



# ACE Structural Engineering Applications LLC

## ACE FrameWorks Utilities

### Purlins on Two Parallel Beams Documentation

Mar 15, 2013

#### Purlins on Two Parallel Beams (ACE\_PB.MA)

(Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.2 & FWP 7.0.x.x rel 7.0.2 & FWP 7.1 /7.2/7.3 rel 6.0.2 & FWP 8.0.x.x rel 8.0.2 & FWP 9.0.x.x rel 9.0.2 & FWP 10.0.x.x rel 10.0.2 & FWP 11.0.x.x rel 11.0.2 & FWP 12.0.x.x rel 12.0.2)

The *Purlins on Two Parallel Beams* application simplifies the placement roof purlins on two parallel FWP beam members. This application is especially useful for the case where the beams are sloped. Purlins may be C, MC, I, WF or HP shapes. For C & MC sections, the purlin CP line may be 1 or 7 and there is an option to control flange direction (Channel Orient). For WF, I or HP sections, the purlin CP line may be 2 or 8. The purlins may overhang beam 1 and beam 2 by specified distances. There are six methods available to determine purlin layout. Once two beams are selected, the purlin arrangement is displayed by temporary graphics. In addition, both beam 1 & beam 2 are highlighted. The controlling point on the control beam (beam 1 or beam 2) is graphically illustrated with an active point. This application places purlins on the CP of the FWP beams. If the CP for the beams is other than 7,8 or 9 and/or the beam is rotated, poor results may be obtained.

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**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1

Select Beam 2

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: HBRACE NG: 2

BM1 Overhang: 0.000 Span BM2 Overhang: 0.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

Place Purlins Display Clear Cancel

#### Purlins on Two Parallel Beams - Primary Dialog Box w/o Member Selected

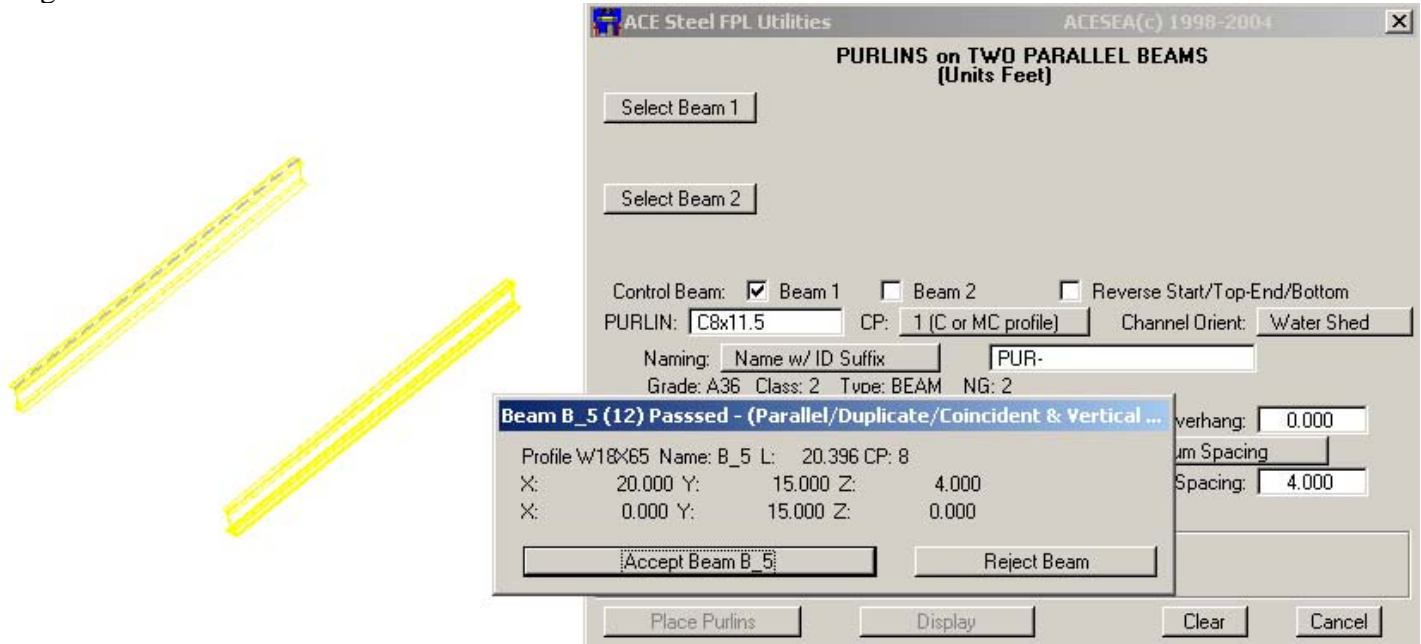
A FWP BEAM member is first selected using the Select Beam 1 (or 2) button (must be non-vertical). Then the second beam (must be parallel) is selected using the other select beam button. Either beam 1 or beam 2 may be utilized as the control beam (beam used to determine roof purlin placement). Purlin placement is relative to the Start/Top of the control beam (termed control point). If the beam is sloped, the Top (highest Z elevation) is the control point. If the beam is flat, the beam start coordinate is used as the control point. The control point may be switched at any time with the "Reverse Start/Top-End/Bottom" toggle. The control beam may be switched at any time with the Control Beam toggle.

This entire process is illustrated in the Program Operation section

# Purlins on Two Parallel Beams Documentation

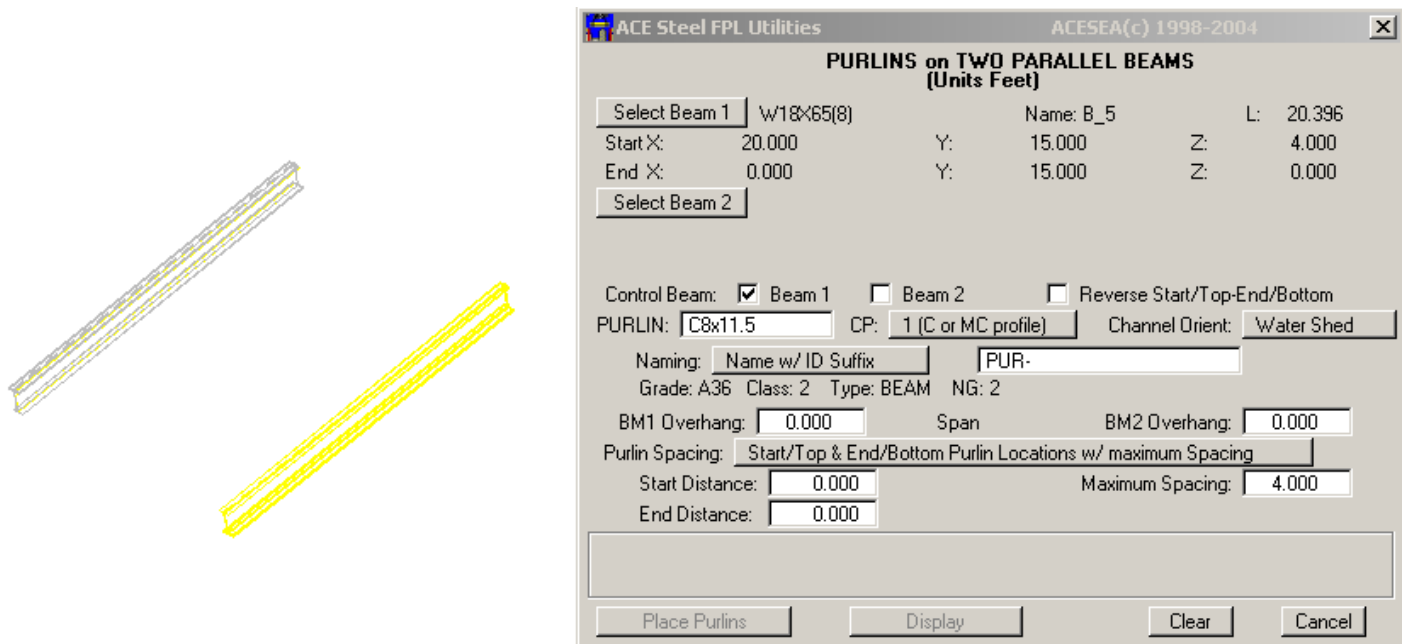
## Program Operation

Using either the Select Beam 1 or Select Beam 2 buttons select the first roof beam as shown below.



Beam 1 Selection

If the proper beam was selected, accept the beam. The dialog box will look as follows.

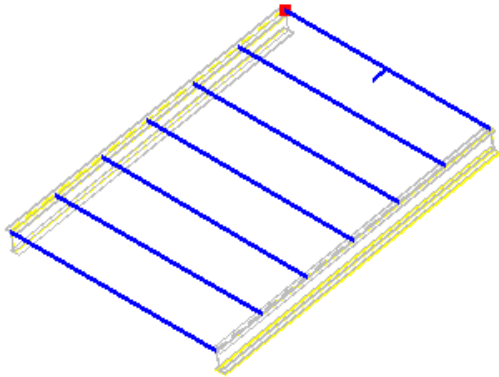


Beam 1 Selected and Accepted

Next select the beam (it must be parallel to the first). The dialog box & display will look as follows after a second roof beam is selected (note that each beam must be FWP type BEAM).

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)



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### PURLINS on TWO PARALLEL BEAMS (Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 0.000 Span 15.000 BM2 Overhang: 0.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

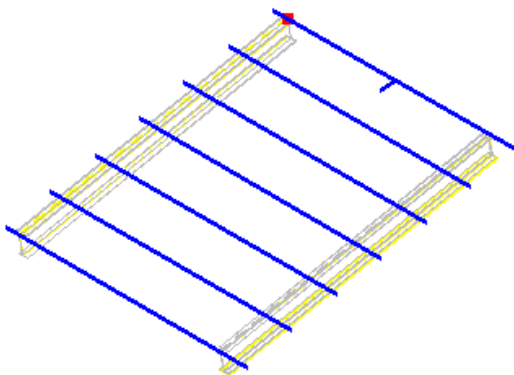
End Distance: 0.000

**7 C8x11.5 Purlins each 15.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 105.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

Beam 1 & Beam 2 Selected

Once two parallel roof beams are selected, the following happens. Both beams are highlighted. The control point is displayed as a active point (color & weight are controllable – default is red weight 6). The purlins are displayed (color & weight are controllable – default is blue weight 2). The control point & the purlins are displayed with temporary graphics. If the purlin is a C or MC profile, the flange direction is illustrated with a line from the center of the first purlin toward the flange edge. If the purlins are as desired they may be now placed. If not any or all of the following may be changed: Control Beam, control point, purlin profile, purlin CP, if purlin C or MC orientation, purlin naming method and data and any spacing parameters. The next few images will show the effect on the dialog box and display for various changes.



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### PURLINS on TWO PARALLEL BEAMS (Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

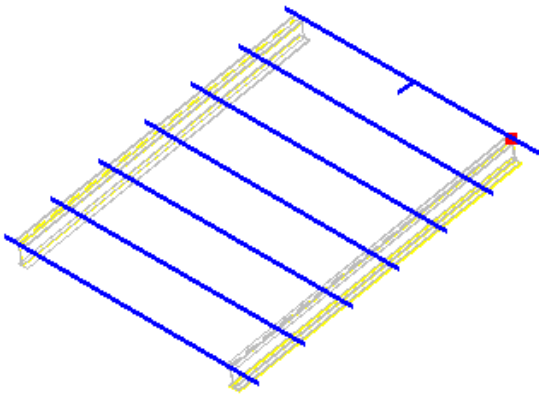
**7 C8x11.5 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

Overhang is Defined for Beam 1 (1 ft) and Beam 2 (2 ft)

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)



**ACE Steel FPL Utilities** ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☐ Beam 1 ☒ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

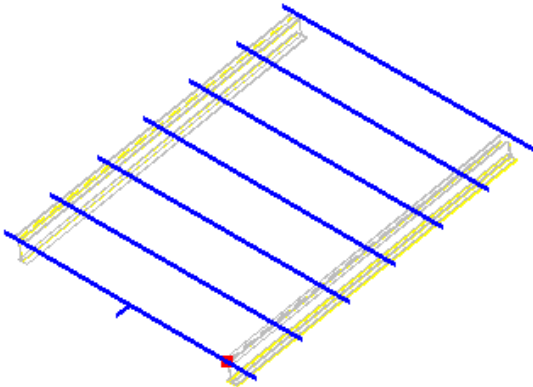
End Distance: 0.000

**7 C8x11.5 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

### Control Beam Switched from Beam 1 to Beam 2

The Beam 2 toggle is selected thereby switching the control beam. The control point (red active point) is now on the elevated end of beam 2. Since beam 1 & beam 2 are of equal length & start at same relative location, the spacing of the purlins is not affected. The control point and the control beam control the spacing of the purlins.



**ACE Steel FPL Utilities** ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☐ Beam 1 ☒ Beam 2 ☒ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

**7 C8x11.5 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

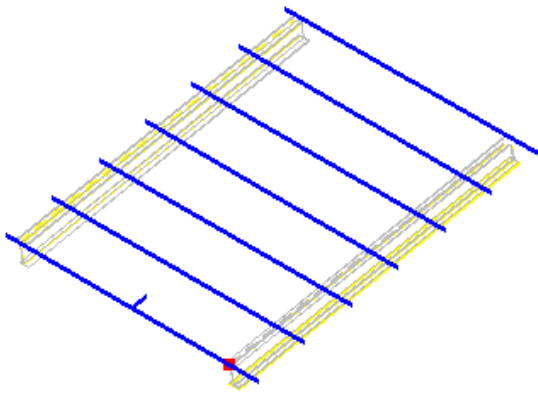
Place Purlins Display Clear Cancel

### Control Point Reversed (Reverse Start/Top-End Bottom toggle)

The Reverse Start/Top-End Bottom toggle is selected thereby switching the control point. The control point (red active point) is now on the lower end of beam 2. Purlin spacing now starts at the base of beam 2 and proceeds upward.

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)



**ACE Steel FPL Utilities** ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18X65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18X65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☐ Beam 1 ☒ Beam 2 ☒ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Catch

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

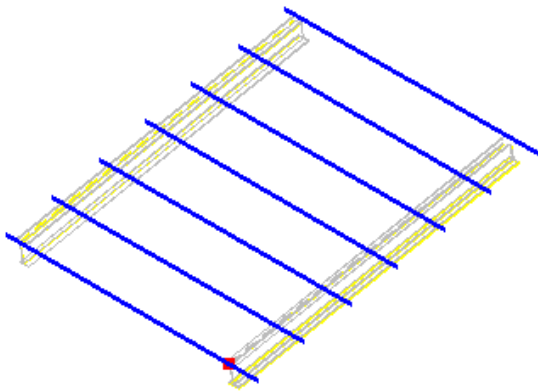
End Distance: 0.000

**7 C8x11.5 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

### Channel Orientation Reversed

The channel orientation is reversed from water shed to water catch. Notice the small line (indicating flange direction) on purlin number 1 (at the base) has reversed direction.



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**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18X65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18X65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☐ Beam 1 ☒ Beam 2 ☒ Reverse Start/Top-End/Bottom

PURLIN: W6x16 CP: 2 (WF, HP or I profile)

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

**7 W6x16 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

### Purlin Profile changed from C to a WF

The purlin profile was changed from a C8X11.5 to a W6X16. The primary effect is that there is no longer an option for the flange direction as a WF is a doubly symmetric profile. The only other difference is that the CP option is now 2 or 8 whereas for a channel profile the option is 1 or 7.



# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)

### Cardinal Point (CP) Options for Purlins

The following CP options are available:

PURLIN: C8x11.5	CP: 1 (C or MC profile)
Naming: Name w/ ID Suffix	7 (w/ vert offset)
Grade: A36 Class: 2 Type: F	7 (w/o vert offset)
BM1 Overhang: 0.000	7 (Flush w/ Bm Top)

C or MC profile CP options

PURLIN: W6x16	CP: 2 (WF, HP or I profile)
Naming: Name w/ ID Suffix	8 (w/ vert offset)
Grade: A36 Class: 2 Type: F	8 (w/o vert offset)
BM1 Overhang: 0.000	8 (Flush w/ Bm Top)

WP, HP or I profile CP options

The options are very similar for Channels & WF profiles. All three methods will put the purlin in the proper location but will have an effect on connectivity, interference checking and delta TOS reporting.

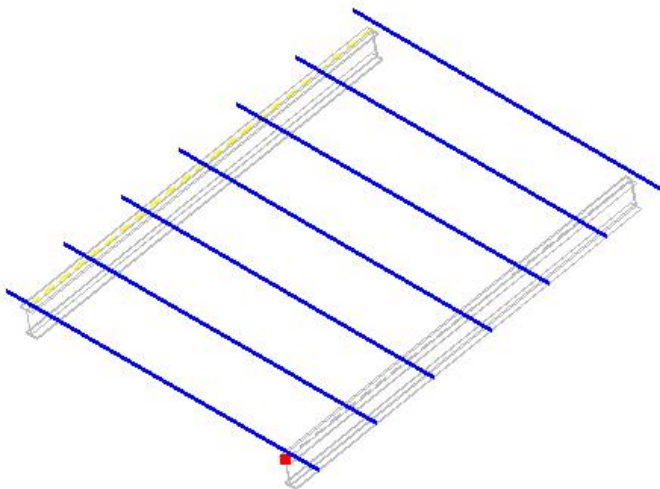
The first option (CP 1 or 2) will connect the bottom flange of the purlin to the CP (typically top flange) of the beam. This will maintain connectivity and do well with interference checking but will not report a delta TOS.

The second option (CP 7 or 8 w/ vert offset) will connect the top flange of the purlin to the CP (typically top flange) of the beam with a WP offset. This will maintain connectivity and do well with interference checking and report a delta TOS. The second option (CP 7 or 8 w/ vert offset) is the recommended option.

The third option (CP 7 or 8 w/o offset) will stack the bottom flange of the purlin onto the CP (typically top flange) of the beam with a WP offset. This will NOT maintain connectivity NOR do well with interference checking but will report a delta TOS. This method is not recommended.

The fourth option (CP 7 or 8 Flush w/ Bm Top) will place the top flange of the purlin onto the CP (typically top flange) of the beam (flush framing). This will maintain connectivity but is not typical of roof framing and not well suited for overhangs as they pass through beams. This method is for floor framing between two beams.

### Changing CP option from “2 (WF, HP or I profile)” to “8 (w/ vert offset)”



ACE Steel FPL Utilities				ACESEA(c) 1998-2004	
PURLINS on TWO PARALLEL BEAMS (Units Feet)					
Select Beam 1	W18x65(8)	Name:	B_5	L:	20.396
Start X:	20.000	Y:	15.000	Z:	4.000
End X:	0.000	Y:	15.000	Z:	0.000
Select Beam 2	W18x65(8)	Name:	B_1	L:	20.396
Start X:	0.000	Y:	0.000	Z:	0.000
End X:	20.000	Y:	0.000	Z:	4.000
Control Beam:	<input type="checkbox"/> Beam 1	<input checked="" type="checkbox"/> Beam 2	<input checked="" type="checkbox"/> Reverse Start/Top-End/Bottom		
PURLIN:	W6x16	CP:	8 (w/ vert offset)		
Naming:	Name w/ ID Suffix	PUR:			
Grade:	A36	Class:	2	Type:	HBRACE
NG:	2				
BM1 Overhang:	1.000	Span:	15.000	BM2 Overhang:	2.000
Purlin Spacing:	Start/Top & End/Bottom Purlin Locations w/ maximum Spacing				
Start Distance:	0.000	Maximum Spacing:	4.000		
End Distance:	0.000				
7 W6x16 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced					
Total of 126.001 Lineal Ft of Purlins					
Place Purlins		Display		Clear	
				Cancel	

Purlin CP changed from 2 to 8 w/ vert offset

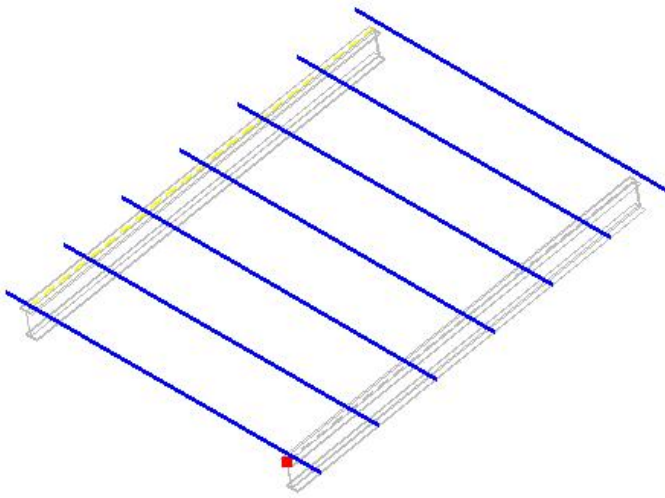
The purlin CP was changed from 2 to 8 (w/ vert offset). The WF profile will now be placed using the top flange center as the CP line. The CP line is elevated the depth of the purlin so that the purlin will rest on the roof beam (note that the purlin lines have been raised by the depth of the purlin). The purlins & beams will maintain connectivity and do well with interference checking. A delta TOS will be reported for the purlins.

# Purlins on Two Parallel Beams Documentation

Program Operation (con'd)

CP Options (con'd)

Changing CP option from to “8 (w/ vert offset)” to “8 (w/o vert offset)”



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☐ Beam 1 ☒ Beam 2 ☒ Reverse Start/Top-End/Bottom

PURLIN: W6x16 CP: 8 (w/o vert offset)

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: HBRACE NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

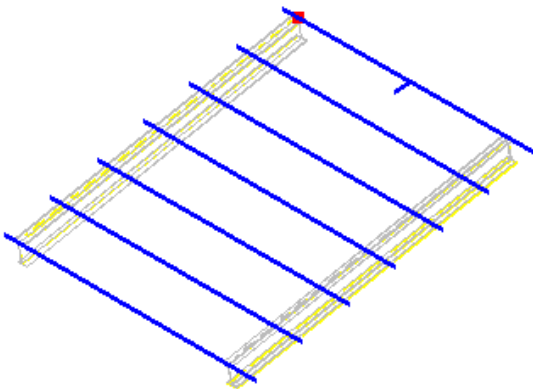
Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

**7 W6x16 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

The purlin CP was changed from 8 (w/ vert offset) to 8 (w/o vert offset)” – visually the display remains the same. The WF profile will still be placed using the top flange center as the CP line. The CP line is elevated the depth of the purlin so that the purlin will rest on the roof beam (note that the purlin lines have been raised by the depth of the purlin). This type of raised purlin framing is provided as an option, however it should be noted that this type of framing results in NO CONNECTIVITY between the roof beam and the purlin & may report false interferences w/ supporting beam.



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**PURLINS on TWO PARALLEL BEAMS**  
(Units Feet)

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 0.000 Maximum Spacing: 4.000

End Distance: 0.000

**7 C8x11.5 Purlins each 18.000 Ft Long @ 3.399 Ft eq spaced**  
**Total of 126.001 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

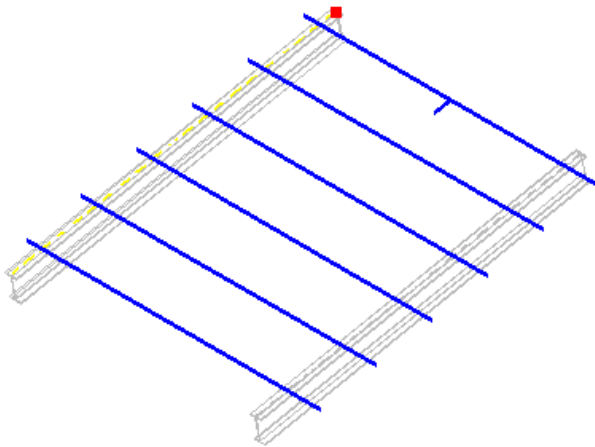
Purlin changed back to Channel w/ original settings

The original settings have been restored. The purlin will be placed with CP 1. Thus the bottom of the Channel flange will rest against the top of the roof beam and connectivity is established.

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)

### Spacing Option 1



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000

Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ maximum Spacing

Start Distance: 1.000 Maximum Spacing: 4.000

End Distance: 2.000

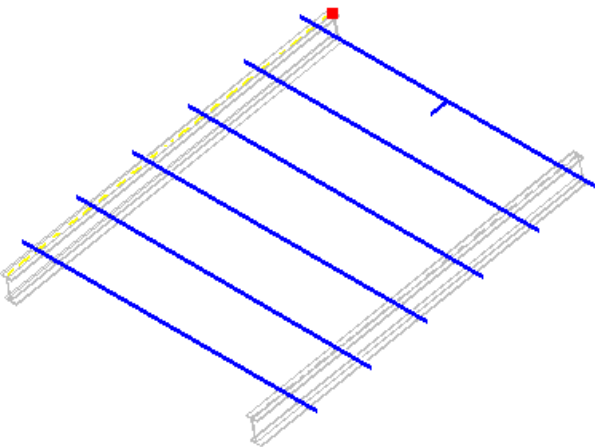
**6 C8x11.5 Purlins each 18.000 Ft Long @ 3.479 Ft eq spaced**  
**Total of 108.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

#### Purlin Spacing: Start/Top & End/Bottom Purlin Location w/ maximum Spacing

The start distance is the distance along the control beam from the control point to the first purlin. The end distance is the distance from the opposite end of the control beam to the last purlin. The maximum spacing specified is be utilized to determine an equal spacing value for purlins between the first and last purlin. The resultant spacing is 3.479 ft between purlins.

### Spacing Option 2



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000

Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-

Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ defined Spacing

Start Distance: 1.000 Defined Spacing: 3.500

End Distance: 2.000

**6 C8x11.5 Purlins each 18.000 Ft Long**  
**Total of 108.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

#### Purlin Spacing: Start/Top & End/Bottom Purlin Location w/ defined Spacing

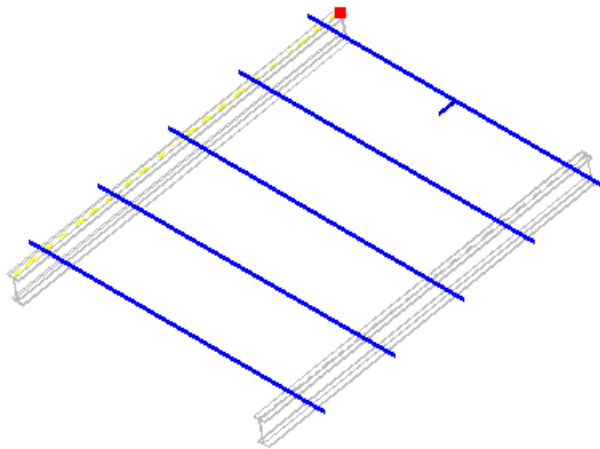
The start & end distances are the same as option 1. The defined spacing specified will be utilized to space purlins from the first to the last using the specified spacing.



# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)

### Spacing Option 3



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000

Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8X11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-  
Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ # Purlins Btwn Eq Spcd

Start Distance: 1.000 Number Purlins Btwn: 3

End Distance: 2.000

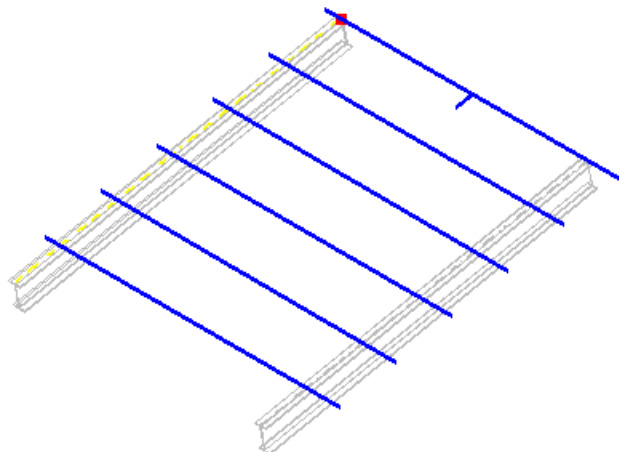
**5 C8X11.5 Purlins each 18.000 Ft Long @ 4.349 Ft eq spaced**  
**Total of 90.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

Purlin Spacing: Start/Top & End/Bottom Purlin Location w/ number purlins between

The start & end distances are the same as options 1 & 2. The number of purlins specified will be equally spaced between the first & last purlin. (total purlins = # purlins+ 2) The resultant spacing is 3.479 ft between purlins.

### Spacing Option 4



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000

Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8X11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-  
Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top Purlin Location w/ defined Spacing to Bottom

Start Distance: 0.000 Defined Spacing: 3.500

**6 C8X11.5 Purlins each 18.000 Ft Long**  
**Total of 108.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

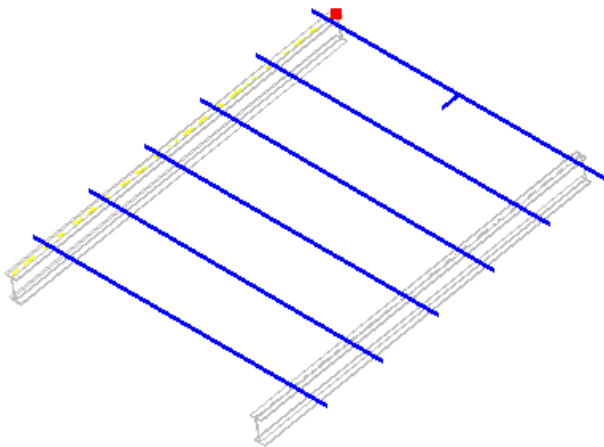
Purlin Spacing: Start/Top Purlin Location w/ defined spacing to bottom

The start distance is the distance along the control beam from the control point to the first purlin. The defined spacing is be utilized to determine an equal spacing value for purlins between the first and the opposite end (bottom) of the control beam.

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)

### Spacing Option 5



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-  
Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top Purlin Location w/ # Purlins at specified Spacing

Start Distance: 0.500 Spacing Distance: 3.500  
# Spaced Purlins: 5

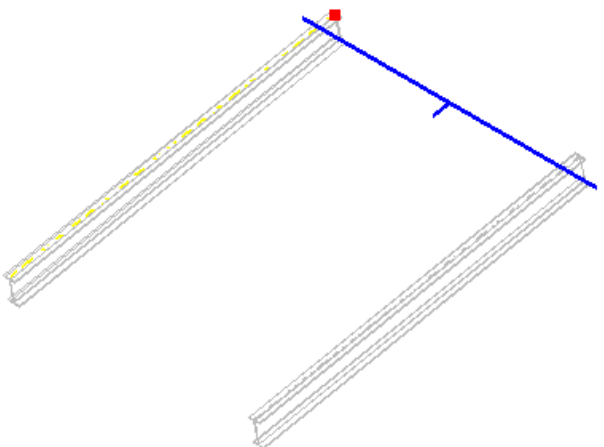
**6 C8x11.5 Purlins each 18.000 Ft Long**  
**Total of 108.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

#### Purlin Spacing: Start/Top Purlin Location w/ # purlins at defined spacing

The start distance is the distance along the control beam from the control point to the first purlin. The specified number of purlins will be spaced at the defined spacing toward the opposite end of the control beam. (total purlins = # purlins+ 1)

### Spacing Option 6



ACE Steel FPL Utilities ACESEA(c) 1998-2004

**PURLINS on TWO PARALLEL BEAMS (Units Feet)**

Select Beam 1	W18x65(8)	Name: B_5	L: 20.396
Start X:	20.000	Y: 15.000	Z: 4.000
End X:	0.000	Y: 15.000	Z: 0.000
Select Beam 2	W18x65(8)	Name: B_1	L: 20.396
Start X:	0.000	Y: 0.000	Z: 0.000
End X:	20.000	Y: 0.000	Z: 4.000

Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top-End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-  
Grade: A36 Class: 2 Type: BEAM NG: 2

BM1 Overhang: 1.000 Span 15.000 BM2 Overhang: 2.000

Purlin Spacing: Start/Top Purlin Location

Start Distance: 1.000

**1 C8x11.5 Purlins each 18.000 Ft Long**  
**Total of 18.000 Lineal Ft of Purlins**

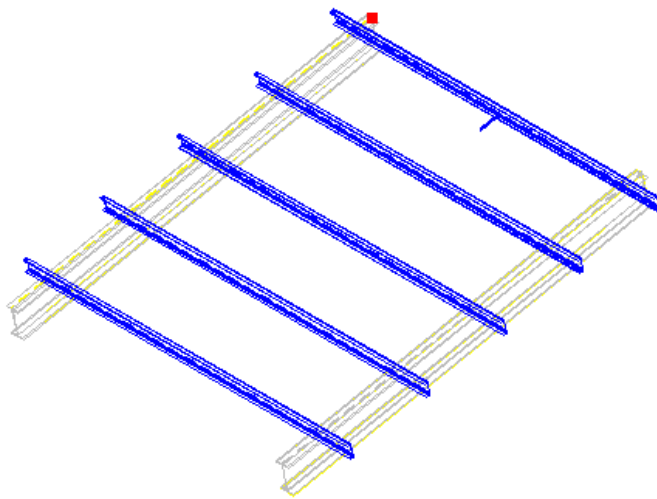
Place Purlins Display Clear Cancel

#### Purlin Spacing: Start/Top Purlin Location

The start distance is the distance along the control beam from the control point to the first & only purlin. This method is useful for placing a single purlin at a time. Virtually any arrangement of purlins can be placed with this technique.

# Purlins on Two Parallel Beams Documentation

## Program Operation (con'd)



ACE Steel FPL Utility

**Alert**

5 Purlins Placed  
Press CANCEL to UNDO (Delete)

OK Cancel

Select Beam 1: W18  
Start X: 20.000  
End X: 0.000  
Select Beam 2: W18  
Start X: 0.000  
End X: 20.000  
Control Beam: ☒ Beam 1 ☐ Beam 2 ☐ Reverse Start/Top/End/Bottom

PURLIN: C8x11.5 CP: 1 (C or MC profile) Channel Orient: Water Shed

Naming: Name w/ ID Suffix PUR-  
Grade: A36 Class: 2 Type: HBRACE NG: 2

BM1 Overhang: 1.000 Span: 15.000 BM2 Overhang: 2.000

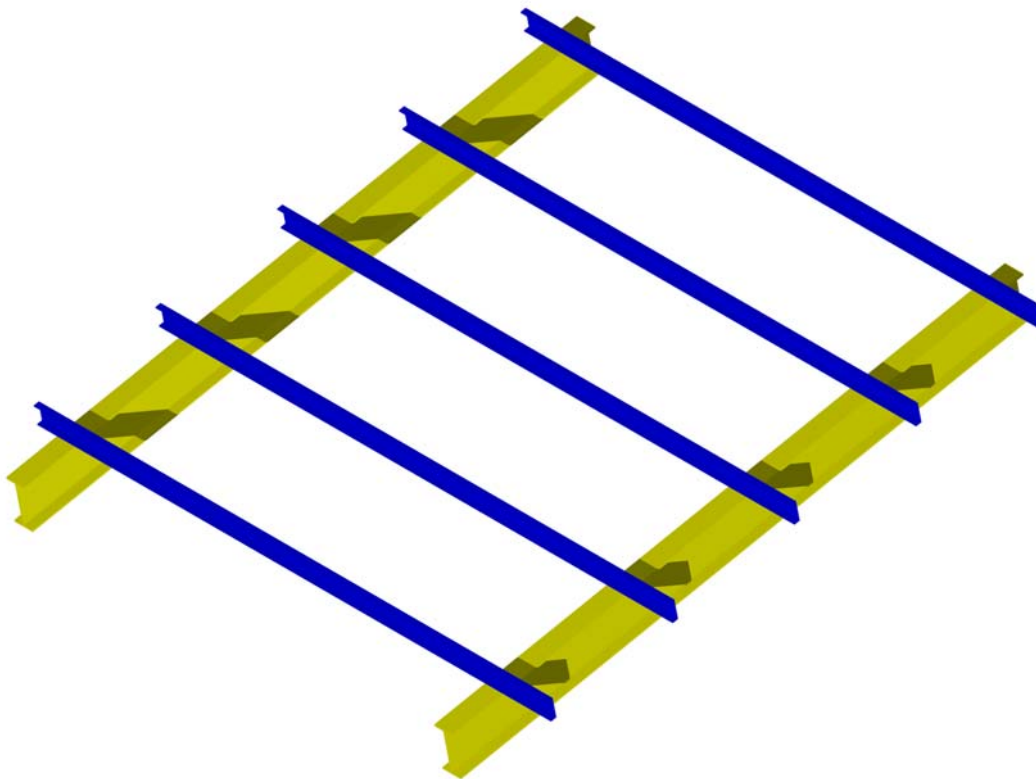
Purlin Spacing: Start/Top & End/Bottom Purlin Locations w/ # Purlins Btwn Eq Spcd  
Start Distance: 1.000 Number Purlins Btwn: 3  
End Distance: 2.000

**5 C8x11.5 Purlins each 18.000 Ft Long @ 4.349 Ft eq spaced**  
**Total of 90.000 Lineal Ft of Purlins**

Place Purlins Display Clear Cancel

## Purlin Placement

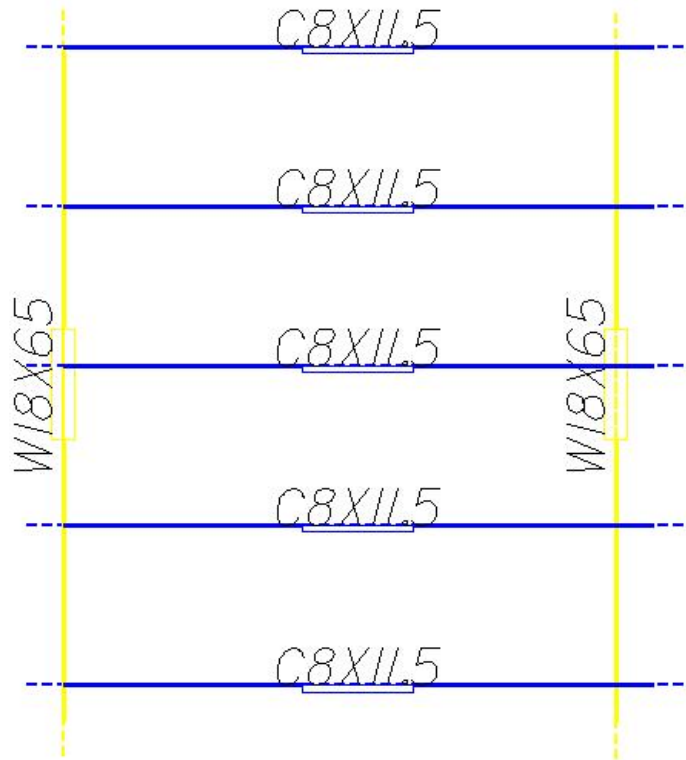
The third spacing option (note that purlin type was also changed in def file to HB) was selected and the Place Purlins button was pressed. The purlins are placed as displayed and the immediate undo option is presented. If the purlin placement is not correct, press cancel. If correct, accept the placement. In this case the placement was accepted. The resultant purlins are as shown below.



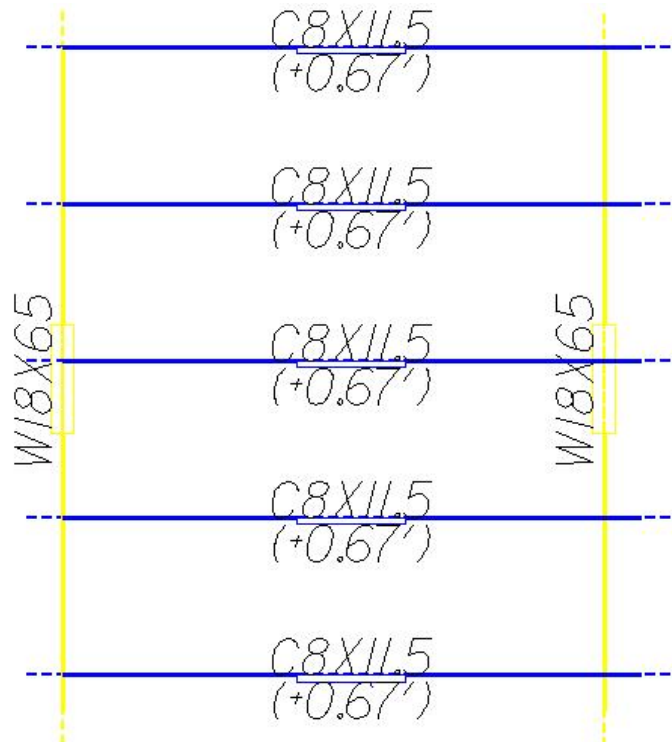
Purlins after Placement  
(same appearance all three CP methods)

## Program Operation (con'd)

## Purlins on Two Parallel Beams Documentation



Purlins after Placement w/ CP option 1 DOES NOT have Delta TOS



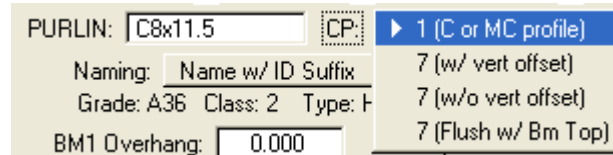
Purlins after Placement w/ CP option 7 w/ vert offset has Delta TOS

# Purlins on Two Parallel Beams Documentation

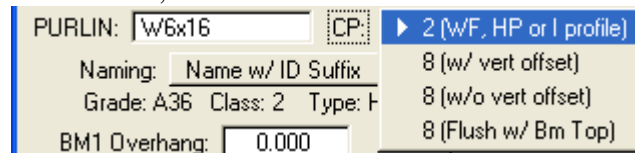
## Purlins on Two Parallel Beams Variables and Options

The Purlins on Two Parallel application, ACE\_PB.MA, has been designed to allow greatly facilitate the placement of roof purlins. Virtually all items shown on the primary dialog boxes can be controlled through the definition files. The following items are controlled through the both the dialog box & definition file (unless noted otherwise).

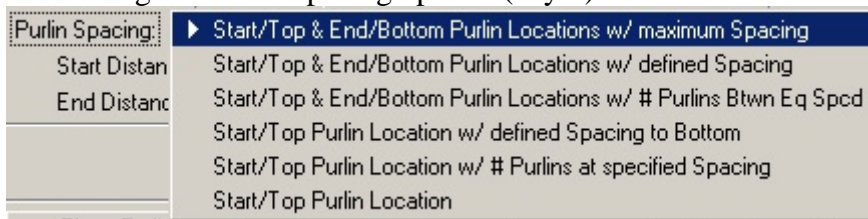
- Button to select beam 1 and beam 2
- Toggle button to select Control Beam
- Toggle button to select Control Point
- Purlin Profile (keyin)
- Option button to select Purlin CP (1 or 7 C or MC & 2 or 8 WF, I or HP)
  - CP options for C & MC Profiles



- CP options for WF, I & HP Profiles



- For Channel only – toggle button for orientation – Water Shed or Water Catch
- BM1 Overhang (keyin)
- BM2 Overhang (keyin)
- Option button to select Purlin Spacing technique
  - 6 spacing techniques with from 1 to 3 dialog boxes
  - starting option button selection
  - starting values for spacing options (keyin)



The following items may be specified in the definition file.

- Purlin Class
- Purlin Grade
- Purlin Type
- Purlin Named Group
- Display weight & color for control point
- Display weight & color for purlin graphics
- Absolute minimum spacing for purlins



# Purlins on Two Parallel Beams Documentation

## Definitions File

Due to the dissimilar nature of the variables in the steel utilities, each steel utility has a separate definition (DEF) file. While each file is distinctly different, each file is similar in the basic method of definition. Each 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 definition file for this utility are: C:\ACE\_PB.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\_PB.DEF). A complete name and location of a definition file may be also specified with the environment variable ACE\_PB\_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\_PB\_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\_PB.DEF is found in this directory, it is used.
3. If there is a c:\ace\_pb.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)

A sample default file is provided in later sections of this document. Toward the end of this document, the commands for the definition file are outlined in detail.

The steel definition files allow 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.

## Sample Definitions File

UNI	ENG	FT							
GEN	1	1	1	0	0.0	0.0			
SPA	1	0.0	0.0	3.5	4.0	.5	3	4	
PUR	C8x11.5	2	A36	HB					
DIS	3	6	1	2					
NGP	2								
NAM	SPE		PUR-						

# Purlins on Two Parallel Beams Documentation

## Definitions File - Command Definition

- **Valid Primary Keyword Commands :** (UNI, GEN, PUR, DIS, SPA, 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\_PB.DEF definition file
- Definition file path may be defined with environment variable ACE\_DEF\_PATH
- ACE\_DEF\_PATH=d:\mydir\  
(the DEF file ACE\_PB.DEF will be looked for in the directory d:\mydir)
- Definition file may be defined with environment variable ACE\_PB\_DEF
- ACE\_PB\_DEF = d:\mydir\mydef\_file (*highest priority definition*)  
(the DEF file mydef\_file will be looked for in the directory d:\mydir)
- **NOTE :** Components shown in bold may only be specified in the definitions file

## UNIT Command - Units Command (optional command)

**UNIT** {UNITTYPE} {UNIT}

where :

- {UNITTYPE} May be ENGLISH (feet or inches) or METRIC (meters or mms).  
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 - General Command

**GEN** iCP iOrient iBM iReverse fOverBM1 fOverBM2

where :

- iCP : Starting CP for purlin (def 2)
- |                             |                         |
|-----------------------------|-------------------------|
| 1 - CP: 1 (C or MC)         | CP: 2 (WF, HP, or I)    |
| 2 - CP: 7 (w/ vert offset)  | CP: 8 (w/ vert offset)  |
| 3 - CP: 7 (w/o vert offset) | CP: 8 (w/o vert offset) |
| 4 - CP: 7 (Flush w/ Bm Top) | CP: 8 (Flush w/ Bm Top) |
- iOrient : Starting Orientation for Channel profiles
- 1 - Watershed (default)
  - 2 - Watercatch
- iBM : Starting Controlling Beam 1 or 2 (def 1)
- iReverse : Reversal of Start/Top & End/Bottom (def 0)
- 0 - DO NOT Reverse (default)
  - 1 - Reverse
- fOverBM1 : Starting Overhang for beam 1 (default 0.0)
- fOverBM2 : Starting Overhang for beam 2 (default 0.0)

# Purlins on Two Parallel Beams Documentation

## Definitions File - Command Definition (con'd)

### PUR Command - PURLIN Command defines purlin parameters

**PUR** *pur\_section pur\_class pur\_grade pur\_type*

where :

**pur\_section** : The profile shape for the purlin (Default = C8X11.5)  
Section profile name may be enclosed in quotes  
If name includes spaces, quotes must be utilized (i.e. "C8 11.5")

**pur\_class** : The class for the purlin (Default = 8)  
(0 =< class < 10)

**pur\_grade** : The grade for the purlin (Default A36)

**pur\_type** : The member type for the rung (Default HB)  
(CO, BE, VB, HB)

### SPA Command - SPACING Command defines starting purlin spacing parameters

**SPA** *iSpacing fStart fEnd fSpacing fMaxSpacing fMinSpacing iNumPurlinsSpcd iNumPurlinsBtwn*

where :

**iSpacing** : Starting Spacing Option (def 1)  
1 - Start/Top & End/Bottom Purlin Locations w/ maximum Spacing  
2 - Start/Top & End/Bottom Purlin Locations w/ defined Spacing  
3 - Start/Top & End/Bottom Purlin Locations w/ # Purlins Btwn Eq Spc  
4 - Start/Top Purlin Location w/ defined Spacing to Bottom  
5 - Start/Top Purlin Location w/ # purlins at specified Spacing  
6 - Start/Top Purlin Location

**fStart** : Starting value for Start/Top Distance (default 0.0) (cases 1-6)

**fEnd** : Starting value for End/Bottom Distance (default 0.0) (cases 1-3)

**fSpacing** : Starting value for Defined/Specified Spacing (default 4 FT) (cases 2,4 & 5)

**fMaxSpacing** : Starting value for Maximum Spacing (default 4 FT) (cases 1)

**fMinSpacing** : Absolute Minimum Spacing between any twp purlins - (default .25 FT) all cases

**iNumPurlinsSpcd** : Starting value for number purlins spcd (default 4) (case 5)

**iNumPurlinsBtwn** : Starting value for number purlins btwn (default 4) (cases 3)

### DIS Command - DISPLAY Command defines color & weight for temporary graphics

**DIS** *iColorPt iWeightPt iColorLine iWeightLine*

where :

**iColorPt** : Color for Control Point (default 3) 0 <= iColorPt <= 254

**iWeightPt** : Weight for Control Point (default 6) 0 <= iWeightPt <= 31

**iColorLine** : Color for Purlin Line (default 1) 0 <= iColorLine <= 254

**iWeightLine** : Weight for Purlin Line (default 2) 0 <= iWeightLine <= 31

# Purlins on Two Parallel Beams Documentation

## Definitions File - Command Definition (con'd)

### NGP Command - Named Group Command defines namedgroups

(Optional command to define named groups)

**NGP** *iNGP\_purlins*

where

**iNGP\_purlins** : Named group for Purlins ( 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.

### NAME Command - Name Command defines method of naming components

**NAME** {*NAME\_OPTION*} *name\_prefix*

where

{NAME\_OPTION} : Keyword - must be AUT or SPE or DYN or CON

SPEcified : Use the supplied name and append the member ID for slab placed  
Thus each set of purlins will have a different name

DYNamic : At placement time will display last name used with following options  
1) option to supply a new name  
2) option to request that member ID for purlins placed be appended  
Thus each set of purlins will have a different name  
3) option to abort placement

AUTo : FrameWorks assigns names by type and sequence number  
(name\_prefix not required or utilized)

CONstant : Use this name for all Plates

# **Purlins on Two Parallel Beams Documentation**

## **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).