



ACE Structural Engineering Applications LLC

ACE FrameWorks Foundation Utilities Documentation

Apr 15, 2013

The foundation utilities currently consist of 11 utilities: Single Pedestal Foundation, Vertical Vessel Foundation, Combined Footing Foundation, Mat Foundation, Pedestals, Ringwall Foundation, Drilled Pier Foundation, Concrete Tank/Foundations, Grout Pads on Peds/Fdns, AB Groups on Peds/Fdns and Pile Groups beneath Foundations. As with all ACE FWP FPL Utilities, the foundation utilities are MDL/FPL (MicroStation Development Language & FrameWorks Parametric Language) applications, which run under Intergraph's FrameWorks Plus product. The foundations are all created from solid FrameWorks shape(s) and the AB's & Piles are FWP members (FWP section libraries). The basic operation of the foundation programs is very similar thus all foundation programs are covered by this single document. This document discusses each foundation program in a separate section. Information, which applies to all programs, is given on the following topics: coordinate system for foundations, multiple foundation placement, foundation definition files (including a sample and the commands for definition files) and the record mode capability.

Spread Footing Foundation (ACE_SF.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.6 & FWP 7.0.x.x rel 7.0.6 & FWP 7.1/7.2/7.3 rel 6.0.6 & FWP 8.0.x.x rel 8.0.6 & FWP 9.0.x.x rel 9.0.6 & FWP 10.0.x.x rel 10.0.6 & FWP 11.0.x.x rel 11.0.6 & FWP 12.0.x.x rel 12.0.6)

The single pedestal foundation program allows for the rapid placement of rectangular or square spread footings

with a single rectangular, square or round concentric pedestal. The pedestal and/or footing may be rotated together or independently. Foundations may be placed in a single or multiple placement mode. In single placement mode, foundations are placed one at a time. In multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Foundation coordinates are specified to the center and may be keyed in or may be selected as the "last data point". A section titled "Coordinate System for Foundation Programs" is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes. This foundation utility has internal defaults for all values shown in dialog box, however user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types

and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

For a given foundation the pedestal and footing are given the same name concatenating the FWP ID to a prefix. The default prefix is SPF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all spread footing foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Combined Footing Foundation (ACE_CF.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.7 & FWP 7.0.x.x rel 7.0.7 & FWP 7.1/7.2/7.3 rel 6.0.7 & FWP 8.0.x.x rel 8.0.7 & FWP 9.0.x.x rel 9.0.7 & FWP 10.0.x.x rel 10.0.7 & FWP 11.0.x.x rel 11.0.7 & FWP 12.0.x.x rel 12.0.7)

The combined footing foundation program allows for the rapid placement of rectangular or square spread

ACE Foundation FPL Utilities ACESEA(c) 1998-2008

COMBINED FOOTING FOUNDATION(s)
(All Units Feet)

Two Pedestal Foundation Class: 2 Fc_3

Octagonal Pedestal Diameter: 3.000
Fdn CL to Ped1 CL (North +): -2.500 Ped 1 TOC: 106.000

Circular Pedestal Diameter: 2.000
Ped1 CL to Ped2 CL (North +): 5.000 Ped 2 TOC: 107.000

Rectangular Footing Width: 9.000 Class: 7 Fc_3
Footing Length (N-S): 15.000
Rotate Pedestals & Footing: 0.00
BOC: 99.000 TF: 1.500

Single Foundation Mode Set Coordinates to Last Data Point

North Coordinate: 100.000 East Coordinate: 200.000

Place Foundation Cancel

footings with two (or one) rectangular, square, octagonal or round one-way non-concentric pedestals. The pedestals and/or footing may be rotated together or independently. Foundations may be placed in a single or multiple placement mode. In the single placement mode, foundations are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Foundation coordinates are specified to the center of the footing and may be keyed in or may be selected as the "last data point". A section titled "Coordinate System for Foundation Programs" is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes. The foundation orientation notes are especially important in understanding the combined footing utility.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and

discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

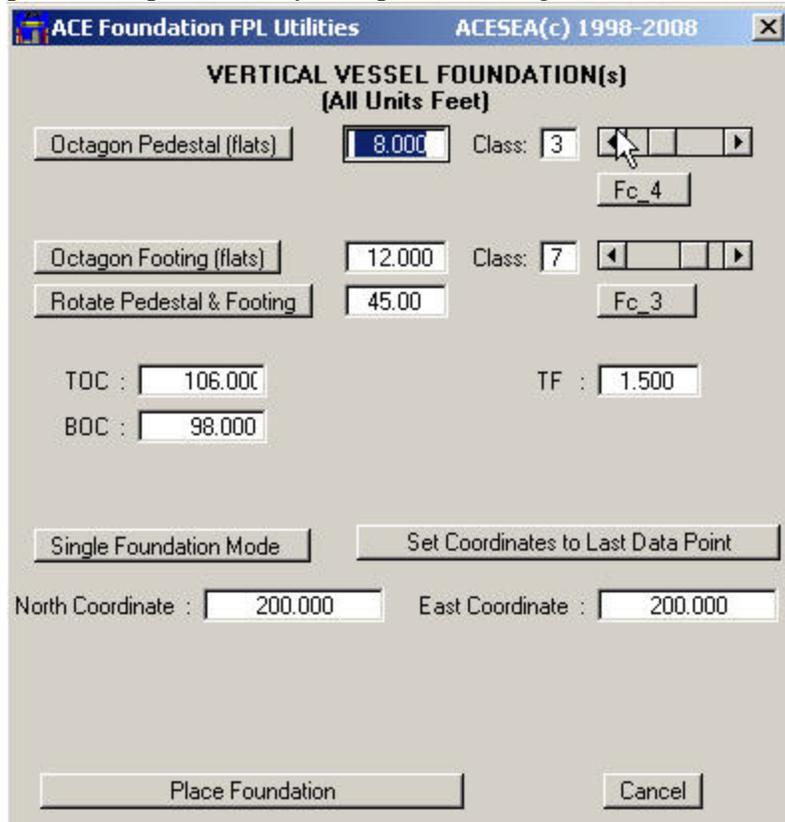
For a given foundation the pedestal(s) and mat are given the same name by concatenating the FWP ID to a prefix. The default prefix is CFF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all combined footing foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Vertical Vessel Foundation (ACE_VV.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.6 & FWP 7.0.x.x rel 7.0.6 & FWP 7.1/7.2/7.3 rel 6.0.6 & FWP 8.0.x.x rel 8.0.6 & FWP 9.0.x.x rel 9.0.6 & FWP 10.0.x.x rel 10.0.6 & FWP 11.0.x.x rel 11.0.6 & FWP 12.0.x.x rel 12.0.6)

The vertical vessel foundation program allows for the rapid placement of vertical vessel foundations. The pedestal (optional) may be square or octagonal and the footing may be square or octagonal. The pedestal and/or footing may be rotated together or independently.



Foundations may be placed in a single or multiple placement mode. In the single placement mode, foundations are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Foundation coordinates are specified to the center (pedestal & footing are concentric) and may be keyed in or may be selected as the "last data point". A section titled "Coordinate System for Foundation Programs" is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation

definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

For a given foundation the pedestal and footing are given the same name by concatenating the FWP ID to a prefix. The default prefix is VVF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all vertical vessel foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Ringwall Foundation (ACE_RW.MA)

(Current 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 ringwall foundation program allows for the rapid placement of ringwall foundations. Ringwall foundations

ACE Foundation FPL Utilities ACESEA(c) 1998-2008

RINGWALL FOUNDATION(s)
(All Units Feet)

Wall Defined by OD & ID Class: 5

Wall OD : 75.000 Wall ID : 72.000 Fc_4

Ringwall Thickness = 1.500 Ringwall Centerline = 73.500

Wall Defined by TOC & BOC

TOC : 101.000 Ringwall Height = 4.000

BOC : 97.000

Single Foundation Mode Set Coordinates to Last Data Point

North Coordinate : 225.000 East Coordinate : 75.000

Place Foundation Cancel

may be placed in a single or multiple placement mode. In the single placement mode, foundations are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Ringwall foundation coordinates are specified to the center and may be keyed in or may be selected as the "last data point". Ringwall diameters may be specified by: Wall OD & ringwall thickness, Wall ID & ringwall thickness or Wall OD & Wall ID. Ringwall dimensions may be specified by: BOC & ringwall height, TOC & ringwall height or TOC & BOC. A section titled "Coordinate System for Foundation Programs" is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

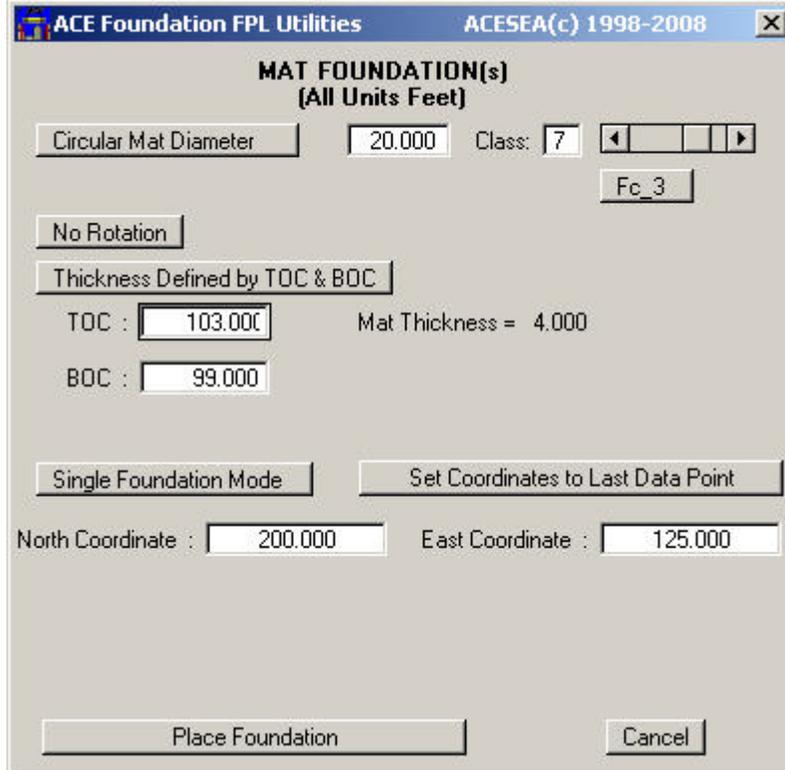
For a given foundation the foundation is named by concatenating the FWP ID to a prefix. The default prefix is RWF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all ringwall foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Mat Foundations (ACE_MT.MA)

(Current 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.x.x 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 mat foundation program allows for the rapid placement of square, rectangular, octagonal or circular mat foundations. The mat foundation may be rotated. Foundations may be placed in a single or multiple placement



mode. In the single placement mode, foundations are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Foundation coordinates are specified to the center and may be keyed in or may be selected as the “last data point”. The mat foundation utility in conjunction with the pedestal utility can create virtually any desired foundation. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation

definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

For a given foundation the foundation is named by concatenating the FWP ID to a prefix. The default prefix is MAT, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all mat foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Pedestals (ACE_PD.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 pedestal foundation program allows for the rapid placement of rectangular, square, octagonal or round pedestals. The pedestal may be rotated. Pedestals may be placed in a single or multiple placement mode. In the single placement mode, pedestals are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Pedestal coordinates are specified to the center and may be keyed in or may be selected as the "last data point". Pedestals may be specified by: BOC & height, TOC & height or TOC & BOC. The pedestal utility combined with the mat utility can create virtually any foundation. A section titled "Coordinate System for Foundation Programs" is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

The screenshot shows a software dialog box titled "ACE Foundation FPL Utilities" with a subtitle "ACESEA(c) 1998-2008". The main heading is "PEDESTAL FOUNDATION(s) (All Units Feet)". The dialog contains several input fields and buttons. The "Rectangular Pedestal Width" is set to 2.500, "Pedestal Length (N-S)" is 2.000, and "Rotate Pedestal" is 0.00. Under "Pedestal Defined by TOC & BOC", "TOC" is 106.000 and "BOC" is 101.000, with a "Pedestal Height" of 5.000. The "Multiple Foundation Mode" and "Set Coordinates to Last Data Point" options are checked. The "North Coordinate" is 70.000, "East Coordinate" is 75.000, "Number" is 1, "North Spacing" is 25.000, "East Spacing" is 20.000, and "Skew Angle" is 30.00. At the bottom, there are "Place Foundations" and "Cancel" buttons.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

For a given foundation the foundation is named by concatenating the FWP ID to a prefix. The default prefix is PED, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all pedestal foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Drilled Pier Foundations (ACE_DP.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.8 & FWP 7.0.x.x rel 7.0.8 & FWP 7.1/7.2/7.3 rel 6.0.8 & FWP 8.0.x.x rel 8.0.8 & FWP 9.0.x.x rel 9.0.8 & FWP 10.0.x.x rel 10.0.8 & FWP 11.0.x.x rel 11.0.8 & FWP 12.0.x.x rel 12.0.8)

The drilled foundation program allows for the rapid placement of drilled shaft pier foundations, which may

ACE Foundation FPL Utilities ACESEA(c) 1998-2008

DRILLED PIER FOUNDATION(s)
(All Units Feet)

Pedestal & Drilled Shaft

Rectangular Pedestal Width: 2.000 Class: 2

Pedestal Length (N-S): 1.500 Fc_3

Rotate Pedestal: 0.000

Pedestal Defined by TOC: 105.000 Pedestal Height = 6.000

Shaft TOC: 99.000 Class: 7

Shaft BOC: 87.000 Fc_6

Shaft Diameter: 3.000

Multiple Foundation Mode Set Coordinates to Last Data Point

North Coordinate: 100.000 East Coordinate: 125.000

Number: 1 North Spacing: 15.000

Number: 1 East Spacing: 20.000

Skew Angle: 0.000

Place Foundations Cancel

optionally include pedestals (rectangular, square, octagonal or round) and/or bell bottoms*. The pedestal may be rotated. Drilled pier foundations may be placed in a single or multiple placement mode. In the single placement mode, foundations are placed one at a time. In the multiple placement mode, a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Foundation coordinates are specified to the center and may be keyed in or may be selected as the “last data point”. Several input options are available for both pedestal & bell bottom definition. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types

and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

For a given foundation the foundation components (pedestal, shaft & bell) are given the same name by concatenating the FWP ID to a prefix. The default prefix is DPF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all drilled pier foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

- *Note that the bell bottom can be placed as a true bell or as a lined bell (default). If FWP plan views are going to be utilized, a lined bell should be considered. At one time there was an abort problem with all FWP versions and uStn SE and J with FWP plan views. The lined bell produces larger & slower files but will not abort. The lined bell uses a 12 sided polygon. Problem details are outlined in ACEDOC.PDF release notes. FWP 7.1.x.x has no known problems*

ACE FrameWorks Foundation Utilities Documentation

Concrete Tank/Foundations (ACE_TF.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 7.1/7.2/7.3 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 concrete tank/foundation program allows for the rapid placement of rectangular, square, or round concrete

ACE Foundation FPL Utilities ACESEA(c) 1998-2008

TANK FOUNDATION(s)
(All Units Feet)

Tank w/ Top tk = 1.500 Class: 6

Circular Tank Wall tk = 1.250 Fc_4

Tank Width 15.500

TOC : 101.000 BOC : 84.000

Tank w/ Larger Base tk = 2.25 Class: 5

Rectangular Base Fc_4

Base Width 18.000

Single Foundation Mode Set Coordinates to Last Data Point

North Coordinate : 300.000 East Coordinate : 75.000

Place Foundation Cancel

tanks with or without a top and with or without a base. The base may be oversized and a rectangular base may be placed beneath a circular tank. A top is optional and is always the same size and configuration as the tank if a top is requested. Tanks may be placed in a single or multiple placement mode. In the single placement mode, tanks are placed one at a time. In the multiple placement mode a rectangular grid is specified by number North/South and North spacing and number East/West and East spacing. A skew angle for the rectangular grid may be specified in cases where the grid is not aligned with N/S & E/W coordinates. Tank coordinates are specified to the center and may be keyed in or may be selected as the “last data point”. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

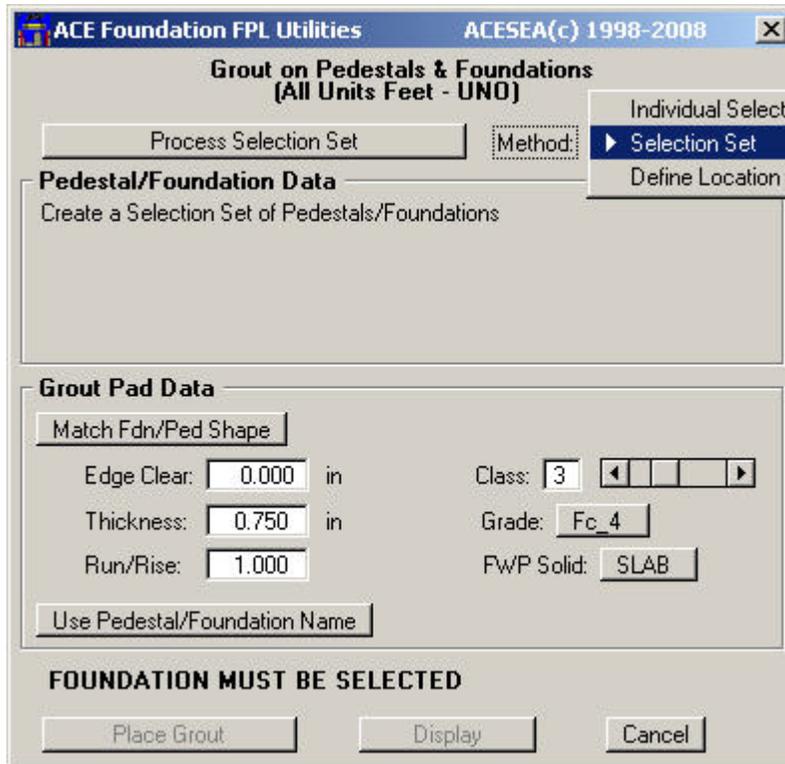
For a given foundation the foundation components (top, tank walls & base) are given the same name by concatenating the FWP ID to a prefix. The default prefix is TKF, however a different prefix may be specified in the definition file. Other naming options include a 1) constant specified name for all tank foundations, 2) dynamic naming at placement time or 3) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the last name (prefix) and allows it to be changed as a foundation is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Grout Pads on Pedestals/Foundations (ACE_GR.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.1 & FWP 7.0.x.x rel 7.0.1 & FWP 7.1/7.2/7.3 rel 6.0.1 & FWP 8.0.x.x rel 8.0.1 & FWP 9.0.x.x rel 9.0.1 & FWP 10.0.x.x rel 10.0.1 & FWP 11.0.x.x rel 11.0.1 & FWP 12.0.x.x rel 12.0.1)

The Grout Pads on Pedestals/Foundations application allows for the rapid placement grout pads on pedestals, foundations or specific locations. A pedestal/foundation is any flat FWP solid of rectangular, square, circular or octagonal shape. A single pedestal/foundation may be selected or a selection set of pedestals/foundations may be utilized. In the selection set mode, the pedestal/foundation data is displayed for acceptance or rejection. Once accepted all identical shapes in the original selection set will be processed. The grout pad may match the shape of the foundation or the grout pad may be rectangular, square, circular or octagonal. The grout pad may be placed as a FWP solid type SOLID or SLAB. If the grout pad matches the foundation, a grout pad edge clearance may be specified. When placing grout pads at specific location (good for slabs or foundations where pad is not centered on foundation), the grout pad may be rectangular, square, circular or octagonal. In cases where the grout pad shape is specified, an optional rotation angle for the pad may be specified. The specific location is specified with



coordinates at the center of the grout pad and may be keyed in or may be selected as the “last data point”. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

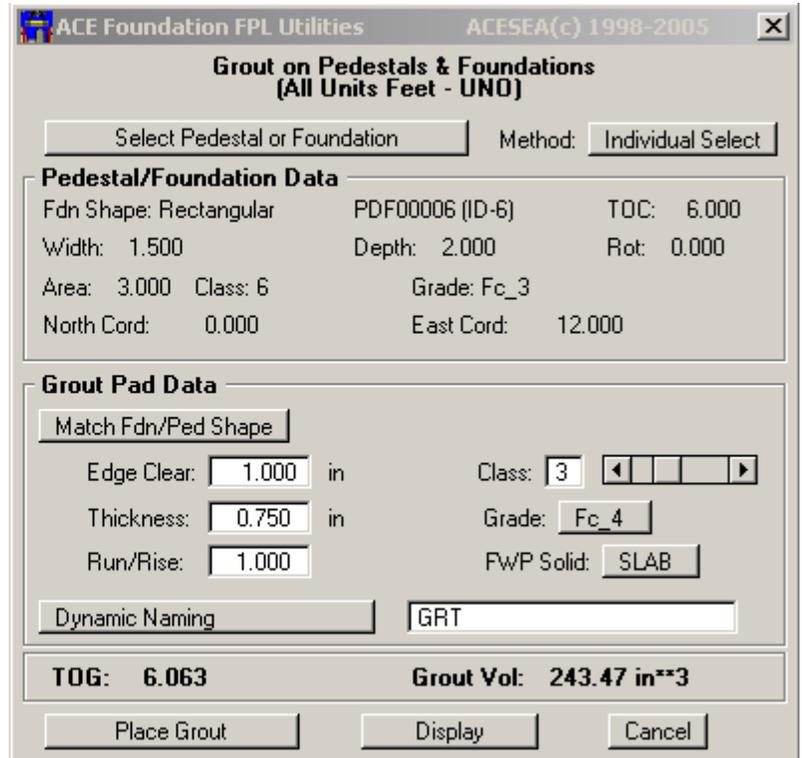
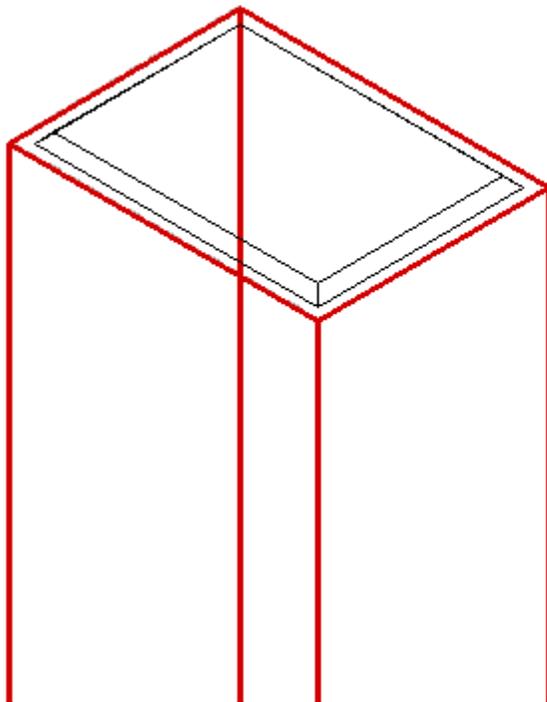
Once a foundation is selected or a location is selected, the grout pad is displayed in temporary graphics (see next page) – providing grout pad is valid. A grout pad is valid if it does not overlap the foundation and if the size of the pad allows placement of grout pad according to thickness, edge clear & rise/run.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

A grout pad may be named several ways. The grout pad naming options include: 1) Named the same as the solid to which it is applied, 2) Named by concatenating the FWP ID to a prefix (default GRT), 3) Constant specified name for all grout pads, 4) Dynamic naming at placement time or 5) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the current name (prefix) and allows it to be changed as a grout pad is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

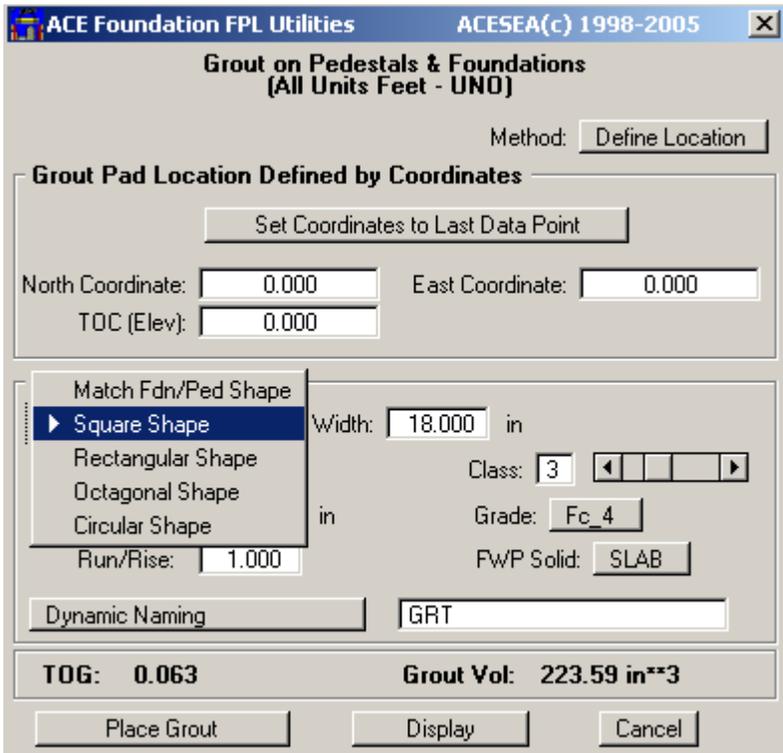
ACE FrameWorks Foundation Utilities Documentation

Grout Pads on Pedestals/Foundations (continued)



Dialog Box & Temporary Graphics after Pedestal Selection

The above image shows the dialog box after a pedestal is selected. The grout pad properties may be changed and the image of the new grout pad will be displayed in temporary graphics. Note that if a selection set is utilized, the temporary graphics will only be displayed on the first solid (the one accepted) from the selection set, however the grout pad will be placed on all identical foundations.



When “Define Location” is selected, the dialog box will appear as shown left. In this case, a grout pad shape (other than Match Fdn/Ped Shape) must be selected. The define location option is valuable for grout placement on slabs or foundations where the grout pad will not be centered. The naming method for the define location option can be anything except “Use Pedestal/Foundation Name”.

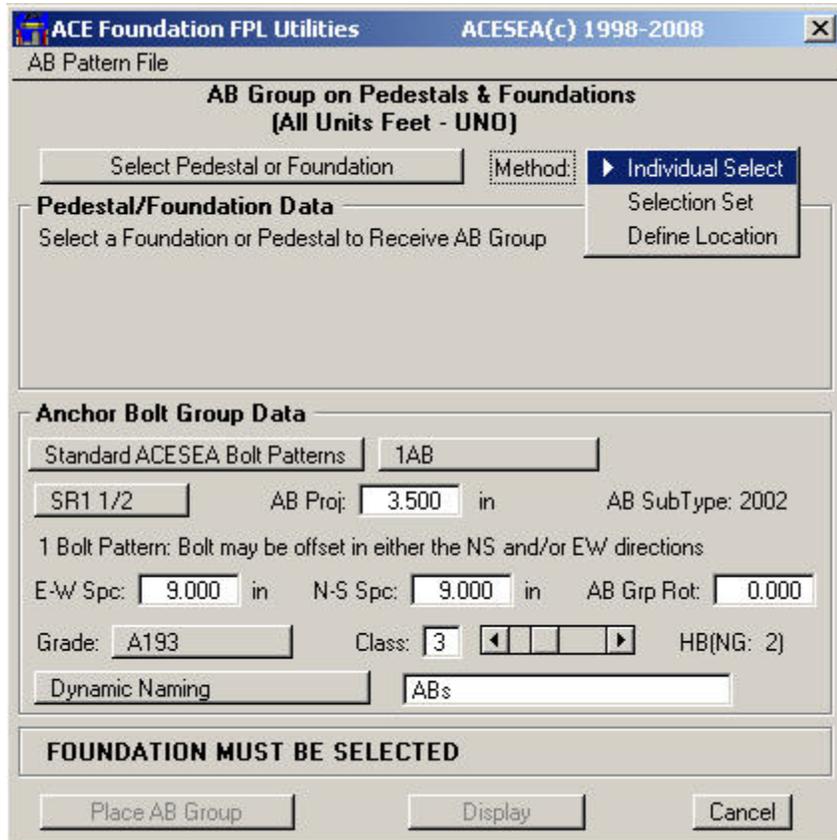
ACE FrameWorks Foundation Utilities Documentation

Anchor Bolt Groups on Pedestals/Foundations (ACE_AB.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.1 & FWP 7.0.x.x rel 7.0.1 & FWP 7.1/7.2/7.3 rel 6.0.1 & FWP 8.0.x.x rel 8.0.1 & FWP 9.0.x.x rel 9.0.1 & FWP10.0.x.x rel 10.0.1 & FWP11.0.x.x rel 11.0.1 & FWP12.0.x.x rel 12.0.1)

The Anchor Bolt Groups on Pedestals/Foundations application allows for the rapid placement Anchor Bolt

Groups on pedestals, foundations or at specific locations. A pedestal/foundation is any flat FWP solid of rectangular, square, circular or octagonal shape. A single pedestal/foundation may be selected or a selection set of pedestals/foundations may be utilized. In the selection set mode, the pedestal/foundation data is displayed for acceptance or rejection. Once accepted all identical shapes in the original selection set will be processed. The Anchor Bolts Group may be from a set of internal patterns or from an external user supplied Anchor Bolt Group Pattern file. The internal patterns are 1, 2, 4, 6 & 8 bolts patterns in various configurations or a circular bolt pattern. The spacing & size of the anchor bolts is specified via keyin fields and option buttons for internal patterns. External pattern files specify the spacing & may specify bolt size which can be overridden from dialog box. External patterns may consist of the standard internal patterns or may be defined as random or symmetric patterns (see pages 40



thru 42). The AB group is placed at the center of the foundation but may be rotated relative to the foundation. The BOS for the AB is the TOC for the foundation and the TOS is determined by the AB projection. If specific location option is utilized, the selected point is the center of the AB group and also the BOS. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

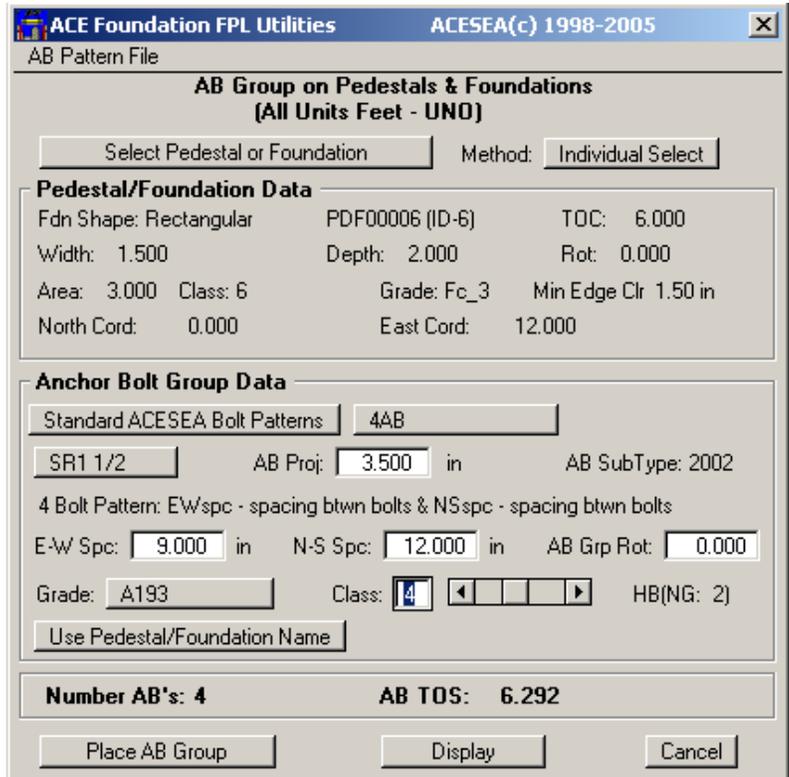
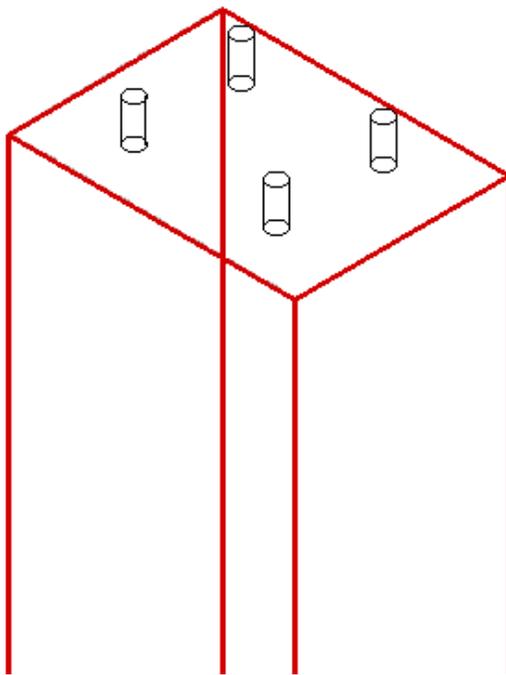
Once a foundation is selected or a location is selected, the Anchor Bolt Group is displayed in temporary graphics (see next page). An anchor bolt group cannot be placed if it overlaps the foundation and/or impinges on edge clearance specification.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

An anchor bolt group may be named several ways. The anchor bolt group naming options include: 1) Named the same as the solid to which it is applied, 2) Named by concatenating the FWP ID to a prefix (default ABG), 3) Constant specified name for all anchor bolt groups, 4) Dynamic naming at placement time or 5) FrameWorks normal naming for solids (autaname). Dynamic naming is a powerful feature that displays the current name (prefix) and allows it to be changed as a anchor bolt group is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

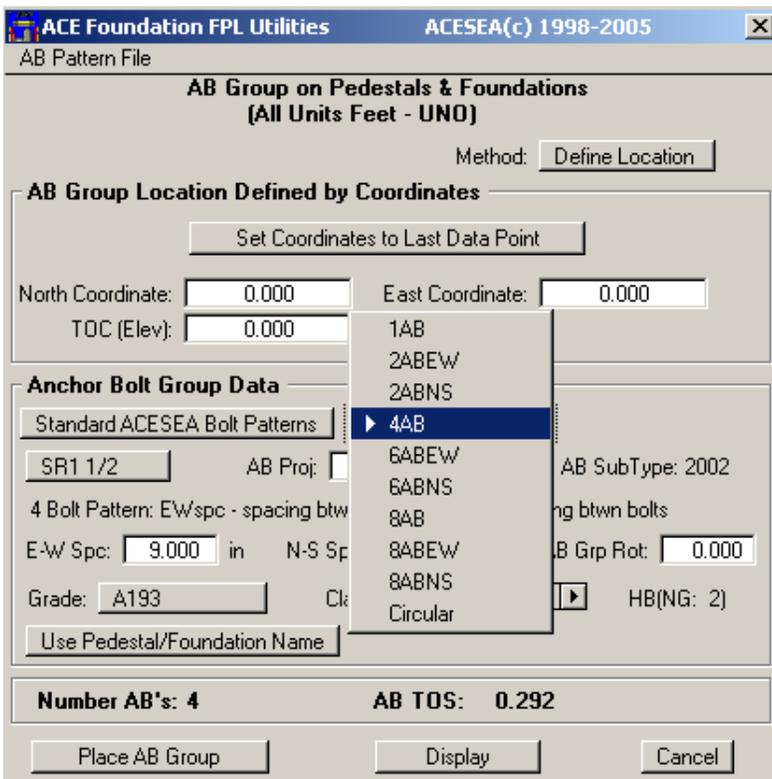
ACE FrameWorks Foundation Utilities Documentation

Anchor Bolt Groups on Pedestals/Foundations (continued)



Dialog Box & Temporary Graphics after Pedestal Selection

The above image shows the dialog box after a pedestal is selected. The AB group properties may be changed and the image of the new AB group will be displayed in temporary graphics. Note that if a selection set is utilized, the temporary graphics will only be displayed on the first solid (the one accepted) from the selection set, however the AB group will be placed on all identical foundations.



When “Define Location” is selected, the dialog box will appear as shown left. The define location option is valuable for AB placement on slabs or foundations where the AB group will not be centered. The naming method for the define location option can be anything except “Use Pedestal/Foundation Name”.

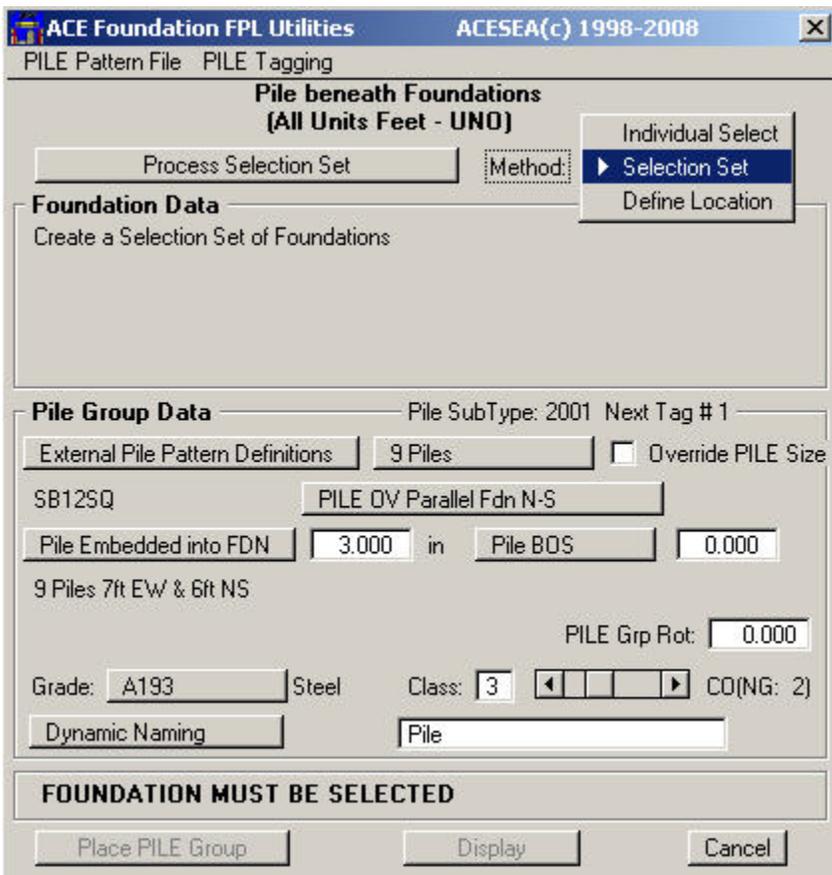
A “new attribute” Sub Type may be specified for AB Groups. (see page 36)

ACE FrameWorks Foundation Utilities Documentation

Pile Groups beneath Foundations (ACE_PIL.MA)

(Current Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.1 & FWP 7.0.x.x rel 7.0.1 & FWP 7.1/7.2/7.3 rel 6.0.1 & FWP 8.0.x.x rel 8.0.1 & FWP 9.0.x.x rel 9.0.1 & FWP 10.0.x.x rel 10.0.1 & FWP 11.0.x.x rel 11.0.1 & FWP 12.0.x.x rel 12.0.1)

The Pile Groups beneath Foundations application allows for the rapid placement Pile Groups beneath



foundations or at specific locations. A foundation is any flat FWP solid of rectangular, square, circular or octagonal shape. A single foundation may be selected or a selection set of foundations may be utilized. In the selection set mode, the foundation data is displayed for acceptance or rejection. Once accepted all identical shapes in the original selection set will be processed. The Pile Group may be from a set of internal patterns or from an external user supplied Pile Group Pattern file. The internal patterns are 1, 2, 4, 5, 6, 8, 9, 12, 15 & 16 pile patterns in various configurations or a circular pile pattern. The spacing & size of the piles is specified via keyin fields and option buttons for internal patterns. External pattern files specify the spacing & may specify pile size which can be overridden from dialog box. External patterns may consist of the standard internal patterns or may be defined as random or symmetric patterns (see pages 43 thru 45). The Pile group is placed at the center of the foundation but may be rotated relative to the

foundation. The TOS for the pile is the BOC for the foundation plus embedment or TOS may be specified and the BOS is either specified or determined by the pile length. If specific location option is utilized, the selected point is the center of the Pile group and also considered BOC for TOS computation. A section titled “Coordinate System for Foundation Programs” is presented later in this document which covers the coordinate system nomenclature and foundation orientation notes.

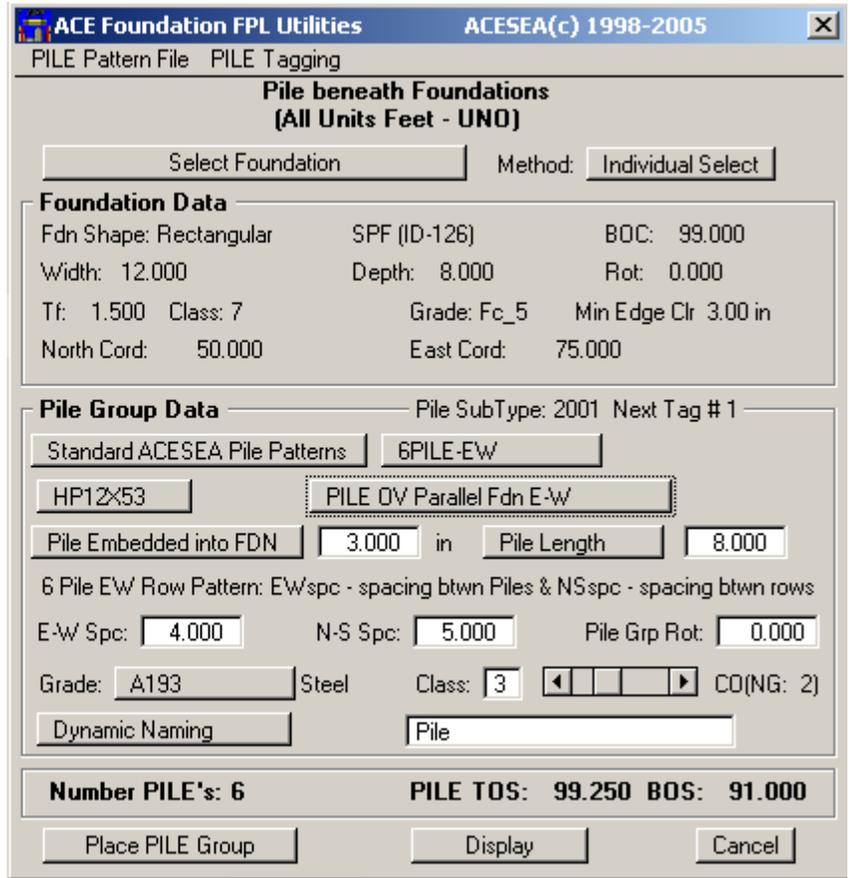
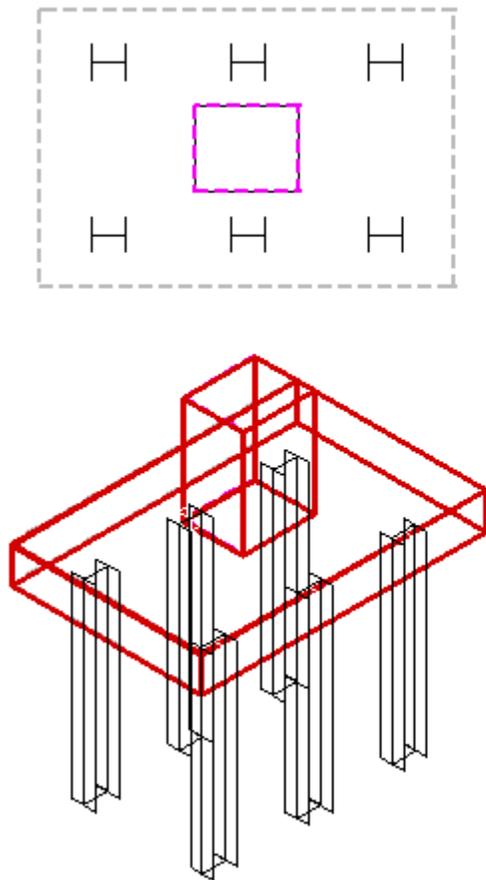
Once a foundation is selected or a location is selected, the Pile Group Group is displayed in temporary graphics (see next page). A pile group cannot be placed if it overlaps the foundation and/or impinges on edge clearance specification.

This foundation utility has internal defaults for all values shown in dialog box, however, user defined defaults may be specified using a foundation definition file. The foundation definition file applies to all 11 foundation types and format for this file is presented and discussed in detail at the end of this document. A sample foundation default file (ACE_FDN.DEF) is distributed with the software and is also presented in this document.

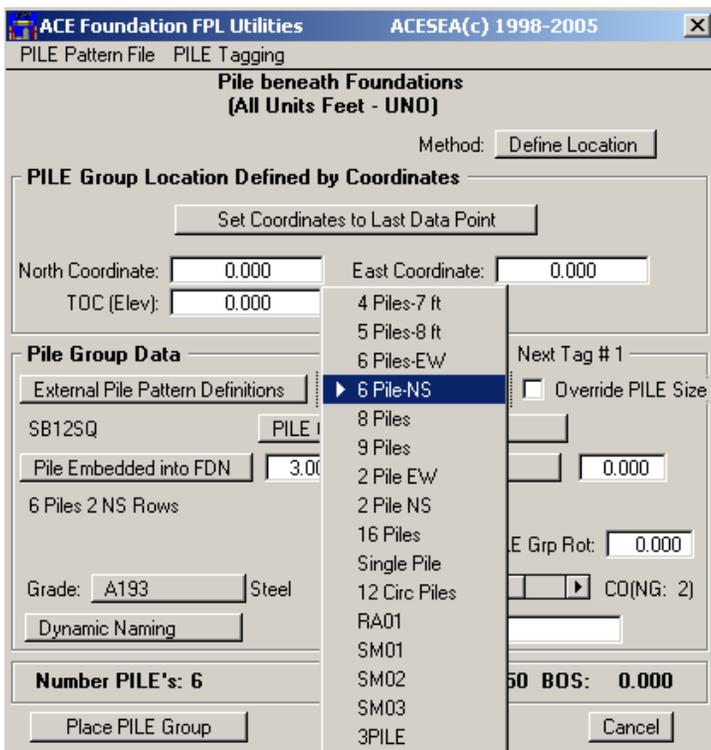
A pile group may be named several ways. The pile group naming options include: 1) Named the same as the solid to which it is applied, 2) Named by concatenating the FWP ID to a prefix (default PIL), 3) Constant specified name for all anchor bolt groups, 4) Dynamic naming at placement time or 5) FrameWorks normal naming for solids (autoname). Dynamic naming is a powerful feature that displays the current name (prefix) and allows it to be changed as a pile group is about to be placed. An option exists to append a FWP ID to the prefix. An abort option is also available when dynamic naming is active.

ACE FrameWorks Foundation Utilities Documentation

Pile Groups beneath Foundations (continued)



Dialog Box & Temporary Graphics after Foundation Selection



The above image shows the dialog box after a foundation is selected. The Pile group properties may be changed and the image of the new Pile group will be displayed in temporary graphics. Note that if a selection set is utilized, the temporary graphics will only be displayed on the first solid (the one accepted) from the selection set, however the Pile group will be placed on all identical foundations.

When "Define Location" is selected, the dialog box will appear as shown left. The define location option is valuable for Pile placement on foundations where the Pile group will not be centered or foundation does not yet exist. The naming method for the define location option can be anything except "Use Pedestal/Foundation Name".

A "new attribute" Sub Type may be specified for Pile Groups. In addition each pile may be uniquely tagged with a long integer using the "new attribute" Fabricator_PrebuyMark. (see page 38)

ACE FrameWorks Foundation Utilities Documentation

Coordinate System for Foundation Programs

Coordinate System Nomenclature

ACE FPL Utilities consider the coordinate system to map to plant coordinates (North/South, East/West, elevation). While a design file is typically considered to have x, y and z coordinates, the FPL's consider East to be positive x, North to be positive y and the elevation to be z. Thus when specifying a MicroStation keyin such as xy=100,50,10 remember that MicroStation expects the first coordinate to be x which is East for positive and West for negative. The second coordinate is y which is North for positive and South for negative. And of course the third coordinate is z for elevation.

Foundation Orientation Notes (with emphasis on the combined footing)

The foundation programs all utilize the same nomenclature for items such as pedestal width, pedestal length or depth, footing width and footing length. In all cases the width is the East-West dimension (parallel to x-axis) and the depth (sometimes referred to as length) is the North-South dimension (parallel to the y-axis). All elevations and heights refer to elevations or elevation distances (parallel to the z-axis).

Most of the foundation programs footing & pedestal orientations are relatively easy to understand, however the combined footing program may be the exception to that statement. The combined footing program always starts with the two pedestals forming a South-North line. The first pedestal is always the southern most pedestal. In cases where the eccentric single pedestal option is utilized, the pedestal is placed on a South-North line and the pedestal centerline does not have to match the footing centerline in the South-North direction. All pedestal centerlines will always match the footing centerline in the East-West direction. Obviously many combined footing will have different orientation, which is controlled by the ability to rotate the foundation. Generally the rotate footing and pedestal together option will suffice. In rare cases where the pedestal(s) are further rotated, the rotate footing and pedestals separately option must be utilized. In this case, the rotations are additive for the pedestal (i.e. the final pedestal rotation is the sum of the specified footing rotation and the specified pedestal rotation for pedestal in question). A little experimentation with this application should clear up any confusion.

In the multiple placement mode, a variable called the skew angle is provided. This variable is necessary when a set of foundations lie on a grid whose orientation is not parallel to North-South and East-West lines. The skew angle is used to 1) rotate the entire grid about the starting location and 2) rotate the pedestal and footing. If additionally footing and/or pedestal rotations are specified, the specified rotation will take place after the rotation of the grid. Thus skew angle is added to any specified footing or pedestal rotations. If multiple mode is specified and the spacing North/South and the spacing East/West is both one, specifying a skew angle will cause a rotation of the entire foundation. In such a case, the individual mode placement is far less confusing.

A skew angle does not exist in the individual placement mode as orientation is handled by the footing & pedestal rotation angles. All rotation angles follow the right hand rule about the positive z-axis. Again any confusion can be easily cleared up with a little experimentation.

ACE FrameWorks Foundation Utilities Documentation

Foundation Definition File

Due to the similarity of variables in foundations, a single defaults foundation definition file is utilized for all eight foundation types. The default name for the definition file is: ACE_FDN.DEF. The location of this definition file may optionally be controlled with either of two environment variables. Thus a project specific definition file for each project may be easily specified. The environment variables may be specified in numerous ways (similar to any MicroStation variable), however the utilization of a project.pcf is highly recommended. Environment variable definition is discussed in detail in the installation notes provided with the ACE FrameWorks utilities. The default name and location for the foundation definition file are: C:\ACE_FDN.DEF. A directory for the definition file may be specified with the environment variable ACE_DEF_PATH (will look in specified path for file ACE_FDN.DEF). A complete name and location of a definition file may be also specified with the environment variable ACE_FDN_DEF. The first valid definition file found is utilized. The search for a definition file happens in the following order or priority:

1. If the variable ACE_FDN_DEF is specified, the named file at this location will be used if found.
2. If the variable ACE_DEF_PATH is specified and ACE_FDN.DEF is found in this directory, it is used.
3. If there is a c:\ace_fdn.def file it is utilized.
4. If none of the above, internal program defaults are utilized – a warning message will be displayed.

(if environment variables in 1 and/or 2 above are specified and corresponding DEF file is not found, a warning is displayed)

The definition file begins by specifying general definition of variables that would apply to all foundation types. The general primary keywords are: (**UNI, GEN, GRA, PED, FTG, NGP, NAME**). All general keywords should be specified – note that while UNI is an optional command, it is suggested that it be provided. The UNI command may be specified as necessary (i.e. can be specified multiple times and can be specified in the general and/or specific definition areas). After the general definition, a specific definition for each different foundation type may be included. Each specific definition starts with a keyword (i.e. SPF for spread footing foundation) and terminates with the keyword END. The various foundation types may be placed in any order, however only one section for each foundation type is permitted. Any line in the definition file that begins with a blank or non-recognized keyword is skipped. The ACE_FDN.DEF file is a valid foundation default file that illustrates the above defined techniques. In addition the variables for each section are clearly defined toward the bottom of the included ACE_FDN.DEF file.

The foundation definition file allows the specification of units (Metric (meters or mm) or English (ft or in)). Thus a given default file may be utilized in either a Metric or English project. The units may be changed throughout the definition file. If units are not specified, it is assumed that the definition file units match the units of the model (feet/in-English & meters/mm-Metric). If units are defined and they do not match the model, the variables after the units command are converted to match the model units.

ACE FrameWorks Foundation Utilities Documentation

Foundation Definition File (continued)

Sample Definition File

Sample Definition File for Foundation Utilities
(All records that start with a blank are comments)
(Definition Commands are defined after this example file)

```
UNI ENG FEE
GEN 105. 99. IND BOT
GRADE 4 Fc_3 Fc_5 Fc_6 Fc_4
PED SQUARE 2.5 45.0 2 Fc_6
FTG OCTAGON 1.5 12.0 50.0 7 Fc_5
NGP 1 2
```

```
SPF Spread Footing Definition
PED RECT 3.0 2.5 55.0 2 Fc_4
FTG RECT 1.5 12.0 8.0 30.0 7 Fc_5
LOC MULTI 50. 75. 18 14 130.
END
```

```
CFF Combined Footing Definition
PED RECT 3.0 2.5 0.0 2 Fc_3
PD1 OCT 3.0 3.0 45.0 -2.5 106
PD2 CIR 2.0 2.0 0.0 5.0 107
FTG RECT 1.5 9.0 15.0 0.0 7 Fc_3
LOC SIN 100. 200.
END
```

```
DPF Drilled Pier Definition
GEN 105. 99. 87. IND
PED RECT 2.0 1.5 0.0 2 Fc_3
FTG 3.0 6.0 45. 7 Fc_6
LOC MULTI 100. 125.0 15. 20. 0
NGP 1 3
END
```

```
VVF Vertical Vessel Definition
GEN 106. 98. IND BOT
PED OCT 8.0 0.0 2 Fc_4
FTG OCTAGON 1.5 12.0 45.0 7 Fc_3
LOC SIN 200. 200.
END
```

```
MAT Mat Foundation Definition
GEN 103. 99. NON
FTG CIR 20.0 20.0 0.0 7 Fc_3
LOC SINGle 200. 125.0
NGP 4
END
```

ACE FrameWorks Foundation Utilities Documentation

Foundation Definition File (continued)

Sample Definition File (continued)

PDF Pedestal Foundation Definition
GEN 106. 101. IND
PED RECT 2.5 2.0 0.0 1 Fc_3
LOC MULTI 70. 75. 25 20 30.
NGP 0 5
END

RWF Ringwall Foundation Definition
GEN 101. 97.
FTG 75 72 5 Fc_4
LOC SINGLE 225.0 75.
NGP 6
END

TKF Tank Foundation Definition
GEN 101. 84.0
TAN 1.25 CIR 15.5 0.0 1.5 0.0 6 Fc_4
BAS 2.25 18.0 0.0 5 Fc_4
LOC SINGLE 300.0 75.
NGP 7 8
NAM DYN TANK
END

GRT Grout on Pedestal Foundation Definition
UNI ENG INC
GEN .0625 1.0 0.0 3 Fc_4 1 1 10
PAD SQU 1.5 1.5 0.0
NAM MAT
END

ABG AB's on Pedestal Foundation Definition
UNI ENG INC
GEN 0 1 0 5 3.5 9.0 9.0 20 1.5
ABP "SR1 1/2" 3 A193 HB
SIZ 4 "SR1" "SR1 1/2" "SR2" "SR2 1/2"
FIL c:\ABpatterns.pat
TAG 2002
GRADE 4 A36 A42 A307 A193
NAM DYN ABs
END

PIG Pile Group beneath Foundation Definition
UNI ENG FEE
GEN 0 1 0 5 .25 4.0 4.0 20 .25
TAG 2001 -100
PIP "HP12X53" 3 A193 CO
SIZ 6 "HP12X53" "HP12X74" "HP13X60" "HP14X73" "SB12SQ" "P12STD"
FIL c:\PILEpatterns.pat
GRM 5 A36 0 A42 0 A307 0 A193 0 Fc_3 1
NAM DYN Pile
END

ACE Frameworks Foundation Utilities Documentation

Input Definitions & Rules for Foundations Definition File

Definitions File - Command Definition

- **General Section must be the first section and MUST be provided**
- **Valid General Section Primary Keyword Commands: (UNI, GEN, GRA, PED, FTG, NGP, NAME)**
- 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
- All values for a given command must be defined in order shown above. If default values are acceptable, only the changed values must be given. However all values up to that point must be defined whether changed or not.
- The components of a given command (record) must all be present and in the order shown
- The units command is special and may be repeated and located as required. While commands may be in any order, it should be obvious that the location of the units command is extremely important.
- By default application looks for C:\ACE_FDN.DEF definition file
- Definition file path may be defined with environment variable ACE_DEF_PATH
ACE_DEF_PATH = d:\mydir\ (will look for ACE_FDN.DEF in this directory)
- Definition file may be defined with environment variable ACE_FDN_DEF
ACE_FDN_DEF = d:\mydir\mydef_file

NOTE : Components shown in bold may only be specified in the definitions file

General Definition Section MUST be first section (Required)

UNIT Command - Units Command (optional command – can be placed anywhere)

UNIT {UNITTYPE} {UNIT}

where :

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

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.

GEN Command - GEN Command defines some general default parameters

GEN *toc boc ped_angle_opt ftg_angle_opt iVerify*

Where :

toc is the top of concrete for foundation

boc is the bottom of concrete for foundation

ped_angle_opt (IND-individual or NON-none)

ftg_angle_opt (IND-individual or BOT-both or NON-none)

iVerify (0- verify ped <= FDN(default) or 1 DO NOT VERIFY)

GRA Command - GRA Command defines concrete grades

GRA *num_grades grade1 grade2 graden*

Where:

num_grades is the number of grades specified (10 maximum)

grade1 is the first grade (i.e. FC_4)

grade2 is the second grade

graden is the last grade

PED Command - PED Command defines default pedestal parameters

PED {PEDSHAPE} *width angle class grade*

Where:

{PEDSHAPE} Keyword - must be SQU, CIR, REC or OCT

width is both North-South & East-West dimensions

angle is required even if 0

class can be from 0 to 9

grade must be a valid grade definition 24 chars max

ACE FrameWorks Foundation Utilities Documentation

General Definition Section (continued)

FTG Command - FTG Command defines default footing parameters

FTG {FTGSHAPE} width angle class grade

Where:

{FTGSHAPE} Keyword - must be SQU, OCT or REC
if SQU or OCT - depth is ignored but must be supplied
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC Command - LOC Command defines default location parameters

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NAME Command - NAME Command defines default naming parameters

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

SPEcified : Use the supplied name and append the FWP solid ID for first solid placed
Thus each foundation will have a different name
However all components of a given foundation will have same name

CONstant : Use this name for all foundations placed for all components

NGP Command - Named Group Command defines namedgroups

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : Named group for footing/mat/bell/shaft (default -1 which is none)
iNGP_pedestals : Named group for pedestals/tank/top (default -1 which is none)

NOTE: Namedgroups are defined globally for a project. The iNGP_xxx value is an integer value that corresponds to the index of the global namedgroups. The first namedgroup is 0, the next is 1 and so on up to a maximum integer value of the number of namedgroups minus one. If a name group does not exist for the integer value specified, the member type in question will simply not be placed in a named group. A value of -1 specifies that the member type in question is not to be put in a namedgroup. In FWP namedgroups are specified by an alpha name so be careful when selecting integers. **SOLID NAMEDGROUPS ARE FUNCTIONAL with FWP version 7.0.0.17 and later**

ACE FrameWorks Foundation Utilities Documentation

Spread Footing Section: SPF (must be first 3 characters - capitalization important)

SPF

GEN toc boc ped_angle_opt ftg_angle_opt

Where:

toc is the top of concrete for foundation
boc is the bottom of concrete for foundation
ped_angle_opt (IND-individual or NON-none)
ftg_angle_opt (IND-individual or BOT-both or NON-none)

PED {PEDSHAPE} width depth angle class grade

Where:

{PEDSHAPE} Keyword - must be CIR, SQU or REC
if CIR or SQU - depth is ignored but must be supplied
if CIR - angle is ignored but must be supplied
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

FTG {FTGSHAPE} thickness width depth angle class grade

Where:

{FTGSHAPE} Keyword - must be SQU or REC
if SQU - depth is ignored but must be supplied
thickness is the thickness of the Ftg
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : Named group for footing (default -1 which is none)
iNGP_pedestals : Named group for pedestal (default -1 which is none)

ACE FrameWorks Foundation Utilities Documentation

Spread Footing Section (continued)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options
1) option to supply new name/prefix
2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
3) option to discontinue asking at any time during multiple foundation placement
4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each spread foundation will have a different name
However all pedestal & footing of a given foundation will have same name

CONstant : Use this name for all spread footings placed for all components

END

ACE FrameWorks Foundation Utilities Documentation

Vertical Vessel Foundation Section: VVF (must be first 3 characters - capitalization important)

VVF

GEN toc boc ped_angle_opt ftg_angle_opt

Where:

toc is the top of concrete for foundation
boc is the bottom of concrete for foundation
ped_angle_opt (IND-individual or NON-none)
ftg_angle_opt (IND-individual or BOT-both or NON-none)

PED {PEDSHAPE} width angle class grade

Where:

{PEDSHAPE} Keyword - must be SQU or OCT
width is both North-South & East-West dimensions
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

FTG {FTGSHAPE} thickness width angle class grade

Where:

{FTGSHAPE} Keyword - must be SQU or OCT
thickness is the thickness of the Ftg
width is both North-South & East-West dimensions
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : Named group for footing (default -1 which is none)
iNGP_pedestals : Named group for pedestal (default -1 which is none)

ACE FrameWorks Foundation Utilities Documentation

Vertical Vessel Foundation Section (continued)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options

- 1) option to supply new name/prefix
- 2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
- 3) option to discontinue asking at any time during multiple foundation placement
- 4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each vessel foundation will have a different name

CONstant : Use this name for all vessel foundations placed for all components
However the pedestal & footing of a given foundation will have same name

END

ACE FrameWorks Foundation Utilities Documentation

Mat Foundation Section: MAT (must be first 3 characters - capitalization important)

MAT

GEN toc boc ftg_angle_opt

Where:

toc is the top of concrete for foundation
boc is the bottom of concrete for foundation
ftg_angle_opt (IND-individual or BOT-both or NON-none)

FTG {FTGSHAPE} thickness width depth angle class grade

Where:

{FTGSHAPE} Keyword - must be SQU, CIR, OCT or REC
if SQU, CIR or OCT - depth is ignored but must be supplied
thickness is the thickness of the Ftg
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings

Where:

iNGP_footings : Named group for mat (default -1 which is none)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options
1) option to supply new name/prefix
2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
3) option to discontinue asking at any time during multiple foundation placement
4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each mat foundation will have a different name

CONstant : Use this name for all mat foundations

END

ACE FrameWorks Foundation Utilities Documentation

Pedestal Foundation Section: PDF (must be first 3 characters - capitalization important)

PDF

GEN toc boc ftg_angle_opt

Where:

toc is the top of concrete for foundation
boc is the bottom of concrete for foundation
ftg_angle_opt (IND-individual or BOT-both or NON-none)

PED {PEDSHAPE} width depth angle class grade

Where:

{PEDSHAPE} Keyword - must be SQU, CIR, OCT or REC
if SQU, CIR or OCT - depth is ignored but must be supplied
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : NOT USED BUT MUST BE PRESENT (0 works fine)
iNGP_pedestals : Named group for pedestals (default -1 which is none)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options
1) option to supply new name/prefix
2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
3) option to discontinue asking at any time during multiple foundation placement
4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for pedestal
Thus each pedestal will have a different name

CONstant : Use this name for all pedestals placed

END

ACE FrameWorks Foundation Utilities Documentation

Combined Footing Foundation Section: CFF (must be first 3 characters)

CFF

GEN toc boc ped_angle_opt ftg_angle_opt

Where:

- toc is the top of concrete for foundation
- boc is the bottom of concrete for foundation
- ped_angle_opt (IND-individual or NON-none)
- ftg_angle_opt (IND-individual or BOT-both or NON-none)

PED {PEDSHAPE} width depth angle class grade

Where: (note that both pedestals have same class & grade)

- {PEDSHAPE} Keyword - must be CIR, OCT, SQU or REC
 - if CIR, OCT or SQU - depth is ignored but must be supplied
 - if CIR - angle is ignored but must be supplied
- width is always a East-West dimension
- depth is always a North-South dimension
- angle is required even if 0
- class can be from 0 to 9
- grade must be a valid grade definition 24 chars max

PED1 {PEDSHAPE1} width1 depth1 angle1 offset1 toc1

Where: (note ped1 is always Southern most pedestal)

- {PEDSHAPE1} Keyword - must be CIR, OCT, SQU or REC
 - if CIR, OCT or SQU - depth is ignored but must be supplied
 - if CIR - angle is ignored but must be supplied
- width1 is always a East-West dimension
- depth1 is always a North-South dimension
- angle1 is required even if 0
- offset1 is distance from Ftg CL to PED1 CL (+ North)
- toc1 is TOC for PED1

PED2 {PEDSHAPE2} width2 depth2 angle2 offset2 toc2

Where:

- {PEDSHAPE2} Keyword - must be CIR, OCT, SQU or REC
 - if CIR, OCT or SQU - depth is ignored but must be supplied
 - if CIR - angle is ignored but must be supplied
- width2 is always a East-West dimension
- depth2 is always a North-South dimension
- angle2 is required even if 0
- offset2 is distance from PED1 CL to PED2 CL
- toc2 is TOC for PED2

ACE FrameWorks Foundation Utilities Documentation

Combined Footing Foundation Section (continued)

FTG {FTGSHAPE} thickness width depth angle class grade

Where:

- {FTGSHAPE} Keyword - must be SQU or REC
- if SQU - depth is ignored but must be supplied
- thickness is the thickness of the Ftg
- width is always a East-West dimension
- depth is always a North-South dimension
- angle is required even if 0
- class can be from 0 to 9
- grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

- {LOCMODE} Keyword - must be MUL or SIN
- north_cord is North/South coordinate (North positive)
- east_cord is East/West coordinate (East Positive)
- north_space is the spacing in the North-South direction
- east_space is the spacing in the East-West direction
- skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

- iNGP_footings : Named group for footing (default -1 which is none)
- iNGP_pedestals : Named group for pedestals (default -1 which is none)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

- AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)
- DYNamic : At placement time will display the last name(prefix) used with following options
 - 1) option to supply new name/prefix
 - 2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
 - 3) option to discontinue asking at any time during multiple foundation placement
 - 4) option to abort placement of foundation(s)
- SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each combined foundation will have a different name
However all pedestals & footing of a given foundation will have same name
- CONstant : Use this name for all combined footings placed for all components

END

ACE FrameWorks Foundation Utilities Documentation

Ringwall Foundation Section: RWF (must be first 3 characters)

RWF

GEN toc boc

Where:

toc is the top of concrete for foundation
boc is the bottom of concrete for foundation

FTG ringwall_od ringwall_id class grade

Where:

ringwall_od is the outside ringwall diameter
ringwall_id is the inside ringwall diameter
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings

Where:

iNGP_footings : Named group for ringwall (default -1 which is none)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options
1) option to supply new name/prefix
2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
3) option to discontinue asking at any time during multiple foundation placement
4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each ringwall foundation will have a different name

CONstant : Use this name for all ringwall foundations placed

END

ACE Frameworks Foundation Utilities Documentation

Drilled Pier Foundation Section: DPF (must be first 3 characters)

DPF

GEN ped_toc shaft_toc boc ped_angle_opt

Where:

ped_toc is the top of concrete for pedestal
shaft_toc is the top of concrete for the shaft
boc is the bottom of concrete for foundation (shaft or bell)
ped_angle_opt (IND-individual or NON-none)

PED {PEDSHAPE} width depth angle class grade

Where: (note that both pedestals have same class & grade)

{PEDSHAPE} Keyword - must be CIR, OCT, SQU or REC
if CIR, OCT or SQU - depth is ignored but must be supplied
if CIR - angle is ignored but must be supplied
width is always a East-West dimension
depth is always a North-South dimension
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

FTG shaft_diam bell_diam bell_angle class grade

Where:

shaft_diam is the diameter of the shaft
bell_diam is the diameter of the bell bottom
bell_angle is the bell angle (commonly 60 to 45 degrees)
class for shaft & bell can be from 0 to 9
grade for shaft & bell - must be a valid grade definition 24 chars max

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : Named group for bell and/or shaft (default -1 which is none)
iNGP_pedestals : Named group for pedestal (default -1 which is none)

ACE FrameWorks Foundation Utilities Documentation

Drilled Pier Foundation Section (continued)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options

1) option to supply new name/prefix

2) option to append the member ID for first solid placed

Thus each foundation can have a unique name

However all components of a given foundation will have same name

3) option to discontinue asking at any time during multiple foundation placement

4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for shaft

Thus each drilled pier foundation will have a different name

However pedestal & shaft & bell of a given drilled pier foundation will have same name

CONstant : Use this name for all drilled pier foundations placed for all components

END

ACE FrameWorks Foundation Utilities Documentation

Tank Foundation Section: TKF (must be first 3 characters - capitalization important)

TKF

GEN toc boc

Where:

toc is the top of concrete for tank wall or tank top if one exists
boc is the bottom of concrete for foundation wall or base if one exists

TAN wall_thick {TANKSHAPE} width depth top_thick angle class grade

Where:

tkf_thick is the thickness of tank wall
{TANKSHAPE} Keyword - must be CIR, SQU or REC
if CIR or SQU - depth is ignored but must be supplied
if CIR - angle is ignored but must be supplied
width is always a East-West dimension
depth is always a North-South dimension
top_thick must be supplied (top is omitted if top_thick is 0.0)
angle is required even if 0
class can be from 0 to 9
grade must be a valid grade definition 24 chars max

BASE base_thick base_width base_depth class grade

Where:

base_thick must be supplied (base is omitted if base_thick is 0.0)
base_width is always a East-West dimension
base_depth is always a North-South dimension
class can be from 0 to 9
grade must be a valid grade definition 24 chars max
Note: base shape will match tank shape - may be changed at placement time

LOC {LOCMODE} north_cord east_cord space_north space_east skew_angle

Where:

{LOCMODE} Keyword - must be MUL or SIN
north_cord is North/South coordinate (North positive)
east_cord is East/West coordinate (East Positive)
north_space is the spacing in the North-South direction
east_space is the spacing in the East-West direction
skew_angle is the angle to rotate the grid
(positive follows right hand rule with positive z)

NGP iNGP_footings iNGP_pedestals

Where:

iNGP_footings : Named group for base (default -1 which is none)
iNGP_pedestals : Named group for tank & top (default -1 which is none)

ACE FrameWorks Foundation Utilities Documentation

Tank Foundation Section (continued)

NAME {NAME_OPTION} name_prefix

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display the last name(prefix) used with following options
1) option to supply new name/prefix
2) option to append the member ID for first solid placed
Thus each foundation can have a unique name
However all components of a given foundation will have same name
3) option to discontinue asking at any time during multiple foundation placement
4) option to abort placement of foundation(s)

SPEcified : Use the supplied name and append the FWP solid ID for footing
Thus each tank foundation will have a different name

HowevEr all tank components of a given foundation will have same name
CONstant : Use this name for all tank foundations placed for all components

END

ACE FrameWorks Foundation Utilities Documentation

Grout on Peds/Fdns Section: GRT (must be first 3 characters - capitalization important)

GRT

GEN *grout_thick grout_slope grout_edge grout_grade grout_class grout_solid grout_method UORlimit*

Where :

grout_thick	: The thickness for the grout (grout_thick > 0)
grout_slope	: The slope (run/rise) for the grout (0 is no slope - 1 is 45 degree etc) (grout_slope >= 0)
grout_edge	: Distance from edge of Ped/Fdn where grout begins (grout_edge >= 0)
grout_class	: Grout class can be from 0 to 9
grout_grade	: Grout grade - must be a valid grade definition 24 chars max
grout_solid	: Grout FWP Solid Type 0 - FWP SOLID (default) 1 - FWP SLAB
grout_method	: Method of Placing Grout Pad 0 - Individual Selected Pedestal/Foundation (default) 1 - Selection Set of Identical Pedestals/Foundations 2 - Define Location & Group Pad Data

NOTE: The above are all starting values which can be changed from dialog box

UORlimit : UOR limit used to determine identical Pedestals/Foundations (default 20)

PAD {PEDSHAPE} *pad_width pad_depth pad_angle*

Where:

{PEDSHAPE} Keyword - must be CIR, OCT, SQU or REC
if CIR or SQU or OCT - pad_depth is ignored but must be supplied
if CIR - angle is ignored but must be supplied
pad_width is always a East-West dimension
pad_depth is always a North-South dimension
pad_angle angle is required even if 0

NGP *iNGP_grout*

Where:

iNGP_grout : Named group for grout (default -1 which is none)

NAME {NAME_OPTION} *name_prefix*

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE or CON
AUTO : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)
DYNAMIC : At placement time will display last name used with following options
1) option to supply new name/prefix
2) option to discontinue asking at any time during multiple grout pad placement
3) option to abort placement of grout on pedestals or foundation(s)
SPECified : Use the supplied name and append the FWP solid ID for grout pad
Thus each grout pad will have a different name
CONstant : Use this name for all grout pads placed
MATch : Match the grout name to the pedestal/foundation name where placed

NOTE: The above defines starting value, which can be changed from dialog box

UNIts {UNIT_TYPE} {UNIT}

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE, CON or MAT
(if not specified - assumed that it matches model units)
{UNIT} : Keyword - must be FEET or INCh for ENGLISH
must be METer or MM for METric
(if not specified - FEET for ENGLISH & METer for METric)

NOTE: The UNIts command is optional and may be placed as required throughout the input file

END

ACE Frameworks Foundation Utilities Documentation

AB Group on Peds/Fdns Section: ABG (must be first 3 characters - capitalization important)

ABG

GEN ABmethod ABsource ACESEApatrn USERpatrn ABproj fNSspc fEWspc UORlimit ABedgeClr

Where :

ABmethod : Method of Placing Anchor Bolt Group
0 - AB Group on Individual Selected Pedestal/Foundation (default)
1 - AB Group on a Selection Set of Identical Pedestals/Foundations
2 - Define Location for AB Group

ABsource : Source of AB patterns
0 - ACESEA defined patterns (default)
1 - User defined patterns (see FIL cmd)

ACESEApatrn : ACESEA pattern to start with (0 to 9)
0 - 1AB (default)
1 - 2ABEW
2 - 2ABNS
3 - 4AB
4 - 6ABEW
5 - 6ABNS
6 - 8AB
7 - 8ABEW
8 - 8ABNS
9 - CIRC

USERpatrn : User defined pattern to start with (0 to # defined patterns)
0 - (default)

ABproj : Default Anchor Bolt Projection (ABproj > 0)
fNSspc : Default Anchor Bolt N-S spacing (fNSspc > 0)
fEWspc : Default Anchor Bolt E-W spacing (fEWspc > 0)

NOTE: The above are all starting values which can be changed from dialog box

UORlimit : UOR limit used to determine identical Pedestals/Foundations (default 20)
ABedgeClr : Min Clr Distance from edge AB to edge of Ped/Fdn (ABedgeClr >= 0)

ABP ABprofile ABclass ABgrade ABtype

Where :

ABprofile : Starting AB profile - must be one of SIZES (see below) 24 char max
(must be enclosed in " " 24 char max)

ABclass : Starting value for AB class (0 <= ABclass <=9)

ABgrade : Starting AB grade - must be one of GRADES (see below) 24 char max

ABtype : 2 char to specify AB type (cannot be changed from dialog)
CO - COLUMN (default)
BE - BEAM
VB - VBRACE
HB - HBRACE

SIZE num_ABprof ABprofile1 ABprofile2 ABprofilen

Where :

numABprof is the number of AB profiles specified (25 maximum - 24 char max)

ABprofile1 is the first AB profile ("SR 3/4")

ABprofile2 is the second AB profile

ABprofile2 is the last ABprofile (num_ABprof profile)

Note that ABprofiles MUST be enclosed in " "

ACE FrameWorks Foundation Utilities Documentation

AB Group on Pedestals/Foundation Section (continued)

GRAd *num_grades grade1 grade2 graden*

Where :

num_grades is the number of grades specified (10 maximum - 24 char max)
grade1 is the first grade (i.e. A36)
grade2 is the second grade
graden is the last grade

(NOTE that grades specified in the general area are ignored - concrete grades)

FIL *sABpattern_file*

Where :

sABpattern_file : path & name of valid pattern file (suffix .PAT)
(file path & name MAY NOT contain spaces)
(file path & name MAY contain environment variables)

TAG *iABSubType*

Where :

iABSubType is the "new attribute" member subtype (default NO SubType)
iABSubType > 10

Note that iABSubType CANNOT be changed from the dialog box.

NGP *iNGP_AB*

Where:

iNGP_AB : Named group for AB Group (default -1 which is none)

NAME *{NAME_OPTION} name_prefix*

{NAME_OPTION} : Keyword - must be AUT or DYN or SPE, CON or MAT

AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)

DYNamic : At placement time will display last name used with following options
1) option to supply new name/prefix
2) option to discontinue asking at any time during multiple AB Group placement
3) option to abort placement of AB Groups on pedestals or foundation(s)

SPEcified : Use the supplied name and append the FWP member ID for 1st AB
Thus each AB Group will have a different name
However all AB's in a specific group will have same name

CONstant : Use this name for all AB Groups placed (all bolts - all groups)

MATch : Match the AB Group name to the pedestal/foundation name where placed

NOTE: The above defines starting value which can be changed from dialog box

UNIts *{UNIT_TYPE} {UNIT}*

{UNIT_TYPE} : Keyword - must be ENGLISH or METric
(if not specified - assumed that it matches model units)

{UNIT} : Keyword - must be FEET or INCh for ENGLISH
must be METer or MM for METric
(if not specified - FEET for ENGLISH & METer for METric)

NOTE: The UNIts command is optional and may be placed as required throughout the input file

END

ACE FrameWorks Foundation Utilities Documentation

Pile Group beneath Fdn Section: PIG (must be first 3 characters - capitalization important)

PIG

**GEN PILEmethod PILEsource ACESEApatrnrn USERpatrnrn PILEembed fNSspc fEWspc
UORlimit PILEedgeClr**

Where :

PILEmethod : Method of Placing Anchor Bolt Group
0 - Pile Group on Individual Selected Pedestal/Foundation (default)
1 - Pile Group on a Selection Set of Identical Pedestals/Foundations
2 - Define Location for PILE Group

PILEsource : Source of Pile patterns
0 - ACESEA defined patterns (default)
1 - User defined patterns (see FIL cmd)

ACESEApatrnrn : ACESEA pattern to start with (0 to 6)
0 - 1PILE (default)
1 - 2PILEEW
2 - 2PILENS
3 - 4PILE
4 - 5PILE
5 - 6PILEEW
6 - 6PILENS
7 - 8PILE
8 - 8PILEEW
9 - 8PILENS
10 - 9PILE
11 - 12PILE4EW3NS
12 - 12PILE4NS3EW
13 - 15PILE5EW3NS
14 - 15PILE5NS3EW
15 - 16PILE
16 - CIRC

USERpatrnrn : User defined pattern to start with (0 to # defined patterns)
0 - (default)

PILEembed : Default Pile Embedment into Fdn (PILEembed > 0)

fNSspc : Default Pile N-S spacing (fNSspc > 0)

fEWspc : Default Pile E-W spacing (fEWspc > 0)

NOTE: The above are all starting values which can be changed from dialog box

UORlimit : UOR limit used to determine identical Pedestals/Foundations (default 20)

PILEedgeClr : Min Clr Distance from edge Pile to edge of Ped/Fdn (PILEedgeClr >= 0)

PIP PILEprofile PILEclass PILEgrade PILEtype

Where :

PILEprofile : Starting PILE profile - must be one of SIZES (see below) 24 char max
(must be enclosed in " " 24 char max)

PILEclass : Starting value for PILE class (0 <= PILEclass <=9)

PILEgrade : Starting PILE grade - must be one of GRADes (see GRM below) 24 char max

PILEtype : 2 char to specify PILE type (cannot be changed from dialog)

CO - COLUMN (default)

BE - BEAM

VB - VBRACE

HB - HBRACE

ACE Frameworks Foundation Utilities Documentation

Pile Group beneath Foundation Section (continued)

SIZE *num_PILEprof PILEprofile1 PILEprofile2 PILEprofilen*

Where :

numPILEprof	is the number of PILE profiles specified (25 maximum - 24 char max)
PILEprofile1	is the first PILE profile ("HP12X73", "SQ12STD" etc)
PILEprofile2	is the second PILE profile
PILEprofile2	is the last PILEprofile (num_PILEprof profile)

Note that PILEprofiles MUST be enclosed in " "

GRM *num_grms grade1 matl1 grade2 matl2 graden matln*

Where :

num_grm	is the number of grades/material pairs specified (10 maximum - 24 char max for grade)
grade1	is the first grade (i.e. A36)
matl1	is the material for grade1 (0-steel 1-concrete 2-)
grade2	is the second grade
matl2	is the material for the second grade
graden	is the last grade
matl2	is the material for the last grade

(NOTE that grades specified in the general area are ignored)

FIL *sPILEpattern_file*

sPILEpattern_file : path & name of valid pattern file (suffix .PAT)
(file path & name MAY NOT contain spaces)
(file path & name MAY contain environment variables)

TAG *iPileSubType iPileSeqNum*

Where :

iPileSubType	is the "new attribute" member subtype (default NO SubType) iPileSubType > 10
iPileSeqNum	is a number to determine how each pile is numbered w/ "new attribute" Fabricator_PrebuyMark iPileSeqNum > 0 is starting sequence number (each pile incremented thereafter) iPileSeqNum = -1 search design file for tagged files and start with MaxtTag + 1 (each pile incremented thereafter) iPileSeqNum = -10 search design file & attached files for tagged files and start with MaxtTag + 1 (each pile incremented thereafter)

Note that iPileSeqNum may be changed via a pulldown dialog box and that the mdoel file & reference files can be interrogated for MaxTag at any time. **iPileSubType CANNOT be changed from the dialog box.**

NGP *iNGP_PILE*

Where:

iNGP_PILE : Named group for PILE Group (default -1 which is none)

ACE Frameworks Foundation Utilities Documentation

Pile Group beneath Foundation Section (continued)

NAME {NAME_OPTION} name_prefix

- {NAME_OPTION} : Keyword - must be AUT or DYN or SPE, CON or MAT
- AUTo : FrameWorks assigns names by type (SO) and sequence number
(name_prefix not required or utilized)
- DYNamic : At placement time will display last name used with following options
1) option to supply new name/prefix
2) option to discontinue asking at any time during multiple PILE Group placement
3) option to abort placement of PILE Groups on pedestals or foundation(s)
- SPEcified : Use the supplied name and append the FWP member ID for 1st PILE
Thus each PILE Group will have a different name
However all PILE's in a specific group will have same name
- CONstant : Use this name for all PILE Groups placed (all bolts - all groups)
- MATch : Match the PILE Group name to the pedestal/foundation name where placed

NOTE: The above defines starting value which can be changed from dialog box

UNIts {UNIT_TYPE} {UNIT}

- {UNIT_TYPE} : Keyword - must be ENGLISH or METric
(if not specified - assumed that it matches model units)
- {UNIT} : Keyword - must be FEET or INCh for ENGLISH
must be METer or MM for METric
(if not specified - FEET for ENGLISH & METer for METric)

NOTE: The UNIts command is optional and may be placed as required throughout the input file

END

ACE FrameWorks Foundation Utilities Documentation

Anchor Bolt Group Pattern File

Command Definition

- **Valid Primary Keyword Commands : (UNIT, PAT, ABL)**
- **Each record must begin with a valid primary keyword or it is ignored**
- **All records that start with a blank are considered comments**
- **A maximum of 100 patterns may be defined**
- **File may be defined in DEF file with FIL command**
- **File may be selected interactively from dialog box pulldown menu**
- **Path for search may be specified with variable ACE_AB_FILE**
- **Anchor Bolt Group pattern file has a suffix of .PAT**

UNIT 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.

ACE Frameworks Foundation Utilities Documentation

Anchor Bolt Group Pattern File (con'd)

PATtern Command – Anchor Bolt Pattern Command

PATtern "*pattern name*" {**T**YPE} (**P**rofile "*section*") (**E**W *EWspc*) (**N**S *NSspc*) (**A**B *ABnum*)
(**D**I *circle*) (**D**E "*description*")

Where :

"pattern_name" unique identifying name of up to 24 char surrounded by " "

{TYPE} Type of anchor bolt pattern – options:

1AB	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
2ABEW	provide	EW <i>EWspc</i>		(PR <i>section</i>)	(DE <i>desc</i>)
2ABNS	provide	NS <i>NSspc</i>		(PR <i>section</i>)	(DE <i>desc</i>)
4AB	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
6ABEW	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
6ABNS	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8AB	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8ABEW	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8ABNS	provide	EW <i>EWspc</i>	NS <i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
CIRC	provide	AB <i>ABnum</i>	DI <i>circle</i>	(PR <i>section</i>)	(DE <i>desc</i>)
SYMM	provide	AB <i>ABnum</i> (1/4 total)		(PR <i>section</i>)	(DE <i>desc</i>)
SYMEW	provide	AB <i>ABnum</i> (1/2 total)		(PR <i>section</i>)	(DE <i>desc</i>)
SYMNS	provide	AB <i>ABnum</i> (1/2 total)		(PR <i>section</i>)	(DE <i>desc</i>)
RAND	provide	AB <i>ABnum</i>		(PR <i>section</i>)	(DE <i>desc</i>)

Parameters:

EW	the East-West spacing for AB's
NS	the East-West spacing for AB's
PRofile	section profile surrounded by " " (i.e. "SR1 1/2")
AB	Number of Bolts to be defined (that many ABL commands must immediately follow a PAT command)
DI	Anchor Bolt Circle Diameter
DE	Description of up to 80 char surrounded by " "

ABL Command – Anchor Bolt Location Command

ABL *north_cord* *east_cord*

Where :

<i>north_cord</i>	is North coordinate for anchor bolt center (CP-5)
<i>east_cord</i>	is East coordinate for anchor bolt center (CP-5)

Note that ABnum ABL commands must immediately follow PAT command for TYPES – SYMM, SYMNS, SYMEW & RAND

ACE FrameWorks Foundation Utilities Documentation

Anchor Bolt Group Pattern File (con'd)

Sample

ANCHOR BOLT Pattern File

UNITS ENGLISH INC

```
PAT "4ABlight" 4AB PR "SR 3/4" EW 7.0 NS 7.0 DE "4-3/4 Bolts for Light Columns"
PAT "4ABheavy" 4AB PR "SR1 1/2" EW 11.0 NS 11.0 DE "4-1 1/2 Bolts Heavy Columns"
PAT "6ABEWlight" 6ABEW PR "SR1" EW 5.0 NS 9.0 DE "6-1 - 2 EW rows w/ 3 bolts"
PAT "6ABEWheavy" 6ABNS PR "SR1 3/4" EW 6.0 NS 12.0 DE "6-1 3/4 - 2 EW rows w/ 3 bolts"
PAT "2ABEWlight" 2ABEW PR "SR 3/4" EW 6.0 DE "2-3/4 EW Bolts Light Column"
PAT "2ABEWheavy" 2ABEW PR "SR1 1/2" EW 8.0 DE "2-1 1/2 EW Bolts Heavy Column"
PAT "2ABNSlight" 2ABNS PR "SR 3/4" NS 6.0 DE "2-3/4 NS Bolts Light Column"
PAT "2ABNSheavy" 2ABNS PR "SR1 1/2" NS 8.0 DE "2-1 1/2 NS Bolts Heavy Column"
PAT "8AB" 8AB PR "SR1 1/2" EW 6.0 NS 6.0 DE "8 1 1/2 Symm Bolt Pattern"
PAT "1ABlight" 1AB PR "SR 5/8" EW 0.0 NS 0.0 DE "Single 5/8 AB for light angles"
PAT "1ABheavy" 1AB PR "SR 3/4" EW 0.0 NS 0.0 DE "Single 3/4 AB for angles"
PAT "Circ16-1.5" CIRC PR "SR1.5" AB 16 DI 75. DE "16-1.5AB Circ Patrn 6.5ft diam"
PAT "RA01" RAND PR "SR2" AB 8 DE "Random unsymmetrical 8 bolt AB pattern"
ABL 3.1 6.0
ABL 7.0 6.1
ABL 3.2 -6.0
ABL 7.0 -6.0
ABL -3.0 6.1
ABL -7.1 6.0
ABL -3.0 -6.1
ABL -7.2 -6.0
PAT "SM01" SYMM PR "SR2" AB 2 DE "Symmetrical 8 bolt pattern: 8 bolts defined w/ 2"
ABL 3.0 6.0
ABL 7.0 6.0
PAT "SM02" SYMNS PR "SR2" AB 4 DE "Sym abt EW line 8 bolt pattern: 8 bolts defined w/ 4"
ABL 3.1 6.0
ABL 7.1 6.0
ABL 3.2 -6.0
ABL 7.2 -6.0
PAT "SM03" SYMEW PR "SR2" AB 4 DE "Sym abt NS line 8 bolt pattern: 8 bolts defined w/ 2"
ABL 3.0 6.1
ABL 7.0 6.2
ABL -3.0 6.3
ABL -7.0 6.4
```

NOTE: Be very careful when copying from DOC files as the quote marks do NOT match ASCII

ACE FrameWorks Foundation Utilities Documentation

Pile Group Pattern File

Command Definition

- **Valid Primary Keyword Commands: (UNIT, PAT, PIL)**
- **Each record must begin with a valid primary keyword or it is ignored**
- **All records that start with a blank are considered comments**
- **A maximum of 100 patterns may be defined**
- **File may be defined in DEF file with FIL command**
- **File may be selected interactively from dialog box pulldown menu**
- **Path for search may be specified with variable ACE_PILE_FILE**
- **Pile Group pattern file has a suffix of .PAT**

UNIT Command - Units Command (optional command)

UNIT {UNITYTYPE} {UNIT}

where :

{UNITYTYPE} 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.

ACE Frameworks Foundation Utilities Documentation

Pile Group Pattern File (con'd)

PATtern Command – Pile Group Pattern Command

PATtern “*pattern name*” {*TYPE*} (*PR*ofile “*section*”) (*EW EWspc*) (*NS NSspc*) (*PI PILEnum*)
(*DI circle*) (*DE “description”*)

Where :

“*pattern_name*” unique identifying name of up to 24 char surrounded by “ “
{*TYPE*} Type of pile group pattern – options:

1AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
2ABEW	provide	EW	<i>EWspc</i>			(PR <i>section</i>)	(DE <i>desc</i>)
2ABNS	provide	NS	<i>NSspc</i>			(PR <i>section</i>)	(DE <i>desc</i>)
4AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
5AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
6ABEW	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
6ABNS	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8ABEW	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
8ABNS	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
9AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
12AB4EW3NS	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
12AB4NS3EW	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
15AB5EW3NS	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
15AB5NS3EW	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
16AB	provide	EW	<i>EWspc</i>	NS	<i>NSspc</i>	(PR <i>section</i>)	(DE <i>desc</i>)
CIRC	provide	PI	<i>PILEnum</i>	DI	<i>circle</i>	(PR <i>section</i>)	(DE <i>desc</i>)
SYMM	provide	PI	<i>PILEnum</i>	(1/4 total)		(PR <i>section</i>)	(DE <i>desc</i>)
SYMEW	provide	PI	<i>PILEnum</i>	(1/2 total)		(PR <i>section</i>)	(DE <i>desc</i>)
SYMNS	provide	PI	<i>PILEnum</i>	(1/2 total)		(PR <i>section</i>)	(DE <i>desc</i>)
RAND	provide	PI	<i>PILEnum</i>			(PR <i>section</i>)	(DE <i>desc</i>)

Parameters:

EW	the East-West spacing for Pile’s
NS	the East-West spacing for Pile’s
Profile	section profile surrounded by " " (i.e. "HP12X73")
PI	Number of Piles to be defined (that many PIL commands must immediately follow a PAT command)
DI	Pile group Circle Diameter
DE	Description of up to 80 char surrounded by “ “

PIL Command – Individual Pile Location Command

PIL *north_cord* *east_cord*

Where :

<i>north_cord</i>	is North coordinate for pile center (CP-5)
<i>east_cord</i>	is East coordinate for pile center (CP-5)

Note that PILEnum PIL commands must immediately follow PAT command for TYPES – SYMM, SYMNS, SYMEW & RAND

ACE Frameworks Foundation Utilities Documentation

Pile Group Pattern File *(con'd)*

Sample

```
UNITS ENGLISH FEET
PAT "4 Piles-7 ft" 4PILE PR "P12STD" EW 7.0 NS 7.0 DE "4 Sym Piles 7ft ea way"
PAT "5 Piles-8 ft" 5PILE PR "P12STD" EW 8.0 NS 8.0 DE "5 Sym Piles 8ft ea way"
PAT "6 Piles-EW" 6PILEEW PR "P12STD" EW 6.0 NS 7.0 DE "6 Piles 2 EW Rows"
PAT "6 Pile-NS" 6PILENS PR "SB12SQ" EW 6.0 NS 8.0 DE "6 Piles 2 NS Rows"
PAT "8 Piles" 8PILE PR "SB12SQ" EW 6.0 NS 5.0 DE "8 Piles 6ft EW & 5ft NS"
PAT "9 Piles" 9PILE PR "SB12SQ" EW 7.0 NS 6.0 DE "9 Piles 7ft EW & 6ft NS"
PAT "2 Pile EW" 2PILEEW PR "P12STD" EW 5.0 DE "2 Piles EW spcd @ 5ft"
PAT "2 Pile NS" 2PILENS PR "HP12x53" NS 7.0 DE "2 Piles NS spcd @ 7ft"
PAT "16 Piles" 16PILE PR "HP12x53" EW 8.0 NS 6.0 DE "16 Piles 8ft EW & 6ft NS"
PAT "Single Pile" 1PILE PR "P12STD" EW 0.0 NS 0.0 DE "Single Centered Pile"
PAT "12 Circ Piles" CIRC PR "P12STD" PI 12 DI 12.5 DE "12 Cir Pile Patrn 12.5ft diam"
PAT "RA01" RAND PR "HP12x53" PI 8 DE "Random unsymmetrical 8 pile PILE pattern"
PIL 3.1 6.0
PIL 7.0 6.1
PIL 3.2 -6.0
PIL 7.0 -6.0
PIL -3.0 6.1
PIL -7.1 6.0
PIL -3.0 -6.1
PIL -7.2 -6.0
PAT "SM01" SYMM PR "P12STD" PI 2 DE "Double Sym 8 pile patrn: 8 piles defined w/ 2"
PIL 3.0 6.0
PIL 7.0 6.0
PAT "SM02" SYMNS PR "SB12SQ" PI 4 DE "Sym abt EW line 8 pile patrn: 8 piles def w/ 4"
PIL 3.1 6.0
PIL 7.1 6.0
PIL 3.2 -6.0
PIL 7.2 -6.0
PAT "SM03" SYMEW PR "SB12SQ" PI 4 DE "Sym abt NS line 8 pile patrn: 8 piles def w/4"
PIL 3.0 6.1
PIL 7.0 6.2
PIL -3.0 6.3
PIL -7.0 6.4
PAT "3PILE" RAND PR "P12STD" PI 3 DE "3 Pile Pattern"
PIL 2.5 0.0
PIL -1.5 3.0
PIL -1.5 -3.0
```

NOTE: Be very careful when copying from DOC files as the quote marks do NOT match ASCII

ACE FrameWorks Foundation Utilities Documentation

Foundation Record Mode

The default mode for the 11 foundation utilities is the place foundation mode. However a special record mode can be controlled with a special MicroStation environment variable. The available modes are: place only, record and place and record only. The MicroStation environment variable, which controls the mode, is ACE_REC. When ACE_REC is 0 or undefined, the default place only mode is active. When ACE_REC is 1, foundations are both placed and recorded. Finally when ACE_REC is 2, the record only mode is entered. When the record only mode is active, the 11 foundation programs can be run from MicroStation without FrameWorks active. All other modes will activate FrameWorks and will fail if FrameWorks is not on system.

In the record mode, a foundation input file is appended to the file c:\ace.fdn (default file name). If the MicroStation environment variable ACE_RECORD_FILE points to a valid path and file name, that will be the record file. The file written is compatible with the ACE FWP general utility Foundation Import. Thus engineers/designers utilizing MicroStation can write record files, which can be subsequently batch loaded into FrameWorks. The Foundation Import program is discussed in detail in a separate document.

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).