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August 17th, 2005

## LTSCALE for MicroStation users

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With thanks to *Lincoln Chun* for this article that explains the use of *LTSCALE* in DWG files being edited in MicroStation.

This little explanation is only relevant to you if you plan to save your DGN files as DWG files and to utilize AutoCAD line types as well, or work in DWG files. Otherwise steer well away from fiddling with the *LTSCALE*. The default value in DGN files is 0 although 1 seems to have the same effect.

*LTSCALE* is a setting within AutoCAD that controls the display and printing of all non-continuous line styles or line styles other than style '0'. It is short for 'line type scale'. Now that MicroStation can read and write to DWG files natively the *LTSCALE* is a setting that can be set in DGN and DWG files. Unlike MicroStation AutoCAD line styles are not dynamic in display or printing. When working in a DWG file a 'hidden' line (similar to style 2 line style in MicroStation) will consist of a constant length of solid line, a constant space and then a constant length of solid line, etc. So when you zoom in you will see the space between the solid bits of line and when you zoom out the line looks like it is continuous. If you were to increase the *LTSCALE* in this instance and not adjust the zoom there will come a point where the spaces will become visible again. (In MicroStation to adjust the *LTSCALE* keyin `\LTSCALE=x` where x is a number).

Note that changing the *LTSCALE* will impact on the display of any custom line style that you may have created and is like setting the 'scale factor' for a line style under the *Line Styles* dialog box, only globally for every line type! So all your custom line styles will change. Therefore great consideration must be given to setting the appropriate *LTSCALE* especially if your custom line styles are dimensionally critical.

A text file in AutoCAD controls the display of the different default line styles. It is called *acad.lin* in AutoCAD and *aclt.lin* in AutoCAD Lite. They are in effect the same file. These are defined for imperial dimensions. The metric equivalents are called *acadiso.lin* and *acltiso.lin* respectively and are basically scaled up by a factor of 25.4 (how many millimeters in an inch). In AutoCAD these files are found in the *support* folder. Before AutoCAD 2004 by default: `C:\Program Files\AutoCAD\Support`. AutoCAD 2004 onwards these are found in `C:\Documents and Settings\Username\Application Data\Autodesk\AutoCAD\Support`.

If you open one of these files up in Notepad you will see the name of each line type followed by some dimensions that define the length of solid lines and the length of the spaces between the solid bits. The *dashed* line type for instance from the *acadiso.lin* file consists of a solid line sections 12.7 millimeters long (1/2") with a space in between of 6.35 millimeters (1/4"). (I apologise to imperial users, but I use metric). The *dashed2* line type is half the scale of this consisting of a solid line 6.35 millimeters long (1/4") with a space of 3.175 millimeters (1/8") and the *dashedx2* line type is two times the *dashed* scale with solid lines 25.4mm long (1") with 12.7mm long (1/2") spaces.

The value of the *LTSCALE* is related to the scale at which your drawings are printed. For example you are printing a drawing at 1:100 and you want the *dashed* line type to print with a solid line length of 12.7mm (its default value- 1/2"). You would then have to set the *LTSCALE* to 100; this enlarges the solid line 100 times to a length of 1270mm long (4' 2") in model space. Setting it to 50 would result in a printed solid line length of 635mm (2'1') long. It gets tricky when you have a single drawing with different details at different scales. This problem can be overcome by drawing the details with different line styles. The line type *dashed2* is half the length of *dashed*; and *dashedx2* is twice the size of *dashed*. The *hidden* style is a smaller version of *dashed*, half the length of *dashed*, exactly the same in fact as *dashed2*. Each default style has smaller version half the regular style, designated with a 2 at the end of its name and a larger version twice the regular size, designated with x2 at the end.

### Other quirky bits of information:

- There is another AutoCAD setting called *PSLTSCALE* (paper space line type scale) that controls the display of line styles in layout spaces. It is a simple on-off (`\PSLTSCALE =0 or =1`) setting that displays the referenced files with the *LTSCALE* active or not. When this is off all line types display as continuous or style 0.

- You can import acad.lin or acadiso.lin files as line styles via the Line Styles Editor dialog box. In a DWG file using MS08.05.02.35 it will ask if you want to over-write existing styles if the style already exists in the file (these are shown in red in the dialog box). If you say *No*, it will not do it. If you say *Yes* it will do it temporarily until you save the file, after which it reverts back to the original definition. If you really want to replace the line style with the same name you must delete all instances of it in the drawing, compress the file with the *delete unused line styles* option ticked and then import the \*.lin file again. This function has implications in how your seed files are set up.

- A general approach of setting the LTSCALE to 50 and using a variety of line types to represent dashed lines at different scales is probably the better means of tackling the issue of LTSCALES in DWG files.

- If however consist and accurate representation of default line types is paramount; following are suggested LTSCALES for drawings from a seasoned AutoCAD user with the solid line lengths of hidden and dashed line styles in model space for reference. Using these LTSCALES will give you a constant printed solid line length of 1.5875mm (1/16") for hidden lines and 3.175mm (1/8") for dashed lines. My colleague Steve who has used and taught people how to use AutoCAD says that he tries to achieve a printed length of the dashed line at about 3mm long, but recognises that there is about as much hope for people adopting a standard for the use of LTSCALES as there is for people using a standard level structure. We are in an architectural firm and would suggest the fixed setting mentioned above as opposed to a dynamic LTSCALE standard based on drawing scale:

Print Scale of Drawing	LTSCALE	HIDDEN line length	DASHED line length
1:1	0.25	1.5875mm (1/16")	3.175mm (1/8")
1:2	0.5	3.175mm (1/8")	6.35mm (1/4")
1:5	1.25	7.9375mm (5/16")	15.875mm (5/8")
1:10	2.5	15.875mm (5/8")	31.75mm (1 1/4")
1:20	5	31.75mm (1 1/4")	63.5mm (2 1/2")
1:50	12.5	79.375mm (3 1/8")	158.75mm (6 1/4")
1:100	25	158.75mm (6 1/4")	317.5mm (1' 1/2")
1:200	50	317.5mm (1' 1/2")	635mm (2' 1")
1:500	125	793.75mm (2' 7 1/4")	1587.5mm (5' 2 1/2")
1:1000	250	1587.5mm (5' 2 1/2")	3175mm (10' 5")

Note that using these varying LTSCALES will completely stuff up the accurate representation of any custom lines in the file.

- When AutoCAD is loaded onto a computer it looks to the windows language settings to determine which \*.lin file to load. For example English American will get you the imperial file and English Australian will get you the metric file.

- There are similar text files to the \*.lin files that control pattern parameters. They are called *acad.pat* and *acadiso.pat*. These are also found in the *support* folders of AutoCAD and warrant a separate description of their function and use.

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1/4/2006

[All About Custom Line Style Scales](#) UPDATED

#### Lincoln Chun

Surrounded by AutoCAD users and confined to a two story building somewhere in Austrailia, Lincoln is pretty much the only MicroStation user at his shop. When not designing things to build at [LEFFLER SIMES ARCHITECTS](#), Lincoln spends his free time thinking up nicknames for the members of a local kangaroo gang that have been spotted hanging out at 7-Eleven recently.

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