies the parts it connects.

macro

saved series of actions that includes instructions for a program.

Macros are located in the *applications and components catalog*. They are recorded or created manually and stored as .cs file in a folder defined with the *advanced option XS_MACRO_DIRECTORY*.

Macros can, for example, be used for creating *drawings (1)* or reports.

Macros are sometimes used to run an application.

migration wizard

tool that is used when taking into use an updated version of *Tekla Structures* for copying *settings* defined by the user in the earlier version.

The migration wizard can be used to copy settings included in *initialization files*. 
1.3 User interfaces

24 ribbon
control element in *Tekla Structures* user interface in the form of toolbars placed on several tabs

   The ribbon can be customized.

25 ribbon editor
not: ribbon customizer
tool that is used for customizing the ribbon and adding user-defined commands to it

   The ribbon editor can be used, for example, to add new buttons, to change the icons and texts of the buttons.

   The term ribbon customizer is used in *Tekla Structures* until version 2018.

26 command editor
tool that is used for creating user-defined commands that can be included in the ribbon with the ribbon editor

27 property pane
control element in *Tekla Structures* user interface in the form of a side pane window

   The property pane can be used to show and modify the *properties* of *model objects*.

28 property pane editor
tool that is used for customizing the property pane and adding *user-defined attributes* to it

   The property pane editor can be used, for example, to organize properties, to create groups of properties, and to create nested property groups.

29 contextual toolbar
not: mini toolbar
floating toolbar that contains commands for modifying the most common *object properties*

   The user can customize the contextual toolbar.

   The term mini toolbar is used in *Tekla Structures* until version 21.1.

30 Tekla Open API
application programming interface that lets third-party applications integrate to and communicate with *Tekla Structures*

   Tekla Open API enables, for example, customizing *Tekla Structures*.

31 quick launch
tool that is used for quickly finding commands, dialog boxes, and other functions in *Tekla Structures*

   The other functions include local content from *Tekla Warehouse*, for example.
Concept diagram 3. Tekla Structures interfaces.

1.4 Tekla Structures related online services

Trimble Identity

user account to Tekla online services and other Trimble services

For a Tekla Structures user, Trimble Identity is a single sign-on account which enables the user’s online identity management. The organization that the user’s Trimble Identity belongs to, determines the user’s access rights. Trimble Identity is needed, for example, for Tekla Campus and Tekla Warehouse, and to log in to Tekla User Assistance.
33  
**Tekla Online Admin tool**  
Tool that is used in an organization to manage users’ access rights to [Tekla online services](#).  
Each user must have a **Trimble Identity**. The users can be the organization’s internal or external members.

34  
**Tekla online services**  
Services provided for the users of [Tekla Structures](#) through different online channels  
Tekla online services include [Tekla Campus](#), [Tekla User Assistance](#), and [Tekla Warehouse](#), for example.

35  
**Tekla Warehouse**  
Service for collaboration and for storing and sharing [Tekla Structures](#) content  
In Tekla Warehouse the **content items** are stored in **collections**. Tekla Warehouse includes the Tekla Warehouse Service and the Tekla Warehouse web site.

Tekla Warehouse is one of the [Tekla online services](#).

36  
**collection**  
Group of **content items** that are organized and stored together in [Tekla Warehouse](#)  
Users can create online, local, or network collections. Collections can be private or public. The local and network collections are stored in a local or network folder selected by the user. The local collection can also be used offline. [Tekla Structures](#) collections contain official Tekla Structures content that is grouped by geographical area.

37  
**content item**  
Logical group of content files  
A content item can be, for example, a product catalog or a **model template**. Content items can be labeled by type and use case to help find the content. Content items may have versions that work with different versions of [Tekla Structures](#).

38  
**Tekla User Assistance**  
Online help and self-support service for [Tekla Structures](#)  
Tekla User Assistance includes instructions, support articles, and instructional videos, and it offers a possibility for feedback.

Tekla User Assistance is one of the [Tekla online services](#).

39  
**Tekla Model Sharing**  
Cloud service for collaboration and for storing and sharing a **model**  
Tekla Model Sharing is one of the [Tekla online services](#).
Management Console for Tekla Model Sharing

web-based tool for administrators to manage all the organization’s models shared with Tekla Model Sharing

The Management Console for Tekla Model Sharing requires a valid Trimble Identity and administrator rights.

on-premises sharing service

alternative service for the Tekla Model Sharing service that uses a local server

Tekla Downloads

online portal service for downloading Tekla product family software packages and applications

For example, Tekla Structures can be downloaded from Tekla Downloads.

Tekla Downloads is one of the Tekla online services.

Tekla Campus

online portal service for students to learn Tekla Structures

Tekla Campus offers a student license for downloading a Tekla Structures learning edition, and it includes a learning environment for Tekla BIM tools.

Tekla Campus is one of the Tekla online services.

Tekla Discussion Forum

site where the users can have discussions and ask questions

Tekla Discussion Forum has a wish list for sending ideas and wishes.

Tekla Discussion Forum is one of the Tekla online services.

Tekla Developer Center

online service for providing Tekla Open API material

Tekla Developer Center includes Tekla Open API reference material and code examples, for example.

Tekla Developer Center is one of the Tekla online services.

Trimble Connect platform; Trimble Connect

Trimble’s platform for microservices in the cloud

Trimble Connect platform’s microservices include services for uploading, storing, processing, and managing or consuming data. These services are meant to provide common solutions required by multiple applications.
47
Trimble Connect application; Trimble Connect (1)
application for information sharing and collaboration for construction projects that is based on the
Trimble Connect platform

Reference models are used in Trimble Connect application instead of using import and export.

Trimble Connect application includes web, desktop and mobile clients, and the Sync tool, for example.

48
Trimble Connector

feature that enables interoperability between Tekla Structures and Trimble Connect application
Concept diagram 4. Tekla Structures online services.

- **Trimble Identity**
  - user account to Tekla online services and other Trimble services

- **Tekla Online Admin tool**
  - tool that is used in an organization to manage users' access rights to Tekla online services

- **Tekla User Assistance**
  - online help and self-support service for Tekla Structures

- **Tekla Model Sharing**
  - cloud service for collaboration and for storing and sharing a model (1)

- **Tekla Downloads**
  - online portal service for downloading Tekla product family software packages and applications

- **Tekla Campus**
  - online portal service for students to learn Tekla Structures

- **Management Console for Tekla Model Sharing**
  - web-based tool for administrators to manage all the organization’s models (1) shared with Tekla Model Sharing

- **Tekla Structures learning edition**

- **Tekla Structures student license**

- **Tekla Structures collection**
  - group of content items that are organized and stored together in Tekla Warehouse

- **content item**
  - logical group of content files

- **collection**
  - according to the ownership of the collection
  - according to the placement of the collection
  - according to privacy

- **Tekla Warehouse**
  - service for collaboration and for storing and sharing Tekla Structures content

- **other service**

- **Trimble service**

- **Trimble Connect platform**
  - Trimble’s platform for microservices in the cloud

- **other Trimble service**

- **Trimble Connect application**
  - application for information sharing and collaboration for construction projects that is based on the Trimble Connect platform

- **Trimble Connector**
  - feature that enables interoperability between Tekla Structures and Trimble Connect application

- **Tekla Discussion Forum**
  - site where the users can have discussions and ask questions

- **Tekla Developer Center**
  - online service for providing Tekla Open API material

- **GENERIC RELATION**

- **PARTITIVE RELATION**

- **ASSOCIATIVE RELATION**

- **MULTIDIMENSIONAL SYSTEM**

- **SUPPLEMENTARY INFORMATION**

- **criterion of subdivision**
### Concept diagram 5. Trimble Connect and Trimble Connector.

#### 1.5 Tekla Structures objects

49 **object** (1)

A collection of human and computer interpretable data that is needed to model, manufacture, and construct a structure

50 **model object; object** (2)

**object** (1) that is represented in a **model** (1)

A model object is either created in a model (1) or imported into it.

51 **model information**

Information stored to the **model** (1)

Model information covers, for example, **model objects**, and **drawing** (1) and **project** information.

52 **drawing object**

**object** (1) that is represented in a **drawing** (2)
associative object

drawing object that is updated according to the changes made to an object (1) in the modeling mode.

All the associative annotation objects and the building objects that are represented in drawings (1) are associative objects.

annotation object

drawing object that represents information that is only relevant in a drawing (1).

An annotation object can be either an associative annotation object or an independent annotation object.

For example, dimensions, marks, texts, and symbols (2) are annotation objects.

building object

object (1) that represents something that will exist in the real building or be closely related to it.

A building object is always created in a model (1), but it is also represented as a drawing object in a drawing (1) in which its properties can be modified.

modeling aid

object (1) that represents information that is only relevant in building a model (1).

For example, grids, points (2), construction lines, construction circles, and reference models are modeling aids.

object type

description of a group of objects (1) that share common characteristics.

The objects (1) are grouped based on different characteristics in models (1) and in drawings (1). Examples of model object types are beams and rebar sets. Examples of drawing object types are parts and marks.

selection switch

switch used for controlling which object types can be selected.

area selection

method of selecting objects (1) that are included in a certain rectangular area of a model (1).

In addition to the selected area, selection switches and selection filters control which object types are selected.

verb

explode

to ungroup the objects (1) that are parts of another object (1) or a component (2).

In Tekla Structures, it is possible to explode components (2), cast units, assemblies, bent plates (1), parts that have attached parts, and drawing shapes and plugins.

The exploded objects (1) cannot be reverted back to the original group.
Concept diagram 6. Objects.
1.5.1 Model objects

61 reference model object

A model object that is an individual part of an imported reference model.

The user can define user-defined attributes for a reference model object.

The reference model objects can be moved to a model (1) that is currently being worked on.

Information included in a reference model object can be saved in the model database.

62 component object

A single model object that belongs to a component (2).

Component objects created by a component (1) can be modified separately or as a group.

63 solid object

A model object that is represented as a closed 3D boundary representation.

Solid objects are based on solid modeling and they can be described as being watertight. Solid objects can be poured, detailed, and deformed, for example.

64 surface; surface object

A model object that is created on the face of a part or a pour object.

Surface can be used to calculate surface areas, such as formwork areas.
1.5.2 Building objects

A part; piece /US/ is a basic element of a model (1) and can be modeled and detailed further.

The main concrete parts are: column, beam, polybeam, spiral beam, panel, slab, pad footing, strip footing, and item.

The main steel parts are: column, beam, polybeam, curved beam, twin profile, orthogonal beam, spiral beam, contour plate, bent plate (1), and item.

The term piece is sometimes used to refer to part.

A composite structure is one that has been produced by combining different materials (such as steel and concrete, or cast-in-place and precast concrete) in such a way that the combined parts act together as a single part.

Composite beams and composite slabs are examples of composite structures.

A bolt (1) is a building object that is defined in the bolt assembly, and that fastens parts or assemblies or attaches to them.

Bolt (1) must belong to a bolt assembly before it can be used in modeling.
68  
**bolt group**

A group of bolts (1) that forms a connecting building object between an assembly main part and secondary parts.

The number of bolts (1) in a bolt group depends on the bolt group shape and the values of bolt (1) distances (1).

69  
**weld**

A building object that joins steel parts or assemblies to form an assembly, or attaches to them.

70  
**cut length**

A bolt (1) property that indicates the depth at which Tekla Structures searches for the sections of the bolted parts.

Cut length determines whether the bolt (1) will go through one flange or two, for example.

71  
**cutting part**

A building object that creates a part-shaped hollow.

72  
**embed**

A building object that represents an object (1) that is to be cast into a concrete structure and that is used to connect structures or as an aid when constructing a structure.

For example, a cast-in socket is an embed that is placed in concrete structures to allow parts to be bolted together on site. In Tekla Structures, embeds are modeled as steel sub-assemblies that are inside a concrete nested assembly.

73  
**grouting; grout**

A building object that represents the filling of seams between parts, or holes or voids in a part with grout.

Grouting can be used when connecting parts with anchor bolts (1) or rods, or in seams between panels, for example.

Grout is flowing concrete that hardens after application.

74  
**surface treatment; surface finish**

A building object that represents finishing of a part.

The term surface treatment is used in concrete detailing. For concrete parts surface treatment includes surface mixes, tiles, and flat finishes, such as troweling and sandblasting.

The term surface finish is used in steel detailing. For steel parts surface finishes include fire-proofing and unpainted areas.
assembly

building object that represents a structure that consists of one or several parts and possibly other objects.

Typically, an assembly is a steel structure.
1.5.3 Reinforcement

76 reinforcement; reinforcement object

*building object* that represents steel bars that are cast into the concrete in such a manner that the steel and the concrete act together in resisting forces

Reinforcement types include *reinforcing bars, reinforcement meshes*, and *strands*.

77 reinforcing bar group; rebar group

*group of reinforcing bars* that are side by side and have identical *properties*, except the possible variation in bar lengths

78 reinforcing bar; rebar

*reinforcement* that represents a steel bar used to reinforce a concrete structure

The steel bars are usually ribbed and they are used to increase the tensile strength of concrete.

79 stirrup

*reinforcing bar* that is used in *parts* located in mainly horizontal position and that is transverse to the other *reinforcement* which is parallel to the part

Stirrups are used to take the shear force in the structure and prevent buckling of main bars in compressed structures.

Typically, stirrup is a bar or a wire, either single leg or bent into an L, a U, or rectangular shape, and located perpendicular to or at an angle to a longitudinal reinforcement.

80 tie

*reinforcing bar* that is used in *parts* located in mainly vertical position and that is transverse to the other *reinforcement* which is parallel to the part

81 lacer bar

*reinforcing bar* that is placed at the sides of a *footing*

Lacer bars are used, for example, in *pile caps*.

82 rebar shape manager

*tool* that is used for customizing the bending shapes of *reinforcing bars*

Rebar shape manager can be used for bending shapes only and not for any other reinforcing bar properties.

83 reinforcement splice; rebar splice

*connecting building object* that joins *reinforcing bars*

Reinforcement splices are used to extend reinforcing bars by lapping or welding them or by using couplers. With a reinforcement splice there is continuity of tensile stress in the *reinforcement* when the concrete *part* is subjected to a flexural or tensile load.
84 reinforcement mesh; mesh

*reinforcement* that represents a mesh of steel bars in two perpendicular directions

In *Tekla Structures*, the reinforcement mesh bars in one direction are called main bars and reinforcement mesh bars perpendicular to them are called crossing bars.

85 strand; prestressing strand; prestressed strand

*reinforcement* that represents a group of wires spun together

86 tendon

*reinforcement* that represents reinforcing bars, strands, or wires that are used to produce a compressive stress in *prestressed concrete*

Besides the actual reinforcing bars, strands, or wires, tendons may comprise an anchorage.

Tendons can be prestressing or post-tensioning tendons. Prestressing tendons are used in prestressed reinforcement.

87 shear reinforcement

*reinforcement* provided to resist shear force

Shear reinforcement in *beams* is in form of *stirrups* and in *columns* in form of *ties*.

88 rebar set

*reinforcement* that represents multiple reinforcing bars which may have different geometries, spacings and properties

Rebar set can be modified by using *direct modification* features and by adding *rebar set modifiers*.

*Tekla Structures* automatically groups reinforcing bars in a rebar set when they fulfill the grouping criteria.

89 rebar set leg face; leg face

*plane* that defines where the reinforcing bar legs are created in a *rebar set*

*Tekla Structures* creates rebar set leg faces at the reinforced faces of concrete parts or pour objects, or according to the points (1) picked when creating a rebar set.

90 rebar set guideline; guideline

definition of the distribution and direction of the reinforcing bars in rebar sets

The spacing of the reinforcing bars is measured along the rebar set guideline. The rebar set guideline can be a line, or a polyline that may have corner chamfers.

91 rebar set primary guideline; primary guideline

*rebar set guideline* that is created automatically when a *rebar set* is created
92
rebar set secondary guideline; secondary guideline

*rebar set guideline* that can be used in addition to the *rebar set primary guideline* to modify the geometry, direction, and spacing of *reinforcing bars* in a *rebar set*.

Rebar set secondary guidelines can be used to create curved reinforcing bars or to define a different spacing at the start and end of the rebar set reinforcing bars, for example.

93
rebar set modifier; modifier

Line or polyline that can be used to locally modify *reinforcing bars* in a *rebar set*.

Rebar set modifiers can be *rebar set property modifiers, end detail modifiers*, or *splitters*. Also, *rebar set secondary guidelines* behave like rebar set modifiers.

Polyline modifier may have corner *chamfers*. Each rebar set modifier only affects those rebar set reinforcing bars that its projection touches.

94
rebar set property modifier; property modifier

*rebar set modifier* that can be used to locally change the *properties* of certain *reinforcing bars* in a *rebar set*.

95
rebar set end detail modifier; end detail modifier

*rebar set modifier* that can be used to create hooks or threading for certain *reinforcing bars* in a *rebar set*.

The rebar set end detail modifier affects the nearest end of the *reinforcing bar*.

96
rebar set splitter; splitter

*rebar set modifier* that can be used to split the *reinforcing bars* in a *rebar set* and to create *reinforcement splices*.

97
rebar shape placing tool

Tool that is used for creating *rebar sets* using predefined *reinforcing bar* shapes.

Rebar shape placing tool for rebar sets is similar to *reinforcing bar shape catalog* for *reinforcing bar groups*. 
Concept diagram 9. Reinforcement.
1.5.4 Cast units

98 cast unit

*building object* that represents a concrete structure that consists of one or several *parts* and possibly other *objects* (1)

99 cast unit type

property of a concrete *part* in a *cast unit* that defines if the structure type of the part is precast or cast in place

100 precast concrete

*cast unit type* where the concrete is formed, cast, and cured before moved to its final position

101 cast-in-place concrete; CIP; cast-in-situ concrete /UK/; poured concrete /US/;

*reinforced concrete* (2) /IN/

*cast unit type* where the concrete is formed, poured, and cured in its final position

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*Concept diagram 10. Rebar set.*
102

**reinforced concrete** (1)

Concrete structure which contains *reinforcement* designed on the assumption that the concrete and reinforcement act together in resisting forces.

- Reinforcement in reinforced concrete (1) is usually steel bars, wires, or welded wire fabric. It may also be structural fiber of some other material.

- In *Tekla Structures*, reinforced concrete (1) is modeled with *reinforcement* objects.

103

**prestressed concrete**

Concrete structure in which internal stresses have been introduced to increase its ability to withstand tension and stress that will be produced by loads.

- Prestressed concrete is *reinforced concrete (1)*. In reinforced concrete (1), prestressing is commonly introduced by tensioning the *tendons*. 
1.5.5 Pour units

**Pour unit**

entity that combines together a *pour object* and the other *building objects* that need to be in place before *cast-in-place concrete* can be poured

The needed building objects can be *reinforcement* and *embeds*, for example.
**105**

**pour object**

*building object* that is formed of one or more *cast-in-place concrete parts*, or a part of a cast-in-place concrete part

The cast-in-place concrete parts are merged into one pour object if they have the same material grade and *pour phase*, and if they touch each other. Pour objects are visible in *pour view*.

**106**

**pour number**

Property of a *pour object* used to define the sequence of pours.

**107**

**pour type**

Property of a *pour object* that uses a cast-in-place *part* name or a manually given value to describe the pour object.

By default the part name is used for pour type. The part name used is the name of the part with the largest volume in the pour object.

**108**

**pour break**

*building object* used to split a *pour object* into smaller pour objects.

**109**

**pour phase**

*part* property that defines which *cast-in-place concrete* parts form a *pour object*.

Pour phase can be used to prevent cast-in-place concrete parts from merging into one pour object.
1.5.6 Assemblies

110 basic assembly

*assembly* that is an independent unit on one *assembly level*

111 nested assembly

*assembly* that consists of several assemblies on many *assembly levels*

Nested assemblies include elements that are manufactured as *sub-assemblies*. 

---

**Concept diagram 12.** Pour unit.
parent assembly

*assembly* in a *nested assembly* that is superordinate to assemblies on the lower *assembly level*

sub-assembly

*assembly* in a *nested assembly* that is subordinate to a *parent assembly*

single-part assembly

*assembly* that consists of one *part*

assembly hierarchy

arrangement of *assemblies* that describes the manufacture and erecting of the actual assembly to be built

assembly level

*assembly’s* place in the *assembly hierarchy*

The assembly level is expressed as a number.

lotting

process of creating *lots* and adding *assemblies* to them

lot

consignment of *assemblies* for transportation to site

It is possible to use *lot numbers* and descriptions in *reports*.

lot number

numerical value that indicates a *lot*

control number; ACN

not: † assembly control number

*user-defined attribute* of an *assembly* or a *cast unit* that identifies the *assembly* or *cast unit main part*

A control number does not affect *numbering*.

Control numbers are running numbers.
1.5.7  Modeling aids

121  grid

*modeling aid* that represents a three-dimensional complex of horizontal and vertical *planes*

In *Tekla Structures*, grids are used as an aid in locating *objects* (1) in a *model* (1). The grid is shown on the *view plane* by dash-and-dot lines. It is also possible to show grids and *grid line labels* in *drawings* (1), and to modify grid properties in the drawings (1).

It is possible to have more than one grid in a model (1). For example, a large-scale grid for the entire structure, and smaller grids for some detailed sections.

122  grid plane

single horizontal or vertical *plane* of a *grid*

123  grid line

single line that visualizes a single *grid plane* on a *view plane*

124  grid line label; grid label

name of a *grid line*

125  grid label frame

frame of a *grid line label* in a *drawing* (1)

126  constraint

*modeling aid* that represents a *dependency* (1) between two *model objects*

Constraints are used in a *model view*, in *custom components*, and in *profiles*.

With constraints it is possible to straighten lines, create 90 degree angles, force lines to meet, close the profile, and add *chamfers* in the corners of a profile, for example.

127  construction object

*modeling aid* that represents a *point* (1), line, circle, or *plane* and that helps in placing other *objects* (1)

128  construction line

*construction object* that represents a line between two *points* (1)

129  construction plane

*construction object* that represents a *plane*

130  construction circle

*construction object* that represents a circle
measure

*modeling aid* that displays the *distance (1)* between *points (1)* in the *model (1)*, or the measurements of angles, arcs, or *bolt groups*

point (2)

*modeling aid* that visualizes a determined place in a coordinate system, compare with *point (1)*

extension line (2)

temporary line in a *model (1)* that can be used for aligning *objects (1)* with each other

   Extension lines (2) can be used when snapping or creating *points (2).*
1.5.8 Components

134 Plugin

Component (1) that is developed using Tekla Open API

Plugin is a .dll file and loaded inside Tekla Structures process.

Plugins can be started from the applications and components catalog.

135 Connection

Component (1) for creating such component objects that automatically connect component secondary parts to a component main part and create the necessary other objects (1)

A connection can be a system or a custom component. Other objects (1) can include bolts (1), welds, cuts, and fittings.

136 AutoConnection

tool that creates connections with predefined properties in certain framing conditions

137 AutoDefaults

Predefined properties that AutoConnection uses when creating connections

138 Up Direction

connection or detail property that indicates how the created connection is rotated around the component secondary part, or the created detail around the component main part, relative to the current work plane

The up direction options are +x, -x, +y, -y, +z, -z, and auto.

139 Detail

Component (1) for creating such component objects that automatically connect to a component main part at a picked location

A detail can be a system or a custom component. For example, an alignment hook or a steel column base plate is a detail.

140 Detailing Component

Not: modeling tool

Component (1) for creating and assembling component objects for building a structure

The term modeling tool is used in Tekla Structures until version 21.1.

141 Custom Part

Component (1) for creating a part that cannot be created by using any existing part command or part profile

Typically, custom parts are used to create parts that have a complex composition. For example, castellated beams and sandwich panels are often created as custom parts.
142

seam

component (1) for creating such component objects that connect parts along a line picked using two points (1)

143

system component

component (1) that is included in a Tekla Structures configuration and whose component objects and composition the user can modify within the limits of the component (1) properties

144

custom component

component (1) that the user creates and uses for creating model objects whose composition the user can modify as a group

145

custom component editor

tool that is used for modifying component (2) that is created by a custom component, and for creating dependencies (1) between component objects and other model objects

146

custom component dialog editor

tool that is used for modifying the custom component dialog box in custom component editor

The custom component dialog editor is used for adding and arranging the dialog box elements, such as images, tabs, and lists.

147

component (2)

group of model objects that is created by a component (1) and that Tekla Structures treats as a single unit

Components (2) adapt to changes in the model (1). For example, Tekla Structures automatically modifies a connection if the user modifies the parts it connects.

148

nested component

component (2) that consists of several components (2)

Nested components include elements that are modeled as sub-components.

149

sub-component

component (2) in a nested component that is subordinate to another component (2)

150

component hierarchy

arrangement of components (2) that describes the internal structure of a nested component

151

component symbol

symbol in a model (1) that indicates a component (2) type, functions as a link to component (2) properties, and can be used to control component objects

Component symbol of a connection or a detail also indicates the status of the connection or the detail using colors.
**Tekla Structures glossary**

- **component (1)**
  - part of Tekla Structures functionality that is used for creating a group of model objects that are easy to model and modify as a single unit.

- **component (2)**
  - group of model objects that is created by a component (1) and that Tekla Structures treats as a single unit.

- **plugin**
  - component (1) that is developed using Tekla Open API.

- **connection**
  - component (1) for creating such component objects that automatically connect component secondary parts to a component main part and create the necessary other objects (1).

- **detail**
  - component (1) for creating such component objects that automatically connect to a component main part at a picked location.

- **detailing component**
  - component (1) for creating and assembling component objects for building a structure.

- **seam**
  - component (1) for creating such component objects that connect parts along a line picked using two points (1).

- **AutoConnection**
  - tool that creates connections with predefined properties in certain framing conditions.

- **AutoDefaults**
  - predefined properties that AutoConnection uses when creating connections.

- **up direction**
  - connection or detail property that indicates how the created connection is rotated around the component secondary part, or the created detail around the component main part, relative to the current work plane.

- **system component**
  - component (1) that is included in a Tekla Structures configuration and whose component objects and composition the user can modify within the limits of the component (1) properties.

- **custom component editor**
  - tool that is used for modifying the custom component dialog box in custom component editor.

- **custom component**
  - component (1) that the user creates and uses for creating model objects whose composition the user can modify as a group.

- **custom component**
  - component (2) that is created by a custom component, and for creating dependencies (1) between component objects and other model objects.
1.6 Settings and properties

**settings** *pl*

collection of choices defined by a software user or predefined in the software in order to control operations of the software

Settings may affect general functions of the software (see *general settings*) or a specific function. Examples of settings in *Tekla Structures* include display settings, numbering settings, and color settings. Also *advanced options* are a category of settings.

The user can define settings, for example, by entering a value or by selecting a value among the available ones.

Giving values to *properties* also influences operations of the software. Therefore, values given to properties are also regarded as settings. For example, values given to *grid* properties form part of general *modeling settings*.

The term settings is sometimes used as a synonym for properties. The term properties is used to refer to real-world entities, such as *parts* or *details*. The term settings is used to refer to software operations, for example rotation settings and display settings. The term properties is used when the viewpoint is that of a single *object* (1) and the term settings is used when the viewpoint is more general.
General settings
settings that are used to control the general functions of the software

For example, autosave interval and mouse settings are general settings in Tekla Structures. General settings can be saved for each model (1) or as a standard file.

In Tekla Structures, general settings are defined in the Options dialog box.

Advanced options
settings used to customize Tekla Structures for specific companies, standards, users, or user groups

In Tekla Structures, advanced options are settings that are used, for example, in a specific project or geographical area, or by a specific company.

In Tekla Structures, advanced options usually begin with the initials XS and are followed by the name of the function, for example XS_BACKGROUND_COLOR.

Role-specific advanced options
advanced options that work for all users with the same role

User-specific advanced options
advanced options that affect all models (1) the user has

User-specific advanced options set the user’s personal preferences, for example, the background color of the model views.

User-specific advanced options are saved in the options.bin file.

Model-specific advanced options
advanced options that affect the current model

Model-specific advanced options are saved in the model options and drawing options databases.

System-specific advanced options
advanced options that affect all sessions and work for all users and in all models (1)

System-specific advanced options are read from initialization files.

Modeling settings
settings applied in the modeling mode

Examples of modeling settings include rotation settings, color settings, transparency settings, display settings and numbering settings.

Current properties
rather than: applied values

Properties related to an object type and applied to new objects (1) of this type

In Tekla Structures, properties related to an object type are activated in the property pane or in the dialog box.
161

**properties** *pl*

collection of characteristics of an *object (1)* in a software or application

The selection of properties related to each object (1) is usually predefined. For example, properties related to *parts* include name, *profile* and material. The software user can also create certain properties (see *user-defined attributes*).

In *Tekla Structures* the values related to properties can be given in a *property pane* or a dialog box.

The term *settings* is sometimes used as a synonym for properties. The term *properties* is used to refer to real-world entities, such as *parts* or *details*. The term *settings* is used to refer to software operations, for example rotation settings and display settings. The term *properties* is used when the viewpoint is that of a single *object (1)* and the term *settings* is used when the viewpoint is more general.

162

**object properties** *pl*

*properties* associated with an *object type*

Usually a single *object property* includes a default value that the user can modify.

163

**object property**

single characteristic associated with an *object type*

For example, *profile* and material are object properties.

164

**user-defined attribute; UDA**

*object property* created by the user in order to widen the range of predefined *object properties*

User-defined attributes are used when the predefined object properties are not sufficient but more *properties* are needed. For example, comment, locked, and erection status are user-defined attributes.

165

**object lock**

*user-defined attribute* that is used to protect *model objects* from being accidentally changed

The model objects can be locked and unlocked in the object locks dialog box and the *phase manager*. 
settings
collection of choices
defined by a software
user or predefined in
the software in order
to control operations of
the software

properties
collection of
characteristics of an
object (1) in a software
or application

according to the
number of cases used
in

according to how the
settings control the
drawing

according to the
properties are applied
for

view properties

object properties
properties associated
with an object type

current properties
properties related to an
object type and applied
to new objects (1) of
this type

object property
single characteristic
associated with an
object type

user-defined
attribute
object property created
by the user in order to
widen the range of
predefined object
properties

predefined object
property

other user-defined
attribute

Object lock
user-defined attribute
that is used to protect
model objects from
being accidentally
changed

object

 Tekla Structures glossary – 2019.01.23
1.7 Tekla Structures intelligence

166
<Tekla Structures>

associativity

drawing (1) property that represents the linking of drawing objects to model objects so that the former are updated according to changes made to the latter in the modeling mode.

In Tekla Structures, associativity only relates to one type of drawing objects, namely associative objects. These can be building objects and associative annotation objects.

In Tekla Structures, the term associativity has traditionally been used when referring to the linking of drawing objects to model objects. In other modeling contexts, however, the term associativity may refer to any kind of linking between model objects or parts of a model (1) by using dependencies (1).

167
adaptivity

automatic linking of model objects to another model object

For example, reinforcement and surface treatment automatically adapt to the changes made to the part they are linked with.

168
<Tekla Structures>

parametric modeling

modeling that uses parametric variables to define various properties

In Tekla Structures, parametric modeling is used in custom components and parametric user-defined profiles.

Parametric modeling can be used for defining a model object’s geometry, location, and relationship to other model objects. Parametric modeling may also use dependencies (1) between the model objects to update the model objects.

The term parametric modeling has traditionally been used in Tekla Structures as defined above. In other modeling contexts, the term associative parametric modeling may be used (see also how associativity is defined in Tekla Structures).

169
magnetic; magnetism

grid and construction object property which enables attaching adaptive model objects so that the attached model objects follow when part of the grid or construction object is moved

See also adaptivity.

170
verb

attach

to relate a model object to another model object or to a point (1) so that the related model object follows when the other model object or point (1) is moved or deleted

For example, reinforcement can be attached to a concrete beam and a load can be attached to a part.
variable (1) string that is used to bind *model objects* or to set or store values

In *Tekla Structures*, variables (1) have names like P4 or D2.

reference distance variable; reference distance

variable (1) used to pass on *distance (1)* information in order to define *properties*

distance variable; distance (2)

variable (1) used to *bind* the *model object* to the *object (1) planes* or *construction planes*

A distance variable includes a value and a *dependency (1)*.

parametric variable

rather than: parameter

variable (1) used to define a value for a *parametric property*

A parametric variable does not include a *dependency (1)*.

For example, name, material grade, and bolt size are parametric variables.

parametric property

rather than: variable (2)

*model object property* that can include *dependencies (1)*

For example, length is a parametric property.

dependency (1)

rule that defines a *model object’s* relationship to other model objects so that the latter ones adapt to changes made in the former

A dependency (1) can be created between *parametric properties* or between *variables (1)*.

bind
to relate a *model object point (1)* or *plane* to an *object (1) plane* or *construction plane* so that they change according to the changes made to the object (1) plane or construction plane

For example, *distance variables* can be used to bind *handles, fittings*, and *cuts* to construction planes, so that the *custom component* can adapt to different situations, such as different shapes and sizes of *component main part profile*.

binding
general *dependency (1)* between *model objects* and model object *planes* or *construction planes*

In *Tekla Structures*, bindings are used to define *locations* using *distance variables*. 

179
equation
dependency (1) that determines that two things are equal

In *Tekla Structures*, equations are used to define values for *parametric properties*.

180
formula
rule stated in a mathematical language

Formula is part of an *equation*. 
**Concept diagram 18. Tekla Structures intelligence.**
1.8 Views

representation
the way that the information included in a model (1) is represented visually

object representation
representation of a model object or an object group in a model view, such a representation being based on the color and transparency settings applied to the model object or the object group

view representation
representation of a model (1) or a part of it, which is displayed inside the Tekla Structures window

view plane
plane in a space that defines the view

In Tekla Structures, the grids are projected onto the view plane and the grid lines can be visible on it.

View depth is defined starting from the view plane.

view depth
thickness of a slice of the model (1) defined starting from, and perpendicular to, the view plane

work area
certain portion of the model (1) that is currently active for working on in a view

Tekla Structures indicates the work area using dashed lines. Since objects (1) outside the work area exist but are not visible the user can set a certain sized work area so that the views of the model (1) are simpler and quickly updated, for example.

view name
name of an individual view

model view
view that is represented in the modeling mode

Model view is available also in the drawing mode and it is represented in its own window.

basic view
model view whose view plane is defined by two axes of the global coordinate system and the distance (1) from the global origin along the third axis

perspective
view projection that displays objects (1) in a model view from a particular standpoint so that distant objects (1) appear smaller than close ones, as do text and points (2)

The user can zoom, rotate, pan, or fly through the model objects.
orthogonal view projection that displays objects (1) in right-angles projection

In model view the size of the objects (1) is the same despite of their distance (1) to the viewing point and the zoom remains on part faces.

drawing view
view that includes selected model objects or an area in the model (1), that is represented in a drawing (1)

A drawing view is a container for model and drawing objects.

A drawing (1) can include several drawing views, which usually are two-dimensional views, plane views, to the model (1).

Examples of drawing views in Tekla Structures include main views, section views, single-part views, and 3D views.

plane view; 2D view
view that displays objects (1) two-dimensionally

3D view
view that displays objects (1) three-dimensionally

3D view is one of the default views.

default view
view that is created for a selected part or component (2) and whose view plane is defined by the coordinate system of the selected part or component (2)

Tekla Structures creates four default views at the same time: front, top, end (2), and 3D views. Each default view can have its own view properties.

default view that is created perpendicular to the part’s or component’s (1) front and top view

front view
default view that is created using the part’s or component’s (2) coordinate system and that shows the part or component (2) from the front direction

Part’s front view is a view on part plane created of the part’s front plane.

top view
default view that is created using the part’s or component’s (2) coordinate system and that shows the part or component (2) from the top direction

Part’s top view is a view on part plane created of the part’s top plane.
grid view; view along grid line

A view that is created along a specified grid line of a selected grid and whose view plane is the same as the specified grid plane.

view on plane

A view that is created on the work plane or on any plane of an existing part. The plane can be selected by the user and it shows the selected part only.

view on part plane

A view that is created based on a selected part and using the part’s coordinate system. The view on part plane is a front, top, bottom, or back view.

back view

A view on part plane that is created using the part’s coordinate system and that shows the part from the back direction.

bottom view

A view on part plane that is created using the part’s coordinate system and that shows the part from the bottom direction.

undeformed view

A view that shows a deformed part in undeformed form.

pour view

A view that displays cast-in-place concrete parts merged into pour objects. The cast-in-place concrete parts are merged into one pour object if they have the same material grade and if they touch each other.
1.9 Coordinates, planes, points, and lines

1.9.1 Coordinate systems

206 global coordinate system

coordinate system that reflects the entire space of a model (1)

A green cube represents the global coordinate system and lies at the global point of origin in the 3D view.

207 local coordinate system

coordinate system that reflects the current work plane or drawing view plane

The local coordinate system is represented in a model (1) by a symbol with three axes (x, y, and z). This symbol indicates the direction of the model (1). It is located in the lower right corner of the model view.

In a drawing (1), the local coordinate system symbol has two axes.

208 user coordinate system; UCS

local coordinate system defined by the user and used in a drawing view

User coordinate system makes it easier to place drawing objects, because the user can place the drawing objects relative to a user-defined point of origin, or a base point in the drawing view.

Tekla Structures displays the user coordinate system symbol in the current drawing view when the user creates, copies, moves, or modifies drawing objects.

209 point of origin

center of the coordinate system where the axes intersect and form a fixed point of reference for the geometry of the surrounding space

210 model origin

global coordinate system point of origin used for the model (1)

Model origin is the default project base point.

211 user-defined point of origin

local point of origin defined by the user in the user coordinate system and used in a drawing view
212

**base point**

*point (1)* in a *model (1)* that is used to define a starting point (1) in surveying and that is used as an anchor point (1) in coordinate and height transformations.

A *Tekla Structures project* can have several base points but only one of them can be the *project base point*.

Base points allow the use of another coordinate system needed for interoperability and collaboration. Base points can also be used in *drawings (2)*, and in *reports* and *templates (1)*. *Model origin* is the default base point in Tekla Structures.

Base points are also called control points.

213

**project base point**

*base point* that sets the *point of origin* for a *project* if the *model (1)* has several base points.

A project can have only one project base point.

214

**current base point**

*base point* currently selected in the *model (1)*.

If the model (1) has no defined base points, the *model origin* is the base point.
Concept diagram 20. Coordinate systems.

1.9.2 Planes

215 plane
infinite flat surface represented in a three-dimensional coordinate system

216 face
flat surface that forms part of a faceted representation object

Face can form a part of a solid object boundary or it can be an element forming part of a non-solid object.
217

positioning plane

*plane* that defines the position of a *model object* relative to the *part’s reference points* or other *model objects*

218

connection positioning plane

*positioning plane* that defines the position of *component objects* in a *connection* relative to *component main parts*

219

part positioning plane

*positioning plane* that defines the position of a *part* relative to its *reference points*

220

component plane

*plane* that is in a *component (2)* and that defines the position of the *component objects* inside the component (2)

   Component plane is used for binding *model objects* in *custom components*.

221

outline plane

*plane* whose position is defined by the outer and inner surfaces of a *part*

222

boundary plane

*plane* whose position is defined by the edge of a *bounding box*

223

bounding box

rectangular border with the smallest measure within which all the selected *points (1)* that position the *model objects* lie

   In *Tekla Structures* two-dimensional bounding boxes are used in *drawings (1)* and three-dimensional bounding boxes in *models (1)*.

224

center plane

*plane* whose position is defined so that it passes through the midpoint of a *part cross section*

225

cut plane

*plane* whose position is defined by a cut surface

226

work plane

*plane* that the user has chosen in a *model (1)* and that is currently active for working on in a *model view*

   Newly created, copied, or moved *model objects* comply with the work plane. For example, shifting the work plane to follow a sloped plane makes it easier to model sloped structures.
227

**clip plane**

tool that hides a portion of the *model* in a *model view*

Clip plane can be created in model views that show *model object faces*. The clip plane is aligned with the selected model object face.
1.9.3 Points and lines

point (1); location
determined place in a coordinate system

The user can determine a point (1) by clicking it or by inputting numerical coordinates.

layout point
point (1) that can be exported to a layout device

Layout point can be a reference point.

design point
layout point that is created in the Tekla Structures model (1)

measured point
layout point that has been measured on the construction site and imported to Tekla Structures model (1)

point cloud
group of measured points that are imported to Tekla Structures as one unit

Point clouds can be placed by the model origin or by a defined base point.

gometry point
point (1) on an object’s (1) geometry determined by the object’s (1) shape

Geometry points can be selected as snap points in a snap switch.

gometry line
line on an object’s (1) geometry determined by the object’s (1) shape

Geometry lines can be used in snapping in a snap switch.

reference point
point (1) that Tekla Structures creates when the user creates a model object, the point (1) being visualized as a handle

The reference points follow the model object if it is moved. They are only deleted if the related model object is deleted.

Reference points can be selected as snap points in a snap switch.

handle
symbol that is shown if a model object is selected

Handles can be used to move a model object or to modify the model object’s shape or size.
direct modification

function that activates the mode where the model objects can be modified by using handles

Direct modification enables additional handles and modification options.

reference line

line between two reference points

For example, if the user picks two points (1) to position a beam, these points (1) form the reference line, and handles appear at the line ends.

Reference lines can be used in snapping in a snap switch.

associativity point

in a drawing object, a point (1) that follows the changes in the model (2)

For example, an end point (1) of a line or a base point of a dimension is an associativity point.
Concept diagram 22. Points and lines.

1.9.4 Snap

verb pick

(perform by Tekla Structures user) to click one or more points (1) in a model (1) in order to execute an action using those points (1)

The user picks points (1) to position model objects when creating them, for example.

Picking can be done by using the left mouse button, for example.
verb

snap

(performer by Tekla Structures) to automatically hit an exact point (1) on a model object when the user moves the mouse pointer near it

242

snap point

point (1) to which Tekla Structures snaps

243

snap zone

zone around one or more snap points inside which Tekla Structures hits the closest snap point corresponding to the active snap switches

244

snap priority

property of a snap point that defines its ranking among the snap points inside a snap zone

Tekla Structures automatically snaps to the point (1) with the highest snap priority, but the user can also choose another point (1).

245

snap grid

area covered with regularly spaced snap points

246

snap switch

switch used for controlling what kind of points (1) Tekla Structures snaps to

The user needs to activate snap switches to be able to pick different points (1), for example, line ends and intersections.

Snap switches help the user to pick points (1) in order to position model objects precisely without having to know the coordinates or create additional lines or points (2).

247

snap override

tool that is used for temporarily bypassing the snap switch in use

Snap override only bypasses the snap switch settings for the next point (1) the user picks.

248

ortho tool

tool that is used to snap into orthogonal directions in a model (1) or drawing (1)
1.10 Modes

modeling mode

mode that is used for creating and analyzing a model, and initiating the creation of a drawing and a report

Custom component editor and sketch editor can be accessed in modeling mode.
250
drawing mode
mode that is used for editing the appearance and content of drawings.

Tekla Structures switches to the drawing mode when the user opens any drawing.

251
single-user mode
mode in which only one user can work on a model.

252
multi-user mode
mode in which several users can work on the same model using their own working models.

253
Tekla Structures multi-user server
computer in a multi-user system set up as a server running the Tekla Structures multi-user server program.

254
Tekla Structures multi-user server program
program that enables using Tekla Structures in multi-user mode.

The Tekla Structures multi-user server program is xs_server.exe.

The Tekla Structures multi-user server program’s main tasks are to distribute ID numbers for new objects, to lock the model when somebody saves or numbers the model, and to identify client computers.
Concept diagram 24. Modes.
2 MODELING

2.1 Model types

255 building information model

*model (2)* that facilitates the exchange and use of building information

In *Tekla Structures* context, the term *BIM* is only used to refer to ‘building information modeling’.

256 single-user model

*model (1)* that is opened in *single-user mode*

257 multi-user model

*model (1)* that is used for collaboration and that is opened in *multi-user mode*

258 master model

*multi-user model* from and to which information is fetched and saved in *multi-user mode*, and into which *Tekla Structures* merges changes that individual users make in the *working models*

It is not possible to work on the master model.

259 working model

*multi-user model* that an individual user works on in *multi-user mode*

Working model is a local copy of a *master model* and the user’s *current model*.

260 shared model; Tekla Model Sharing model

*model (1)* used for collaboration over the *Tekla Model Sharing* service

With a shared model, each user works with their own model (1) and the changes are shared through Tekla Model Sharing. A shared model requires the use of a *single-user model*. The same model (1) cannot be a shared model and a *multi-user model*.

261 model template

*model (1)* which is used as a basis for creating new models (1)

The user can save a model (1) including all its elements, such as *object properties*, certain *settings*, *parts*, and *components (2)*, in a model template.

262 current model

*model (1)* that is active in *Tekla Structures*

The current model can be a *single-user model*, a *shared model* or a *working model*.

263 standard-part model

*model (1)* that contains *standard parts* and that is only used for defining *part* prefixes when *numbering* parts in the *current model*
264
structure model

*model (2)* that represents a structure to be constructed

265
physical model

*structural model* with a direct or indirect counterpart in the structure to be built

266
analysis model; analysis and design model; analysis & design model

*structural model* that is created from a *physical model* and used on the one hand for analyzing structural behavior and *load* bearing, and on the other hand for design

Analysis model can be viewed in *Tekla Structures* in a *model view*.

Analysis model that is made with Tekla Structures can be worked on in other analysis and design software or application.

267
maintenance model

*model (2)* that covers information on the maintenance of the building
Concept diagram 25. Models.
2.2 Parts

beam

part that represents a linear extruded structure in a mainly horizontal position

In Tekla Structures, beams are created with two points (1).

In some contexts, for example in analysis, the term beam object may be used to refer to beams and columns.

orthogonal beam

beam created perpendicular to a work plane in a picked location

Beam is only orthogonal in the creation stage. After its creation, an orthogonal beam can be modified as if it were a beam or column.

spiral beam

beam that follows the form of a helix and is defined by a start point (1), center point (1) and the rotation axis

Spiral beams can be concrete spiral beams or steel spiral beams. They can be used to create spiral staircases, complex architectural structures, and concrete parking ramps, for example.

Spiral beam can rise from the work plane or be flat. If the spiral beam rises, the total rise is defined between the start and the end point (1).

curved beam

beam that follows the form of an arc

Steel curved beams can be created by picking three points (1), where a point (1) between the start point (1) and the end point (1) defines the arc. Both steel and concrete curved beams can be created by adjusting radius in beam properties or by using polybeams.

column

part that represents a linear extruded structure in a mainly vertical position

In Tekla Structures, columns are created with one point (1).

In some contexts, for example in analysis, the term beam object may be used to refer to beams and columns.

pile

slender column or pole that is put into the ground to carry loads or to provide support

Pile may be made of precast or cast-in-place concrete, or steel.

footing

part that represents a construction that is located under another part and used for distributing loads on the ground
275

**pile cap**

*footing* that covers the heads of a group of *piles*, tying them together so that the structural *load* is distributed and they act as a single unit

Pile cap usually includes *reinforcement*.

276

**pad footing**

*footing* that supports a single point of contact

Pad footing usually supports one *column*.

277

**strip footing**

*footing* that supports several points of contact or a region of points of contact

Strip footing supports a length of wall or a line of closely spaced *columns*, for example.

In *Tekla Structures*, strip footing has a polygon shape that the user defines by *picking points* (1).

278

**plate (1)**

*part* that represents a flat structure

In some contexts, for example in analysis, the term plate object may be used to refer to plates (1).

279

**panel; > wall**

*plate (1)* that represents a structure such as a wall or roof panel

In *Tekla Structures*, a panel is created by *picking* two or more *points* (1).  
In *cast-in-place concrete* the term wall refers to a concept similar to panel.

280

**slab**

*plate (1)* that represents a concrete structure

In *Tekla Structures*, a slab is created by *picking* three or more *points* (1).  
Slab may be part of a floor, for example.

281

**plate (2)**

*plate (1)* that represents a steel structure

Plate (2) is mainly used as a connection piece or as a floor plate.

282

**polybeam**

*part* of a certain shape that is created as a continuous chain of *beams* passing through *points* (1) that the user *picks*

The segments of the polybeam are straight, but segment intersections can be curved. For example, a beam that follows a zigzag line is a polybeam.
contour plate

A part whose outline the user defines by picking three or more points. The user can define the shape of the contour plate parallel to the work plane. The profile in use defines the thickness. The corners of the contour plate can be chamfered.

bent plate

A part that is created from contour plates, or beams whose profile is a plate.

Bent plates can be conical or cylindrical.

Curved beams, spiral beams, or deformed parts cannot be used for creating a bent plate.

twin profile

A part that represents two identical parts mirrored in relation to their position.

Twin profile can be separated into two individual parts, after which it is no longer a twin profile.

corbel

A concrete part representing a structure that projects from the face of a concrete part and that serves as a support for an overhanging part and connects the parts.

item

A part that has a three-dimensional shape.

The item is defined by a shape and the main difference to other parts is that parts have a profile extruded to create the length of the part.

main part

A part that exists in a building object and that determines the position number for the assembly or cast unit and the direction of assembly or cast unit drawings.

Main part can be an assembly main part or a cast unit main part.

secondary part

A part that exists in a building object and that is connected to the main part.

Secondary part can be an assembly secondary part or a cast unit secondary part.

assembly main part

The assembly main part in a steel assembly may have other parts welded or bolted to it. By default, the assembly main part is not welded or bolted to any other parts.

The user can change the assembly main part.
291
**cast unit main part**

*main part (1)* that exists in a *cast unit*

The cast unit main part in a concrete cast unit is, by default, the *part* with the largest volume of concrete.

The user can change the cast unit main part.

292
**assembly secondary part**

*secondary part (1)* that exists in an *assembly* and that is connected to an *assembly main part*

293
**cast unit secondary part**

*secondary part (1)* that exists in a *cast unit* and that is connected to a *cast unit main part*

294
**standard part**

steel *part* that *current model* parts are compared with in the *numbering* process in order to give them specific part prefixes
concept diagram 27. Parts according to their roles in the model.

part
building object that is a basic element of a model (1) and that can be modeled and detailed further

according to existence in building object

according to role in analysis

according to part usage

according to what is created

main part (1)
part that exists in a building object and that determines the position number for the assembly or cast unit and the direction of assembly or cast unit drawings

physical part
part in a physical model

analysis part
analysis model object that is a representation of a physical part in an analysis model

part in a project model (1)

input part
part that exists in a model (1) and that the user selects when creating a component (2)

standard part
steel part that current model parts are compared with in the numbering process in order to give them specific part prefixes

main part (1) that exists in a building object and that is connected to the main part (1)

secondary part (1)
part in an assembly

secondary part (1) that exists in a building object and that is connected to the main part (1)

assembly main part
main part (1) that exists in an assembly

assembly secondary part
secondary part (1) that exists in an assembly and that is connected to an assembly main part

cast unit main part
main part (1) that exists in a cast unit

cast unit secondary part
secondary part (1) that exists in a cast unit and that is connected to a cast unit main part

cast unit secondary part
input part that the user selects first when creating a component (2)

component main part
input part that the user selects after selecting the component main part when creating a component (2)
2.3 Part properties and profiles

**profile**

*part* property that specifies the *cross sections* of the whole length of the part

A profile can have one or more cross sections, and the separate cross sections can have different geometrical form and dimensions. The part cross sections are extruded to create the length of the part.

In *Tekla Structures*, it is possible to use different functionalities for creating and managing profiles of different types.

**cross section**

generational form of a *part* sectioned perpendicular to its axis

**fixed profile**
rather than: library profile

predefined *profile* whose *cross section* dimensions the user cannot change

**fixed user-defined profile**

*fixed profile* whose *cross section* dimensions the user has predefined from scratch, or by modifying an existing *parametric profile*

The user can create a fixed user-defined profile in several ways, for example, by importing a DWG file to a *model* (1).

**standard fixed profile**

*fixed profile* whose *cross section* dimensions are predefined in *Tekla Structures*

The standard fixed profiles are located in the *profile catalog*.

**parametric profile**

predefined *profile* whose *cross section* dimensions the user can change by using *parametric variables*

**predefined parametric profile**

*parametric profile* whose *cross section* dimensions are predefined in *Tekla Structures*

For example, ledger beams and fixed I-shaped profiles are predefined parametric profiles.

**parametric user-defined profile**

*parametric profile* whose *cross section* dimensions the user has predefined

Parametric user-defined profiles are defined using the *sketch editor* or .clb files.

**sketch editor**
rather than: cross section sketch editor

tool that is used for creating and editing *parametric user-defined profiles*
sketched profile

Parametric user-defined profile created in the sketch editor

class

Part property that groups parts according to identifiers given by the user

The identifiers of classes are usually numbers. Classes can be used for defining the color of parts in the model (1), for example. Class does not influence the numbering of model objects.

finish

Part property that describes how the part surface will be treated

Finish influences numbering.

deforming

Part property that changes the geometry of the part

deforming that decreases the modeled length of a part in a drawing (1) by a value the user has entered

Shortening is used when the parts are manufactured shorter than modeled.

warping

Deforming that twists the part by rotating the ends of the part

cambering

Deforming that curves a part to compensate for deflection which arises due to loads on the structure

Cambering is typically an upward curvature defined for a beam.

end offset

Part property that is used to move the ends of a part, relative to the part’s reference line

shape

Item property that specifies its geometry in space

The shapes are modeled using software other than Tekla Structures, for example SketchUp.

part label

Set of part properties that the user has selected to be displayed with the part in a model view
2.4 Details

Picture 1. Bolt assembly and bolt elements.

314 bolt assembly
set of bolt elements that consists of a bolt (2), a stud, or a screw, and possibly the related washers and nuts

315 bolt (2)
bolt element that represents a metal rod or pin that has a head at one end and the other end is open and threaded

Bolts (2) and other bolt elements are listed in the bolt catalog.
A bolt (2) is usually secured by a nut. A bolt (2) is part of the bolt assembly.

316 stud
bolt element that represents a metal rod or pin that is used to transfer loads

Studs and other bolt elements are listed in the bolt catalog.
A stud can be secured with two or more nuts and have threading at both ends, or it can be welded to steel parts, for example.
A stud is part of the bolt assembly.

317 cut
deletion of a portion of a part or a rebar set

318 line cut
cut that is defined by a cutting line

319 cutting line
straight line that is defined by picking two points (1) and used for shaping the part or a rebar set

320 polygon cut
cut that is defined by a polygon
part cut

*cut* that is defined by a *cutting part*

hollow

*cut* in a *part*

hole

small *hollow* open throughout a *part* or *assembly* that is usually used for fastening parts with *bolts (1)* or other such *objects (1)*

Hole is created in the same way as bolts (1) and hole *properties* are defined in the bolt properties.

opening

large *hollow* open throughout a wall, partition, roof, floor, ceiling or other such *part*

Opening can be created for a door, window or ductwork, for example.

recess

*hollow* that does not extend through an *object (1)* or part of the construction

void

*hollow* inside a *part*

<steel>

*notch /UK/; cope /US/*

*cut* in one *component object* or *input part* for receiving another component object or input part

weld access hole; rathole

small *cut* that is made on the *beam* web in order to enable welding by using an electrode

weld preparation

not: weld prep

*cut* that is made on the *part* edge in order to enable a more complete weld penetration which provides a stronger joint

fitting

adjustment of a *part* end

chamfer

refining of the *part* corners and edges

Chamfers can be corner chamfers or edge chamfers.
distance (1)

space that represents the degree or amount of separation between two points (1), lines, planes, or objects (1)

setback distance; setback

distance (1) between a part end and its reference point

In Tekla Structures, knock-off dimensions are an example of setback distances.

clearance

set space between objects (1)

In bolted connections, clearance is required for entering and tightening the bolts (2) with an impact wrench. In addition to this, there may be a clearance for a fillet.

In welded connections, clearances are required in order to allow a welder to lay a correct weld.

Reinforcing bar clearance defines the minimum clearance or the allowed overlap for reinforcing bars when they are checked against other objects (1).

gap

any space between two objects (1)

The term gap is used in its general sense in Tekla Structures.
Concept diagram 29. Bolt assembly.
Cut: deletion of a portion of a part or a rebar set

Fitting: adjustment of a part end

Chamfer: refining of the part corners and edges

Space:

Corner chamfer:

Gap: any space between two objects (1)

Clearance: set space between objects (1)

Distance (1): space that represents the degree or amount of separation between two points (1), lines, planes, or objects (1)

Setback distance: distance (1) between a part end and its reference point

Polygon cut: cut that is defined by a polygon

Part cut: cut that is defined by a cutting part

Cut that modifies the outline of the part:

Notch: cut in one component object or input part for receiving another component object or input part

Weld preparation: cut that is made on the part edge in order to enable a more complete weld penetration which provides a stronger joint

Weld access hole: small cut that is made on the beam web in order to enable welding by using an electrode

Opening: large hollow open throughout a wall, partition, roof, floor, ceiling or other such part

Void: hollow inside a part

Hollow: cut in part

Hollow open: hollow that does not extend through an object (1) or part of the construction

Line cut: cut that is defined by a cutting line

Cutting part: building object that creates a part-shaped hollow

Polygon:

Cutting line: straight line that is defined by picking two points (1) and used for shaping the part or a rebar set

Hole: small hollow open throughout a part or assembly that is usually used for fastening parts with bolts (1) or other such objects (1)
2.5 Component creation and structure

input point

point (1) that the user picks when creating a component (2)

input part

part that exists in a model (1) and that the user selects when creating a component (2)

component main part; main part (2)

not: primary part; supporting part

input part that the user selects first when creating a component (2)

Connections and details always have a component main part.

component secondary part; secondary part (2)

not: supported part

input part that the user selects after selecting the component main part when creating a component (2)

A component (2) can have none, one or more component secondary parts.

Concept diagram 31. Component creation.
2.6 Component objects in steel components

2.6.1 Basic component objects

340 <steel>

shear tab /US/
rather than: shear plate /UK/

component object that represents a plate (2) welded to the component main part and bolted to the web of the component secondary part

341 <steel>
gusset

component object that represents a plate (2) that connects braces to a beam, column, or base plate

342 <steel>
base plate

component object that represents a plate (2) welded to a column base

Base plates are used to distribute the concentrated load of the column over a wider area.

343 <steel>
end plate

component object that represents a plate (2) welded perpendicular to the end of the component secondary part

344 <steel>
seat

component object that represents a structure upon which a component secondary part rests

345 <steel>
seat angle
rather than: angle seat

seat that represents an angle

346 <steel>
seat plate

seat that represents a plate (2)

347 <steel>
clip angle /US/; angle cleat /UK/

component object that represents a right angle that is made of a standard L-shaped profile and that connects parts

348 <steel>
bent plate (2)

component object that represents an angle that is bent from a plate (2) and that connects parts
349

<steel>

**haunch**

*component object* that represents a wedge-like structure that strengthens a *beam* at its end.
2.6.2 Additional component objects

350
<w:st>steel
weld backing bar; backing bar</w:st>

<component object> that represents a structure that facilitates the welding process

Weld backing bars are used, for example, to help contain the weld metal or suspend the structure.

351
<w:st>steel
shim plate; shim</w:st>

rather than: fitting plate; filler plate

<component object> that represents a plate (2) that is used for filling clearances and gaps on the construction site

352
<w:st>steel
finger shim; comb</w:st>

shim plate with slots cut through the edge

353
<w:st>steel
strip shim</w:st>

shim plate with round punched holes

354
<w:st>steel
stiffener</w:st>

<component object> that represents a structure that strengthens a steel beam or column

Stiffeners are usually plates (2).

Stiffeners are used to prevent web buckling at supports or concentrated loads.

355
<w:st>steel
web doubler plate; doubler plate</w:st>

<component object> that represents a structure that strengthens a steel beam web or steel column web by thickening it

356
<w:st>steel
flange plate</w:st>

<component object> that represents a plate (2) that connects the flanges of a beam to a column

Flange plates are used in moment connections, for example.

357
<w:st>steel
shear key</w:st>

<component object> that represents a short steel part welded to the bottom of a base plate
Concept diagram 33. Additional component objects.

2.7 Filtering and visualization tools

filter

tool that is used for displaying, modifying, or selecting only the desired information in a model (1) or in a drawing (1)

For example, part properties can be used as criteria in filters. The user can select, modify, or hide parts based on their properties.

view filter

filter used for defining which objects (1) are displayed in a model view or drawing view

View filter chooses objects (1) according to object properties. The user can filter objects (1) according to their profile or material, for example.
selection filter

*filter* used for defining which *object types* can be selected

Selection filter chooses *model objects* according to *object properties*.

Selection filters can be standard or user-defined.

For example, selection filters can be used to select *parts* for *drawings (1)* or analysis.

object group

*model objects* with *settings* that match the settings that the user has defined for a certain purpose

In *Tekla Structures*, an object group is used on the one hand to control the transparency and coloring of model objects in the *views* and on the other in project management. Object groups can also be used in filtering tools, for example in *selection filter*, to select all *objects (1)* that match certain *properties*.

project status visualization

tool that is used in the *modeling mode* for visualizing the *properties* of *model objects*

The project status visualization tool can be used, for example, to show model objects related to different phases of a *project* in different colors. A typical example of using the project status visualization tool is creating an erection schedule.

rendering

process of making the *model object faces* visible

The rendered model object faces can be transparent or non-transparent
2.8 Numbering

Numbering is the process of assigning position numbers to parts, cast units, assemblies, or reinforcement. In Tekla Structures, the position numbers assigned in the numbering are shown in marks and templates (1), for example.
Position number consists of a prefix, separator, and running number. The prefix is part of the position number, identifying a numbering series. The running number is part of the position number, and is the assigned number in the numbering series, based on the start number. The separator is an optional character, such as a slash, that separates the prefix and the running number.

In Tekla Structures, the position numbers assigned in the numbering are shown in marks and templates (1), for example.

In the US, the term piece mark or ship mark is used to refer to a position number.

**part position; part position number**

position number that is assigned to a part

**preliminary number**

user-defined attribute of a part that defines the part’s part position before the structure is detailed

**assembly position; assembly position number**

position number that is assigned to an assembly or a cast unit

**reinforcement position number; rebar position number**

position number that is assigned to reinforcement

**numbering series**

set of identifiers defined by the user, based on which Tekla Structures compares parts, assemblies, cast units, or reinforcement with each other during the numbering and gives position numbers

Numbering series is defined by a prefix and a start number.

The user can, for example, allocate separate numbering series to different phases or part types.

**start number; starting number**

first number of a numbering series

**family numbering**

process of assigning family-based numbers to cast units or assemblies

**family**

group of cast units or assemblies within the same numbering series created based on the criteria selected by the user
374
family-based number; family position number

identifier that Tekla Structures assigns to cast units or assemblies based on a family

Family-based number consists of a family number and a qualifier.

375
family number

family-based number component that refers to a numbering series

Family number is used to describe which parts can be cast in the same bed, for example.

376
qualifier

family-based number component that refers to a group of similar cast units or assemblies within a family

Qualifier is a running number. It is used to describe cast units that contain, for example, the same embeds.
Concept diagram 35. Numbering.
3 DRAWING

3.1 Drawing types

377 general arrangement drawing; GA drawing
drawing (1) that is created from one or more model views and that shows information needed to understand the general arrangement of structural elements on a project

General arrangement drawings show how parts, assemblies, cast units, or pour objects are located in a building.

378 anchor bolt plan
general arrangement drawing that displays the anchor bolt layout

379 single-part drawing
drawing (1) that shows fabrication information for one part and that is generally used at the workshop

380 assembly drawing
drawing (1) that shows fabrication information for a basic or a nested assembly, including bolts (1) and welds, and that is generally used at the workshop

Assembly drawings show how parts are located in an assembly. They contain the parts of the assembly presented in one or more views.

381 cast unit drawing
rather than: cast-unit drawing
drawing (1) that displays information on concrete parts, including reinforcement, cast-in embeds, edge chamfers, and insulation, in a cast unit

Cast unit drawings are generally used either at the element factory or at the construction site.

382 multidrawing
drawing (1) that gathers together several drawings (1) on one sheet

The individual drawings (1) in a multidrawing may be of any drawing type.

383 mult номер
identifier of a part or assembly in a multidrawing

Multinumbers can include, for example, the multidrawing number and an identifier that indicates the order of parts or assemblies in the multidrawing.

384 drawing snapshot
image of a drawing (1) that shows the drawing (1) as it was at a certain point in time

Drawing snapshots make it possible to have a quick look at any drawing (1) without opening the drawing (1). Snapshots are used, for example, for finding a certain drawing (1) edition. Snapshots can be viewed in Tekla Structures but they cannot be edited.
385

**snapshot overlay**

drawing snapshot displayed on top of a drawing (1) or a model (1)

Snapshot overlays can be used to view the contents of the drawings (1) directly in a model view without opening the actual drawing (1). Drawing snapshots can also be shown against the latest version of a drawing (1), or against another drawing (1) in the drawing mode.

**Concept diagram 36. Drawing types.**
3.2 Drawing layout and drawing views

386 drawing layout

plan of a drawing (1) that includes the table layout and definitions of the sheet size.

Tekla Structures includes several predefined drawing layouts, which are drawing-type specific. The user can also create new drawing layouts.

387 table layout

plan that defines the selection, placing, and scale of tables (1) in a drawing (1).

388 layout editor

tool that enables editing the table layout directly on a drawing (1).

In the layout editor, it is possible select which tables (1) are included in the table layout and where they are placed. The table (1) scale, and rotation and overlapping with drawing views can be adjusted.

389 table (1)

element in a drawing (1) that may include information on the building objects in the drawing (1), and information on the project.

In Tekla Structures, the term table (1) is used to refer to various elements of a drawing (1), such as revision tables, title blocks, bills of material, lists, general notes, key plans, and DWG and DXF files.

When the user makes changes to a model (1), Tekla Structures updates the drawing (1) and the contents of the affected tables (1). This means that not only drawings (1) are associative but also the tables (1).

390 table (2)
rather than: template (2)

In template editor tables (2) are called templates (2).

391 key plan

small-scale view in a drawing (1) that indicates the location of an assembly, a cast unit, or a part in the model (1).

A key plan contains the model (1) grid and the assembly, cast unit, or part shown in the included drawing view.

392 drawing view frame

solid frame around all the contents of a drawing view.

Drawing view frame can be used when modifying properties of a single drawing view. Drawing views can be dragged using the drawing view frame.
393
drawing view boundary; view boundary
not: view extrema
pl

dashed frame inside a drawing view

Drawing view boundary can be used when cropping the contents of a drawing view. For example, it is possible to resize drawing views so that there is no unnecessary empty space in them, or to show just a specific part of the drawing view contents.

394
automatic drawing view
drawing view that Tekla Structures creates when it creates a drawing (1)

395
additional drawing view
drawing view that the user adds into an open drawing (1)

It is possible to create additional drawing views in the open drawing (1) of a model view or to add section views or detail views.

396
detail view
drawing view that is created from an existing drawing view and that shows a selected area of that view in the same viewing direction

Detail view is usually in a larger scale than the source view.

The view plane of the detail view is the same as the view plane of the source view.

397
section view
drawing view that shows a selected area as a cross section

A section view can be created of the parts in a drawing view. A section view can be created manually or automatically.

398
curved section view
section view that is created based on a curved view plane

399
end view (1)
section view that shows a selected area of an end of a part in a drawing (1)

An end view (1) can be created manually or automatically. Automatic end views (1) represent the part from one end of the part or also from the other end of the part, depending on the settings.

400
main view
drawing view that shows all parts in an assembly, cast unit, or single-part drawing from the selected viewing direction

Main view can be front view, top view, back view, or bottom view. The user can create several main views.
single-part view

drawing view that is in an assembly drawing and that shows an individual part in the assembly
3.3 Creating and modifying drawings in Tekla Structures

Drawing settings

Settings that control what the drawing looks like and what it includes.

Drawing settings can be defined in the modeling mode when creating a drawing, and they can be modified in the drawing mode.

The range of the objects and elements that drawing settings affect may vary.

Object level settings

Drawing settings that affect the representation of selected drawing objects.

Object level settings can be defined when creating a new drawing or when modifying an open drawing.

Object level settings can be use in a drawing or in a drawing view in order to change the representation of the chosen drawing objects.

View level settings

Drawing settings that affect the properties of all building objects, marks, and dimensions in a selected view.

Drawing level settings

Drawing settings that affect the properties of all building objects, marks, and dimensions in all drawing views.

Drawing level settings are defined in the drawing properties dialog box.

Master drawing catalog

Catalog that is used for creating drawings by using master drawings.

Master drawing catalog can be used for searching for master drawings usually in the current model and saving the search results.

Master drawing

Collection of properties and drawing settings that are used for creating a new drawing.

Saved settings

Master drawing where the drawing settings are saved in a drawing property file and used when creating a new drawing of a specific drawing type.

Rule set

Master drawing that contains model selection filters and where the properties and drawing settings vary based on the selected model objects.
410
drawing wizard file; wizard file

rule set that is saved in a file

The rule sets in drawing wizard files are modified by editing the file in a text editor.

411
cloning template

not: drawing template; template drawing

master drawing where an existing drawing (1) is used to copy the drawing settings for a new drawing (1)

The new drawing (1) has the same drawing settings as the original drawing (1).

The user creates a cloning template of a drawing (1) typically after extensive manual modifications have been made in the drawing (1), in order to achieve the same appearance and contents in new drawings (1).

In the master drawing catalog, it is possible to create single-part, assembly, and cast unit drawings using cloning templates. It is also possible to add new cloning templates to the master drawing catalog from the document manager.

412
verb
cloned (performed by Tekla Structures) to create a new drawing (1) by using a cloning template

Cloning aims at using the drawing (1) properties, view properties, and object properties from the cloning template in a new drawing (1).

Drawings (1) can be cloned from the current model or another model (1).

Cloned drawings (1) need some manual checking.

413
automatic cloning

process of creating a drawing (1) that Tekla Structures carries out for a part or assembly when its position number changes and the original drawing is no longer valid for that part or assembly

In automatic cloning, Tekla Structures creates a new drawing (1) using the original drawing (1) as a cloning template, and the original drawing (1) is saved for other, similar parts or assemblies.

414
drawing list

list of drawings (1) that provides information about the drawings (1) in a particular model (1) and that is used for searching, managing, and printing the drawings (1)

In the drawing list, the user can, for example, search, open, update, freeze, lock, and delete drawings (1). The drawing list can also be used to display the associations between the drawings (1) and the parts in the model (1).

Drawing list is used in Tekla Structures until version 2018. See document manager.
Document manager

Tool that is used for listing and managing drawings (1) and other types of documents

With the document manager the user can, for example, reorganize, update, freeze, lock, and delete drawings (1).

The user can also organize file documents, such as PDF, NC, and DWG files, and drawings (1), in document categories, and search documents and open drawings (1).

Document manager is replacing drawing list from the version 2018i onward.

Verb

Freeze

to prevent Tekla Structures from updating annotation objects and certain drawing view properties in a drawing (1) when it updates the drawing (1) as the model (1) changes.

When a drawing (1) is frozen, only part geometry is updated when the model (1) changes.

Verb

Lock

to prevent unwanted action in a model (1) or a drawing (1)

It is possible to lock model objects, reference models, and drawings (1), for example.
### 3.4 Objects in drawings

#### 3.4.1 Associative annotation objects

A dimension consists of dimension lines, extension lines (1), a dimension mark, dimension tag, and possibly other elements.
419
automatic dimension
dimension that Tekla Structures creates in a drawing (1) based on the dimensioning properties of the drawing (1)

420
additional dimension
dimension that the user adds in an open drawing (1)

421
mark
associative annotation object that is used for the identification of an individual building object and that displays a set of property elements that the user has selected

Examples of marks are part mark, bolt mark, and reinforcement mark.

422
automatic mark
mark that Tekla Structures creates in a drawing (1) based on the mark properties of a building object

423
additional mark
mark that the user adds in an open drawing (1)

Additional marks are typically used for temporary, revision-related, or other similar types of information. Examples of the additional marks that the user can add in a drawing (1) include part marks, bolt marks, connection marks, level marks, revision marks, and weld marks.

424
neighbor part; neighboring part
part that is close to a part that the drawing (1) is made for but that is not in the same assembly or cast unit

The representation of neighbor parts is usually different from that of the part.

Neighbor parts can be used as reference in dimensioning.

425
leader line
line that connects an annotation object to the related object (1) or point (1)

426
associative annotation object
annotation object that is updated according to the changes made to the related model object

An associative annotation object can be automatic or additional. Tekla Structures creates the automatic associative annotation objects based on the drawing’s (1) properties when it creates the drawing (1). The user adds the additional associative annotation objects in a drawing (1).

427
level mark
associative annotation object that represents the elevation of a point (1)
part mark; piece mark /US/
not: part number

*mark* that includes a set of selected property elements related to a *part*

Part marks are made use of, for example, when identifying constructions, when giving information about welding, when giving information about assemblies to a workshop, when giving information about how parts should be connected to each other, and when creating bills of quantities.

In the US, the term piece mark is used to refer to *position number*.

bolt mark

*mark* that includes a set of selected property elements related to a *bolt (1) or bolt group*

weld mark

*mark* that includes a set of selected property elements related to a *weld*

connection mark

*mark* that includes a set of selected property elements related to a *connection*

reinforcement mark

*mark* that includes a set of selected property elements related to a *reinforcement*

pull-out; pull-out picture

small graphic in a *reinforcement mark, table (1), or report template* that shows the shape and dimensions of a *reinforcing bar*

pour object mark

*mark* that includes a set of selected property elements related to a *pour object*

surface treatment mark

*mark* that includes a set of selected property elements related to *surface treatment*

view label

*associative annotation object* that is displayed in an individual *drawing view* and that includes information about the view

associative note

*associative annotation object* that can include any additional information about the *building object* it is attached to

One building object can have several associative notes.
drawing content manager

tool for checking and editing building objects and drawing (1) content in the current drawing (1), especially marks, dimension marks, tagged dimension marks and associative notes

The building object categories available in drawing content manager are assemblies, parts, welds, bolts (1), reinforcement, pour objects, and neighbor parts, if they exist in the drawing (1).
Concept diagram 39. Associative annotation objects.
3.4.2 Independent annotation objects

439 independent annotation object

annotation object that is not linked to the model (1) and has no associativity points to any model objects

Independent annotation objects are added to drawings (1) by the user.

Types of independent annotation objects that can be added to drawings (1) include text, text files, symbols (2), links, hyperlinks, DWG and DXF files, and reference models.

440 drawing shape

independent annotation object that represents a graphic form or outline

Examples of drawing shapes are clouds, lines, and rectangles.

441 symbol (1)

independent annotation object that the user has added in a drawing view and that is related to a certain point (1) in the drawing view

442 orientation mark; north mark

symbol (1) that indicates the construction direction of an assembly

443 revision mark

user-created symbol (1) that indicates a change in the model (1) or in the drawing (1), and in which information about the change is enclosed

Information enclosed in a revision mark is shown in a revision table (1).

444 plate side mark

user-created symbol (1) that indicates whether a dimension point is to the face or center of a part

Plate side mark can be found on the dimension extension line (1).

445 detail mark

user-created symbol (1) that includes a set of mark elements, identifies the point of creation of the detail view, and is displayed in the source view

446 section mark

user-created symbol (1) that includes a set of mark elements, identifies a section, and is displayed in the source view

447 symbol (2)

independent annotation object in graphical format

Symbols (2) are saved in symbol files. It is possible to create new symbol files, and to create and modify symbols (2) in the symbol editor.
**drawing 2D library**

Tool that can be used to quickly select objects (1) in drawings (1) and save them as 2D drawing details.

With drawing 2D library the user can insert drawing details in drawing views and drawings (1). It is possible to create drawing details out of many kinds of drawing objects, such as parts, texts, notes, drawing sketch objects, or DWG files. In addition to details, the user can browse and insert DWG files and images directly to the drawings (1) from the drawing 2D library.

*Concept diagram 40. Independent annotation objects.*

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**drawing 2D library**

Tool that can be used to quickly select objects (1) in drawings (1) and save them as 2D drawing details.
3.4.3 Graphical symbols in drawings

**change symbol**
graphic that Tekla Structures creates in a drawing (1) and that indicates that an associative annotation object has been changed

Change symbols are created for dimensions, marks, and associative notes, for example.

Examples of change symbols include mark change symbols and dimension change symbols.

**associativity symbol**
graphic that Tekla Structures creates in a drawing (1) and that indicates that an associativity point of a drawing object is associative

The associativity symbol changes if the associativity point is not associative.

![Concept diagram 41. Indicators.](image)

3.4.4 Dimensions

**dimension line**
line that visualizes the distance (1) between the defined dimension points

Separate dimensions can be combined into a longer dimension line.

**extension line (1); dimension extension line**
line in a drawing (1) that is perpendicular to a dimension line and that connects the dimension line to the building object
**453**

**dimension mark**

Part of a *dimension* that displays the basic information about the *building object* measurements.

A dimension mark can consist of a prefix, numerical value, and postfix.

**454**

**dimension tag**

Part of a *dimension* that displays additional information about the *building object*.

**455**

**check dimension**

*dimension* used for checking detailing.

*Tekla Structures* uses *work points* to create check dimensions.

**456**

**dimension point**

*Point (1)* that *Tekla Structures* or the user has used for dimensioning.

**457**

**work point**

*dimension point* that is based on *reference points* or *reference lines*.

A work point can be either a *part* reference point, or an intersection of reference lines.

In bracings, for example, the work point is where the brace reference line intersects the main *beam* or *column* reference line. For example, the location of *bolts (1)* is then dimensioned from this work point.
Concept diagram 42. Dimensions.
4 TEMPLATES AND REPORTS

458 symbol editor; SymEd

tool in Tekla Structures that is used for creating and modifying symbols (2) to be used in drawings (1), reports, and templates (1)

The symbols (2) are saved in symbol files.

459 template editor; TplEd

tool in Tekla Structures that is used for creating and modifying templates (1) to be used in drawings (1) and reports

460 template (1)

file that gathers information to be output in a defined format

Templates (1) can be viewed and printed.

The properties of template components, template objects, and the template (1) itself determine the final appearance of the template (1) output.

461 textual template

template (1) that may contain only text

Textual templates are used for creating reports or listings of objects (1), for example, material lists of assemblies.

462 graphical template

template (1) that may contain text, graphics, and bitmaps

Graphical templates are primarily used in drawings (1) but they can also be used in HTML reports. Graphical templates display project and company information, for example. In addition to text, they can contain graphics, such as table (1) outlines, bitmaps or symbols (2).

463 report template

template (1) that is used for creating a report

464 template component

building block of a template (1) that is used for displaying data in a defined format

Template components define the template (1) layout.

Templates (1) can contain the following template components: header, page header, row, page footer, and footer. Not all of the template components need to be present in a template (1).
**template object**

entity in a template component that is used to add either graphical or textual data

The template (1) type determines what kinds of template objects can appear inside its template components. Template objects can be basic geometric shapes, text objects, symbols (2), bitmaps, imported files, or field objects.

Template objects are represented as rows in the template components.

**template attribute**

attribute in a template object that Tekla Structures uses to calculate and display information from a model database

Template attributes represent object properties.

**content type**

determination of which template attributes can be used in the template object value fields for a template component row

Content types are mainly based on object types.

**pattern line editor**

tool in Tekla Structures that is used for creating and modifying pattern lines

Pattern line editor can be used in a model (1) or in an open drawing (1). The created pattern lines are added to drawings (1) with the pattern line command.

**pattern line**

drawing shape that consists of one or several blocks of elements and that may include symbols (2), lines, and spacings.

Pattern lines can be used to indicate cut lines, foundations, weld paths, or electrical wiring, for example.
Concept diagram 43. Editors and templates.
5 SYSTEM

5.1 Files

470 model database
database file that contains a model (1)

Model database file has the extension .db1. In addition, other files, such as the corresponding numbering database .db2, are needed in order to obtain the functionality of the model database.

471 model history database
database file that collects model (1) history on the actions in shared and multi-user models

Model history database is used for Tekla Model Sharing and in multi-user mode.

472 Organizer database
database file that contains object properties, category information and rules, and property templates

The organizer database is created when the Organizer is started for the first time.

473 drawing file
file that contains a drawing (1)

Drawing files have the extension .dg.

Drawing files cannot be used without a model (1).

474 property file
not: † properties file
file that contains properties or settings in the property pane or a dialog box

Property files are saved in the current model folder. The user can copy property files to the project or firm folders for future use.

User-defined attributes can be stored as a property file.

475 standard file
property file that Tekla Structures uses by default

Standard files are used, for example, for loading frequently used values into the property pane or a dialog box.

Standard file name is standard.* where the symbol * is the file name extension. For example, standard.clm file is used for column properties.

476 data file
file that contains options for object properties

Data files contain information used by certain components (1), for example.

Data files have the extension .dat.
477 reference file
file that contains information that can be used in a model or a drawing

A reference file can contain a reference model or a reference drawing, for example.

478 catalog file
file that defines catalog information used by Tekla Structures

Catalog files have the extension .bin, .db, or .inp, for example.

479 symbol file
file that contains symbols

The symbol file in use can be changed in the symbol files dialog box.

480 initialization file
text file that contains user interface definitions, start-up parameters, default settings, or advanced options

Initialization files are used when starting Tekla Structures and they can contain system-specific and user-specific advanced options that are used to configure Tekla Structures for different standards and the user’s individual style of working.

Initialization files have the extension .ini.

481 environment database
database file that contains the definitions of user-defined attributes used in a model

The file name of the environment database is environment.db.

482 options database
database file that contains the settings of model-specific general settings and advanced options

There are two options databases, the model options database (options_model.db) and the drawing options database (options_drawings.db).

483 model options database
options database that contains settings specific to a model

The file name of the model options database is options_model.db.

484 drawing options database
options database that contains settings specific to drawings belonging to a model

The file name of the drawing options database is options_drawings.db.
Input file

Input files are used for different purposes, for example, for defining the content and structure of a dialog box and for defining certain reinforcement-related settings.

Input files have the extension .inp, for example rebar_config.inp.
5.2 Folders

486 Tekla Structures software folder; Tekla Structures folder
folder that is created when Tekla Structures is installed and that contains folders related to Tekla Structures software

487 Tekla Structures environments folder; Tekla Structures folder
folder that is created when Tekla Structures or a Tekla Structures environment is installed and that contains folders related to Tekla Structures environments

488 system folder
folder that is used for storing files that define default settings

489 TeklaStructuresModels folder
folder that contains model folders related to each model

490 firm folder
folder that is used for storing Tekla Structures-related files customized for a particular organization

A Tekla Structures user can, for example, customize a company’s cloning templates and save them in a sub-folder located under the firm folder. After this, the customized cloning templates can be used in all projects carried out for the company.

491 project folder
folder that is used for storing Tekla Structures-related files customized for a particular project

492 model folder
folder that is used for storing files associated with a model

Tekla Structures stores all files associated with a model in a folder it creates with the same name as the model database (.db1).

In multi-user mode all users access the same model folder.
5.3 Catalogs

493 catalog
user interface for displaying or modifying information in categorized lists

For example, profile catalog and shape catalog are catalogs.

494 profile catalog

catalog that displays profiles and information on the profiles

In addition to the available profiles in the respective Tekla Structures environment, the user can add fixed or parametric user-defined profiles to the profile catalog. It is also possible to import profiles to the profile catalog.

495 material catalog

catalog that displays material grades and information on them

By default, the material catalog contains standard, environment-specific materials. The user can add, modify, and delete material grades.

496 shape catalog

catalog that displays a list of predefined item shapes

The shapes are modeled using software other than Tekla Structures, for example SketchUp.

497 reinforcing bar catalog; rebar catalog

catalog that displays reinforcing bar types with a predefined bending radius and hook dimensions

498 reinforcing bar shape catalog; rebar shape catalog

catalog that displays a list of predefined reinforcing bar shapes

499 mesh catalog

catalog that displays standard reinforcement mesh properties

500 bolt assembly catalog

catalog that displays bolt assemblies and their properties

The user can add, modify, and delete bolt assemblies.

501 bolt catalog

catalog that displays predefined objects (1) that can be used in a bolt assembly catalog

Predefined objects (1) in the bolt catalog are bolt elements, for example, bolts (2) of different sizes and lengths, washers, and nuts.
502

**applications and components catalog; component catalog**

A *catalog* that contains all *system components* and *custom components*, and the *macros* and *applications*.

The term component catalog is used in *Tekla Structures* until version 21.1.
concept diagram

catalog
user interface for displaying or modifying information in categorized lists

catalog file
file that defines catalog information used by Tekla Structures

applications and components catalog
catalog that contains all system components and custom components, and the macros and applications

master drawing catalog
catalog that is used for creating drawings (1) by using master drawings

catalog related to parts

catalog related to bolts

catalog related to reinforcement

profile catalog
catalog that displays profiles and information on the profiles

material catalog
catalog that displays material grades and information on them

shape catalog
catalog that displays a list of predefined item shapes

bolt assembly catalog
catalog that displays bolt assemblies and their properties

bolt catalog
catalog that displays predefined objects (1) that can be used in a bolt assembly catalog

reinforcing bar shape catalog
catalog that displays a list of predefined reinforcing bar shapes

reinforcing bar catalog
catalog that displays reinforcing bar types with a predefined bending radius and hook dimensions

mesh catalog
catalog that displays standard reinforcement mesh properties

GENERIC RELATION
PARTITIVE RELATION
ASSOCIATIVE RELATION
MULTIDIMENSIONAL SYSTEM
SUPPLEMENTARY INFORMATION
criterion of subdivision

Tekla Structures glossary – 2019.01.23

5.4 Import and export

503 model import

import of a model (2) from another software to Tekla Structures

Tekla Structures supports several different formats to import models (2).

504 model transfer

moving the model (2) in a selected format from another software to Tekla Structures or from Tekla Structures to another software

Model transfer refers to the use of both import and export. Model transfer may include the use of conversion files.

505 attribute import

import of user-defined attribute values to a model (1) from a text file

506 shape import

import of a 3D object (1) from another modeling software as a shape into Tekla Structures shape catalog

507 shape export

export of a shape from Tekla Structures shape catalog into a zipped file

The file name extension of the zipped file is .tsc. The zipped file includes the shape information and the shape geometry.

508 model output

representation of information included in a model (1) exported into the desired format

In Tekla Structures, for example, drawings (1), reports, lists, and NC files are model output.

Some common output formats of Tekla Structures are, for example, IFC, DWG, DGN, CIS/2, and SDNF.

509 IFC; Industry Foundation Classes

file format commonly used in BIM that facilitates software interoperability

IFC is an open specification developed by the IAI (International Alliance for Interoperability).

Model (1) can be exported into an IFC file.

510 NC file

file that contains information gathered from a model (1) and exported to computer numerical controlled fabrication machinery

Tekla Structures produces NC files in several formats, for example, DSTV.
511

computer numerical control; CNC

operation of a machine tool with a computer controlling the manufacturing process

   During the computer numerical control manufacturing process, a machine tool or machining center drills, cuts, or shapes the piece of material.

   The terms numerical control and NC refer to the method used prior to computer numerical control. However, the abbreviation NC is often used in the term NC file.

512

hard stamp

information written in an NC file that sets the NC machine to create a text mark, containing information on the part or assembly, in a part

   Hard stamp can contain, for example, a project and lot number, phase, or part and assembly position.

513

pop mark

information written in an NC file that sets the NC machine to drill a small hole in the surface of the material, which is used to weld or bolt assembly secondary parts to the right location on an assembly main part

514

contour marking

information written in an NC file that passes information to the NC machine on the layout and the parts that are welded or bolted together

   Tekla Structures contour marking does not work on polybeams.

515

model dump

model output in ASCII format that includes all information of the entire model (1), including drawings (1)

   Model dump can be used to save the model (1) in problematic situations and it can be imported into a new model (1).

   Model dump is used in Tekla Structures until version 2017. See model import.

516

precast automation file

file that contains precast information gathered from the model (1) and exported for management and production software

   Tekla Structures produces precast automation files in several formats, for example, Unitechnik and BVBS.

517

web viewer

tool that enables the user to publish a model (1) or parts of it in a certain web page format

   Models (1) published with web viewer can be viewed via the Internet using a web browser (for example, Internet Explorer).
layout manager

Tool that is used to import and export layout data between Tekla Structures and field layout devices.

Layout manager enables the use of accurate model (2) point (1) and line data on the construction site.
6  MANAGING MODEL

519
Organizer
tool that is used for categorizing and managing *model information*, *object properties* and *object property* queries, and *model object* classification

Organizer consists of two tools, *object browser* and *categories*.

520
object browser
tool in *Organizer* used to inquire, view, and report *model information* based on selected *model objects*

521
categories

tool in *Organizer* that is used to define *location*, *property*, and *custom categories*

The defined *categories* and their combinations can be used to highlight or select *model objects*, or to apply *user-defined attributes* and their values to model objects.

522
property template
definition of *object property* layout for the *property table* in *object browser*

The property template is saved in an .xml file or in the *Organizer database*.

523
property table
view in *object browser* that shows the values of selected *model object properties*

The property table is created based on a selected *property template*.

524
category
In *Organizer*, a set of *model objects* that is formed based on rules or by selecting the model objects manually

The rules can be based on model object location, *object properties*, the content of other categories or *filters*.

525
custom property
*object property* that the user can manually include in *Organizer*

Some *properties* are not automatically available in the Organizer, for example the properties of *reference model objects*.

526
automated subcategory
automatically created lower level *category* within a *custom* or *property category* in *Organizer*

Subcategories can also be created manually.
location category

category based on location rules in Organizer

Location categories divide the model (1) into projects, sites, buildings, sections, and floors. Location category can be defined automatically based on the boundary box or manually.

boundary box

user-defined box that defines which model objects are placed in the same location category in Organizer

location breakdown structure

logical subdivision of the model (1) into work units based on the location of the model objects

In Organizer, location breakdown structure forms a hierarchical tree-structure and it can be used to divide the model (1) into projects, sites, buildings, sections and floors.

location property; location category property

object property that reports the model object location in the location breakdown structure in Organizer

uncategorized category

category where the model objects are automatically placed in Organizer if they are not inside a defined boundary box

The uncategorized category shows that the location breakdown structure is incomplete. The model objects can be manually moved from the uncategorized category to a chosen location category, or boundary boxes can be changed to move the model objects to the wanted location category.

property category

category in Organizer based on adding user-defined attributes to model objects

Within a property category, a model object can belong to only one lowest level category at a time.

custom category

category in Organizer based on user-defined rules or manually selected properties

A custom category can be created based on any property or other model information. Custom categories can be used to group the model objects based on other than location-based information.

phase manager

tool that is used for assigning model objects to phases

The phase content can be viewed and modified in the phase manager.

The phase manager can be used to lock and unlock model objects.

See object lock.
535

**phase**

selection of *model objects* in a *model (1)* that the user can create for a desired purpose

Model objects have a *phase number* that indicates the phase they belong to.

536

**phase name**

description that indicates a *phase*

537

**phase number**

numeric value that indicates a *phase*

For example, it is possible to create *reports*, to *filter* and *lock model objects*, and to copy model objects from other *models (1)*, according to their phase number.

New model objects are given the current phase number.

538

**sequencer**

tool that is used for creating named sequences for *parts* and assigning *sequence numbers* to the parts

Sequencer is used for defining erection sequences, for example.

539

**sequence number**

incremental number of an individual *part* that belongs to a sequence of parts

540

**sequence name**

*user-defined attribute* name that indicates a sequence of *parts*

541

**task manager**

tool that enables the linking of temporal data to a *model (1)*

The task manager can be used to create, save, and manage *tasks* that are used to create a schedule.

*Model objects* can be added to the tasks. *Organizer categories* can be used to select the model objects that will be added to the tasks.

542

**task**

in the *task manager*, a representation of a piece of work that needs to be carried out in order to complete a *project*

543

**task information**

data related to a *task*

Task information includes properties related to a task, such as task name, *task type*, planned and actual start and end dates, and task completeness.
**task type**

*task information* that reflects the category into which *tasks* can be classified in order to apply the same *settings* to all of them

Examples of task types in the *task manager* include formwork, *reinforcement*, pour, and cast-in-place.

**production rate**

*task information* that reflects the quantity produced in a given amount of time

The *task manager* is able to count the production rate automatically on the basis of the values given to quantity and duration, or the user may define the rate.

**task dependency; dependency (2)**

*task information* which expresses that starting or finishing a *task* requires that a certain other task has been started or finished

Task dependency types in *Tekla Structures* are start-to-start, start-to-finish, finish-to-start, and finish-to-finish.

Changes made to a task's schedule may cause automatic changes to the schedules of the tasks that depend on it.

Task dependency is represented as a symbol in the *Gantt chart*.

**task list**

list that displays *task information* belonging to a certain *scenario*

**Gantt chart**

diagram that displays the schedule related to a *scenario* in a graphic form

**scenario**

*view* in the *task manager* which includes the *tasks* chosen and the *task information* defined by the user for a certain purpose

In different scenarios users can define alternative workflows by adding different tasks or dependencies between the tasks.

A scenario may include the tasks belonging to an entire *project* or a certain project phase, such as design, fabrication, or erection. In addition, a scenario may be related to certain deliverables, such as *footings*, a frame, or an HVAC (heating, ventilating, and air-conditioning) system.

**clash check manager**

tool that is used for finding *parts* that collide on a selected area and managing data related to the collisions

In addition to finding and highlighting clashes, clash check manager classifies them according to their type, and allows the user, for example, to sort the detected clashes and save clash check sessions.
Concept diagram 48. Organizer.
Concept diagram 49. Managing model.
7 ANALYSIS

7.1 Loads

551 load modeling code
information about the building or design code, and about the load group types, safety factors, and load combination (1) factors used in the load combination (2)

552 load
model object that represents a force or system of forces carried by a structure or part of a structure

553 load type
collection of data describing a load that represents the common characteristics shared by a number of individual loads, see also object type

The basic load types are point load, line load, area load, uniform load, and temperature load.

554 loading
part property that represents a force or system of forces carried by a structure

Forces can be self-weight or area loads.

555 load group
set of loads and loadings that are caused by the same action and to which the user wants to refer collectively

Loads belonging to the same load group are treated alike during load combination (2).

556 load group type
load group property that indicates the action that causes a load and that is used as a basis for a load group

Load group types are, for example, wind loads, thermal loads, snow loads, traffic loads, dead loads, and live loads.

557 compatibility; load group compatibility
property of a load group that indicates that load groups having the same compatibility indicator can act together and need to be considered in the load combination (2)

The compatible load groups act together with or separately from other load groups.

558 incompatibility; load group incompatibility
property of a load group that indicates that load groups having the same incompatibility indicator always exclude each other in the load combination (2)

Only one incompatible load group can exist in a given load combination (1).
559

**load combination (1)**

set of *load groups* multiplied by their partial safety factors that is created in the *load combination (2)* process

Each load combination (1) represents a loading situation to be checked according to the design code.

560

**load combination (2); load combination process**

process in which some simultaneously acting *load groups* are multiplied by their partial safety factors and combined with each other according to specific rules

Load combination (2) rules are specific to a design process and are defined in design codes.
Concept diagram 50. Loads.

7.2 Analysis and design

7.2.1 Analysis objects

561 physical model object; physical object

model object in a physical model

For example, physical parts are physical model objects in Tekla Structures.
562
**physical part**

*part* in a *physical model*

563
**analysis model object; analysis object**

*model object* that *Tekla Structures* creates from a *physical model object* or on the basis of *analysis part connectivity* into an *analysis model*

564
**analysis part**

*analysis model object* that is a *representation* of a *physical part* in an *analysis model*

In different analysis models, a physical part is represented by different analysis parts.

565
**analysis area**

*analysis part* that is a *representation* of a *plate (2)*, a *slab*, or a *panel*

Analysis area consists of one or more *analysis elements*.

566
**analysis bar**

*analysis part* that *Tekla Structures* creates from a *beam*, a *column*, or a brace, or from a segment of these *parts*

Tekla Structures creates more than one analysis bar from a *physical part* if the part is a *polybeam* or if the part *cross section* changes non-linearly. An analysis bar consists of one or more *analysis members*.

Some analysis applications use analysis members whereas others use analysis bars.

567
**node; analysis node**

*analysis model object* that *Tekla Structures* creates at a defined *point (1)* of an *analysis model* based on *analysis part connectivity*

Tekla Structures creates nodes at ends and intersection points (1) of *analysis parts*, and the corners of *analysis areas*.

568
**analysis member**

*analysis model object* that *Tekla Structures* creates between two *nodes* of an *analysis bar*

Every *physical part* that the user selects for inclusion in the *analysis model* produces one or more analysis members. A single physical part produces several analysis members if the physical part intersects with other physical parts. Tekla Structures splits the physical part at the intersection *points (1)* of the member axes. For example, a *physical model beam* that supports two other beams is split into three analysis members between nodes.

Some analysis applications use analysis members whereas others use analysis bars.

569
**analysis element**

*analysis model object* that the analysis application creates between three or more *nodes* in an *analysis area*
570 rigid link

**analysis model object** that connects two **nodes** so that they do not move in relation to each other

571 rigid diaphragm

**analysis model object** that connects more than two **nodes** that move with exactly the same rotation and translation

---

**Concept diagram 51. Analysis objects.**
7.2.2 Analysis settings

572

**design group**

group of *physical parts* that *Tekla Structures* uses when it searches for optimal *profiles* for steel *parts* and optimal *reinforcement* for concrete parts

573

**design check; check design**

option that checks if criteria of the selected design code are fulfilled for the *analysis part*

The design check is activated in the *analysis part properties* or in the *analysis model properties*. Design check might check whether *cross sections* are adequate, for example.

574

**analysis part properties**

*object properties* associated with an *analysis part*

Analysis part properties can be defined in the *physical model* or in the *analysis model*.

575

**start releases**

*analysis part properties* that define the *support conditions* and describe the degrees of freedom at the start of the *part*

576

**end releases**

*analysis part properties* that define the *support conditions* and describe the degrees of freedom at the end of the *part*

577

**analysis part property**

single characteristic in *analysis part properties*

578

**analysis part connectivity; connectivity**

*analysis part property* that defines the *analysis part’s* relationship to other analysis parts

For example, an analysis part automatically *snaps* or connects with *rigid links* to other parts based on the analysis part connectivity.

579

**support condition**

*analysis part property* that describes if the *analysis part* is supported or not

If an analysis part end is supported, the *physical part* end is the ultimate support for a superstructure (for example, the foot of a *column* in a frame), and some of the part end’s degrees of freedom result in zero translation and/or rotation.

580

**analysis class**

*analysis part property* that defines how *Tekla Structures* handles each *analysis part*
**581**

**analysis axis**

*analysis part property* or analysis model setting that defines the location of the *analysis part* in relation to the corresponding *physical part*.  

The analysis axis can be defined on the analysis part or the *analysis model* level. For example, the analysis axis can be the neutral axis or the *reference line* of the physical part.

**582**

**design results**

rather than: optimization results

results that concern *physical part* design and that an analysis application generates after it has run a structural analysis and design on an *analysis model*.

**583**

**design properties**

properties that concern *physical part* design  

Design properties vary depending on the analysis application that is used.

Design properties may be applied to the entire *model* (1) or to individual *objects* (1).

For example, buckling length is a design property.

**584**

**analysis model settings**

*settings* that are defined by giving values to the *properties* associated with an *analysis model*.

Analysis model settings can be defined in the *physical model* or in the analysis model.

**585**

**utilization ratio**

ratio of the actual to maximum allowable performance values of structural *building objects*  

Utilization ratio is an *analysis result*. In *Tekla Structures* utilization ratio is calculated for steel *parts*.

**586**

**analysis results**

results that concern forces and stresses and that an analysis application generates after it has run a structural analysis on an *analysis model*.

Analysis results are stored in *Tekla Structures* in an analysis results database.
INDEX

Numbers in the index refer to the term record numbers.

2D view .............................................. 193
3D view .............................................. 194
ACN .................................................. 120
adaptivity .......................................... 167
additional component object; see weld backing bar ............. 350
additional component object; see shim plate ....................... 351
additional component object; see finger shim ....................... 352
additional component object; see strip shim ......................... 353
additional component object; see stiffener ......................... 354
additional component object; see web doubler plate ............ 355
additional component object; see flange plate .................... 356
additional component object; see shear key ....................... 357
additional dimension .................................. 420
additional drawing view ................................ 395
additional mark ...................................... 423
advanced options .................................... 154
analysis & design model .................................. 266
analysis and design model .................................. 266
analysis area ........................................ 565
analysis axis ......................................... 581
analysis bar ......................................... 566
analysis class ........................................ 580
analysis element ..................................... 569
analysis member ...................................... 568
analysis model ....................................... 266
analysis model object .................................. 563
analysis model properties ................................ 584
analysis model settings ................................ 584
analysis node ....................................... 567
analysis object ....................................... 563
analysis part ......................................... 564
analysis part connectivity .................................. 578
analysis part properties ................................ 574
analysis part property .................................. 577
analysis results ...................................... 586
anchor bolt plan ..................................... 378
angle cleat .......................................... 347
angle seat .......................................... 345
annotation object .................................... 54
application .......................................... 20
applications and components catalog ......................... 502
applied values ....................................... 160
architectural model; see model (2) ......................... 4
area selection ......................................... 59
assembly ............................................ 75
assembly control number ................................ 120
assembly drawing ..................................... 380
assembly hierarchy ................................... 115
assembly level ....................................... 116
assembly main part ................................... 290
assembly position .................................... 368
assembly position number ................................ 368
assembly secondary part ................................ 292
associative annotation object ......................... 426
associative note ...................................... 437
associative object .................................... 53
associativity ......................................... 166
associativity point .................................... 239
associativity symbol .................................. 450
attach .................................................. 170
attribute import ...................................... 505
AutoConnection ...................................... 136
AutoDefaults ........................................ 137
automated subcategory ................................ 526
automatic cloning ..................................... 413
automatic dimension .................................. 419
automatic drawing view ................................ 394
automatic mark ....................................... 422
back view ............................................ 202
backing bar .......................................... 350
base plate ............................................ 342
base point ............................................ 212
basic assembly ....................................... 110
basic component object; see shear tab .................... 340
basic component object; see gusset ......................... 341
basic component object; see base plate ................. 342
basic component object; see end plate .................. 343
basic component object; see seat ......................... 344
basic component object; see seat angle .................. 345
basic component object; see seat plate .................. 346
basic component object; see clip angle .................. 347
basic component object; see bent plate (2) ........... 348
basic component object; see haunch ..................... 349
basic view ........................................... 189
beam ................................................. 268
beam object; see beam ................................ 268
beam object; see column ................................ 272
bent plate (1) ........................................ 284
bent plate (2) ........................................ 348
bill of material; see table (1) .......................... 389
BIM ...................................................... 2
bind .................................................... 177
binding ............................................... 178
blank project ........................................ 17
bolt assembly ........................................ 314
bolt assembly catalog ................................ 500
bolt catalog .......................................... 501
bolt group ............................................ 68
bolt mark ............................................. 429
bolt (1) ................................................ 67
bolt (2) .................................................. 315
bottom view ........................................... 203
boundary box ........................................... 528
boundary plane ......................................... 222
bounding box ........................................... 223
building code;
  see load modeling code .......................... 551
building information model ......................... 255
building information modeling .................... 2
building object ......................................... 55
cambering .............................................. 310
cast unit ................................................ 98
cast unit drawing ....................................... 381
cast unit main part ................................... 291
cast unit secondary part ............................. 293
cast unit type .......................................... 99
cast-in-place concrete ................................ 101
cast-in-place concrete part;  
  see pour object ..................................... 105
cast-in-situ concrete .................................. 101
cast-unit drawing ....................................... 381
catalog .................................................. 493
catalog file ............................................ 478
categories ............................................. 521
category .................................................. 524
center plane ........................................... 224
chamfer ............................................... 331
change symbol ........................................ 449
check design .......................................... 573
check dimension ...................................... 455
CIP .................................................... 101
clash check manager .................................. 550
class .................................................... 305
clearance ............................................. 334
clip angle ............................................. 347
clip plane ............................................ 227
clobe ................................................... 412
cloning template ..................................... 411
CNC ................................................... 511
collection ............................................. 36
color settings;
  see settings ........................................ 152
column .................................................. 272
comb ................................................... 352
command editor ....................................... 26
common environment ................................ 14
comparison set ........................................ 7
compatibility .......................................... 557
compatibility indicator;
  see compatibility .................................. 557
component catalog ................................... 502
component hierarchy .................................. 150
component main part ................................ 338
component object ..................................... 62
component plane ...................................... 220
component secondary part .......................... 339
component symbol .................................... 151
component (1) ........................................ 21
component (2) ........................................ 147
composite beam;
  see composite structure ......................... 66
composite slab;
  see composite structure ......................... 66
composite structure ................................... 66
computer numerical control ......................... 511
concrete part;
  see cast unit ....................................... 98
configuration ......................................... 12
conical bent plate;
  see bent plate (1) .................................. 284
connecting building object;
  see bolt (1) ......................................... 67
connecting building object;
  see weld ............................................ 69
connecting building object;
  see reinforcement splice ......................... 83
connection ............................................ 135
connection mark ....................................... 431
connection positioning plane ....................... 218
connectivity .......................................... 578
constraint ............................................. 126
construction circle ................................... 130
construction line ..................................... 128
construction object ................................... 127
construction plane .................................... 129
content item .......................................... 37
content type .......................................... 467
textual toolbar ....................................... 29
contour marking ....................................... 514
contour plate ......................................... 283
control number ....................................... 120
control point;
  see base point .................................... 212
coordinate system;
  see global coordinate system .................... 206
coordinate system;
  see local coordinate system ..................... 207
cope .................................................. 327
corbel .................................................. 286
corner chamfer;
  see chamfer ....................................... 331
cross section .......................................... 296
cross section sketch editor ......................... 303
crossing bar;
  see reinforcement mesh ......................... 84
current base point .................................... 214
current model ......................................... 262
current properties .................................... 160
curved beam .......................................... 271
curved section view .................................. 398
custom category ...................................... 533
custom component .................................. 144
custom component dialog editor .................... 146
custom component editor ........................... 145
custom part .......................................... 141
custom property ....................................... 525
cut ...................................................... 317
cut length ............................................. 70
cut plane ............................................. 225
cutting line .......................................... 319
cutting part .......................................... 71
cylindrical bent plate;
  see bent plate (1) .................................. 284
data file ............................................. 476
default environment .................................. 15
default view .......................................... 195
deforming ............................................. 307
dependency (1) ........................................ 176
dependency (2) ........................................ 546
design check ......................................... 573

Numbers in the index refer to the term record numbers.

151
design code; see load modeling code ........................................ 551
design group ........................................................................ 572
design point ........................................................................... 230
design properties .................................................................... 583
design results .......................................................................... 582
detail ......................................................................................... 139
detail mark .............................................................................. 445
detail view ................................................................................. 396
detailing component .................................................................. 140
dimension ................................................................................... 418
dimension change symbol; see change symbol ......................... 449
dimension extension line ............................................................ 452
dimension line ............................................................................ 451
dimension mark ......................................................................... 453
dimension point ......................................................................... 456
dimension tag ............................................................................. 457
direct modification .................................................................... 237
display settings; see settings ....................................................... 152
distance variable ...................................................................... 173
distance (1) .............................................................................. 332
distance (2) .............................................................................. 173
document manager ..................................................................... 415
doubler plate ............................................................................. 355
drawing 2D library .................................................................... 448
drawing content manager ............................................................. 438
drawing file ............................................................................... 473
drawing layout .......................................................................... 386
drawing level settings ................................................................. 405
drawing list ............................................................................... 414
drawing mode ........................................................................... 250
drawing object ......................................................................... 52
drawing object property; see object property ......................... 163
drawing options database .......................................................... 484
drawing settings ....................................................................... 402
drawing shape .......................................................................... 440
drawing snapshot ...................................................................... 384
drawing template ...................................................................... 411
drawing view ............................................................................. 192
drawing view boundary ............................................................... 393
drawing view frame .................................................................... 392
drawing wizard file .................................................................... 410
drawing (1) ............................................................................... 9
drawing (2) .............................................................................. 8
detail chamfer; see chamfer ....................................................... 331
detail edge ................................................................................. 72
detail embedded object .............................................................. 72
detail offset detail modifier ......................................................... 95
detail offset .............................................................................. 311
detail end plate ........................................................................ 343
detail end releases .................................................................... 576
detail end view (2) .................................................................... 196
detail end view (1) .................................................................... 399
detail environment database ....................................................... 481
detail equation .......................................................................... 179
detail erection schedule; see scenario ........................................ 549
detail explode ........................................................................... 60
detail extension ....................................................................... 20
detail extension line (2) .............................................................. 133
detail extension line (1) .............................................................. 452
detail extrema; see bounding box ............................................. 223
detail face ............................................................................... 216
detail family ............................................................................ 373
detail family number ................................................................. 375
detail family numbering ............................................................. 372
detail family position number ................................................... 374
detail family-based number ...................................................... 374
detail feature ............................................................................. 19
detail filler plate ....................................................................... 351
detail filter ............................................................................... 358
detail finger shim ...................................................................... 352
detail finish ............................................................................... 306
detail firm folder ........................................................................ 490
detail fitting .............................................................................. 330
detail fitting plate ...................................................................... 351
detail fixed profile ..................................................................... 297
detail fixed user-defined profile ................................................ 298
detail flange plate ..................................................................... 356
detail folded plate ..................................................................... 284
detail footing ............................................................................ 274
detail formula ........................................................................... 180
detail freeze ............................................................................. 416
detail front view ...................................................................... 197
detail GA drawing .................................................................... 377
detail Gantt chart ..................................................................... 548
detail gap ................................................................................ 335
detail general arrangement drawing ......................................... 377
detail general note; see table (1) ................................................. 389
detail general settings ................................................................. 153
detail geometry line .................................................................. 234
detail geometry point ................................................................. 233
detail global coordinate system ................................................ 206
detail graphical template ............................................................ 462
detail grid .................................................................................. 121
detail grid label ........................................................................ 124
detail grid label frame ................................................................. 125
detail grid line .......................................................................... 123
detail grid line label ................................................................. 124
detail grid plane ......................................................................... 122
detail grid view ......................................................................... 199
detail grout ............................................................................... 73
detail grouting .......................................................................... 73
detail guideline .......................................................................... 90
detail gusset ............................................................................. 341
detail handle ............................................................................. 236
detail hard stamp ....................................................................... 512
detail haunch ........................................................................... 349
detail hole .................................................................................. 323
detail hollow ............................................................................. 322
detail incompatibility ................................................................ 509
detail incompatibility indicator; see incompatibility .......... 558
detail independent annotation object ........................................ 439
detail Industry Foundation Classes ........................................... 480
detail initialization file ................................................................. 480
detail input file ........................................................................ 485
detail input part ........................................................................ 337
detail input point ....................................................................... 336
detail item ............................................................................... 364
detail key plan .......................................................................... 391
detail lacer bar .......................................................................... 81
detail layout editor .................................................................... 388

Numbers in the index refer to the term record numbers.

152
<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameter</td>
<td>174</td>
</tr>
<tr>
<td>parametric modeling</td>
<td>168</td>
</tr>
<tr>
<td>parametric profile</td>
<td>300</td>
</tr>
<tr>
<td>parametric property</td>
<td>175</td>
</tr>
<tr>
<td>parametric user-defined profile</td>
<td>302</td>
</tr>
<tr>
<td>parametric variable</td>
<td>174</td>
</tr>
<tr>
<td>parent assembly</td>
<td>112</td>
</tr>
<tr>
<td>part</td>
<td>65</td>
</tr>
<tr>
<td>part cut</td>
<td>321</td>
</tr>
<tr>
<td>part label</td>
<td>313</td>
</tr>
<tr>
<td>part mark</td>
<td>428</td>
</tr>
<tr>
<td>part number</td>
<td>428</td>
</tr>
<tr>
<td>part position</td>
<td>366</td>
</tr>
<tr>
<td>part positioning plane</td>
<td>219</td>
</tr>
<tr>
<td>part position number</td>
<td>366</td>
</tr>
<tr>
<td>part property</td>
<td></td>
</tr>
<tr>
<td>see class</td>
<td>305</td>
</tr>
<tr>
<td>see finish</td>
<td>306</td>
</tr>
<tr>
<td>part property</td>
<td></td>
</tr>
<tr>
<td>see deforming</td>
<td>307</td>
</tr>
<tr>
<td>part property</td>
<td></td>
</tr>
<tr>
<td>see end offset</td>
<td>311</td>
</tr>
<tr>
<td>pattern line</td>
<td>469</td>
</tr>
<tr>
<td>pattern line editor</td>
<td>468</td>
</tr>
<tr>
<td>perspective</td>
<td>190</td>
</tr>
<tr>
<td>phase</td>
<td>535</td>
</tr>
<tr>
<td>phase manager</td>
<td>534</td>
</tr>
<tr>
<td>phase name</td>
<td>536</td>
</tr>
<tr>
<td>phase number</td>
<td>537</td>
</tr>
<tr>
<td>physical model</td>
<td>265</td>
</tr>
<tr>
<td>physical model object</td>
<td>561</td>
</tr>
<tr>
<td>physical object</td>
<td>561</td>
</tr>
<tr>
<td>physical part</td>
<td>562</td>
</tr>
<tr>
<td>pick</td>
<td>240</td>
</tr>
<tr>
<td>piece</td>
<td>65</td>
</tr>
<tr>
<td>piece mark</td>
<td>428</td>
</tr>
<tr>
<td>pile</td>
<td>273</td>
</tr>
<tr>
<td>pile cap</td>
<td>275</td>
</tr>
<tr>
<td>plane</td>
<td>215</td>
</tr>
<tr>
<td>plane view</td>
<td>193</td>
</tr>
<tr>
<td>plate object;</td>
<td></td>
</tr>
<tr>
<td>see plate (1)</td>
<td>278</td>
</tr>
<tr>
<td>plate side mark</td>
<td>444</td>
</tr>
<tr>
<td>plate (1)</td>
<td>278</td>
</tr>
<tr>
<td>plate (2)</td>
<td>281</td>
</tr>
<tr>
<td>plugin</td>
<td>134</td>
</tr>
<tr>
<td>point cloud</td>
<td>232</td>
</tr>
<tr>
<td>point of origin</td>
<td>209</td>
</tr>
<tr>
<td>point (1)</td>
<td>228</td>
</tr>
<tr>
<td>point (2)</td>
<td>132</td>
</tr>
<tr>
<td>polybeam</td>
<td>282</td>
</tr>
<tr>
<td>polygon cut</td>
<td>320</td>
</tr>
<tr>
<td>pop mark</td>
<td>513</td>
</tr>
<tr>
<td>position number</td>
<td>365</td>
</tr>
<tr>
<td>positioning plane</td>
<td>217</td>
</tr>
<tr>
<td>pour break</td>
<td>108</td>
</tr>
<tr>
<td>pour number</td>
<td>106</td>
</tr>
<tr>
<td>pour object</td>
<td>105</td>
</tr>
<tr>
<td>pour object mark</td>
<td>434</td>
</tr>
<tr>
<td>pour phase</td>
<td>109</td>
</tr>
<tr>
<td>pour type</td>
<td>107</td>
</tr>
<tr>
<td>pour unit</td>
<td>104</td>
</tr>
<tr>
<td>pour view</td>
<td>205</td>
</tr>
<tr>
<td>poured concrete</td>
<td>101</td>
</tr>
<tr>
<td>precast automation file</td>
<td>516</td>
</tr>
<tr>
<td>precast concrete</td>
<td>100</td>
</tr>
<tr>
<td>predefined object property;</td>
<td></td>
</tr>
<tr>
<td>see object property</td>
<td>163</td>
</tr>
<tr>
<td>predefined parametric profile</td>
<td>301</td>
</tr>
<tr>
<td>prefix</td>
<td></td>
</tr>
<tr>
<td>see position number</td>
<td>365</td>
</tr>
<tr>
<td>preliminary number</td>
<td>367</td>
</tr>
<tr>
<td>prestressed concrete</td>
<td>103</td>
</tr>
<tr>
<td>prestressed strand</td>
<td>85</td>
</tr>
<tr>
<td>prestressing strand</td>
<td>85</td>
</tr>
<tr>
<td>primary guideline</td>
<td>91</td>
</tr>
<tr>
<td>primary part</td>
<td>338</td>
</tr>
<tr>
<td>production rate</td>
<td>545</td>
</tr>
<tr>
<td>profile</td>
<td>295</td>
</tr>
<tr>
<td>profile catalog</td>
<td>494</td>
</tr>
<tr>
<td>project</td>
<td>11</td>
</tr>
<tr>
<td>project base point</td>
<td>213</td>
</tr>
<tr>
<td>project folder</td>
<td>491</td>
</tr>
<tr>
<td>project status visualization</td>
<td>362</td>
</tr>
<tr>
<td>properties</td>
<td>161</td>
</tr>
<tr>
<td>properties file</td>
<td>474</td>
</tr>
<tr>
<td>property category</td>
<td>532</td>
</tr>
<tr>
<td>property file</td>
<td>474</td>
</tr>
<tr>
<td>property modifier</td>
<td>94</td>
</tr>
<tr>
<td>property pane</td>
<td>27</td>
</tr>
<tr>
<td>property pane editor</td>
<td>28</td>
</tr>
<tr>
<td>property table</td>
<td>523</td>
</tr>
<tr>
<td>property template</td>
<td>522</td>
</tr>
<tr>
<td>pull-out</td>
<td>433</td>
</tr>
<tr>
<td>pull-out picture</td>
<td>433</td>
</tr>
<tr>
<td>qualifier</td>
<td>376</td>
</tr>
<tr>
<td>quick launch</td>
<td>31</td>
</tr>
<tr>
<td>rathole</td>
<td>328</td>
</tr>
<tr>
<td>rebar</td>
<td>78</td>
</tr>
<tr>
<td>rebar catalog</td>
<td>497</td>
</tr>
<tr>
<td>rebar group</td>
<td>77</td>
</tr>
<tr>
<td>rebar position number</td>
<td>369</td>
</tr>
<tr>
<td>rebar set</td>
<td>88</td>
</tr>
<tr>
<td>rebar set end detail modifier</td>
<td>95</td>
</tr>
<tr>
<td>rebar set guideline</td>
<td>90</td>
</tr>
<tr>
<td>rebar set leg face</td>
<td>89</td>
</tr>
<tr>
<td>rebar set modifier</td>
<td>93</td>
</tr>
<tr>
<td>rebar set primary guideline</td>
<td>91</td>
</tr>
<tr>
<td>rebar set property modifier</td>
<td>94</td>
</tr>
<tr>
<td>rebar set secondary guideline</td>
<td>92</td>
</tr>
<tr>
<td>rebar set splitter</td>
<td>96</td>
</tr>
<tr>
<td>rebar shape catalog</td>
<td>498</td>
</tr>
<tr>
<td>rebar shape manager</td>
<td>82</td>
</tr>
<tr>
<td>rebar shape placing tool</td>
<td>97</td>
</tr>
<tr>
<td>rebar splice</td>
<td>83</td>
</tr>
<tr>
<td>recess</td>
<td>325</td>
</tr>
<tr>
<td>reference distance</td>
<td>172</td>
</tr>
<tr>
<td>reference distance variable</td>
<td>172</td>
</tr>
<tr>
<td>reference file</td>
<td>477</td>
</tr>
<tr>
<td>reference line</td>
<td>238</td>
</tr>
<tr>
<td>reference model</td>
<td>6</td>
</tr>
<tr>
<td>reference model object</td>
<td>61</td>
</tr>
<tr>
<td>reference point</td>
<td>235</td>
</tr>
<tr>
<td>reinforced concrete (2)</td>
<td>101</td>
</tr>
<tr>
<td>reinforced concrete (1)</td>
<td>102</td>
</tr>
<tr>
<td>reinforcement</td>
<td>76</td>
</tr>
<tr>
<td>reinforcement mark</td>
<td>432</td>
</tr>
<tr>
<td>reinforcement mesh</td>
<td>84</td>
</tr>
</tbody>
</table>

Numbers in the index refer to the term record numbers.
<table>
<thead>
<tr>
<th>English index</th>
</tr>
</thead>
<tbody>
<tr>
<td>system folder ................................................. 488</td>
</tr>
<tr>
<td>system-specific advanced options .......................... 158</td>
</tr>
<tr>
<td>table layout .................................................. 387</td>
</tr>
<tr>
<td>table (1) ....................................................... 389</td>
</tr>
<tr>
<td>table (2) ....................................................... 390</td>
</tr>
<tr>
<td>task ............................................................ 542</td>
</tr>
<tr>
<td>task dependency ................................................ 546</td>
</tr>
<tr>
<td>task information ............................................... 543</td>
</tr>
<tr>
<td>task list ......................................................... 547</td>
</tr>
<tr>
<td>task manager .................................................... 541</td>
</tr>
<tr>
<td>task type ....................................................... 544</td>
</tr>
<tr>
<td>Tekla Campus ................................................... 43</td>
</tr>
<tr>
<td>Tekla Developer Center ....................................... 45</td>
</tr>
<tr>
<td>Tekla Discussion Forum ....................................... 44</td>
</tr>
<tr>
<td>Tekla Downloads ................................................. 42</td>
</tr>
<tr>
<td>Tekla Model Sharing .......................................... 39</td>
</tr>
<tr>
<td>Tekla Model Sharing model ................................... 260</td>
</tr>
<tr>
<td>Tekla Online Admin tool ...................................... 33</td>
</tr>
<tr>
<td>Tekla online services ......................................... 34</td>
</tr>
<tr>
<td>Tekla Open API .................................................. 30</td>
</tr>
<tr>
<td>Tekla Structures ................................................ 1</td>
</tr>
<tr>
<td>Tekla Structures configuration ............................... 12</td>
</tr>
<tr>
<td>Tekla Structures drawing ..................................... 9</td>
</tr>
<tr>
<td>Tekla Structures environment ................................ 13</td>
</tr>
<tr>
<td>Tekla Structures environments folder ....................... 487</td>
</tr>
<tr>
<td>Tekla Structures folder (1) ................................... 486</td>
</tr>
<tr>
<td>Tekla Structures folder (2) ................................... 487</td>
</tr>
<tr>
<td>Tekla Structures learning edition; see Tekla Campus ..... 43</td>
</tr>
<tr>
<td>Tekla Structures model ........................................ 5</td>
</tr>
<tr>
<td>Tekla Structures multi-user server .......................... 253</td>
</tr>
<tr>
<td>Tekla Structures multi-user server program ............... 254</td>
</tr>
<tr>
<td>Tekla Structures software folder ............................ 486</td>
</tr>
<tr>
<td>Tekla User Assistance .......................................... 38</td>
</tr>
<tr>
<td>Tekla Warehouse ................................................ 35</td>
</tr>
<tr>
<td>TeklaStructuresModels folder .................. 489</td>
</tr>
<tr>
<td>template attribute .............................................. 466</td>
</tr>
<tr>
<td>template component ............................................. 464</td>
</tr>
<tr>
<td>template drawing ............................................... 411</td>
</tr>
<tr>
<td>template editor ................................................. 459</td>
</tr>
<tr>
<td>template object ................................................. 465</td>
</tr>
<tr>
<td>template (1) ..................................................... 460</td>
</tr>
<tr>
<td>template (2) ..................................................... 390</td>
</tr>
<tr>
<td>tendon ............................................................. 86</td>
</tr>
<tr>
<td>textual template ............................................... 461</td>
</tr>
<tr>
<td>tie ................................................................. 80</td>
</tr>
<tr>
<td>title block; see table (1) ..................................... 389</td>
</tr>
<tr>
<td>top view .......................................................... 198</td>
</tr>
<tr>
<td>TplEd ............................................................. 459</td>
</tr>
<tr>
<td>Trimble Connect (2) ............................................. 46</td>
</tr>
<tr>
<td>Trimble Connect (1) ............................................. 47</td>
</tr>
<tr>
<td>Trimble Connect application ................................ 47</td>
</tr>
<tr>
<td>Trimble Connector .............................................. 48</td>
</tr>
<tr>
<td>Trimble Connect platform .................................... 46</td>
</tr>
<tr>
<td>Trimble Identity ............................................... 32</td>
</tr>
<tr>
<td>twin profile ..................................................... 285</td>
</tr>
<tr>
<td>UCS ............................................................... 208</td>
</tr>
<tr>
<td>UDA ............................................................... 164</td>
</tr>
<tr>
<td>Uncategorized category ....................................... 531</td>
</tr>
<tr>
<td>undeformed view ............................................... 204</td>
</tr>
<tr>
<td>up direction ..................................................... 138</td>
</tr>
<tr>
<td>User coordinate system ...................................... 208</td>
</tr>
<tr>
<td>user-defined attribute ....................................... 164</td>
</tr>
<tr>
<td>user-defined point of origin ................................ 211</td>
</tr>
<tr>
<td>user-specific advanced options ......................... 156</td>
</tr>
<tr>
<td>utilization ratio ............................................... 585</td>
</tr>
<tr>
<td>variable (1) ...................................................... 171</td>
</tr>
<tr>
<td>variable (2) ...................................................... 175</td>
</tr>
<tr>
<td>view ............................................................... 183</td>
</tr>
<tr>
<td>view along grid line ......................................... 199</td>
</tr>
<tr>
<td>view boundary .................................................. 393</td>
</tr>
<tr>
<td>view depth ....................................................... 185</td>
</tr>
<tr>
<td>view extrema .................................................... 393</td>
</tr>
<tr>
<td>view filter ....................................................... 359</td>
</tr>
<tr>
<td>view label ....................................................... 436</td>
</tr>
<tr>
<td>view level settings ............................................ 404</td>
</tr>
<tr>
<td>view name ....................................................... 187</td>
</tr>
<tr>
<td>view on part plane ............................................ 201</td>
</tr>
<tr>
<td>view on plane .................................................. 200</td>
</tr>
<tr>
<td>view plane ...................................................... 184</td>
</tr>
<tr>
<td>void ............................................................... 326</td>
</tr>
<tr>
<td>wall ............................................................... 279</td>
</tr>
<tr>
<td>Warping .......................................................... 309</td>
</tr>
<tr>
<td>washer; see bolt assembly .................................... 314</td>
</tr>
<tr>
<td>web doubler plate .............................................. 355</td>
</tr>
<tr>
<td>web viewer ....................................................... 517</td>
</tr>
<tr>
<td>weld .............................................................. 69</td>
</tr>
<tr>
<td>weld access hole ............................................... 328</td>
</tr>
<tr>
<td>weld backing bar .............................................. 350</td>
</tr>
<tr>
<td>weld mark ......................................................... 430</td>
</tr>
<tr>
<td>weld prep ........................................................ 329</td>
</tr>
<tr>
<td>weld preparation ............................................... 329</td>
</tr>
<tr>
<td>wizard file ...................................................... 410</td>
</tr>
<tr>
<td>Work area ....................................................... 186</td>
</tr>
<tr>
<td>work area ...................................................... 226</td>
</tr>
<tr>
<td>work plane ..................................................... 457</td>
</tr>
<tr>
<td>work point ...................................................... 457</td>
</tr>
<tr>
<td>working model .................................................. 259</td>
</tr>
</tbody>
</table>

Numbers in the index refer to the term record numbers.

156