

## **ODCLASS**

ODCLASS is an application prototype for object drawing and object characteristics' definition based on Xrecord AutoCAD ® or Object Data (OD) AutoCAD ® Map/Civil 3D ®.

The possibilities for increasing the productivity and quality of drawings/object models, drawing processing capabilities build-up, check automation based on Xrecord or Object Data are modeled and practically tested in ODCLASS.

The goal of ODCLASS together with other add-ons (ODEDIT, etc.) – to enable users to create object models, and to ensure the competitiveness of AutoCAD ® and AutoCAD ® Map 3D ® as a means of creating drawings/object models, collecting descriptive data.

The solution is ODCLASS based on Xrecord or Object Data. It accelerates, simplifies drawing of drawings/object models, allows to define object characteristics, improves the input of characteristic values. ODCLASS implements the best of Map 3D ® Object (Feature) classes concepts, with the addition of many mandatory features not available in Map 3D. ODCLASS provides the automation of checks and the achievement of 100% formal quality of the created drawings/object models, the quality of the entered characteristics' values.

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## ODCLASS window

The ODCLASS window is invoked with ODCLASS\_GUI command.

The ODCLASS window contains a hierarchical menu of commands, search by object types and the object type menu window. The object type menu has three tabs: Classification, Recent, Favorites.

To call ODCLASS commands from the menu, press the left mouse button once.

To draw from the object type menu window – double click the left mouse button.

To call ODCLASS commands from the command line – enter the name of the desired command.

## Command menu

**File** – object definition files commands:

**Load Description, ODCLASS\_LOAD** command – load the object definition file. Select the txt file with the desired objects' definition. In the object type menu window, classes and object types from the loaded definition file are displayed. Object types classes are displayed with a "+" sign – a drop-down list.

AutoCAD command line window (Ctrl + 9) displays the process of the definition file loading with errors and warning messages.

**Reload Description, ODCLASS\_RELOAD** command - update the loaded before object definition file.

AutoCAD command line window (Ctrl + 9) displays the process of the definition file loading with errors and warning messages.

**Generate Description Template, ODCLASS\_TEMPLATE** command – build a template for object definition file based on the graphical elements of the active dwg file. Select the path and enter the name for the created object definition txt file. In the command line, define the format of object type names: "*Format <% t\_% i\_% L>:.*". "*t*" is the type of AutoCAD primitive, "*i*" is the sequence number of the element, "*L*" is the name of the layer. Enter means use default format.

Object definition file is created – the file the active dwg graphical primitives with the same graphical properties (color, layer, lineweight, linetype, text style, block name, etc.). In the definition file, object classes are created according to the types of graphical primitives available in the active dwg: 3DPolyline, Polyline, Line, BlockReference, Text, etc. In each of these classes, object definitions are created with the appropriate types of

graphical primitives. For each object type, Object Data is described with the name of "OD\_NAME" and a single od\_key data field with the name of "OD\_KEY", intended for the names of object types.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

After the template object definition file is build, this file can be loaded and used for work. In the usual case, a revision is needed – replacing the names of object types with custom ones, description of Object data required, adding characteristic fields in OD.

**ODCLASS\_TYPE command** – definition of primitive class names (Class Name, Original Class Name) of the graphical elements specified in accordance with the notation used in ODCLASS.

The names of the primitive classes are displayed in the AutoCAD message window. The names of most of basic AutoCAD primitives have their aliases in ODCLASS (instead of AcDb3dPolyline - 3DPolyline, etc.), and these aliases are displayed. For the list of such primitives, see *ODCLASS\_definition\_file\_structure\_v-4, htm* or *pdf*. The names of any other primitive classes are their Class Name, Original Class Name – for Proxy Objects.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

The command is valid, but it is not in the menu.

**Edit** – object commands:

**Define, ODCLASS\_CLASSIFY\_AUTO** command – definition of graphical elements as objects based on their graphical properties specified in the object definition file.

In the command line, define the value "*Undrawable* [0/1] <0>:": 0 - for all types of objects from the definition file, 1 - only for objects displayed in the object menu window.

Graphical elements which graphical properties correspond to those defined for objects in the definition file, are assigned with the corresponding Object Data with the corresponding names of object types in the od\_key field.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Assign Graphical Properties**, the **ODCLASS\_CLASSIFY\_AUTO** command — assigns graphical elements with graphical properties in accordance with their object definitions specified in the object definition file.

In the command line, define the value "*Undrawable [0/1] <0>:*": 0 - for all types of objects from the definition file, 1 - only for objects displayed in the object menu window.

Graphical elements attached with Object Data with object type names in the *od\_key* fields are assigned corresponding graphical properties. If a graphical element is defined as several types of objects, then graphical properties of the highest priority are assigned.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Restore Graphical Properties, ODCLASS\_RESTORE** command – restore graphical properties for graphical elements in accordance with their object definitions specified in the object definition file.

In the command line, define the value "*Mode [0 (all) / 1 (default)] <0>:*": 0 - save the existing graphical properties, if they are provided with variants of their values, 1 - assign only the default graphical properties.

Graphical elements attached with Object Data with the names of the object types in the *od\_key* fields are assigned corresponding graphical properties.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Display Order by Priority, ODCLASS\_SORT** command – displaying graphical elements defined as objects, in accordance with the priorities specified in the object definition file.

Graphical elements defined as objects are displayed in a sequence corresponding to the priorities of their display — objects with a higher priority are displayed in the foreground.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Round values, ODCLASS\_ROUND** command — rounding the values of numeric characteristics of Real type to the number of decimal places specified in the object definition file for each such characteristic.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Remove All, ODCLASS\_REMOVE\_ALL** command - deletes all object definitions of graphical elements.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Remove Duplicates, ODCLASS\_DEL\_DUPLICATES** command - deletes all duplicate object definitions from graphical elements.

In the command line, define the value "*Mode (First, Last) <First>:*": *First, f, F* - delete the first object definition, *Last, l, L* - delete the last object definition. After deletion, only the single object definition of one type and only one corresponding Object Data remain.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Properties, ODCLASS\_PROPERTIES** command – calls the window for object definitions displaying, viewing, entering and editing of characteristics.

**Check** – audit commands:

**Null Field Values, ODCLASS\_SEL\_NULL** command, value 1 for **Check non-required fields** – search and select graphical elements with non-specified values of characteristics. Graphical elements which objects have no defined value for at least one characteristic are selected.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Null Required Field Values, ODCLASS\_SEL\_NULL** command, value 0 for **Check non-required fields** – search and select graphical elements with non-specified values of mandatory characteristics. Graphical elements with at least one non-defined mandatory characteristic are selected.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Illegal Field Values, ODCLASS\_ASSERT** command, value 1 for **Check non-required fields** – search and select graphical elements with illegal values of characteristics. Graphical elements which objects have at least one characteristic with an illegal value are selected. Illegal value – not corresponding to the lists of acceptable values or ranges of possible values for numeric characteristics.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Illegal Required Field Values, ODCCLASS\_ASSERT** command, value 0 for **Check non-required fields** – search and select graphical elements with illegal values of mandatory characteristics. Graphical elements which objects have at least one mandatory characteristic with an illegal value are selected. Illegal value – not corresponding to the lists of acceptable values or ranges of possible values for numeric characteristics.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Normal Graphical Elements, ODCCLASS\_SEL\_ALL** command, value 1 for **Use properties**, value 0 for **Use objects**, value 1 for **Match** – search and select graphical elements with correct graphical properties and corresponding object definitions. Graphical elements defined as objects which graphical properties correspond to the object definition file are selected.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Abnormal Graphical Elements, ODCCLASS\_SEL\_ALL** command, value 1 for **Use properties**, value 1 for **Use objects**, value 1 for **Match** – search and select graphical elements with abnormal graphical properties or missing object definitions. Graphical elements defined as objects which graphical properties do not correspond to the object definition file are selected. Or graphical elements not defined as objects.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Normal Objects, ODCCLASS\_SEL\_ALL** command, value 1 for **Use properties**, value 0 for **Use objects**, value 1 for **Match** – search and select graphical elements with correct graphical properties and corresponding object definitions. Graphical elements that are defined as objects which graphical properties correspond to the object definition file are selected.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Abnormal Objects, ODCCLASS\_SEL\_ALL** command, value 1 for **Use properties**, value 1 for **Use objects**, value 1 for **Match** – search and select graphical elements with

abnormal graphical properties or missing object definitions. Graphical elements defined as objects which graphical properties do not correspond to the object definition file. Or graphical elements not defined as objects.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Own Objects, ODCLASS\_SEL\_ALL** command, value 1 for **Use properties**, value 1 for **Use objects**, value 1 for **Match** – search and select graphical elements with object definitions corresponding to the loaded object definition file.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Foreign Objects, ODCLASS\_SEL\_CLASSIFIED** command, value 1 for **Use properties**, value 1 for **Use objects**, value 1 for **Match** – search and select graphical elements with object definitions that do not match the loaded object definition file, or with missing object definitions.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Duplicates, ODCLASS\_SEL\_DUPLICATES** command – search and select graphical elements with duplicate object definitions.

The command processes both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

**Info** – commands for displaying information about DWG file objects and ODCLASS.

**Statistics, ODCLASS\_STAT** command — displays statistics available in the active DWG file about ODCLASS. Information about the objects is displayed in a special window.

Data from the Statistics window can be copied using Ctrl + C.

**About, ODCLASS\_ABOUT** command – displays About window for ODCLASS.

Data from the About window can be copied using Ctrl + C.



## Search by object type

Search by object type – character input string to search for object types and their classes containing the specified characters.

While input into the Search bar, only those object types and their classes are automatically displayed whose names contain these character sets.

An empty search string of object types means the absence of selection criteria, and consequently the display of all object types and their classes in the object type window.

## Object type menu

***Object type window** – menu of object types and their classes from the loaded object definition file:*

When object definition file is successfully loaded, object types and their classes from this file are displayed in the lower part of the ODCLASS\_GUI window. Classes of object types are marked with “+” sign before their names and left indent. Click on the “+” sign or double-click on the class name expands the lists of subclasses and/or their object types.

Double-clicking on the name of the object type activates the drawing/insertion command and certain graphical properties set for each type of object in the definition file. Drawing/insertion of selected types of objects can be performed until canceled (Esc, etc.) or until another type of objects is selected. When drawing/inserting, graphical elements of a given type of primitive are created with certain Object Data attached. In these Object Data, the key field contains the object type ID and specific data fields for object characteristics. The required Object Data, the fields, default values, valid values and descriptions of characteristics are specified in the loaded object definition file.

Right-click on the object class/subclass name, the menu appears: Remove, Select, Normal Graphical Elements, Abnormal Graphical Elements, Normal Objects, Abnormal Objects. These actions are performed only for the object types of the selected class.

**Remove** – delete object definitions from graphical elements. **Select** – select graphical elements defined as the corresponding objects. **Normal Graphical Elements** – analogue of the main menu item **Normal Graphical Elements**, **ODCLASS\_SEL\_ALL** command. **Abnormal Graphical Elements** – analogue of the **Abnormal Graphical Elements** main menu item, command **ODCLASS\_SEL\_ALL**. **Normal Objects** – analogue of the **Normal Objects** main menu item, **ODCLASS\_SEL\_ALL** command. **Abnormal Objects** – analogue of the **Abnormal Objects** main menu item, **ODCLASS\_SEL\_ALL** command.

Right-click on the name of the object type, the following menu appears: Define, Restore Graphic Properties, Remove, Select, Normal Graphic Elements, Abnormal Graphical Elements, Normal Objects, Abnormal Objects, Add to Favorites. These actions are performed only for the specified type of objects.

**Define** – add an object definition to the specified graphical elements. **Restore Graphical Properties** – analogue of the main menu item **Restore Graphical Properties**, **ODCLASS\_RESTORE** command. **Remove** – delete object definitions from graphical elements. **Select** – select graphical elements defined as the corresponding objects. **Normal Graphical Elements** - analogue of the main menu item **Normal Graphical Elements**, **ODCLASS\_SEL\_ALL** command. **Abnormal Graphical Elements** is an analogue of the **Abnormal Graphical Elements** main menu item, command **ODCLASS\_SEL\_ALL**. **Normal Objects** – analogue of the **Normal Objects** main menu item, **ODCLASS\_SEL\_ALL** command. **Abnormal Objects** – analogue of the **Abnormal Objects** main menu item, **ODCLASS\_SEL\_ALL** command. **Add to Favorites** – add an object type to the Favorites tab of the ODCLASS window.

Commands process both the preliminary and subsequent selection of graphical elements. Enter while subsequent selection means select all. Graphical elements are processed from non-disabled and non-frozen layers only.

***Classification tab – display of all object types and their classes from the loaded object definition file in the menu:***

At the bottom of the ODCLASS\_GUI window all types of objects and their classes from the loaded object definition file are displayed.

The Classification tab is the main layout of the object type menu, containing the Search object type string.

***Recent tab – display of object types used from the loaded object definition file in the menu:***

In the lower part of the ODCLASS\_GUI window, object types from the loaded object definition file that were previously used for drawing are displayed. Types of objects are arranged in a sequence of frequency of their use – often used are placed above.

For object types in the Recent tab, all actions are available in the same way as in the Classification tab.

***Favorites tab – display of user-selected object types from the loaded object definition file in the menu:***

At the bottom of the ODCLASS\_GUI window, user-selected object types from the loaded object definition file are displayed. The types of objects are arranged in the sequence of adding them to Favorites – previously added are above. User can move any type of object to the desired place with drag and drop.

User can create sections ("classes") of object types list by clicking the right mouse button on the empty line. In the activated field, the section name is entered. The number of sections and their mutual position is not limited. User can move any section to the desired place with drag and drop.

For object types in the Recent tab, all actions are available in the same way as in the Classification tab, except for Add to Favorites. In the Favorites tab for all types of objects and sections in right mouse button menu Remove from Favorites item is available – remove selected types of objects or their sections from the list.

## **ODCLASS\_PROPERTIES window**

The ODCLASS\_PROPERTIES window is intended for displaying object data, for entering and editing characteristic values.

The ODCLASS\_PROPERTIES window is invoked by the ODCLASS\_PROPERTIES command.

In the upper part of the ODCLASS\_PROPERTIES window, the object definitions of the selected graphical elements are displayed. In the middle of the window, Object Data attached to graphical elements is displayed. In the lower part of the ODCLASS\_PROPERTIES window, the Object Data fields of the specified object types are displayed as a table. Object Data fields (Field column) are intended for the values of object characteristics (Value column). Also the types of fields are displayed in this table – *char*, *int*, *real* (Type column), restrictions of values (Range column), descriptions of characteristics (Description column).

In the Type column, fields with a single possible value are marked in gray, fields that are optional for the definition are marked in green, and mandatory fields are marked in white.

In the Value column, valid values of fields are marked with white, fields with a single possible value with gray (not editable), fields with different values for several objects – blue, fields with illegal values – magenta.

In the cells of the Value column, one can enter and edit the desired values, select options from the lists if the lists are defined.

## **General information about ODCLASS commands**

All basic actions of ODCLASS application correspond to their commands, which can be called from the command line, from other applications, and used in macros.

ODCLASS commands contain both known and unnoticed yet shortcomings. Your findings as well as your wishes or opinions can be reported to the specified mail, to the publication source or in ODCLASS forums.

After quitting AutoCAD, system warnings may appear. These are the consequences of programming under condition of lack of documentation for AutoCAD Map 3D. AutoCAD or any other program workflow problems do not arise.

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