



# ACE Structural Engineering Applications LLC

## ACE FrameWorks Utilities

### ACE FWP Frame Structure Import/Record Documentation

Mar 15, 2013

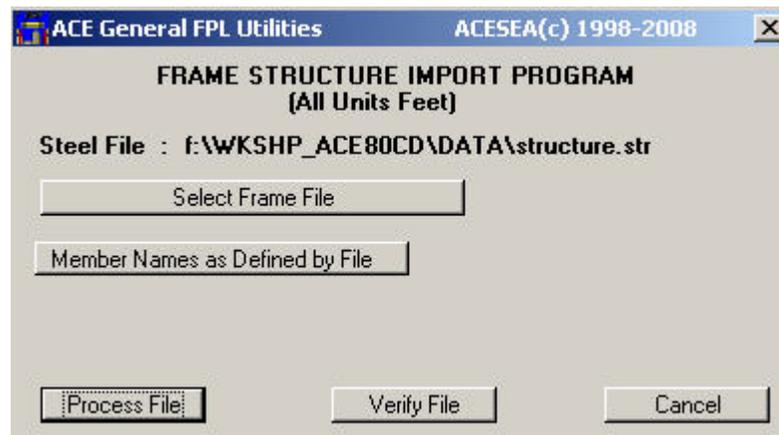
The ACE FrameWorks FPL Utilities have two general utilities for frame structures. The first is the Frame Structure Import program, which can read a specific ASCII format and place library defined frame members into a FrameWorks model. The second is the Frame Structure Record program, which will write to an ASCII file member data for members contained in a selection set. These programs are related in that each utilizes the same format for the ASCII Import/Record file. Each program is discussed separately in the ensuing sections. Finally a sample ASCII file is presented and the commands for the ASCII file are described in detail.

#### ACE FWP Frame Structure Import Program (ACE\_SS.MA)

(Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.5 & FWP 7.0.x.x rel 7.0.5 & FWP 7.1/7.2/7.3 rel 6.0.5 & FWP 8.0.x.x rel 8.0.5 & FWP 9.0.x.x rel 9.0.5 & FWP 10.0.x.x rel 10.0.5 & FWP 11.0.x.x rel 11.0.5 & FWP 12.0.x.x rel 12.0.5)

The frame structure import program can be utilized to place ordinary FrameWorks tapered/non-tapered members & arcs (beams, columns, vertical & horizontal braces), which are defined by FWP section libraries. This program reads a defined ASCII file format (extension STR) and places all valid frame members found in the file. A sample ASCII file, ACE.STR, is distributed with the product, which illustrates the simple format for frame member definition. For each arc/member the following information may be specified: section size, type, class, name, end points, center point for arcs, material, grade, orientation vector, rotation, reflect status and cardinal point.

Portions of the sample file, ACE.STR, are contained in this document. In addition, the required ASCII file format for this application is discussed and documented in detail toward the end of this document. The application will by default look for \*.STR files in the c:\ directory. The starting search directory can be specified with the environment variable ACE\_STR\_FILE.



Several methods (3 options) for naming the members & arcs imported with this utility are available. First the frame member name may be specified in the ASCII file and that name may be requested as shown in the dialog box at the left. However, new names can be generated at placement time. Under this option, all components for a given member type (beam, column etc ...) are given the a name by concatenating a sequence number to a prefix (i.e. BM CO etc ...). Finally, FrameWorks normal naming for individual components (autoname) may be specified.

This program can be extremely useful for organizations that have piperack or similar design/database utilities. These utilities can be easily modified to create a ASCII file which can be read by this utility to create FrameWorks models which can be used for interference checking, design review or drawing generation.

# ACE FrameWorks Frame Structure Import/Export Documentation

## ACE FWP Frame Structure Record Program (ACE\_RS.MA)

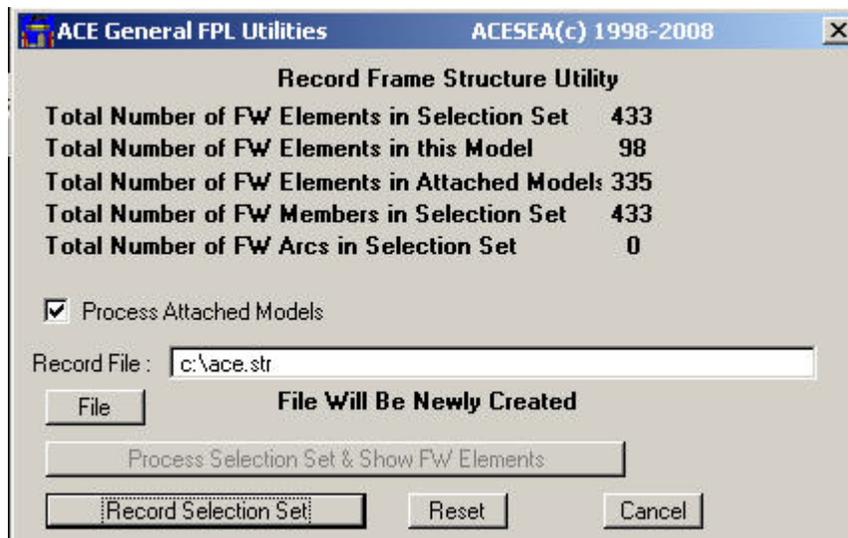
(Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.4 & FWP 7.0.x.x rel 7.0.4 & FWP 7.1.x.x rel 6.0.4 & FWP 8.0.x.x rel 8.0.4 & FWP 9.0.x.x rel 9.0.4 & FWP 10.0.x.x rel 10.0.4 & FWP 11.0.x.x rel 11.0.4 & FWP 12.0.x.x rel 12.0.4)

The record frame structure program can be utilized to record a selection set of ordinary FrameWorks framing arc/member (beams, columns, vertical braces, and horizontal braces). This program records/writes a defined ASCII file format (default extension STR) and places all valid (must have an attached FWP library definition) frame members found in the file. This utility produces a file that is compatible with the Frame Structure Import utility. A sample of a valid ASCII file, ACE.STL, is distributed with this application, which illustrates the simple format for frame member definition.

This utility will export both tapered/non-tapered arcs and ordinary tapered/non-tapered members. For each arc/member the following information is exported: section size, type, class, name, end points (adjusted from offsets), center point for arcs, material, grade, orientation vector, rotation, reflect status and cardinal point.

Portions of the sample file, ACE.STR are presented in this document. The file ACE.STR was originally generated with the frame structure record utility. The ASCII file for the frame import utility and the frame record utility are compatible. The rules for the ASCII file are discussed toward the end of this document.

This program can be used to record complete structures or subsets. The ASCII file can be easily edited. The ASCII file format supports both units and offset commands. Using these capabilities English & Metric models can be combined (the Section Library Units Conversion Utility can be quite useful in such a combination). Uses of this utility are unlimited.



# ACE FrameWorks Frame Structure Import/Export Documentation

## Sample Frame Structure ASCII Import File

- All records that start with a blank are comments
- This particular sample file is a subset of ACE.STR which was created by the Record Frame Utility. The Record Frame Utility provides complete repetitive command definition which is not required but is of course supported by the Frame Structure Import Utility. As an example, all members are grade A36, thus the grade needs to be specified only once for each of the four pertinent types. i.e. (Columns, Beams, Vertical Braces & Horizontal Braces) The same is true for material, class, cardinal points and reflect. This is also somewhat true for orientation vector and rotation. Thus the size of this input file could be significantly reduced. Over specification does provide the luxury of cut and paste editing without worrying about missed property or orientation data.
- Each record is limited to 254 characters
- For better presentation, many 0's were truncated (see delivered file ACE.STR)
- To reduce volume, many records were deleted (see delivered file ACE.STR)

```
UNITS ENGLISH FEET
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
MEM CO "W14X90" 35.000 20.0 0.000 35.000 20.0 18.000 NAME C_4
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
MEM CO "W14X82" 0.000 0.000 0.000 0.000 0.000 18.000 NAME C_8
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 20.0 0.000 18.000 20.0 20.0 18.000 NAME B_14
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 35.000 0.000 18.000 35.000 20.0 18.000 NAME B_15
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 0.000 0.000 18.000 20.0 0.000 18.000 NAME B_17
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 20.0 0.000 18.000 35.000 0.000 18.000 NAME B_18
PRO VB MA 0 CL 0 GR A36
ORI VB VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 10
MEM VB "L3.5X3X5/16" 0.000 0.000 0.000 20.0 0.000 18.000 NAME VB_1
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
TME CO "W14X90" "W14X82" 0.000 0.000 36.000 0.000 0.000 54.000 NAME C_8
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
MEM CO "W14X82" 20.0 0.000 36.000 20.0 0.000 54.000 NAME C_9
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 20.0 0.000 54.000 20.0 20.0 54.000 NAME B_14
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 35.000 0.000 54.000 35.000 20.0 54.000 NAME B_15
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 0.000 0.000 54.000 0.000 20.0 54.000 NAME B_16
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 0.000 0.000 54.000 20.0 0.000 54.000 NAME B_17
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 20.0 0.000 54.000 35.000 0.000 54.000 NAME B_18
PRO BE MA 0 CL 0 GR A36
```

# ACE FrameWorks Frame Structure Import/Export Documentation

## Sample Frame Structure ASCII Import File (continued)

```
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 0.000 20.0 54.000 20.0 20.0 54.000 NAME B_19
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 20.0 20.0 54.000 35.000 20.0 54.000 NAME B_20
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 25.000 0.000 54.000 25.000 20.0 54.000 NAME B_21
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 30.000 0.000 54.000 30.000 20.0 54.000 NAME B_22
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 5.000 0.000 54.000 5.000 20.0 54.000 NAME B_23
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 10.000 0.000 54.000 10.000 20.0 54.000 NAME B_24
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 15.000 0.000 54.000 15.000 20.0 54.000 NAME B_25
PRO VB MA 0 CL 0 GR A36
ORI VB VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 10
MEM VB "L3.5X3X5/16" 0.000 0.000 36.000 20.0 0.000 54.000 NAME VB_1
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
MEM CO "W14X68" 35.000 20.0 18.000 35.000 20.0 36.000 NAME C_4
PRO CO MA 0 CL 0 GR A36
ORI CO VE 1.000 0.000 0.000 RO 90.000 RE 0 CP 5
MEM CO "W14X82" 0.000 0.000 18.000 0.000 0.000 36.000 NAME C_8
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W24X68" 20.0 0.000 36.000 20.0 20.0 36.000 NAME B_14
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W16X40" 0.000 0.000 36.000 20.0 0.000 36.000 NAME B_17
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
MEM BE "W10X30" 25.000 0.000 36.000 25.000 20.0 36.000 NAME B_21
PRO VB MA 0 CL 0 GR A36
ORI VB VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 10
MEM VB "L3.5X3X5/16" 0.000 0.000 18.000 20.0 0.000 36.000 NAME VB_1
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X24" "W8X31" 20.0 10.0 61.50 20.0 16.290074 59.470098 20.0 20.0 54.0 NAME B_3
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X31" "W8X24" 20.0 0.0 54.000 20.0 3.709926 59.470098 20.0 10.0 61.50 NAME B_2
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X31" "W8X24" 35.0 0.0 54.0 35.0 3.709926 59.470098 35.0 10.0 61.50 NAME B_2
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X24" "W8X31" 35.0 10.0 61.50 35.0 16.290074 59.470098 35.0 20.0 54.0 NAME B_3
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X24" "W8X31" 0.0 10.0 61.50 0.0 16.290074 59.470098 0.0 20.0 54.0 NAME B_3
PRO BE MA 0 CL 0 GR A36
ORI BE VE 0.000 0.000 1.000 RO 0.000 RE 0 CP 8
TAR BE "W8X31" "W8X24" 0.000 0.000 54.0 0.0 3.709926 59.470098 0.0 10.0 61.50 NAME B_2
```

# ACE FrameWorks Frame Structure Import/Export Documentation

## Command Definition

- **Valid Primary Keyword Commands :** (UNI, OFF, PRO, ORI, MEM, TME, ARC, TAR)
- **Each record must begin with a valid primary keyword or it is ignored**
- **All records that start with a blank are considered comments**
- **The commands/keywords (records) may be placed in any order however the order is significant**
- **The components of a given command (record) must all be present and in the order shown**

## UNI Command - Units Command (optional command)

**UNIT** {UNITTYPE} {UNIT}

where :

{UNITTYPE} May be ENGLISH (feet) or METRIC (meters).

If units is not specified it is assumed that the units match the current model units.

{UNIT} Must be FEET or INCH for ENGLISH (default feet) or must be METER or MM for METRIC (default meters).

If unit is not specified, it is assumed that the units are feet for English & meters for metric.

Units may be changed at any time but be aware that the properties (in attached library) for the member specified must match the current model units.

## OFF Command - Offset Command (optional command)

- **If component keyword is given, command arguments must be supplied in order & quantity**

**OFF** *east\_cord north\_cord elev*

where :

east\_cord is offset to be applied to all East coordinates

north\_cord is offset to be applied to all North coordinates

elev is offset to be applied to all elevations

If command is utilized all three coordinates must be provided

Once command is used offset remains in effect until a new offset is specified

Command may be specified multiple times.

## PRO Command - Property Command (optional command)

- **Command components are optional and may be provided in any order**
- **If component keyword is given, command argument must be supplied**

**PRO** {MEMTYPE} (*MA material (CL class) (GR grade)*)

where :

{MEMTYPE} Keyword - must be CO, BM, VB or HB  
(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontal Brace)

MA is material integer value (optional command)

CL is class - valid range 0 - 9 (optional command)

GR is grade - any valid grade (24 chars) (optional command)

MA, CL and/or GR may be specified in any order - all optional

Once command is used properties for this member type remain in effect

until a new property command for this member type is given.

Command may be specified multiple times as required.

Note if command is not specified, the FWP default for the given

member type is utilized.

# ACE FrameWorks Frame Structure Import/Export Documentation

## ORI Command - Orientation Command (optional command)

- Command components are optional and may be provided in any order
- If component keyword is given, command argument(s) must be supplied in order & quantity

**ORI {MEMTYPE} (VE veast vnorth velev) (RO rotation) (RE reflect) (CP cardinal\_point)**

where :

{MEMTYPE} Keyword - must be CO, BM, VB or HB

(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontn Brace)

VE is orientation vector (optional command)

veast is the East vector value (x-value)

vnorth is the North vector value (y-value)

velev is the elevation vector value (z-value)

If VE is specified all three values must be provided

RO is rotation in degrees (optional command)

RE is reflect - integer value (0-off 1-on) (optional command)

CP is cardinal\_point - valid range 1 - 10 (optional command)

VE, RO, RE and/or CP may be specified in any order - all are optional

Once command is used orientation for this member type remain in effect until a new orientation command for this member type is given.

Command may be specified multiple times as required

Note if command is not specified, the FWP default for the given member type is utilized.

## MEM Command - Frame Member (non-tapered) Command

- Command places a non-tapered member frame element
- All arguments are required and must be provided in the order specified
- Command must be contained on a single record (continuation not allowed)

**MEM {MEMTYPE} section start\_ecord start\_ncord start\_elev end\_ecord end\_ncord end\_elev NAME name**

where :

{MEMTYPE} Keyword for member type - must be CO, BM, VB or HB

(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontal Brace)

section is valid library name surrounded by " " (i.e. "W8X31")

start\_ecord is the starting East coordinate (x-value)

start\_ncord is the starting North coordinate (y-value)

start\_elev is the starting elevation (z-value)

end\_ecord is the ending East coordinate (x-value)

end\_ncord is the ending North coordinate (y-value)

end\_elev is the ending elevation (z-value)

NAME keyword for name - required (capitalization is important)

name can be up to 24 characters (may contain blanks - any case)

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## TME Command - Tapered Frame Member Command

- Command places a tapered member frame element
- All arguments are required and must be provided in the order specified
- Command must be contained on a single record (continuation not allowed)

*TME {MEMTYPE} startsec endsec start\_ecord start\_ncord start\_elev end\_ecord end\_ncord end\_elev  
NAME name*

where :

- {MEMTYPE} Keyword for member type - must be CO, BM, VB or HB  
(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontal Brace)
- startsec is valid library name for member start (i.e. "W8X31")  
name must be surrounded by " "
- endsec is valid library name for member end (i.e. "W8X24")  
name must be surrounded by " "
- start\_ecord is the starting East coordinate (x-value)
- start\_ncord is the starting North coordinate (y-value)
- start\_elev is the starting elevation (z-value)
- end\_ecord is the ending East coordinate (x-value)
- end\_ncord is the ending North coordinate (y-value)
- end\_elev is the ending elevation (z-value)
- NAME keyword for name - required (capitalization is important)  
name can be up to 24 characters (may contain blanks - any case)

## ARC Command - Frame ARC (non-tapered) Command

- Command places a non-tapered arc frame element
- All arguments are required and must be provided in the order specified
- Command must be contained on a single record (continuation not allowed)

*ARC {MEMTYPE} section start\_ecord start\_ncord start\_elev mid\_ecord mid\_ncord mid\_elev  
end\_ecord end\_ncord end\_elev NAME name*

where :

- {MEMTYPE} Keyword for member type - must be CO, BM, VB or HB  
(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontal Brace)
- section is valid library name for ARC (i.e. "W8X31")  
name must be surrounded by " "
- start\_ecord is the starting East coordinate (x-value)
- start\_ncord is the starting North coordinate (y-value)
- start\_elev is the starting elevation (z-value)
- mid\_ecord is the mid point East coordinate (x-value)
- mid\_ncord is the mid point North coordinate (y-value)
- mid\_elev is the mid point elevation (z-value)
- end\_ecord is the ending East coordinate (x-value)
- end\_ncord is the ending North coordinate (y-value)
- end\_elev is the ending elevation (z-value)
- NAME keyword for name - required (capitalization is important)  
name can be up to 24 characters (may contain blanks - any case)

# ACE FrameWorks Frame Structure Import/Export Documentation

## TAR Command - Tapered Frame ARC Command

- Command places a tapered arc frame element
- All arguments are required and must be provided in the order specified
- Command must be contained on a single record (continuation not allowed)

*TAR {MEMTYPE} startsec endsec start\_ecord start\_ncord start\_elev mid\_ecord mid\_ncord mid\_elev  
end\_ecord end\_ncord end\_elev NAME name*

where :

{MEMTYPE} Keyword for member type - must be CO, BM, VB or HB  
(CO-Column, BM-Beam, VB-Vertical Brace, HB-Horizontal Brace)

startsec is valid library name for ARC start (i.e. "W8X31")

name must be surrounded by " "

endsec is valid library name for ARC end (i.e. "W8X24")

name must be surrounded by " "

start\_ecord is the starting East coordinate (x-value)

start\_ncord is the starting North coordinate (y-value)

start\_elev is the starting elevation (z-value)

mid\_ecord is the mid point East coordinate (x-value)

mid\_ncord is the mid point North coordinate (y-value)

mid\_elev is the mid point elevation (z-value)

end\_ecord is the ending East coordinate (x-value)

end\_ncord is the ending North coordinate (y-value)

end\_elev is the ending elevation (z-value)

NAME keyword for name - required (capitalization is important)

name can be up to 24 characters (may contain blanks - any case)

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## LOG FILES

All applications can write log files if the environment variable `ACE_DUMP` is set to 1. There have been reports that some sites lock the C root drive and under certain conditions a locked C drive can cause a system fault 5.

All applications have been modified to warn of a locked drive/file and then gracefully exit. All applications now look for the environment variable `ACE_LOG_PATH`. If it is found, that is the directory where the log files will be placed. If the directory is locked or non-existent or if file is locked a warning will be given and the C drive will be tried. If it is locked or the file is locked a warning will be given and application will gracefully exit.

Usage of the variable `ACE_LOG_PATH` to control log file locations is similar to `ACE_DEF_PATH` to control DEF files. However there is one very important difference: `ACE_LOG_PATH` should NEVER point to a network drive (this is highly recommended for `ACE_DEF_PATH`). Everyone writes to the same named log file and if they are on a network drive there will be bad consequences. ALWAYS point `ACE_LOG_PATH` to a local drive (perhaps a temp off C root).